Dynamic Reconfiguration User's Guide 2.6

FUJITSU

Preface

Purpose

This manual describes the Dynamic Reconfiguration (DR) feature, which enables you to logically attach and detach system boards without shutting down the operating system.

Intended Readers

This manual is intended for the following readers:

- System software developers and test engineers
- System support engineers
- System administrators who introduce and operate this software
- Technicians who maintain system hardware

Organization

This manual is organized as follows:

- "Chapter 1 Overview of DR(Dynamic Reconfiguration)" is an introduction to the features and applications of DR.
- "Chapter 2 DR Environment and Administration describes the technical background of DR. The administration issues are discussed.
- "Chapter 3 DR User Interface" describes the user interface of DR.
- "Chapter 4 A Sample Connection Script" shows an example of a connection script.
- "Chapter 5 Troubleshooting" describes how to deal with trouble.
- "Chapter 6 Messages and DR Error Conditions on Solaris 8 OS" and "Chapter 7 Messages and DR Error Conditions on Solaris 9 OS and Solaris 10 OS" describe the meaning of messages displayed by this software. It also describes what to do when you get error messages.

Related manuals

- Dynamic Reconfiguration User's Guide I/O device edition
- Partition Operation Guide (C120-E087)
- Dynamic Reconfiguration Architecture Guide (C120-E114)
- PCI Hot Plug User's Guide (C120-E199)
- System Administration Guide: Solaris Containers -- Resource Management and Solaris Zones

Notation Used

The following shows the notation conventions used in this manual.

- The titles of chapters are enclosed in parentheses ("").
  Example: See "Chapter1 Main Cabinet"
- Commands and other input use the following prompts:
  C shell prompt:
    prompt%
  Bourne and korn shell prompt:
    prompt$
  Super user prompt:
    #
- Commands entered by the user is shown in bold:
  # **drc -disconnect sb02**

● Key combinations are represented, for example, by CTL-C, which means to simultaneously press the Control and C key.

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FUJITSU LIMITED
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Notes

Chapter 1   Overview of DR(Dynamic Reconfiguration)

This chapter describes the basic functions of Dynamic Reconfiguration. The DR command interface drc and other system modules like I/O Multipathing and the connection script interface will be introduced.

1.1 Feature Overview

DR allows the user to physically remove, insert or repartition system boards while the operating system is still running. The user can modify the configuration of the system without shutting down the operating system. The typical applications of DR are:

- Removal of system boards with faulty I/O device/controllers, bad memory or CPU's.
- Detaching the system board temporarily to add or remove I/O device.
- Addition of new system boards to expand the CPU, memory and I/O capacity of the system.
- Partition reconfiguration - system boards can be grouped into logically independent partitions. The user can reconfigure system partitions dynamically based on demand.

It depends on the hardware model if you can remove a kernel memory board or not.

[PRIMEPOWER 900/1500/2500]
- The removal of a kernel memory board is supported.

[GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000]
- The removal of a kernel memory board is not supported.

Note that the system has to suspend in order to copy kernel data to another board when removing kernel memory. During the suspension, since all activities of processes and devices are stopped, all accesses to the system are temporarily disabled. For instance, the system can't response to any network requests during the suspension.

DR can be used with hardware that offers Extended Partitioning (XPAR). Refer to "Partition Operation Guide" or "Dynamic Reconfiguration Architecture Guide".
The following models offer XPAR.
- PRIMEPOWER900/1500/2500

1.2 DR Requirements

This section provides an overview of the DR requirements.

1.2.1 Hardware

DR is supported only on GP7000F model 1000/2000 and PRIMEPOWER 800/900/1000/1500(with SPARC64 V)/2000/2500 platforms.
In this manual, descriptions about PRIMEPOWER1500 are only for the SPARC64 V models.

1.2.2 Software

Either of the following software must be installed.
[PRIMEPOWER 900/1500/2500]
- 64bit Solaris 8 ™ Operating System 2/02 or later version and Enhanced Support Facility (ESF) 2.3 or later version

The following Solaris 8 ™ OS patches
- 108528-19 or later
- 111789-04 or later
- 109885-09 or later
- 110460-26 or later
- 110842-11 or later

● 64bit Solaris™ 9 Operating System 4/03 or later version and ESF2.3 or later version

The following Solaris 9 ™ OS patches
- 113068-04 or later
- 113538-06 or later (for kernel memory board migration)

● Solaris™ 10 Operating System and ESF2.5 or later version

The following Solaris 10 ™ OS patch
- 118822-08 or later

The following ESF2.5 patch
- 913732-01 or later

[GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000]

● 64bit Solaris™ 8 OS 6/00 or later version and ESF1.7.1 or later version

The following Solaris 8 ™ OS patch
- 109885-09 or later

● 64bit Solaris™ 9 Operating System and ESF2.2 or later version

● Solaris™ 10 Operating System and ESF2.5 or later version

The following Solaris 10 ™ OS patch
- 118822-08 or later

The following ESF2.5 patch
- 913732-01 or later

DR is not supported on 32bit Solaris™ Operating System.

1.2.3 Notes on DR operation

● This restriction is only applied to Solaris 8 OS 6/00 system. If the **/etc/system** file contains the line "set ftrace_atboot = 1", please comment out this line to disable this configuration. Otherwise, DR attach/detach operation is forced to fail. Please refer to section 6.1.3.1 "Warning Error Message" for more details. On Solaris 8 OS 7/01 or later versions, this configuration doesn't have to be disabled to make DR attach/detach operation proceed.

● This restriction is only applied to Solaris 8 OS system with 108528-19 or 108528-20 and Solaris 9 OS system with 112233-05. After the following line is added into **/etc/system** file, the system needs to be rebooted.
set pg_contig_disable = 1

● During DR detach operation, OBP (Open Boot Prom) device tree should not be accessed through **/dev/openprom** device by any command such as **"prtconf -p"** option.
If OBP device tree is accessed during DR detach operation, the message "nodeid 0x…….. not found" may be shown but it doesn't harm to the DR detach operation.

● During DR detach operation, the DR operation might be failed with the following error messages. This occurs due to a conflict between DR operation and open operation of raw device. In this case, please re-execute the DR operation.

```
/opt/FJSVhwr/sbin/drc -disconnect sbXX-X
XXX XX XX:XX:XX Start disconnecting sbXX-X (board number=X)
......
XXX XX XX:XX:XX Releasing the I/O. (XX/XX)
XXX XX XX:XX:XX Fail to execute cfgadm unconfigure I/O Device=pcipsyX:CXMXX-PCI#slotXX.
......
drc: dr module terminated abnormally(2).
```

● System's run level should be multi-user to operate DR.

- During DR operations, the following system reconfiguration commands, **psradm (1M)**, **devfsadm (1M)** or **cfgadm (1M)** must not be performed. That might cause system down. Please refer to "PCI Hot Plug User's Guide" for details regarding **cfgadm (1M)** command.

1.2.4 Other Requirements

- Kernel cage should be enabled.
  Refer to section 2.3.1 "How to enable DR and Kernel cage memory".
- Multi path I/O configuration is recommended.
  For example, network devices, console devices or disk devices can be set up as the multi path I/O configuration.
- Drivers should be DR Safe.
  Refer to section 2.2 "DR Device Driver Requirement".
- The system needs sufficient memory space and swap space.
  Refer to section 2.1.3.4 "Swap Space Consideration".
- PRIMEPOWER900/1500/2500 systems need to unset interleaved mode on the system boards.
- There are several DR administration issues.
  Refer to section 2.3.3 "DR Administration Issues",

1.3 Command Interface

This section describes basic DR operations using the command interface **drc(1M)** and the connection script interface associated with it. The detailed reference of **drc(1M)** and the connection script interface can be found in "Chapter 3 DR User Interface".

1.3.1 DR attach

Use the following command to perform the DR attach operation.

drc -connect sb*XY*

This command attaches a system board to the operating system in a partition. All the CPU, memory and I/O resources are configured and made available to the Solaris OS. *X* represents cabinet number and *Y* represents slot number in the cabinet.

When XPAR is used, the following command is used.

drc -connect sb*XY-N*

X represents cabinet number, *Y* represents slot number in the cabinet and *N* represents offset number in the system board.

1.3.2 DR detach

Use the following command to perform the DR detach operation.

drc -disconnect sb*XY*

This command detaches a system board from a partition and removes all the resources from the operating system. *X* represents cabinet number and *Y* represents slot number in the cabinet.

When XPAR is used, the following command is used.

drc –disconnect sb*XY-N*

X represents cabinet number, *Y* represents slot number in the cabinet and *N* represents offset number in the system board.

1.3.3 Connection Script Interface

Although the user can use DR while the operating system is still running, this procedure is not transparent to the user processes. For example, a CPU bound process will lose the CPU resource and I/O devices become unavailable after a system board is detached. It is necessary that system applications should be informed of the DR operations so that the proper actions can be taken. The **connection script** interface provides such functionality.

The user can place the application-specific scripts in the connection script directories. These scripts will be called at different stages of the DR operation depending on their locations. Section 3.4 "Connection Script Interface" describe the details of the connection script interface.

1.4   I/O Multipathing

This section explains how I/O Multipathing can be used in conjunction with DR to provide high availability I/O.

1.4.1   Hardware

I/O Multipathing requires a special device that supports multiple I/O channels. Please refer to each multipath device manual for details.

1.4.2   Software

I/O Multipathing is a framework for high reliability I/O. It provides Path Redundant configuration and Medium Redundant configuration. The Path Redundant configuration enhances reliability by providing two or more paths for a device, and increases throughput whenever a device can be accessed simultaneously with two or more paths. The Medium Redundant configuration enhances reliability by providing two or more units (media) with the same connection path. In the case of a disk, this function is generally called software mirroring.

1.4.3   I/O Multipath with DR

The Path Redundant capability by I/O Multipath can be utilized to maintain uninterrupted access to the media in case of a system board detach. An I/O device can be configured such that it can be accessed from two different system boards. Even if one of the system boards is detached, the I/O device remains accessible. However, I/O performance may be degraded because the number of redundant paths is reduced. Without I/O Multipath, all I/O devices on the system board must be deactivated before the system board can be detached. Connection scripts should be used to perform the necessary I/O Multipath operation for the DR.

Chapter 2 DR Environment and Administration

This chapter provides the operator with the technical background necessary to understand how DR operates and the system requirements for DR to function.   Then the system administration issues are discussed.

2.1 DR System Components

The system resources that are attached or detached during the DR process are **CPU, I/O devices** and **Memory**. Each of these resources introduces a different set of requirements and administration issues for DR. This section describes a technical background on these issues.

2.1.1 CPU

CPU reconfiguration is a relatively simple task. Newly attached CPUs are automatically made available to the operating system. There is no requirement for this procedure.

To detach a CPU, these conditions must be satisfied.

- No process is bound to any outgoing CPUs
  All such processes must be stopped or unbound. Or such processes can be unbound automatically during DR operation by using the **dr_conf** command in connection scripts. Please refer to section 3.5 "DR service commands" for more details.
- No outgoing CPU belongs to any processor sets.
  All such CPUs must be removed from processor sets by **psrset(1M)**.

If one of the above conditions is not satisfied, a DR command queries the administrator as to whether the DR operation can continue or not.

2.1.2 I/O Devices

2.1.2.1 DR Attach

The Solaris OS device driver architecture implicitly requires that all drivers support dynamic addition of a new device instance. Therefore all drivers should support DR attach.

After the DR attach operation, **devfsadmd(1M)** automatically invokes the **devfsadm(1M)** command to reconfigure I/O device tree. Please refer to section 2.3.3 "DR Administration Issues" for more details.

Device path names newly added are written to the **/etc/path_to_inst** file. The same path names are also added to the **/devices** hierarchy, and links are created in the **/dev** directory.

2.1.2.2 DR Detach

To detach a device, these strict conditions must be satisfied.

1. The device must not be in use or opened by any user or system process.
2. The device driver must support the DR interface (DR safe driver), to remove the device instance.

It is not always possible to meet the first condition. For example, it is not possible to umount the root file system or any other file system that is vital to the user. To solve this problem, the administrator can use the I/O Multipathing feature to set up alternate paths to the crucial devices, or use other disk mirroring software to mirror the crucial file systems.

To work around non DR safe drivers, the administrator must stop all usage of the devices controlled by the driver and then unload the driver using **modunload(1M).**

Please refer to section 2.2 "DR Device Driver Requirement" about DR safe driver.

2.1.3 Memory

2.1.3.1 Two types of memory and restrictions

DR memory handling classifies memory into two types: kernel memory board and non-kernel memory board.

- Kernel memory board contains kernel pages: this includes memory used by the operating system itself or the OBP program.
- Non-kernel memory board doesn't contain kernel pages at all.

DR doesn't support detaching a kernel memory board on GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000.

The system allocates kernel memory on a certain system board as much as possible. Once that board's memory is fully occupied by the kernel memory, the system selects the next candidates.

The system selects the candidate in the following order.

1. The board where OBP and OS programs are loaded (boot board). (See section 2.3.2.1 "Kernel memory allocation option")
2. The system board without no-obp-sb-cX or no-obp-sb is chosen for kernel in ascending order.
3. The system boards specified by no-obp-sb-cX or no-obp-sb (See section 2.3.2.1 "Kernel memory allocation option")
4. The system boards attached by DR. (the board attached earlier is selected)

2.1.3.2 DR Attach

There is no restriction for memory attach.

2.1.3.3 DR Detach

Handling of detaching memory differs from one another if the hardware supports the removal of kernel memory.

[PRIMEPOWER 900/1500/2500]

PRIMEPOWER 900/1500/2500 support the removal of kernel memory. In order to delete kernel memory on the board, the system has to copy the kernel data to another board and needs to suspend until the copy is finished. Due to this process, detaching the kernel memory board takes some time.

When detaching the kernel memory board, the system copies the kernel data to other board fulfilling the conditions.

- The board has enough memory (greater or equal to size) to copy the data.
- The board has the same memory configuration or the configuration encompassing the kernel memory board configuration.
- The board doesn't contain kernel memory.
- The board is not specified by no-obp-sb-cX or no-obp-sb. (See section 2.3.2.1 "Kernel memory allocation option")

When the system can't detect any boards fulfilling the conditions, detaching the kernel memory board fails. For example, if other boards have less memory than the kernel memory board, or other boards have different memory configuration, detaching the kernel memory can fail. It's recommended that each board has the same memory size including the memory configuration to prevent the failure.

Note that the last condition above is not always required; when **drc** command is invoked, and there is no other system boards meeting the conditions than the board specified by no-obp-sb-cX or no-obp-sb, the inquiring messages prompt you for what to do with the board specified by no-obp-sb-cX or no-obp-sb. By replying "Yes", the process can continue, and the board is chosen to copy kernel memory.   (See section 3.1 "drc(1M)",   section 2.3.2.1 "Kernel memory allocation option", section 6.1.3.3 "Inquiring Messages" and section 7.1.3.3 "Inquiring Messages" in detail)

[GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000]

Solaris OS supports a kernel cage memory feature, which confines kernel memory usage to a minimum subset of system boards. To make the best use of this feature, it is recommended that the system administrator reserves the system board with the largest memory size for the boot board, which is used first at boot time.

To detach the user memory board (kernel is not resident in the memory), all user memory and file system data must be flushed out to the backing storage devices. Although this process can take a while, it is done in the background and the system can still service all the user applications.

Locked/ISM (Initiated Shared Memory) memory pages fall in between non-kernel page and kernel page. They do not contain critical kernel data but they must be migrated to other memory boards instead of being flushed out to the backing storage. The detach process can fail if the system cannot find enough space elsewhere to migrate these pages.

In summary, DR user memory detach will fail if:
- The system board contains kernel page.
- There is not sufficient swap space to flush all non-kernel pages.
- There are too many locked/ISM pages to migrate them elsewhere.

In the connection script, the DR service command **dr_info** can be used to query the system to find out if there is any kernel page on a particular system board. Or **drcstat -system** shows if a specified system board contains kernel memory. Please read the section 3.2 "drcstat(1M)**"** or section 3.5.3 "dr_info" for more information. The system minimizes the number of system boards where kernel memory resides. Please read "2.3.1 How to enable DR and Kernel cage memory" for details.

2.1.3.4 Swap Space Consideration

The total available memory in the system is equal to the physical memory plus swap space. It is recommended that the administrator should configure the system such that the total available memory is sufficient for the intended applications.

2.1.3.4.1 DR attach

The swap space is used to save crash dumps as well. The crash dump size varies according to the installed physical memory size and the application programs. For the sake of saving crash dumps, the system administrator should keep the dump device size large enough to cover the total physical memory after the memory size is expanded by DR attach. Refer to man page of "**dumpadm(1M)**" to configure dump device.

2.1.3.4.2 DR detach

After DR detach, the total available memory is shrunk by the size of detached memory and the size of detached swap space on the detached disks. The detached swap space on the multipathing device doesn't affect the total available memory size.

Therefore, the total available memory before DR detach must be bigger than the total detached size. And you need to add the same amount of swap space as the total detached size before DR detach so that the system keeps the same amount of available memory after DR detach.

'swap -s' shows the current total available memory size. Please refer to the **swap(1M)** manual page for more details.

Examples:
- (the total available memory: 1.5GB) > (the detached memory size: 1.0GB)
  the total available memory size is reduced down to 0.5GB

- (the total available memory: 1.5GB) < (the detached memory size: 2.0GB)
  DR detach operation fails.

2.2 DR Device Driver Requirements

All device drivers running on the system must support DR functions (DR safe drivers). DR safe drivers should support the following Solaris OS DDI/DKI entries.

- DDI_DETACH:detach(9E)
- DDI_SUSPEND
- DDI_RESUME

If any *DR unsafe* driver (not DR safe) is loaded, the DR detach procedure could fail.

It is important to note that even if the driver is *dr-safe*, the DDI_DETACH request will still fail if the device instance is opened by some user process. All devices must be closed for DR detach to work.

It is possible to unload such *dr-unsafe* drivers from the system for DR detach in advance. However that requires stopping all I/O activities controlled by that driver on the entire system partition. Then the standard Solaris OS command **modunload(1M)** can be used to unload the driver. After the DR detach, the remaining I/O activities can start again.

2.3 DR Configuration and Administration Issues

2.3.1 How to enable DR and Kernel cage memory

Kernel cage memory is a DR specific feature that minimizes the number of system boards on which kernel pages are allocated. This feature must be enabled to make DR operations effective since it is disabled by default in the Solaris 8 OS and Solaris 9 OS. Otherwise, any DR operation fails. This feature is enabled by default in the Solaris 10 OS.

Add the following line in **/etc/system** and reboot the system to enable this feature.

```
set kernel_cage_enable = 1
```

After the system reboots, the system administrator can verify if the DR feature has become available by reviewing the file **/var/adm/messages** which should show the message:

```
NOTICE: DR kernel Cage is ENABLED.
```

The DR command **drcstat -system** can also be used for verification. Please read section 3.2 "drcstat(1M)" for more details.

2.3.2 DR configuration and OBP (Open Boot PROM)

All listed OBP environment variables in this section are provided specifically for DR. When you change an OBP environment variable by the **eeprom(1M)** command, the system must be rebooted to make the change effective. However, if DR attaches the system board listed on an OBP environment variable, the change becomes effective without reboot.

OBP environment variables exist on each partition. The setting for one partition does not influence other partition.

2.3.2.1 Kernel memory allocation option

When the system boots up, OBP will always choose the lowest numbered system board as a target where OBP program is loaded. The OS system program is loaded on the same board as well. The board where these programs are loaded at boot time is called "boot board". Since these programs are treated as kernel memory, the boot board cannot be detached on GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000. This policy can be overridden by using the following OBP property. The system boards listed on the kernel memory allocation option will not be chosen as the "boot board" and are chosen as the least candidates for a kernel memory board as well.

- **For GP7000Fmodel 1000/2000 and PRIMEPOWER800/1000/2000**
  # **eeprom no-obp-sb-cX=Y**

- **For PRIMEPOWER900/1500/2500**
  # **eeprom no-obp-sb="XY"**

- **For PRIMEPOWER900/1500/2500 and XPAR environment**
  # **eeprom no-obp-sb="XY-N"**

where X is the cabinet number , Y is a concatenation of board numbers within the cabinet and N is logical number in the system board.

- Example for GP7000Fmodel 1000/2000 and PRIMEPOWER800/1000/2000
  # **eeprom no-obp-sb-c0=134**

In the above example, the boards numbered 1, 3 and 4 on cabinet #0 are specified. On the next reset, OBP and system startup memory will not be allocated on these boards as the OBP home board.

- Example for PRIMEPOWER900/1500/2500
  # **eeprom no-obp-sb="01 03 04 10"**

In the above example, the boards numbered 1, 3 and 4 on cabinet #0 are specified, and the board numbered 0 on cabinet#1 is specified. On the next reset, OBP and system startup memory will not be allocated on these boards as the OBP home board.

If all the system boards on a partition are set as no-obp-sb-cX or no-obp-sb , OBP ignores the setting and behaves as if no board is specified.
OBP chooses the lowest numbered system board as the boot board among system boards not specified by the above option.
This feature is used to manage the system board pool. Please refer to "2.4 System board pool management" for details.

2.3.2.2 Memory nullification option

OBP hides all memory installed on a system board by setting this environment variable.

- **For GP7000Fmodel 1000/2000 and PRIMEPOWER800/1000/2000**
  # **eeprom no-mem-sb-cX=Y**

- **For PRIMEPOWER900/1500/2500**
  # **eeprom no-mem-sb="XY"**

- **For PRIMEPOWER900/1500/2500 and XPAR environment**

```
# eeprom no-mem-sb="XY-N"
```

where *X* is the cabinet number , *Y* is the slot number within the cabinet and *N* is logical number in the system board. The syntax is the same as Kernel memory allocation option.

The specified boards must be listed on no-obp-sb-cX property as well. Otherwise, memory nullification doesn't work appropriately.

When a specified system board is attached by DR operation, the following message might appear but there is no harm to the DR operation. You can ignore it and proceed with the operation.

```
sfdr:sfdr_get_memlist: nodeid (0x0) is not memory node
```

If the board is configured as a memory less board, memory detach operation always succeeds. You do not need to consider the conditions mentioned in "2.1.3.3 DR Detach".

2.3.2.3   I/O nullification option

OBP disables all LAN cards and PCI cards installed (onboard serial ports are excluded) on a system board by changing this environment variable. Internal SCSI boards on PRIMEPOWER900/1500/2500 also can be disabled.

- **For GP7000Fmodel 1000/2000 and PRIMEPOWER800/1000/2000**
  ```
  # eeprom no-io-sb-cX=Y
  ```

- **For PRIMEPOWER900/1500/2500**
  ```
  # eeprom no-io-sb="XY"
  ```

- **For PRIMEPOWER900/1500/2500 and XPAR environment**
  ```
  # eeprom no-io-sb="XY-N"
  ```

where X is the cabinet number and Y is the slot number within the cabinet and *N* is logical number in the system board. The syntax is the same as Kernel memory allocation option.

This feature is intended to avoid complicated I/O operation for a system board detach, e.g. stopping application programs running with outgoing I/O devices.

2.3.3   DR Administration Issues

2.3.3.1   I/O Device Administration

(*) Please check the system fills the requirements of "1.2.3 Notes on DR operation" and "1.2.4 Other Requirements".

After the DR attach operation, **devfsadmd(1M)** automatically invokes **devfsadm(1M)** command to reconfigure I/O device tree.

However, the automatic reconfiguration event doesn't necessarily happen in sync with DR attach operation. Some connection scripts may require updated I/O device tree information. In such a case, **devfsadm(1M)** should be invoked manually before **devfsadmd(1M)**   starts.

2.3.3.1.1   Disk Administration

Disk controllers are numbered consecutively as the **devfsadm(1M)** command encounters them. On a newly inserted board, disk controllers are assigned the next available lowest number by **devfsadm(1M).**

If a re-attached system board consists of the same I/O configuration as it was detached: the same I/O controllers and the same I/O devices installed at the same slots, the system keeps the same disk controller

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numbers as before. Otherwise, different numbers may be assigned. In such a case, re-attaching may require changes of **/etc/vfstab** and may affect some applications.

The system administrator needs to manage I/O configuration with regard to this issue.

Critical file systems that cannot be umounted (See **umount(1M)**) for the DR operation must be protected by **I/O Multi-pathing**, e.g. disk mirroring software. Because GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000 don't support the removal of kernel memory, if the system disk, on which OS is installed, is installed on the boot board (See section 2.3.2.1"Kernel memory allocation option"), the system disk doesn't have to be configured particularly for DR detach operation.

2.3.3.1.2   Network Administration

If any activated network device exists on the outgoing board, the DR detach operation fails with the following message.

> failed to detach I/O node branch (/pci@XX,XXXX/network@X,X) from the node tree. (error=X)

To avoid this error, all activated network devices on the outgoing board should be deactivated as follows.

```
# ifconfig interface down
# ifconfig interface unplumb
```

If the deactivated interface is the primary network interface for the system (the IP address of defined in the file **/etc/nodename**), all basic network applications like **ftp(1M), rsh(1M), rcp(1M), rlogin(1M)** will not function and NFS client and server operations are also affected. The user must use **I/O Multi-pathing** software to solve this problem. In addition, because functions of System Management Console (SMC) become unavailable if a network interface to SMC is disconnected, this issue should be avoided in the same manner.

For GP7000F model 1000/2000, and PRIMEPOWER 800/1000/2000, you can install the primary network interface and the interface to SMC on the boot board (See section 2.3.2.1"Kernel memory allocation option"), which won't be detached due to kernel memory, to avoid such an issue.

2.3.3.2   Realtime Process Administration

During DR attach/detach operation, realtime processes are not scheduled in a few seconds. DR operation query the operator whether this few seconds doesn't meet the requirement of the realtime process or not (See "6.1.3.3 Inquiring Message" and "7.1.3.3 Inquiring Messages"). There are several ways to handle realtime processes against DR attach/detach operation.

- In case the requirement of the realtime process is satisfied.
  Answer "YES" and proceed with DR operation.
- In case the requirement of the realtime process is satisfied and it is known previously.
  That realtime process can be registered as no query required by **dr_conf** command see "3.5.4 dr_conf") in the connection script (See "3.4 Connection Script Interface"). The operator can proceed with DR operation without showing the inquiring message on the registered process.
- In case the requirement of the realtime process is **not** satisfied.
  Answer "NO" then stop DR operation.
- In case the requirement of the realtime process is **not** satisfied but you know how to work it around.
  Write the workaround in the connection script (See section "3.4 Connection Script Interface") and proceed with DR operation.

2.3.3.3   Zones Administration (Solaris 10 OS only)

Please note the followings when using DR in zones.

- DR operation is only possible in a global zone. DR operation is not available in a non-global zone.
- If physical devices are assigned to the non-global zone, DR disconnect operation might be failed. When using DR in zones, please consider about these limitations prior to the system deployment.

For more details about zones, please refer to "System Administration Guide: Solaris Containers -- Resource Management and Solaris Zones".

2.4   System board pool management

GP7000F model 1000/2000, and PRIMEPOWER 800/1000/900/1500/2000/2500 support multiple partitions. Using the DR feature, the administrator can reconfigure the partitions dynamically and move system boards between partitions.
The administrator can also use the system board pool to reserve system boards scheduled for a move.

Note:
To create a new partition, refer to the System Console Software User's Guide (an online manual).

The system administrator can schedule the usage of the system board pool according to the system load. The system administrator picks up some boards from the system board pool, adds them to partitions for load sharing, and puts them back to the system board pool when no longer needed.

It is helpful that the administrator manage the system to ensure that boards intended for a move can be detached. Each component, CPU, I/O and memory, on such boards must meet the conditions for a successful DR operation, as described in section 2.1 "DR System Components".

The administrator can restrict the usage of memory and I/O on boards intended for a move by using the OBP environment variables described in section 2.3.2 "DR configuration and OBP (Open Boot PROM)". If it is possible, restricting I/O usage is an easier solution than redundant configuration like I/O multipathing.

Chapter 3 DR User Interface

This chapter describes the DR commands **drc, drcstat** and **adrc**, the Connection Script Interface and the DR Service Commands.

DR user interface Architecture

```
                          Operator
                             │
                             ▼
          ┌──────────────────────────────────┐
          │        drc, drcstat, adrc         │────────────────┐
          └──────────────────────────────────┘                │
           │                                                   │
           ▼                                                   │
┌────────────────────────┐      ┌──────────────────────────┐  │
│  Internal DR commands   │─────▶│     Connection Script    │  │
└────────────────────────┘      └──────────────────────────┘  │
           │                              │                    │
           │                              ▼                    ▼
           ▼                   ┌──────────────────────────────────┐
┌────────────────────────┐    │ Service Commands                 │
│   kernel dr module      │    │ dr_query, dr_message             │
└────────────────────────┘    │                                  │
                              │ dr_info                          │
                              │ dr_conf                          │
              ┌───────────┐   ├──────────────────────────────────┤
              │ DataBase  │◀──│ dr_get_db                        │
              └───────────┘   │ dr_put_db                        │
                              │ dr_append_db                     │
                              └──────────────────────────────────┘
```
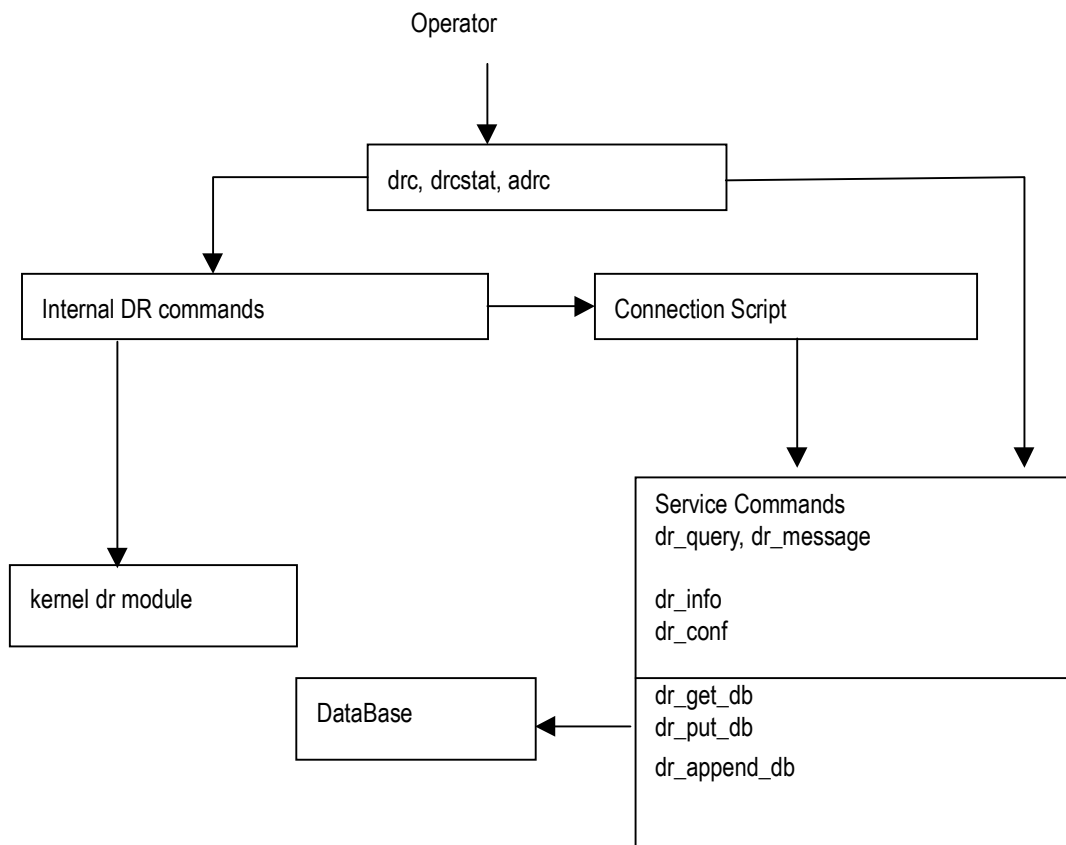
3.1 drc(1M)

NAME

        drc - executes DR operation

SYNOPSYS

        /opt/FJSVhwr/sbin/drc -connect sb*XY* | sb*XY-N* **[-reset]**

        /opt/FJSVhwr/sbin/drc -disconnect sb*XY* | sb*XY-N* **[-reset]**

        /opt/FJSVhwr/sbin/drc -disconnect sb*XY* | sb*XY-N* **-next PID [-reset]**

        /opt/FJSVhwr/sbin/drc -disconnect sb*XY* | sb*XY-N* **-keep**

        /opt/FJSVhwr/sbin/drc -abort

AVAILABILITY

        This command can only be executed by the super user.

        For requirements of this command, please refer to "1.2 DR Requirements".

DESCRIPTION

        drc(1M) executes DR attach/detach, or assists system board hotswap or system board movement between partitions.

        drc(1M) command can be used only for a system board of the current partition or undefined ("-").

OPTIONS

        The following options are available:

        Status, PID, Next_PID, Board_Type, CPU(MHz) on the specified system board: sb*XY* or sb*XY-N* is shown by **drcstat(1M)** command.

-connect

        Attach the system board specified with **sb***XY* or **sb***XY–N* to the current partition (the partition where this command is invoked).

        This option is specified to execute DR attach or dynamical system board replacement.

- For GP7000F model 1000/2000, PRIMEPOWER800/1000/2000

  Both **Board_Type** and **CPU(MHz)** of the system board must match those of the current partition.
- For PRIMEPOWER900/1500/2500

  When **Board_Type** is 0x2X, both **Board_Type** and **CPU(MHz)** of the system board must match those of the current partition. And, when **Board_Type** is 0x3X, only **Board_Type** must match those of the current partition.

Other	Conditions before **drc(1M)** is invoked			Conditions after **drc(1M)** is terminated			Note
options	Status	PID	Next_PID	Status	PID	Next_PID	
none	Waiting	current	current	Configured	current	current	
	Disconnected	-	-				
	Disconnected	-	current				
-reset	Configured	current	dest	Configured	current	current	1.
	Configured	current	--				2.
	Disconnected	-	-	Disconnected	-	current	3.

    current : The current partition id

    dest : The destination partition id

    - : undefined

1. These conditions are generated after running "drc -disconnect sbXY(or sbXY-N) -next PID -reset"
2. These conditions are generated after running "drc -disconnect sbXY(or sbXY-N) -reset"
3. After this command terminates and reboots the current partition, the conditions of the system board

are changed as follows.

Status of the system board is **Configured**; **PID** and **Next_PID** are for the current partition ID

-disconnect

Detach the system board specified with **sb*XY*** or **sb*XY–N*** from the current partition.

This option is specified to remove the system board for one of the following purposes.

- Just detach the system board
- Detach the system board and specify the destination partition id where the system board is to be moved to.
- Detach the system board to hotswap the system board

other options	Conditions before **drc(1M)** is invoked			Conditions after **drc(1M)** is terminated			Note
	Status	PID	Next_PID	Status	PID	Next_PID	
None	Configured	current	Current	Disconnected	-	-	
	Waiting	current	Current				
-next	Configured	current	Current	Waiting	dest	dest	1.
	Waiting	current	Current	or			5.
				Unconfigured			
-keep	Configured	current	Current	Unconfigured	current	current	
-reset	Configured	current	Current	Configured	current	-	2.
	Disconnected	-	Current	Disconnected	-	-	3.
-next -reset	Configured	current	Current	Configured	current	dest	1. 4.

current : The current partition id

dest : The destination partition ID specified with **-next** option

-- : undefined

1. When you specify the -next option and **Board_Type** of the system board which does disconnect is **0x1X** or **0x2X**, both **Board_Type** and **CPU(MHz)** of the system board must match those of the destination partition.
   When **Board_Type** of the system board that does disconnect is **0x3X**, **Board_Type** of the system board only must match those of the destination partition.
2. After this command terminates and reboots the current partition, the conditions of the system board are changed as follows.
   Status of the board is **Disconnected**; **PID** and **Next_PID** are undefined ("-").
3. These conditions are generated after running "drc -connect sbXY(or sbXY-N) -reset"
4. After this command terminates and reboots the current partition, the conditions of the system board are changed as follows.
   Status of the system board is **Disconnected/Unconfigured**, **PID** is undefined ("-") and **Next_PID** is the destination partition id
5. **Status** of the system board is **Unconfigured**, when the destination partition is power-off state

-abort

abort the operation of DR attach/detach.

This option can be specified only for the following purposes.

- **drc(1M)** stops with the following message displayed.
  "**Execute connection script ####**"
- drc(1M) is not completed with the following message displayed.
  "Waiting the completion of memory releasing. (XXXX / YYYY)"

When the command is executed specifying this option by conditions except the above-mentioned, operation afterwards is not guaranteed.

When the system becomes abnormal, it is necessary to reboot the system.

sb*XY*

 The number of the system board.
 X represents the cabinet number (0-3), and Y represents the system board slot number (0-7) in the cabinet.

sb*XY-N*

 The number of the system board. When XPAR is used, this option is effective.
 X represents the cabinet number (0-3), Y represents the system board slot number (0-7) in the cabinet and
 N represents offset number (0-3) in the system board.

-next PID

 The destination partition id (0-14) where the system board moves after the system board is detached.
 When **Board_Type** of the system board which does disconnect is **0x1X or 0x2X**, both **Board_Type** and
 CPU(MHz) of the system board must match those of the destination partition.
 When **Board_Type** of the system board that does disconnect is **0x3X**, **Board_Type** of the system board
 only must match those of the destination partition.

-keep

 This option is specified for system board hotswap.
 This option can be specified together with **-disconnect**.
 To cancel the system board hotswap, execute the cancel operation on SMC.
 See "System Console Software User's Guide" for detail.

-reset

 This option is specified to take the actual DR action at the next reboot.
 When this option is omitted, the DR operation immediately starts.
 When the command is invoked with both **-reset** and -**next**, the DR operation should be executed in the
 following order.
 1. Command execution (drc -disconnect sbXY(or sbXY-N) -next PID -reset)
 2. reboot the current partition
 3. reboot the destination partition

EXAMPLES

 Attach the system board "sb02" to the current partition.
 # **drc -connect sb02**

 Attach the system board "sb02" to the current partition at the next boot.
 # **drc -connect sb02 -reset**

 Detach the system board "sb02" from the current partition.
 # **drc -disconnect sb02**

 Detach the system board "sb02" from the current partition at the next reboot.
 # **drc -disconnect sb02 -reset**

 Remove the system board "sb02" from the current partition and set **Next_PID** to partition #2. The removed
 system board will belong to partition #2 when "drc -connect sb02" is run on the partition #2.
 <the current partition>
 # **drc -disconnect sb02 -next 2**
 <partition #2>
 # **drc -connect sb02**

 Remove the system board "sb02" from the current partition and set **Next_PID** to partition #2 at the next
 reboot. The removed system board will belong to partition #2 after both of the partition #2 and the current
 partition is rebooted next time.
 # **drc -disconnect sb02 -next 2 -reset**
 <reboot the current partition>
 <reboot the partition #2>

Detach the system board "sb02" for system board hotswap.
To complete the hotswap operation, run "drc -connect sb02" to after replacing the board.
drc -disconnect sb02 -keep

When XPAR is used, attach the system board "sb02-1" to the current partition.
drc -connect sb02-1

When XPAR is used, detach the system board "sb02" from the current partition.
drc -disconnect sb02

EXIT STATUS

This command returns the following values:

0
  No failures or errors detected on the system.
>0
  Failures or errors detected on the system.

SEE ALSO

drcstat(1M), adrc(1M)

NOTES

- Confirm **Status** of the system board by drcstat(1M) before this command is invoked.
- The recovery procedure is as follows when the system board is moved into the partition which installed either Solaris 2.6 OS or Solaris 7 OS (DR feature doesn't work).

  After running "drc -disconnect sbXY -next PID"
  1. Reboot the destination partition
  2. Remove the system board by using "System Board Removal from Partition" menu on SMC
  3. Reboot or shutdown the destination partition
  4. Run "drc -connect sbXY" in the current partition

  After running "drc -disconnect sbXY -next PID -reset", run "drc -connect sbXY".

- The following WARNING message is displayed when the drc command is invoked on two or more partitions at the same time for the same system board.
  In this case, this message does not mean hard error.
      FJSVscf: WARNING: /pci@#,#/#@#/FJSV,scfc@#,#(scfc#),SCF command (0x11a2) error.
  Status register = 0xXXXX
  The value of the status register varies on the model.
  - GP7000F model 1000/2000, PRIMEPOWER800/1000/2000
    Status register = 0xXXX9
  - PRIMEPOWER900/1500/2500
    Status register = 0xXX9X

When messages not listed above or Status register values are displayed, refer to "Enhanced Support Facility users guide".

3.2   drcstat(1M)

NAME

drcstat - displays current information of the system board

SYNOPSYS

/opt/FJSVhwr/sbin/drcstat -board [sb*XY* | sb*XY-N* | all] [-xpar]

/opt/FJSVhwr/sbin/drcstat -system [sb*XY* | sb*XY-N*] [-xpar]

/opt/FJSVhwr/sbin/drcstat -device [sb*XY* | sb*XY-N*] [-e] [-xpar]

AVAILABILITY

This command can only be executed by the super user.

For requirements of this command, please refer to "1.2 DR Requirements".

DESCRIPTION

Displays the current information about system boards.

When **sb*XY*** or **sb*XY-N*** is specified, displays the information on the specified system board.

When **all** is specified, displays the information on all the system boards including other partitions.

When options are not specified, displays the information on the current system board.

OPTIONS

-board

display the current system board information.

SB: system board number (cabinet number + system board slot number, when –xpar is specified, + logical number in system board)

BN: system board number (Serial number from 0 to 31 which DR driver displays)

Status: system board status

Detail: detail status of the system board

PID: partition id

Next_PID: partition ID that will be effective after reboot

Board_Type: system board type

    0xX0 : normal mode

    0xX2 : extended system board (XSB) 2-split

    0xX4 : extended system board (XSB) 4-split

CPU(MHz): cpu clock speed

    When Board_type is 0x3X, the cpu clock speed of fastest CPU installed on the system board is displayed.

Status	(Detail)	Descriptions
Configured	none	The system board's resources are completely configured into the partition
	(PC)	The system board's resources are partially configured into the partition This state will occur when drc terminates abnormally
Waiting	none	The system board is physically connected and waiting to be logically connected
Unconfigured	none	Resetting state: The system board is logically disconnected from the partition

	(##)	Resetting state: Some error occurred on the system board. DR processing cannot be continued. Please contact our customer service, and exchange the system board.
Disconnected	none	Resetting state: The system board does not belong to any partition

-system
display the system information regarding DR operation
The system board whose status is "Suspend is required" is kernel memory board.
GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000 don't support detaching kernel memory board.
PRIMEPOWER 900/1500/2500 support detaching kernel memory board. (See section 2.1.3.1 "Two types of memory and restrictions")

-device
display the list of attached devices.

sb*XY*
The number of the system board.
X represents the cabinet number (0-3), and Y represents the system board slot number (0-7) in the cabinet.

sb*XY-N*
The number of the system board. When XPAR is used, this option is effective.
X represents the cabinet number (0-3), Y represents the system board slot number (0-7) in the cabinet and N represents offset number (0-3) in the system board.

all
specify all the system boards on the entire system including other partitions.
When "-board" is specified, this option can be specified.

-e
display the edit list of attached devices. When "-device" is specified, this option can be specified.

-xpar
When the system board number for XPAR (*XY-N* : cabinet number + system board slot number + logical number in system board) is displayed, this option can be specified.
The model for whom the XPAR environment can be used can specify this option.
When this option is not specified, the usual system board number display (*XY* : cabinet number + system board slot number) is done.

EXAMPLES

- display all the system boards

```
# drcstat -board all
SB BN Status (Detail)    PID Next_PID Board_Type CPU(MHz)
-- -- ---------------- --- -------- ---------- --------
00  0 Configured         00    00       10       300
01  1 Unconfigured       00    00       10       300
02  2 Configured         00    00       10       300
03  3 Unconfigured (84)  00    00       10       300
04  4 Unconfigured (84)  00    00       10       300
05  5 Unconfigured (84)  00    00       10       300
06  6 Waiting            00    00       10       300
07  7 Disconnected       --    --       10       300
10  8 Configured         00    00       10       300
11  9 Configured         01    01       20       450
12 10 Configured         01    01       20       450
13 11 Configured         01    01       20       450
14 12 Disconnected       --    01       20       450
```

```
15 13 Disconnected        --       01          20        450
16 14 Disconnected        --       --          20        450
17 15 Disconnected        --       --          20        450
20 16 ---                 --       --          ---       ---
21 17 ---                 --       --          ---       ---
22 18 ---                 --       --          ---       ---
23 19 ---                 --       --          ---       ---
24 20 ---                 --       --          ---       ---
25 21 ---                 --       --          ---       ---
26 22 Waiting             02       02          10        300
27 23 Disconnected        --       --          10        300
30 24 Configured          02       02          10        300
31 25 Configured          02       02          10        300
32 26 Configured          03       03          20        450
33 27 Configured          03       03          20        450
34 28 Disconnected        --       03          20        450
35 29 Disconnected        --       03          20        450
36 30 Disconnected        --       --          20        450
37 31 Disconnected        --       --          20        450
```

- display the system board information on sb02

```
# drcstat -board sb02
SB BN Status (Detail)    PID Next_PID Board_Type CPU(MHz)
-- -- ----------------- --- -------- ---------- --------
02  2 Configured         00       00         10       300
```

- display information on all boards belonging to the current partition.

```
# drcstat -board
SB BN Status (Detail)    PID Next_PID Board_Type CPU(MHz)
-- -- ----------------- --- -------- ---------- --------
10  8 Configured         01       01         20       450
11  9 Configured         01       01         20       450
12 10 Configured         01       01         20       450
13 11 Disconnected       --       01         20       450
14 12 Disconnected       --       01         20       450
20 16 Configured         01       01         20       450
21 17 Configured         01       01         20       450
22 18 Configured         01       01         20       450
23 19 Disconnected       --       01         20       450
24 20 Disconnected       --       01         20       450
```

- display the system information on sb01.

```
# drcstat -system sb01
kernel cage is enabled.

SB BN Status
-- -- ------------------
01  1 Suspend is required
```

- display the system information on the current partition.

```
# drcstat -system
kernel cage is enabled.

SB BN Status
-- -- ------------------
10  8 Suspend is required
11  9 --
12 10 --
```

```
                          25  21 --
                          26  22 --
                          27  23 --
```

- display the list of all attached devices on sb00
  - For GP7000F model 1000/2000, PRIMEPOWER800/1000/2000
    ```
    # drcstat -device sb00
    00-PCI#0B  "/pci@80,4000/scsi@2" 0 "glm"
    00-PCI#0B  "/pci@80,4000/scsi@2,1" 1 "glm"
    00-PCI#0B  "/pci@80,4000/scsi@2/sd@1,0" 1 "sd"
    00-ONBOARD "/pci@83,4000/ebus@1/FJSV,scfc@14,200000" 0 "FJSVscf2"
    00-ONBOARD "/pci@83,4000/ebus@1/FJSV,se@14,400000" 0 "se"
    00-ONBOARD "/pci@83,4000/network@1,1" 0 "hme"
    ```

  - For PRIMEPOWER900/1500/2500
    ```
    # drcstat -device sb00
    00-ONBOARD  "/pci@87,2000/scsi@1" 0 "glm"
    00-ONBOARD  "/pci@87,2000/scsi@1,1" 1 "glm"
    00-ONBOARD  "/pci@87,2000/scsi@1/sd@0,0" 0 "sd"
    00-ONBOARD  "/pci@87,4000/ebus@1/FJSV,panel@14,280030" 0 "FJSVpanel"
    00-ONBOARD  "/pci@87,4000/ebus@1/FJSV,scfc@14,200000" 0 "FJSVscf3"
    00-ONBOARD  "/pci@87,4000/ebus@1/FJSV,se@14,400000" 0 "se"
    00-ONBOARD  "/pci@87,4000/network@1,1" 0 "hme"
    ```

- Specified "-e", and display the edit list of all attached devices on sb00
  - For GP7000F model 1000/2000, PRIMEPOWER800/1000/2000
    ```
    # drcstat -device sb00 -e
    SB Sub name        physical-name instance-number driver-binding-name
    -- --- ------------ ---------------------------------------------------------
    00     PCI#0B      "/pci@80,4000/scsi@2" 0 "glm"
    00     PCI#0B      "/pci@80,4000/scsi@2,1" 1 "glm"
    00     PCI#0B      "/pci@80,4000/scsi@2/sd@1,0" 1 "sd"
    00     ONBOARD     "/pci@83,4000/ebus@1/FJSV,scfc@14,200000" 0 "FJSVscf2"
    00     ONBOARD     "/pci@83,4000/ebus@1/FJSV,se@14,400000" 0 "se"
    00     ONBOARD     "/pci@83,4000/network@1,1" 0 "hme"
    ```

  - For PRIMEPOWER900/1500/2500
    ```
    # drcstat -device sb00 -e
    SB Sub name        physical-name instance-number driver-binding-name
    -- --- ------------ ---------------------------------------------------------
    00     ONBOARD     "/pci@87,2000/scsi@1" 0 "glm"
    00     ONBOARD     "/pci@87,2000/scsi@1,1" 1 "glm"
    00     ONBOARD     "/pci@87,2000/scsi@1/sd@0,0" 0 "sd"
    00     ONBOARD     "/pci@87,4000/ebus@1/FJSV,panel@14,280030" 0 "FJSVpanel"
    00     ONBOARD     "/pci@87,4000/ebus@1/FJSV,scfc@14,200000" 0 "FJSVscf3"
    00     ONBOARD     "/pci@87,4000/ebus@1/FJSV,se@14,400000" 0 "se"
    00     ONBOARD     "/pci@87,4000/network@1,1" 0 "hme"
    ```

- When XPAR is used and "-xpar" is not specified, display all the system boards.
  ```
  # drcstat -board all
  SB BN Status (Detail)   PID Next_PID Board_Type CPU(MHz)
  -- -- ----------------- --- -------- ---------- --------
  00  0 Configured        00    00         34       1350
  00  4 Configured        01    01         34       1350
  00  8 Configured        02    02         34       1350
  00 12 Configured        03    03         34       1350
  01  1 Unconfigured      00    00         34       1350
  ```

```
01   5 Waiting              01       01          34        1350
01   9 Configured           02       02          34        1350
01  13 Disconnected         --       03          34        1350
02   2 Configured           04       04          30        1350
03   3 Disconnected         --       --          30        1350
```

- When XPAR is used and "-xpar" is specified, display all the system boards

```
# drcstat -board all -xpar
SB    BN Status (Detail)    PID Next_PID Board_Type CPU(MHz)
----  -- ----------------   --- -------- ---------- --------
00-0   0 Configured          00       00          34        1350
00-1   4 Configured          01       01          34        1350
00-2   8 Configured          02       02          34        1350
00-3  12 Configured          03       03          34        1350
01-0   1 Unconfigured        00       00          34        1350
01-1   5 Waiting             01       01          34        1350
01-2   9 Configured          02       02          34        1350
01-3  13 Disconnected        --       03          34        1350
02     2 Configured          04       04          30        1350
03     3 Disconnected        --       --          30        1350
```

- When XPAR is used and "-xpar" is specified, display the system board information on sb01

```
# drcstat -board sb01 -xpar
SB    BN Status (Detail)    PID Next_PID Board_Type CPU(MHz)
----  -- ----------------   --- -------- ---------- --------
01-0   1 Unconfigured        00       00          34        1350
01-1   5 Waiting             01       01          34        1350
01-2   9 Configured          02       02          34        1350
01-3  13 Disconnected        --       03          34        1350
```

- When XPAR is used and "-xpar" is specified, display the system board information on sb01-2

```
# drcstat -board sb01-2 -xpar
SB    BN Status (Detail)    PID Next_PID Board_Type CPU(MHz)
----  -- ----------------   --- -------- ---------- --------
01-2   9 Configured          02       02          34        1350
```

- When XPAR is used and "-xpar" is specified, display the system information on sb00-1

```
# drcstat -system sb00-1 -xpar
kernel cage is enabled.

SB    BN Status
----  -- ------------------
00-1   1 Suspend is required
```

- When XPAR is used and "-xpar" is specified, display information on all boards belonging to the current partition.

```
# drcstat -system -xpar
kernel cage is enabled.

SB    BN Status
----  -- ------------------
00-1   1 Suspend is required
01-1   5 --
```

- When XPAR is used, and "-e" and "-xpar" are specified, display the list of all attached devices on sb00-1

```
# drcstat -device sb00-1 -e -xpar
```

```
SB    Sub  name           physical-name instance-number driver-binding-name
----  ---  -------------- --------------------------------------------------
00-1  1    ONBOARD        "/pci@a2,2000/scsi@1" 0 "glm"
00-1  1    ONBOARD        "/pci@a2,2000/scsi@1,1" 1 "glm"
00-1  1    ONBOARD        "/pci@a2,2000/scsi@1/sd@0,0" 0 "sd"
00-1  1    ONBOARD        "/pci@a2,4000/ebus@1/FJSV,panel@14,280030" 0 "FJSVpanel"
00-1  1    ONBOARD        "/pci@a2,4000/ebus@1/FJSV,scfc@14,200000" 0 "FJSVscf3"
00-1  1    ONBOARD        "/pci@a2,4000/ebus@1/FJSV,se@14,400000" 0 "se"
00-1  1    ONBOARD        "/pci@a2,4000/network@1,1" 0 "hme"
```

EXIT STATUS

This command returns the following values.

0: display information successfully

>0: An error occurred.

Please refer to drcstat error messages or console messages in Chapter 6, "Messages and DR Error Conditions on Solaris 8 OS" and Chapter 7 "Messages and DR Error Conditions on Solaris 9 OS and Solaris 10 OS"

SEE ALSO

drc(1M), adrc(1M)

NOTES

This command sometimes fails while executing a DR process.
See "5.2.3 drcstat(1M) failed" for detail.

3.3 adrc(1M)

NAME

adrc - executes automated DR operation

SYNOPSYS

/opt/FJSVhwr/sbin/adrc -connect sb*XY* | sb*XY-N* [-reset]

/opt/FJSVhwr/sbin/adrc -disconnect sb*XY* | sb*XY-N* [-reset]

/opt/FJSVhwr/sbin/adrc -disconnect sb*XY* | sb*XY-N* -next PID [-reset]

AVAILABILITY

This command can only be executed by the super user.

For requirements of this command, please refer to "1.2 DR Requirements".

DESCRIPTION

Executes DR attach/detach, or assists system board hotswap or system board movement between partitions.

adrc(1M) command can be used only for a system board of the current partition or undefined("-").

DR operation can be completed automatically by executing this command.

adrc(1M) will automatically answer questions asked by the **dr_query(1M)** command by defining answers in reply files. (See section 3.6.2 "Reply File")

OPTIONS

The following options are available:

Status, PID, Next_PID, Board_Type, CPU(MHz) on the specified system board. Cabinet and slot numbers (sb*XY* or sb*XY-N*) are show by running the **drcstat(1M)** command.

-connect

Attach the system board specified with **sb*XY*** to the current partition (the partition where this command is

invoked).
This option is specified to execute a DR attach.

- For GP7000F model 1000/2000, PRIMEPOWER800/1000/2000
  Both **Board_Type** and **CPU(MHz)** of the system board must match those of the current partition.
- For PRIMEPOWER900/1500/2500
  When **Board_Type** is 0x2X, both **Board_Type** and **CPU(MHz)** of the system board must match those of the current partition. And, when **Board_Type** is 0x3X, only **Board_Type** must match those of the current partition.

Other options	Conditions before **drc(1M)** is invoked			Conditions after **drc(1M)** is terminated			Note
	Status	PID	Next_PID	Status	PID	Next_PID	
none	Waiting	current	current	Configured	current	current	
	Disconnected	-	-				
	Disconnected	-	current				
-reset	Configured	current	dest	Configured	current	current	1.
	Configured	current	--				2.
	Disconnected	-	-	Disconnected	-	current	3.

current : The current partition id

dest : The destination partition id

- : undefined

1. These conditions are generated after running "drc -disconnect sbXY(or sbXY-N) -next PID -reset"
2. These conditions are generated after running "drc -disconnect sbXY(or sbXY-N) -reset"
3. After this command terminates and reboots the current partition, the conditions of the system board are changed as follows.
   Status of the system board is **Configured**; **PID** and **Next_PID** are for the current partition ID

-disconnect

Detach the system board specified with **sb***XY* or sb*XY-N* from the current partition.
This option is specified to remove the system board for one of the following purposes.

- Just detach the system board
- Detach the system board and specify the destination partition id where the system board is to be moved to.

other options	Conditions before **drc(1M)** is invoked			Conditions after **drc(1M)** is terminated			Note
	Status	PID	Next_PID	Status	PID	Next_PID	
none	Configured	current	current	Disconnected	-	-	
	Waiting	current	current				
-next	Configured	current	current	Waiting	dest	dest	1.
	Waiting	current	current	or Unconfigured			5.
-reset	Configured	current	current	Configured	current	-	2.
	Disconnected	-	current	Disconnected	-	-	3.
-next -reset	Configured	current	current	Configured	current	dest	1. 4.

current : The current partition id

dest : The destination partition ID specified with **-next** option

- : undefined

1. When you specify the -next option and **Board_Type** of the system board which does disconnect is **0x1X or 0x2X**, both **Board_Type** and **CPU(MHz)** of the system board must match those of the destination partition.
   When **Board_Type** of the system board which does disconnect is **0x3X**, **Board_Type** of the system board only must match those of the destination partition.

2. After this command terminates and reboots the current partition, the conditions of the system board are changed as follows.
   Status of the board is **Disconnected**; **PID** and **Next_PID** are undefined("-")
3. These conditions are generated after running "drc -connect sbXY(or sbXY-N) -reset"
4. After this command terminates and reboots the current partition, the conditions of the system board are changed as follows.
   Status of the system board is **Disconnected**/Unconfigured, **PID** is undefined("-") and **Next_PID** is the destination partition id
5. **Status** of the system board is **Unconfigured**; when the destination partition is power-off state

sb*XY*

The number of the system board.
X represents the cabinet number (0-3), and Y represents the system board slot number (0-7) in the cabinet.

sb*XY-N*

The number of the system board. When XPAR is used, this option is effective.
X represents the cabinet number (0-3), Y represents the system board slot number (0-7) in the cabinet and N represents offset number (0-3) in the system board.

-next PID

The destination partition id where the system board moved to after the system board is detached.
When **Board_Type** of the system board which does disconnect is **0x1X or 0x2X**, both **Board_Type** and **CPU(MHz)** of the system board must match those of the destination partition.
When **Board_Type** of the system board that does disconnect is **0x3X**, **Board_Type** of the system board only must match those of the destination partition.

-reset

This option is specified to take the actual DR action at the next reboot.
When this option is omitted, the DR operation immediately starts.

FILES

/etc/opt/FJSVhwr/adrc.conf

LOG_FILE_NAME=/dev/stdout
RETRY_TIME=600
RETRY_CNT=3

LOG_FILE_NAME	specify the file name that holds logging information on **adrc(1M)**.
	default value is /dev/stdout.
	<examples> /tmp/logfile , /dev/null , /dev/stdout , /dev/console
RETRY_TIME	specify interval time(sec) for adrc to retry DR operation in case of error.
RETRY_CNT	specify the number of times for retry.

EXAMPLES

Attach the system board "sb02" to the current partition.
adrc -connect sb02

Attach the system board "sb02" to the current partition at the next boot.
adrc -connect sb02 -reset

Detach the system board "sb02" from the current partition.
adrc -disconnect sb02

Detach the system board "sb02" from the current partition at the next reboot.
adrc -disconnect sb02 -reset

Remove the system board "sb02" from the current partition and set **Next_PID** to partition #2. The removed system board will belong to partition #2 when "adrc -connect sb02" is run on the partition #2.

<the current partition>

adrc -disconnect sb02 -next 2

<partition #2>

adrc -connect sb02

Remove the system board "sb02" from the current partition and set **Next_PID** to partition #2 at the next reboot. The removed system board will belong to partition #2 after both partition #2 and the current partition is rebooted next time.

adrc -disconnect sb02 -next 2 -reset

When XPAR is used, attach the system board "sb02-1" to the current partition.

adrc -connect sb02-1

When XPAR is used, detach the system board "sb02-1" from the current partition.

adrc -disconnect sb02-1

EXIT STATUS

This command returns the following values:

0
  No failures or errors detected on the system.
>0
  Failures or errors detected on the system.

SEE ALSO

drcstat(1M), adrc(1M)

3.4   Connection Script Interface

To automate DR operations, **drc** calls connection scripts at 8 different DR execution states. Connection scripts can perform the necessary DR procedures, e.g. disconnecting one of the multi-pathed I/O devices, terminating a real time process, or simply notifying **drc** to cancel the operation. This section describes the locations, the registration, the naming conventions, the command line arguments, and the exit status of the connection scripts.

3.4.1   drc Execution States

Execution states	Descriptions
checkadd	Pre-check for board attach
preadd	Pre-process for board attach
postadd	Post-process for board attach
canceladd	Error handling process for board attach
checkremove	Pre-check for board detach
preremove	Pre-process for board detach
postremove	Post-process for board detach
cancelremove	Error handling process for board detach

Connection scripts are located in the directories **/etc/opt/FJSVdr/rc**.*<state>*. The **drc** command executes all connection scripts located in each directory at each execution state.

Scripts in rc.checkadd, rc.preadd, rc.postadd, rc.checkremove, rc.preremove, rc.postremove are executed in ascending order based on the 2-digit prefix in the filename of the script. Scripts in rc.canceladd and rc.cancelremove are executed in descending order.

The naming convention of the connection scripts will be discussed in section 3.4.4 "Naming convention of connection script".

The scripts placed under the postadd directory are executed after the board attach operation is completed. However, the device tree is not necessarily updated at that time. The scripts that require the device tree update should call the **devfsadm(1M)** command for immediate update. You can restrict the range of the update within a specified device class or a specified driver by **'-c'** or **'-i'** option respectively. Please refer to the **devfsadm(1M)** manual for more details.

The next figures show the sequences of calling the connection scripts at each execution state.

The sequence of calling the connection scripts in DR attach operation
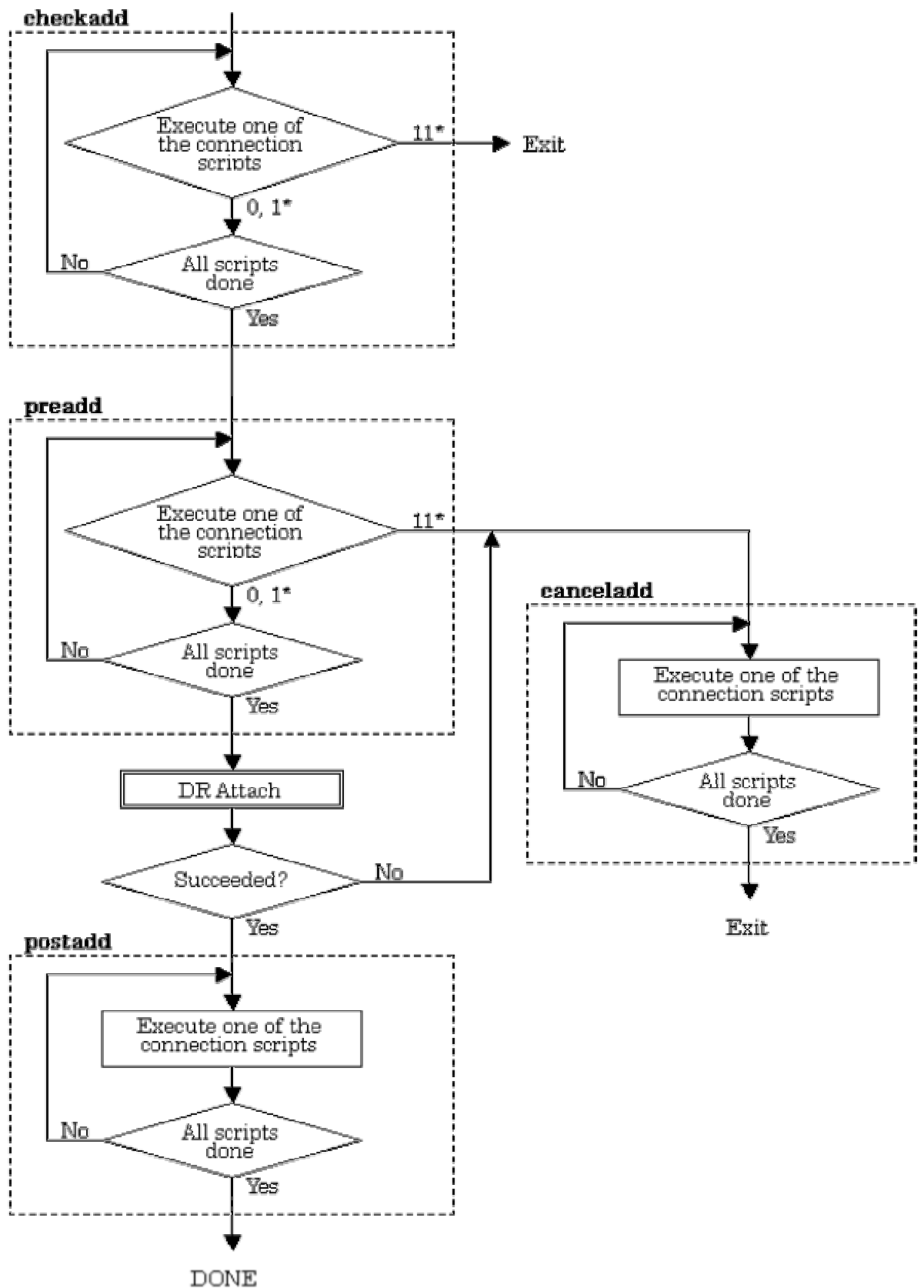
checkadd

Execute one of the connection scripts

11* → Exit

0, 1*

All scripts done

No

Yes

preadd

Execute one of the connection scripts

11*

0, 1*

All scripts done

No

Yes

DR Attach

Succeeded?

No

Yes

canceladd

Execute one of the connection scripts

All scripts done

No

Yes

Exit

postadd

Execute one of the connection scripts

All scripts done

No

Yes

DONE

* digits represent the exit status of connection script (See "3.4.6 Exit Status of Connection Script").

The sequence of calling the connection scripts in DR detach operation
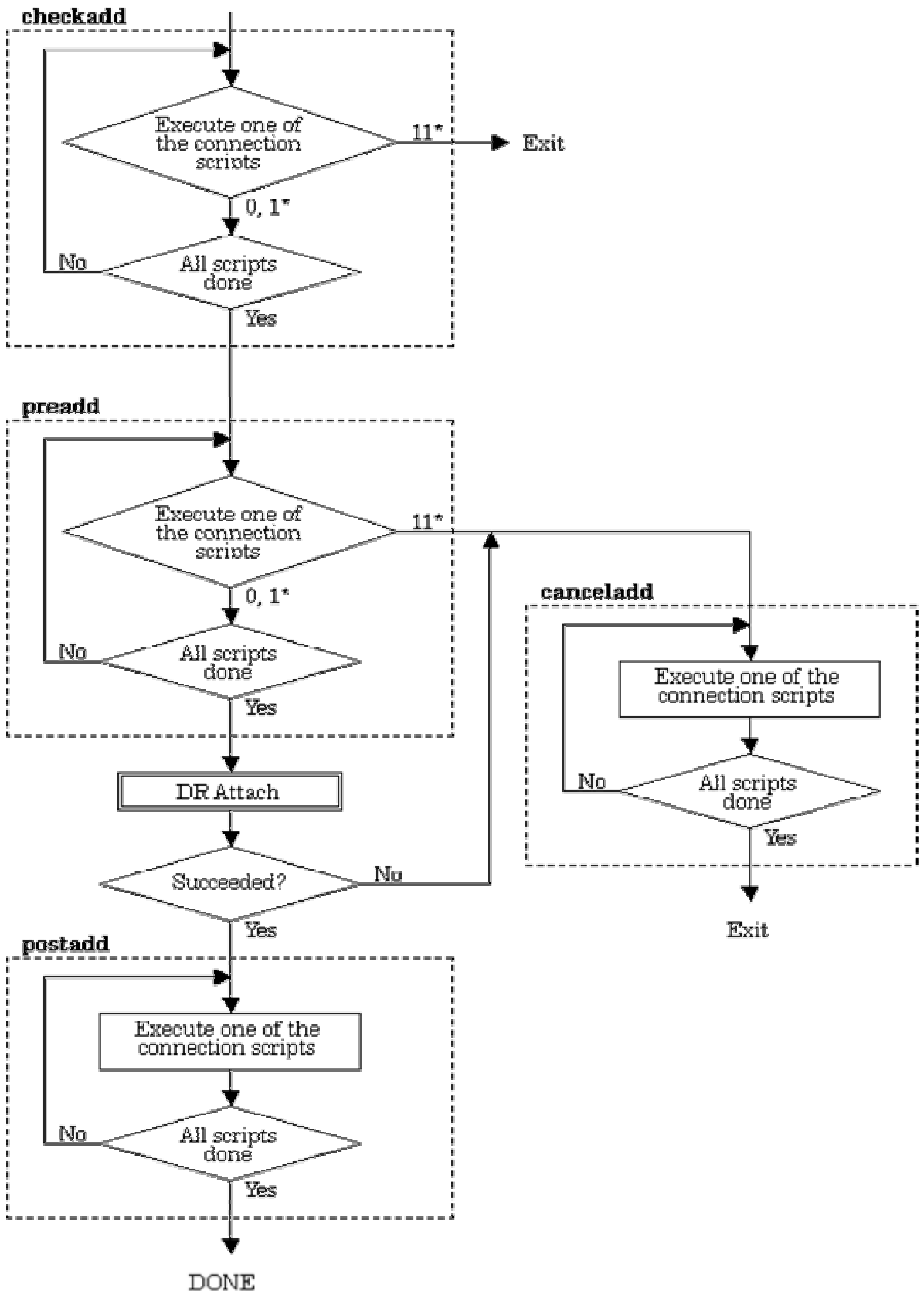
* digits represent the exit status of connection script (See "3.4.6 Exit Status of Connection Script").

3.4.2 Registration

Connection scripts are registered as follows.

1. Place a connection script file under /etc/opt/FJSVdr/dr.d. Its file name should follow the rule described in section3.4.4 "Naming convention of connection script"

    For example:

    # cp iomp /etc/opt/FJSVdr/dr.d

2. Create its symbolic link file under /etc/opt/FJSVdr/dr.<execution state> directory according to the execution state to be executed. The symbolic link file should be created under all execution state directories to be executed.

    For example, if the connection script named "24iomp" needs to run at preadd and preremove, create symbolic link files as follows.

    # ln -s /etc/opt/FJSVdr/dr.d/iomp /etc/opt/FJSVdr/rc.preadd/24iomp

    # ln -s /etc/opt/FJSVdr/dr.d/iomp /etc/opt/FJSVdr/rc.preremove/24iomp

NOTE:

Connection script files must be written by Bourne shell, otherwise scripts don't work.

3.4.3 FJSVdr directories

/etc/opt/FJSVdr/dr.d	contains all the connection scripts.
/etc/opt/FJSVdr/rc.checkadd	contains symbolic link files called before attach.
/etc/opt/FJSVdr/rc.preadd	contains symbolic link files called before attach.
/etc/opt/FJSVdr/rc.postadd	contains symbolic link files called after attach.
/etc/opt/FJSVdr/rc.canceladd	contains symbolic link files called to cancel attach.
/etc/opt/FJSVdr/rc.checkremove	contains symbolic link files called before detach.
/etc/opt/FJSVdr/rc.preremove	contains symbolic link files called before detach.
/etc/opt/FJSVdr/rc.postremove	contains symbolic link files called after detach.
/etc/opt/FJSVdr/rc.cancelremove	contains symbolic link files called to cancel detach.
/etc/opt/FJSVdr/message	contains message files for **dr_message**. (See "3.5.2 dr_message")
/etc/opt/FJSVdr/query	contains message files for **dr_query**. (See "3.5.1 dr_query")
/etc/opt/FJSVdr/reply	contains files in which default answers are defined.

3.4.4 Naming convention of connection script

The name of the connection script must be in the form

<##>< identifier of the script>

<##> must be a decimal number in the range 00 to 99. **drc(1M)** executes the connection scripts in ascending order of this prefix (except in the case of cancellation). **<identifier of the script>** represents a kind of script. <##> is provided to assure the order of calling connection scripts if you provide more than one connection script. You can choose whatever number you like between 00 and 99 as long as the order is appropriate. You can ignore relationships with existing connection scripts installed by packages.

Example:

    24iomp

"iomp" is the identifier of the script and "24iomp" is the connection script name.

3.4.5   Calling convention of connection script

The general connection script calling convention is:

<script name> *<state>* (*<exit status of cancel operation>*) [{ suspend | resume }]

where ***<state>*** is one of the 8 execution states defined in section 3.4.1 "drc Execution States".
<exit status of cancel operation> is specified only by the cancelremove option, its value is 1 or 2. If all devices are still online, the specified value is 1. Otherwise, it is 2. For example, the connection scripts can tell if a meta device like an I/O multipath device is able to go back online. If the system needs to suspend or resume, the script is called with "suspend" or "resume". By checking the arguments, the script can handle the suspending or resuming situation.

Examples:
24iomp preadd
24iomp cancelremove 1
24iomp checkremove suspend
24iomp cancelremove 1 resume

3.4.6   Exit Status of Connection Script

0   The script completes successfully.

1   The script fails but DR should continue. The error should be logged.

11   The script terminates abnormally. If pre-script returns this value, the internal commands
(decimal)   should terminate their operation and begin their recovery procedures. If post-script returns this value, the internal commands should continue and log the error.

3.4.7   Run Time Environment

- SIGKILL signal is sent to all connection scripts if the user issues the cancel command. On receipt of the SIGKILL signal, the connection script must also terminate all of its child processes.
- If the user issues the cancel command, it is possible for the connection script to be called with canceladd or cancelremove options before the preadd or preremove script is killed. Such race conditions must be considered in the connection script.
- Except I/O Multi-path devices, all other devices must not be opened for the DR detach operation to work.

3.4.8   How to create packages

Please follow the method below to create packages with connection scripts.

1.   Install connection scripts by prototype file
Please use this method normally. The directories listed in a prototype file might not exist due to the package installation order and the machine type. Please add the following directories into the prototype file for connection scripts.
d none /etc ? ? ?
d none /etc/opt ? ? ?

d none /etc/opt/FJSVdr 0755 root bin
d none /etc/opt/FJSVdr/dr.d 0755 root bin
d none /etc/opt/FJSVdr/rc.checkadd 0755 root bin
d none /etc/opt/FJSVdr/rc.preadd 0755 root bin
d none /etc/opt/FJSVdr/rc.postadd 0755 root bin
d none /etc/opt/FJSVdr/rc.canceladd 0755 root bin
d none /etc/opt/FJSVdr/rc.checkremove 0755 root bin
d none /etc/opt/FJSVdr/rc.preremove 0755 root bin
d none /etc/opt/FJSVdr/rc.postremove 0755 root bin
d none /etc/opt/FJSVdr/rc.cancelremove 0755 root bin
d none /etc/opt/FJSVdr/message 0755 root bin
d none /etc/opt/FJSVdr/query 0755 root bin
d none /etc/opt/FJSVdr/reply 0755 root bin
d none /etc/opt/FJSVdr/message/C 0755 root bin
d none /etc/opt/FJSVdr/query/C 0755 root bin
d none /etc/opt/FJSVdr/reply/C 0755 root bin

Unnecessary entries can be omitted from the file.

2. Copy connection scripts by installation scripts such as postinstall
   If the connection scripts should be modified according to the environment, please use this method. However please pay attention that the directories listed in a prototype file might not exist due to the package installation order and the machine type.

   To install connection scripts into the directories that don't exist, please use method 1 to create directory too.

3.5 DR service commands

DR service commands are utility functions designed only for connection script applications. Some are also used internally by the **drc** command. This section describes these service commands: **dr_query, dr_message, dr_info, dr_conf, dr_put_db, dr_append_db, dr_get_db.** All these commands are located in **/opt/FJSVdr/bin.**

3.5.1 dr_query

dr_query <message file> <message ID>

The user will be prompted to answer "yes" or "no" for the question specified by the <message ID> in the <message file>. If the answer is "yes", the exit status is 0. If the answer is "no", the exit status is 1.

Exit Status
   0: the answer is "yes"
   1: the answer is "no"
   2: failed to be executed
      Please check the error message shown by the command or the console message.

Example:

dr_query hme 0001

3.5.2 dr_message

dr_message   <message file> <message ID>

The message specified by the <message ID> in the <message file> will be sent to stdout. Typically it should be used by the connection scripts to show the progress.

The connection scripts have to print out messages through **dr_message** or **dr_query**. Standard output or standard error should not be used.

Exit Status

    0: successfully executed

    >0: failed

       Please check the error message shown by the command or the console message.

Example:

dr_message hme 0001

start configuration of hme.

dr_message hme 0002 0

configure the devices. Device number 0.

dr_message hme 0003 /pci@83,4000/network@1,1

Fail to detach /pci@83,4000/network@1,1.

The content of the message file /etc/opt/FJSVdr/message/C/hme is:

0001:"start configuration of hme."

0002:"configure the devices. Device number #."

0003:"Fail to detach ######."

3.5.3 dr_info

dr_info prints information about the system board to be attached or detached to stdout as requested by the user.

dr_info   cage
   check if kernel cage is enabled or not
dr_info   sysmem
   check if the system board contains kernel memory or not
dr_info   cpu
   display CPU ID's on the system board
dr_info   memory
   display the size of memory on the system board
dr_info   devices   [-p path_name] [-d driver_name] [-n name]
   display all device trees on the system board
dr_info   board
   display the system board number

In terms of dr_info cpu, dr_info memory and dr_info devices, their outputs depend on the status where DR attach/detach is in progress or canceled or where the previous DR attach/detach failed. The outputs vary

depending on the current DR status.

The following table shows all possible outputs at each drc execution state (See section 3.4.1 "drc Execution States").

Execution states	Possible outputs
checkadd	No output
preadd	No output
postadd	All specified components

canceladd	The output depends on the status where the DR attach failed or canceled. The possible outputs are as follows.
	  - All specified components
	  - Part of specified components
	  - No output

checkremove	All specified components
	However, in case the previous DR detach failed, that is, retrying DR detach, the output depends on the status where the previous DR detach failed. The possible outputs are as follows.
	  - All specified components
	  - Part of specified components
	  - No output

preremove	All specified components
	However, in case the previous DR detach failed, that is, retrying DR detach, the output depends on the status where the previous DR detach failed. The possible outputs are as follows.
	  - All specified components
	  - Part of specified components
	  - No output

postremove	No output

cancelremove	The output depends on the status where the DR attach failed or canceled. The possible outputs are as follows.
	  - All specified components
	  - Part of specified components
	  - No output

Description

dr_info cage
kernel cage is enabled
kernel cage is disabled

If kernel cage memory (See section 2.3.1 "How to enable DR and Kernel cage memory") is enabled, the output is "kernel cage is enabled", otherwise it prints "kernel cage is disabled".

Exit Status
  0: kernel cage enabled
  1: kernel cage disabled
  2: failed to be executed
    Please check the error message shown by the command or the console message.

dr_info sysmem

If the attached or detached system board contains kernel pages, the message "suspend is required" is shown. Otherwise, the message "suspend is not required" is shown.

Exit Status
  0: the board contains kernel pages
  1: the board doesn't contain kernel pages
  2: failed to be execute
    please check the error message shown by the command or the console message.

dr_info cpu
0:1:2:3

Exit Status
  0: successfully executed
  2: failed to be executed
    please check the error message shown by the command or the console message.

Display CPU ID's on the attached or detached system board. The CPU ID's are delimited by a colon(:).

dr_info memory
512M

The total amount of memory on the attached or detached board is printed by the Mega Byte.

Exit Status
  0: successfully executed
  2: failed to be executed
    please check the error message shown by the command or the console message.

dr_info devices -p /pci@1f,0/pci@1/scsi@1
"/pci@1f,0/pci@1/scsi@1" 0 "glm"

dr_info devices -d sd
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@e,0"   13 "sd"
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@d,0"   12 "sd"
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@f,0"   14 "sd"
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@a,0"   9 "sd"
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@c,0"   11 "sd"
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@b,0"   10 "sd"
"/pci@9d,4000/pci@2/SUNW,isptwo@4/sd@9,0"   8 "sd"

dr_info devices -d hme
"/pci@9d,4000/pci@2/SUNW,hme@0,1"   2 "hme"
"/pci@83,4000/network@1,1"   1 "hme"
"/pci@9f,4000/network@1,1"   3 "hme"

dr_info devices -n network
"/pci@83,4000/network@1,1"   1 "hme"
"/pci@9f,4000/network@1,1"   3 "hme"

The connection scripts use the *devices* option to obtain device information on the attached or detached system board. The format of each record is the same as a single line in **/etc/path_to_inst**(4).

The -p option can be used to specify the device in the physical name format. Each matching device is printed in one single line.

The -d option can be used to specify the driver name for the device.

The -n option can be used to specify the portion enclosed between the / and @ character of the physical name of the device.

If none of the options (-p, -d or -n) is specified, all device information on the system board is displayed.

Exit Status
  0: successfully executed
  2: failed to be executed
    please check the error message shown by the command or the console message

dr_info board
17

This command shows a number corresponding to the system board number on which the current DR operation performs.

Output and corresponding system board number

Output	PRIMEPOWER900/1500 (with XPAR)	PRIMEPOWER2500 (with XPAR)	Without XPAR
00	sb00-0	sb00-0	sb00
01	sb01-0	sb01-0	sb01
02	sb02-0	sb02-0	sb02
03	sb03-0	sb03-0	sb03
04	sb00-1	sb04-0	sb04
05	sb01-1	sb05-0	sb05
06	sb02-1	sb06-0	sb06
07	sb03-1	sb07-0	sb07
10	sb00-2	sb00-1	sb10
11	sb01-2	sb01-1	sb11
12	sb02-2	sb02-1	sb12
13	sb03-2	sb03-1	sb13
14	sb00-3	sb04-1	sb14
15	sb01-3	sb05-1	sb15
16	sb02-3	sb06-1	sb16
17	sb03-3	sb07-1	sb17

Exit Status
  0: successfully executed
  2: failed to be executed
    please check the error message shown by the command or the console message.

3.5.4 dr_conf

```
dr_conf   proc   <process id>
```

The **proc** option can be used to inform the DR module to ignore the specified process ID in case it is a realtime process or a CPU bound process for the DR operation.

Exit Status
  0: successfully executed
  >0: failed to be executed
please check the error message shown by the command or the console message.

3.5.5 DR database command

A very simple database is created by **drc** and the commands **dr_put_db, dr_append_db, dr_get_db** can be used to manage the database. By using these commands, connection scripts can share information about each execution state (See section 3.4.1 "drc Execution States). For example, if each connection script keeps track of its execution status, (e.g. running), done, it is easy to judge which connection script is running or just has finished when an error occurs. It helps canceladd or cancelremove connection scripts run proper error handling procedures.
Each record of the database is a set of name=value pairs and a connection script identifier, e.g. **iomp**.

The user should not use this database as a permanent storage resource since it is initialized every time **drc** is executed.
Concurrent access to the same database is not allowed. In such a case, the commands unsuccessfully end with exit status 5.

3.5.5.1 dr_put_db

```
dr_put_db <script ID> name=value
```

value can be a number or a string enclosed in double quotes. This command adds the name=value pair in the **script ID** section of the database. If the record(script ID and name) already exists, the existing value will be overwritten.

Exit Status
  0   : successfully executed
  >0 : failed to be executed
    please check the error message shown by the command or the console message.
    In case the status is 5, the command failed due to concurrent access.

Example:

dr_put_db iomp status=1
dr_put_db mydb state="suspending the database"

3.5.5.2 dr_append_db

```
dr_append_db <script ID> name=value
```

This is similar to dr_put_db except this command appends **value** after the existing **name**=value. The column delimiter of the values is the space character.

Exit Status
   0   : successfully executed
   >0 : failed to be executed
      please check the error message shown by the command or the console message.
      In case the status is 5, the command failed due to concurrent access.

3.5.5.3   dr_get_db

> **dr_get_db <script ID> name**

This command gets the value of **name** in the **script ID** section of the database. If there is more than one value, the values are separated by a space character. If an undefined <script ID> or nonexistent file is specified, the command doesn't output any records but it ends successfully.

Exit Status
   0   : successfully executed
   >0 : failed to be executed
      please check the error message shown by the command or the console message.
      In case the status is 5, the command failed due to concurrent access.

Example:

dr_get_db iomp status
1
dr_get_db mydb defects
0 8 2 19

3.6   Message Files

Messages from connection scripts are kept in the directories **/etc/opt/FJSVdr/message** and
/etc/opt/FJSVdr/query. Each file contains lines that consist of a message ID and a message.
The dr_message or dr_query command shows the message that matches the message ID and the message
filename passed to the command itself.
  (See section3.5.2 "dr_message", section 3.5.1 "dr_query".)

3.6.1   Message Files for dr_message and dr_query

The filename of the message files should match the connection script identifier as defined in section "3.4.4
Naming convention of connection script". Messages files are located in:

/etc/opt/FJSVdr/message/C
/etc/opt/FJSVdr/query/C

The format of the message file is:

> <message ID>:<message>:<comment>

<message ID> is a decimal number between 0000 and 9999 and <message> is a character string that supports the same format as **printf(3C).**

Example:

0001:"Another DR is running"
0002:"Executing connection script: #####"

3.6.2   Reply File

The reply file is referred to by the adrc(1M) command and used in a non-interactive dr_query. The filename should match the connection script identifier as defined in section 3.4.4 "Naming convention of connection script"

/etc/opt/FJSVdr/reply/C

The format of the reply file is:

```
<message ID>:<return value>:<comment>
```

<message ID> is a decimal number between 0000 and 9999. <return value> is 0 if the answer is "yes" and is 1 if the answer is "no". For the same query message ID, it will always return the same return value. <comment> can be omitted

Example:

0001:0:"query if dr is executed with suspend/resume"
0002:1:"query if processor group is removed"

Chapter 4   A Sample Connection Script

This chapter shows an example of a connection script to manage a real time process.

4.1   Design of the Connection Script

In this example, the process bound to a CPU ("Bound" process) is managed by the connection script as follows:
1.   Check if "Bound" process is bound to one of the outgoing CPUs before board detach. (preremove).
2.   If it is true, query the user whether to unbind the process "Bound" or not. (preremove)
     If the answer is "yes", unbind the process. If the answer is "no", discontinue the DR operation
3.   After the system board detach, bind the process to another CPU by choosing the largest CPU ID. (postremove)
4.   If the system board detach fails and unbind has been done, rebind the process to the original CPU. (cancelremove)
5.   If another system board is attached, rebind the process to the maximum cpuid. (postadd)

The name of the connection script is **bindp.**

4.2   bindp

```
#!/bin/sh

PATH=/usr/bin:/usr/sbin:/opt/FJSVdr/bin; export PATH

# ----- script starts here -----
#

# get process id of "Bound"
PID=`ps -e -o fname -o pid| awk '{ if ($1 == "Bound" )    print $2}'`
if [ -z "$PID" ]
then
        exit 0
fi

case "$1" in
'checkadd')
     # checking procedure whether connect is possible or not
     exit 0
     ;;

'preadd')
     # procedure before device is added
     exit 0
     ;;

'postadd')
     # procedure after device is added

     # get incoming CPU IDs
     DETACHCPUS=`dr_info cpu`
```

```
            if [ $? -ne 0 ]
            then
                  exit 1
            fi
            cpu1=`echo $DETACHCPUS | cut -f1 -d':'`
            cpu2=`echo $DETACHCPUS | cut -f2 -d':'`
            cpu3=`echo $DETACHCPUS | cut -f3 -d':'`
            cpu4=`echo $DETACHCPUS | cut -f4 -d':'`
            # get biggest CPU ID from incoming CPUs.
            for ID in $cpu1 $cpu2 $cpu3 $cpu4
            do
                  psrinfo $ID | grep on-line > /dev/null 2>&1
                  if [ $? -eq 0 ]
                  then
                        CPU=$ID
                  fi
            done
            if [ -z "$CPU" ]
            then
                  exit 0
            fi
            # re-bind    to incoming CPU
            pbind -u $PID > /dev/null 2>&1
            pbind -b $CPU $PID > /dev/null 2>&1
            dr_message bindp 0002 $PID $CPU
            exit 0
            ;;

'canceladd')
            # procedure when attach is cancelled
            exit 0
            ;;

'checkremove')
            # checking procedure whether disconnect is possible or not
            exit 0
            ;;

'preremove')
            # procedure before device is removed

            # get CPU ID that "Bound" is bound.
            CPU=`pbind | grep $PID | awk '{print $4}'`
            if [ -z "$CPU" ]
            then
                  # "Bound" process is not bound cpu.
                  exit 0
            fi
            # get outgoing CPU IDs
            DETACHCPUS=`dr_info cpu`
            if [ $? -ne 0 ]
            then
                  exit 1
            fi
            cpu1=`echo $DETACHCPUS | cut -f1 -d':'`
            cpu2=`echo $DETACHCPUS | cut -f2 -d':'`
            cpu3=`echo $DETACHCPUS | cut -f3 -d':'`
            cpu4=`echo $DETACHCPUS | cut -f4 -d':'`
            # check if $CPU is going to detach
            if [ "x$CPU" = "x$cpu1" -o "x$CPU" = "x$cpu2" -o "x$CPU" = "x$cpu3" -o "x$CPU" = "$cpu4" ]
            then
                  # $PID is bound to outgoing CPU.
                  dr_query bindp 0001 $PID
                  if [ $? -ne 0 ]
                  then
```

```
                    # user rejected DR.
                    dr_message bindp 0003 $PID $CPU
                    exit 11
            fi
            # unbind
            pbind -u $PID > /dev/null 2>&1
            dr_message bindp 0001 $PID $CPU
            # save $CPU for cancel procedure
            dr_put_db bindp cpu=$CPU
        fi
        exit 0
        ;;

'postremove')
        # procedure after device is removed

        # get bigget CPU ID.
            NUMCPU=`psrinfo | grep on-line | wc -l`
            MAXID=`psrinfo | grep on-line | sed -n "${NUMCPU}p" | awk '{print $1}'`
        # bind
        pbind -b $MAXID $PID > /dev/null 2>&1
        dr_message bindp 0002 $PID $MAXID
        exit 0
        ;;

'cancelremove')
        # procedure when detach is cancelled
        CPU=`dr_get_db bindp cpu`
        if [ -z "$CPU" ]
        then
            exit 0
        fi
        if [ $PID ]
        then
            pbind -b $CPU $PID > /dev/null 2>&1
            dr_message bindp 0002 $PID $CPU
        fi
        exit 0
        ;;

*)
        exit 1
        ;;
esac
```

4.3   A message file for dr_message

```
0001:"10bindp: Process(#) is unbound from CPU##"
0002:"10bindp: Process(#) is bound to CPU##"
0003:"10bindp: User rejected to unbind process(#) from CPU#$# and DR operation
is canceled."
```

4.4   A message file for dr_query

```
0001:"Process(#) will be unbound during DR. If you don't want to unbind it, you
can cancel DR. Do you want to continue DR?"
```

Chapter 5   Troubleshooting

5.1   System board status after an error occurs

If an error occurs during a DR operation, the system board status depends on where the error occurs.
The status might be incomplete.

5.1.1   DR attach

If DR attach fails, follow these instructions.
- In case DR attach fails with "recovery fails". (system board status is "Configured")
  Please detach the system board first. Then find out the root cause and try to resolve it according to Chapter 6, "Messages and DR Error Conditions on Solaris 8 OS" and Chapter 7, "Messages and DR Error Conditions on Solaris 9 OS and Solaris 10 OS". After the error is eliminated, retry DR attach.
- In case DR attach fails with "recovery successes". (system board status is "Waiting")
  Please retry DR attach or run DR detach to return the system board status to a valid status.
- In case DR attach seemed to finish successfully but some connection scripts showed error messages. (system board status is "Configured")
  Find out the cause of the error and resolve it according to the connection script error messages

5.1.2   DR detach

If DR detach fails, follow these instructions.
1. Please find out the cause of the error and try to resolve it by reading instructions described in Chapter 6, "Messages and DR Error Conditions on Solaris 8 OS" and Chapter 7, "Messages and DR Error Conditions on Solaris 9 OS and Solaris 10 OS".
2. Once the error is resolved, the user can retry DR detach.

It is not recommended to re-attach the system board after DR detach fails due to the following reason.
If a CPU is detached with the message "drmach: DR: OS detach cpu-unit(#.#)", it will never come back online until the system board is detached and re-attached.

5.2   Example

5.2.1   DR operation ends with "Recovery fails" preceded by DR operation failure

DR operations may not try to restore the system board status in case of some errors because the error may be difficult to recover from or progress has been made too far to be recovered from. In such cases, DR operation fails with the message "Recovery fails". In case of "Recovery fails", the error should be resolved manually to restart the DR operation..
See section 5.1 "System board status after an error occurs" to resolve DR operation errors.

5.2.2 DR detach failed with "Fail to offline the CPU.[processor_id=#]" or "Failed to off-line: dr@0:SBX::cpuY"

The DR detach operation tries to resolve the issues that cause CPU offline failures as much as possible but it may not be able to resolve all issues. When DR fails with the above message, please check these three points and offline active CPUs by **psradm(1M)** and retry the DR detach operation.

Checkpoints:

- Check if there still exists a process bound to one of the CPUs on the outgoing system board. If it does, unbind the process by "**pbind -u**" and check if it is really unbound by **pbind**.
- Check if any outgoing CPU doesn't belong to any processor set by **psrset(1M)**. If there is an outgoing CPU that belongs to some processor set, remove the CPU from the processor set by **psrset -r** or remove the processor set by **psrset -d**.
- Check if there is at least one active CPU running on another system board.

Relationship between system board number and CPU ID

[GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000]

system board number	CPU IDs on the system board
sb00	0,1,2,3
sb01	4,5,6,7
sb02	8,9,10,11
sb03	12,13,14,15
sb04	16,17,18,19
sb05	20,21,22,23
sb06	24,25,26,27
sb07	28,29,30,31
sb10	32,33,34,35
sb11	36,37,38,39
sb12	40,41,42,43
sb13	44,45,46,47
sb14	48,49,50,51
sb15	52,53,54,55
sb16	56,57,58,59
sb17	60,61,62,63
sb20	64,65,66,67
sb21	68,69,70,71
sb22	72,73,74,75
sb23	76,77,78,79
sb24	80,81,82,83
sb25	84,85,86,87
sb26	88,89,90,91
sb27	92,93,94,95
sb30	96,97,98,99
sb31	100,101,102,103
sb32	104,105,106,107
sb33	108,109,110,111
sb34	112,113,114,115
sb35	116,117,118,119
sb36	120,121,122,123
sb37	124,125,126,127

[PRIMEPOWER 900/1500/2500]

system board number	CPU IDs on the system board
sb00	0,1,2,3,4,5,6,7
sb01	8,9,10,11,12,13,14,15
sb02	16,17,18,19, 20,21,22,23
sb03	24,25,26,27, 28,29,30,31
sb04	32,33,34,35,36,37,38,39
sb05	40,41,42,43,44,45,46,47
sb06	48,49,50,51,52,53,54,55
sb07	56,57,58,59,60,61,62,63
sb10	64,65,66,67,68,69,70,71
sb11	72,73,74,75,76,77,78,79
sb12	80,81,82,83,84,85,86,87
sb13	88,89,90,91,92,93,94,95
sb14	96,97,98,99,100,101,102,103
sb15	104,105,106,107,108,109,110,111
sb16	112,113,114,115,116,117,118,119
sb17	120,121,122,123,124,125,126,127

[PRIMEPOWER 900/1500 with XPAR]

system board number	CPU IDs on the system board
sb00-0	0,1
sb00-1	34,35
sb00-2	68,69
sb00-3	102,103
sb01-0	8,9
sb01-1	42,43
sb01-2	76,77
sb01-3	110,111
sb02-0	16,17
sb02-1	50,51
sb02-2	84,85
sb02-3	118,119
sb03-0	24,25
sb03-1	58,59
sb03-2	92,93
sb03-3	126,127

[PRIMEPOWER 2500 with XPAR]

system board number	CPU IDs on the system board
sb00-0	4,5,6,7
sb00-1	64,65,66,67
sb01-0	12,13,14,15
sb01-1	72,73,74,75
sb02-0	20,21,22,23
sb02-1	80,81,82,83
sb03-0	28,29,30,31
sb03-1	88,89,90,91
sb04-0	36,37,38,39
sb04-1	96,97,98,99
sb05-0	44,45,46,47
sb05-1	104,105,106,107
sb06-0	52,53,54,55
sb06-1	112,113,114,115
sb07-0	60,61,62,63
sb07-1	120,121,122,123

5.2.3   drcstat(1M) failed

drcstat(1M) may fail with following messages if this command is executed in parallel or is executed during a DR operation. In these cases, wait awhile and retry **drcstat(1M)**.

- drcstat: ioctl() failed : Device busy
- drcstat: dr_info terminated abnormally(X)
- drcstat: /dev/openprom Ioctl() faild :X: system call error message

5.2.4   Hang during DR operation

First of all, determine whether the system hung or command hung. If the system responds to the **ping(1M)** command, this is a command hang.

- In case of command hang
  - Check in which execution state the command got hung up in.
  - Stop the hung command by **drc -abort**.
    - If it hung in one of the connection scripts, check the script name.
  - If the cause of command hang-up cannot be detected, please repeat the same operation.
    If the problem remains, please contact our customer service.
- Otherwise: system hang
  - Check in which execution state the system got hung up in.
  - Get the partition dump from SMC (System Management Console) and reboot the system.

5.2.5   DR operation isn't completed with keep showing "Waiting the completion of memory releasing. (XXXX / YYYY)"

If the system is under heavy load, releasing the outgoing memory may not have completed. In such a case, the above message "Waiting the completion of memory releasing. (XXXX / YYYY)" comes out repeatedly. To resolve this issue, cancel the current running operation by **drc -abort**, reduce the system load, and then retry the DR detach operation.

5.2.6   DR operation is killed by a signal accidentally

The following explains how to recover in case the DR attach/detach operation is killed by sending a signal.
It is not recommended to stop DR attach/detach operation with a signal on purpose. If it is not recoverable by the following instructions, the system should be rebooted.

5.2.6.1   DR attach

- In case DR attach operation stops with no error message and the system board status is "Unconfigured".
  Wait until the status turns into "Waiting", then detach the system board and retry the system board attach.
- In case DR attach operation stops with the message "recovery successes" and the system board status is "Waiting"
  Retry the system board attach or detach the system board.
- In case DR attach operation stops with the message "recovery fails" and the system board status is "Waiting"
  Detach the system board and retry the system board attach.
- In case DR attach operation stops with no error message and the system board status is "Waiting".
  Detach the system board and retry the system board attach.

5.2.6.2   DR detach

- In case DR detach operation stops with no error message and the system board status is "Configured".
  Retry the DR detach.
- In case DR detach operation stops with the message "recovery successes" and the system board status is "Configured"
  Retry the DR detach.
- In case DR detach operation stops with the message "recovery fails" and the system board status is "Configured"
  Retry the DR detach.
- In case DR detach operation stops with no error message and the system board status is "Unconfigured".
  - In case of simple DR detach.
    The system board status turns into "Disconnected" after a while and the DR detach operation will be done successfully.
  - In case of system board migration to another partition: '-next PID' option specified.
    The system board status turns into "Waiting" after a while and the DR detach operation will be done successfully.
  - In case of system board hotswap: '-keep' option specified.
    The DR detach operation has been done. Proceed with the hotswap operation.

5.2.7   System panic during DR operation

Please contact field engineers

5.3   Note

- The system board number in the console messages or some of the messages shown in standard output are displayed in a different format from the format that is specified as a command argument: e.g. **drc(1M)**. Refer to Chapter 6 "The system board notation in DR driver Messages" and Chapter 7 "The system board notation in DR driver Messages".
- System shutdown or power down is not allowed during a DR operation
- The message **"xc_loop timeout()"** may appear on the console during a DR operation, but there is no impact on the system behavior and can be ignored.

Chapter 6   Messages and DR Error Conditions
on Solaris 8 OS

6.1   Command Messages

6.1.1   Warning and Error Message List

#: handle invalid
(major# #) not hotplugable
is still referenced.
All devices are not unconfigured.
Another DR is executed.
board # is already connected.
can't get fma-ranges on board #.
can't get fma-ranges. No remaining memory is attached.
can't get memlist on board #.
can't get s_basepa from 0xX
can't get t_basepa from 0xX
Connection Script returns illegal exit code. (Exit code=#)
cpu # still active
cpu_configure for cpu # failed
cpu_unconfigure for cpu # failed
deprobe failed for board #
detect dr-status = ######
devlist[#] empty (expected #)
DR is not enabled.
DR operation is not executed.
drc: Another drc is executed.
drc: Board Type is different (sbXY). drc: Board Type is different (sbXY-N).
drc: cannot open /dev/FJSVhwr/pwrctl2: System call error Message
drc: CPU clock frequency is different (sbXY). drc: CPU clock frequency is different (sbXY-N).
drc: DR is failed. Specified partition (PID#nn) is Extended Interleave Mode (sbXY). drc: DR is failed. Specified partition (PID#nn) is Extended Interleave Mode (sbXY-N).
drc: DR is failed. This partition is Extended Interleave Mode (sbXY). drc: DR is failed. This partition is Extended Interleave Mode (sbXY-N).
drc: DR is not enabled.

drc: DR is not supported.
drc: dr module is not found.
drc: dr module terminated abnormally(X).
drc: Incorrect memory mode (sbXY).
drc: Incorrect memory mode (sbXY-N).
drc: Incorrect PID.
drc: Invalid Status XX YY
drc: ioctl() failed: system call error message
drc: not super user
drc: Specified system board is not installed (sbXY).
drc: Specified system board is not installed (sbXY-N).
drc: System board is in use by another partition (sbXY).
drc: System board is in use by another partition (sbXY-N).
drc: System call failed.
drc: Time Out
drc: Unable to connect the specified system board (sbXY).
drc: Unable to connect the specified system board (sbXY-N).
drc: Unable to disconnect the specified system board (sbXY incorrect PID).
drc: Unable to disconnect the specified system board (sbXY-N incorrect PID).
drc: Unable to disconnect the specified system board (sbXY incorrect status).
drc: Unable to disconnect the specified system board (sbXY-N incorrect status).
drc: Unable to disconnect the specified system board (sbXY last system board).
drc: Unable to disconnect the specified system board (sbXY-N last system board).
drcstat: /dev/openprom ioctl() failed :X: system call error message
drcstat: cannot open /dev/FJSVhwr/pwrctl2: system call error Message
drcstat: DR is not supported.
drcstat: dr module is not found.
drcstat: dr_info terminated abnormally(X).
drcstat: ioctl() failed: system call error message
drcstat: malloc() failed.
drcstat: not super user
drcstat: Specified system board does not exist in current partition.
drcstat: Specified system board is not installed.
drcstat: System call failed.
Error occurred on executing #### (Exit code=#)
Fail to cancel releasing the memory.
Fail to check the bound processes.
Fail to configure the board.
Fail to configure the CPU.
Fail to configure the I/O.
Fail to configure the memory.
fail to connect board with the error = 0xX.
fail to connect board. retval = #.
Fail to delete the processor group.
Fail to disconnect the board.
Fail to execute cfgadm ###### I/O Device=######.

fail to get OBP translations
Fail to get the status of the board.
fail to initialize device information.
fail to map the obp area   #
Fail to offline the CPU. [processor_id=#]
Fail to online the CPU. [processor_id=#]
fail to quiesce OS for copy-rename
Fail to release the board.
Fail to release the CPU.
Fail to release the I/O.
Fail to release the memory.
Fail to remove processor from processor group.
Fail to restart picld.
fail to stop kernel thread
fail to stop process: ###### id: # state: #
Fail to unbind processes.
Fail to unconfigure the board.
Fail to unconfigure the CPU.
Fail to unconfigure the I/O.
Fail to unconfigure the memory.
failed obp detach of cpu #
failed to attach cpu node branch to node tree. (error=#)
failed to attach I/O node branch to node tree. (error=#)
failed to attach mem node branch to node tree. (error=#)
failed to copyout ioctl-cmd-arg
failed to detach cpu node branch (######) from the node tree. (error=#)
failed to detach I/O node branch (######) from the node tree. (error=#)
failed to detach mem node branch (######) from the node tree. (error=#)
failed to disable interrupts on cpu #.
failed to get cpuid for nodeid (0xX)
failed to get cpuid(#)
failed to offline cpu #
failed to power-off cpu # (errno = #)
failed to power-on cpu #
failed to quiesce OS for copy-rename
fjsv_cdr_alloc_cache_func() failed.
fjsv_cdr_alloc_fma_job() failed.
fjsv_cdr_fma_clear_data() failed.
fjsv_cdr_fma_copy_data() failed.
fjsv_cdr_make_job() failed.
fjsv_cdr_make_req() failed.
fjsv_u2_ecc_kstat_delete: wrong board number #
fjsv_u2ts_kstat_delete: wrong board number #
fjsv_upa_ecc_kstat_delete: wrong board number #
FMA failed. rtn = #.
I/O devices active
Illegal environment for   DR. (ftrace_atboot is set to 1.)
ineligible mem-unit (#.#) for detach
internal error: no memlist for board #

invalid device
invalid nodetype (#)
invalid state to deprobe board #
invalid state transition
invalid state transition for mem-unit (#.#)
Invalid Status Devices=#### Status=####
Invalid System Board Number
kcage_range_add failed. (#)
kernel cage is disabled
Kernel memory is on the target board.
kphysm_add_memory_dynamic failed. (#)
kphysm_del_status
master TOD present on board #
Memory is not enough to detach the board.
mem-unit (#.#) has non-relocatable page(s).
mem-unit (#.#) memlist not in phys_install
mem-unit (#.#) release in-progress
no available target for mem-unit (#.#)
no available target for mem-unit (#.#). The candidate has no-obp-sb-cX.
no devices present on board #
no quiesce while real-time pid (#) present
probe failed for board #
prom_fjsv_fma_end failed. rtn = #
prom_fjsv_fma_start failed.
protocol error: kphysm_del_span_query [bd=#, bp=0xX,   n=#]
protocol error: mem-unit (#.#) missing target indicator
protocol error: mem-unit (#.#) not released
Psrinfo fails.
Recovery fails.
There is not enough swap space.
unable to get unit for nodeid (0xX)
unexpected state (#) for mem-unit (#.#)
Usage: drc -connect sbXY [-reset] Usage: drc -connect {sbXY | sbXY-N} [-reset] Usage: drc -disconnect sbXY [-reset] Usage: drc -disconnect {sbXY | sbXY-N} [-reset] Usage: drc -disconnect sbXY -next PID [-reset] Usage: drc -disconnect {sbXY | sbXY-N} -next PID [-reset] Usage: drc -disconnect sbXY –keep Usage: drc -disconnect {sbXY | sbXY-N} –keep Usage: drc –abort Usage: adrc -connect sbXY [-reset] Usage: adrc -connect {sbXY | sbXY-N} [-reset] Usage: adrc -disconnect sbXY [-reset] Usage: adrc -disconnect {sbXY | sbXY-N} [-reset] Usage: adrc -disconnect sbXY -next PID [-reset] Usage: adrc -disconnect {sbXY | sbXY-N}-next PID [-reset]
Usage: drcstat -board [sbXY | all] Usage: drcstat -board [sbXY | sbXY-N | all] [-xpar]

Usage: drcstat -system [sbXY]
Usage: drcstat -system [sbXY | sbXY-N] [-xpar]
Usage: drcstat -device [sbXY] [-e]
Usage: drcstat -device [sbXY | sbXY-N] [-e] [-xpar]

6.1.2   Progress and Inquiring Message List

"-keep" option is only used for system board hotswap operation Continue ? [YES]/[NO]
Cancel operation starts.
Checking if I/O is referenced or not.
Checking if there are enough swap space.
Checking if there are real time processes
Checking status of board.
Checking the CPU.
Checking the size of memory.
Configure the CPU.
Configure the I/O.
Configure the memory.
Configuring the board.
Configuring the I/O device [XX/YY].
Connect sbXY (board number=#) at the next reboot Connect sbXY-N (board number=#) at the next reboot
Connecting sbXY (board number=#) is done Connecting sbXY-N (board number=#) is done
Connecting the board.
Connection Script #### is done.
Connection scripts start. Execution states ####
CPU [processor_id=#] is in the processor group. Do you remove?
CPU [processor_id=######] is the last processor in the processor group. Do you remove processor group?"
Disconnect sbXY (board number=#) at the next reboot Disconnect sbXY-N (board number=#) at the next reboot
Disconnect sbXY (board number=#) is done Disconnect sbXY-N (board number=#) is done
Disconnect the board.
Execute connection script ####
Kernel memory found on the target board. Do you continue DR ?
Offline the CPU.
Online the CPU.
Processes[pid=######] is binded to the CPU on the detached board. Are binded processes unbinded automatically?
Real time processes[pid=######] is running. Do you continue DR ?
Recovery successes.
Release the board
Release the CPU
Release the I/O
Release the memory.

Restarting drd.
Restarting picld.
Start connecting sbXY (board number=#)
Start connecting sbXY-N (board number=#)
Start disconnecting sbXY (board number=#)
Start disconnecting sbXY-N (board number=#)
Stopping drd.
Target board has the no-obp-sb-cX property set. Do you continue DR ?
The number of pages to be handle #
Unconfigure the board
Unconfigure the CPU.
Unconfigure the I/O
Unconfigure the memory
Waiting the completion of memory releasing. (XXXX / YYYY)

6.1.3   drc messages

6.1.3.1   Warning Error Messages

If the remedy says "Respond in the manner directed by the system console message.", please refer to section
6.2 "Console Message" and follow the remedy suggested to take an appropriate action.

Message	**Usage: drc -connect sbXY [-reset]**
	Usage: drc -connect {sbXY | sbXY-N} [-reset]
	Usage: drc -disconnect sbXY [-reset]
	Usage: drc -disconnect {sbXY | sbXY-N} [-reset]
	Usage: drc -disconnect sbXY -next PID [-reset]
	Usage: drc -disconnect {sbXY | sbXY-N} -next PID [-reset]
	Usage: drc -disconnect sbXY –keep
	Usage: drc -disconnect {sbXY | sbXY-N} –keep
	Usage: drc –abort
	Usage: adrc -connect sbXY [-reset]
	Usage: adrc -connect {sbXY | sbXY-N} [-reset]
	Usage: adrc -disconnect sbXY [-reset]
	Usage: adrc -disconnect {sbXY | sbXY-N} [-reset]
	Usage: adrc -disconnect sbXY -next PID [-reset]
	Usage: adrc -disconnect {sbXY | sbXY-N}-next PID [-reset]
Cause	Wrong command option

Message	**drc: not super user**
Cause	Executed command by non super user
Remedy	Execute command by super user

Message	**drc: cannot open /dev/FJSVhwr/pwrctl2: System call error Message**
Cause	Cannot access to SCF driver

Remedy	Ensure SCF driver package is properly installed

Message	**drc: Another drc is executed.**
Cause	Another drc Command is already being executed
Remedy	drc command cannot be executed simultaneously

Message	**drc: DR is not enabled.**
Cause	System is not setup to execute DR.
Remedy	Refer to "2.3 DR Configuration and Administration Issues" to enable DR.

Message	**drc: dr module is not found.**
Cause	DR module cannot be found.
Remedy	Ensure FJSVdrcmd package is properly installed.

Message	**drc: ioctl() failed: system call error message** **SENSE: XX XX XX XX**

Cause	Displayed "Operation not supported":
	  This firmware version doesn't support DR.
	Otherwise:
	  failed to access to SCF driver.
	However, SENSE might not be displayed. It depends on "system call error message".

Remedy	Displayed the "Operation not supported":
	  Please contact our customer service.
	SENSE was displayed except the above-mentioned:
	  Please contact our customer service.
	SENSE was not displayed except the above-mentioned:
	  Ensure SCF driver package is properly installed.

Message	**drc: Specified system board is not installed (sbXY).** **drc: Specified system board is not installed (sbXY-N).**
Cause	Specified system board is not installed.
Remedy	Be sure the specified system board is installed

Message	**drc: Incorrect memory mode (sbXY).** **drc: Incorrect memory mode (sbXY-N).**
Cause	Specified system board is running in interleaved mode
Remedy	Check the specified system board

Message	**drc: Board Type is different (sbXY).** **drc: Board Type is different (sbXY-N).**
Cause	While connecting: The system board type is different from other system boards in the partition. While transporting:

	The system board type is different from the destination system board.
Remedy	Check the specified system board

Message	**drc: CPU clock frequency is different (sbXY).**
	drc: CPU clock frequency is different (sbXY-N).
Cause	While connecting:
	The CPU type on the system board is different from the current partition.
	While transporting:
	The CPU type on the system board is different from the destination partition.
Remedy	Check the specified system board

Message	**drc: System board is in use by another partition (sbXY).**
	drc: System board is in use by another partition (sbXY-N).
Cause	Specified system board is already used in another partition
Remedy	Check the specified system board

Message	**drc: Invalid Status XX YY**
Cause	Status of the system board became invalid during the DR process
Remedy	Please contact our customer service.

Message	**drc: Time Out**
Cause	Status of system board does not change within the fixed time.
Remedy	Please contact our customer service.

Message	**drc: Unable to connect the specified system board (sbXY).**
	drc: Unable to connect the specified system board (sbXY-N).
Cause	Specified system board is not connectable status
Remedy	Check the specified system board

Message	**drc: System call failed.**
Cause	System call failed
Remedy	Check swap allocation or memory resources and try again

Message	**drc: dr module terminated abnormally(X).**
Cause	DR module terminated abnormally.
Remedy	Respond in the manner directed by the system console message

Message	**drc: Unable to disconnect the specified system board (sbXY incorrect PID).**
	drc: Unable to disconnect the specified system board (sbXY-N incorrect PID).
Cause	Specified system board does not exist in the target partition.
Remedy	Check the specified system board.

Message	**drc: Unable to disconnect the specified system board (sbXY incorrect status).**
	drc: Unable to disconnect the specified system board (sbXY-N incorrect status).
Cause	Specified system board is not able to be disconnected.
Remedy	Check the specified system board.

Message	**drc: Unable to disconnect the specified system board (sbXY last system board).**
	drc: Unable to disconnect the specified system board (sbXY-N last system board).
Cause	Specified system board is the last one
Remedy	Check the specified system board.

Message	**drc: Incorrect PID.**
Cause	Specified PID does not exist.
Remedy	Check the specified PID

Message	**drc: DR is not supported.**
Cause	1) DR operation was executed with the 32bit Solaris OS system or older Solaris OS release such as Solaris 7 OS. OR 2) DR operation is executed on hardware that does not support DR.
Remedy	For requirements of DR process, please refer to "1.2 DR Requirements"

Message	**drc: DR is failed. This partition is Extended Interleave Mode (sbXY).**
	drc: DR is failed. This partition is Extended Interleave Mode (sbXY-N).
Cause	This partition is being operated in Extended Interleave Mode.
Remedy	Check the Extended Interleave Mode of the partition. If Extended Interleave Mode is available, DR cannot be done.

Message	**drc: DR is failed. Specified partition (PID#nn) is Extended Interleave Mode (sbXY).**
	drc: DR is failed. Specified partition (PID#nn) is Extended Interleave Mode (sbXY-N).
Cause	The partition specified by "-next" is operating in the Extended Interleave Mode .
Remedy	Check the Extended Interleave Mode of the partition specified by "-next". If Extended Interleave Mode is available, DR cannot be done.

Message	**Another DR is executed.**
Explanation	Another DR is already being executed on the partition
Remedy	Additional DR processes can be executed after the current DR is completed.

Message	**Connection Script returns illegal exit code. (Exit code=#)**
Explanation	Connection Script(Script name:####)exit illegally.
Remedy	Check the connection script.

Message	**DR is not enabled.**
Explanation	System is not setup to execute DR
Remedy	Refer to "2.3 DR Configuration and Administration Issues" to enable DR.

Message	**DR operation is not executed.**
Explanation	DR operation is being canceled despite DR is not executing.
Remedy	Cancel command is only supported while DR is executing.

Message	**Error occurred on executing #### (Exit code=#)**
Cause	Connection Script(Script name:####)exit illegally
Remedy	Check the connection script

Message	**Fail to configure the CPU.**
Cause	Fail to configure the CPU.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to configure the I/O.**
Cause	Fail to configure the I/O.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to configure the board.**
Cause	Fail to configure the system board
Remedy	Respond in the manner directed by the console message.

Message	**Fail to configure the memory.**
Cause	Fail to configure the memory
Remedy	Respond in the manner directed by the console message.

Message	**Fail to delete the processor group.**
Cause	Fail to delete the processor set.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to disconnect the board.**
Explanation	Fail to disconnect the system board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to get the status of the board.**
Explanation	Fail to get the system board status.

Remedy	Respond in the manner directed by the console message.

Message	**Fail to offline the CPU. [processor_id=#]**
Explanation	Fail to offline the CPU of processor id #
Remedy	Manually offline the processor by psradm(1M) and re-execute the DR. Refer to section 5.2.2 "DR detach failed with "Fail to offline the CPU.[processor_id=#]"".

Message	**Fail to online the CPU. [processor_id=#]**
Explanation	Fail to online the CPU of processor id #
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the CPU.**
Explanation	Fail to release the CPU.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the I/O.**
Explanation	Fail to release the I/O.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the board.**
Explanation	Fail to release the system board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the memory.**
Explanation	Fail to release the memory.
Remedy	Confirm whether there are enough free memory spaces. If so, respond in the manner directed by the console message. If not, after making more free memory spaces available, respond in the manner directed by the console message.

Message	**Fail to remove processor from processor group.**
Explanation	Fail to remove the CPU from the processor set.
Remedy	Manually remove the processor from the processor set by psrset(1M) and re-execute DR.

Message	**Fail to unbind processes.**
Explanation	Fail to unbind processes from the CPU.
Remedy	Manually unbind the processes by pbind(1M) and re-execute DR.

Message	**Fail to unconfigure the CPU.**
Explanation	Fail to unconfigure the CPU.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to unconfigure the I/O.**
Explanation	Fail to unconfigure the I/O.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to unconfigure the board.**
Explanation	Fail to unconfigure the system board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to unconfigure the memory.**
Explanation	Fail to unconfigure the memory.
Remedy	Confirm whether there are enough free memory spaces. If so, respond in the manner directed by the console message. If not, after making more free memory spaces available, re-execute DR.

Message	**Invalid Status Devices=#### Status=####**
Explanation	The status of devices is illegal.
Remedy	Respond in the manner directed by the console message

Message	**Kernel memory is on the target board.**
Explanation	The kernel memory exists on the DR target system board.
Remedy	[GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000] The target board with kernel memory cannot be disconnected by DR. [PRIMEPOWER 900/1500/2500] Re-execute DR.

Message	**Memory is not enough to detach the board.**
Explanation	Cannot disconnect the system board due to insufficient memory.
Remedy	Increase free memory and execute again.

Message	**Psrinfo fails.**
Explanation	Fail to get the status of processor.
Remedy	Respond in the manner directed by the console message

Message	**Recovery fails.**
Explanation	Recovery failed after the interruption of DR.
Remedy	Execute error recovery directed by Chapter 5.

Message	**There is not enough swap space.**
Explanation	Cannot disconnect the system board due to insufficient swap space.

Remedy	Increase free swap space and execute again.

Message	**Fail to cancel releasing the memory.**
Explanation	Fail to cancel the memory detaching operation.
Remedy	Respond in the manner directed by the console message

Message	**Fail to check the bound processes.**
Explanation	Fail to check the status of bound processes.
Remedy	Manually unbind the processes by pbind(1M) and re-execute DR.

Message	**Illegal environment for DR. (ftrace_atboot is set to 1.)**
Explanation	DR environment is not set up.
Remedy	Please comment out "ftrace_atboot = 1" line in /etc/system to disable this configuration. After this reboot the system.

Message	**Fail to execute cfgadm ###### I/O Device=######.**
Explanation	Fail to execute cfgadm for the I/O device which has ap_id ######.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to restart picld.**
Explanation	Fail to restart picld.
Remedy	Respond in the manner directed by the console message.

Message	**###### is still referenced.**
Explanation	An I/O device on the outgoing system board is still referenced.
Remedy	Confirm that the displayed I/O device is not in use and repeat the DR operation. If this error message appears again, please contact our customer service.

6.1.3.2 Progress Messages

Message	**Start connecting sbXY (board number=#)**
	Start connecting sbXY-N (board number=#)
Explanation	Start DR attach of the system board "sbXY".

Message	**Start disconnecting sbXY (board number=#)**
	Start disconnecting sbXY-N (board number=#)
Explanation	Start DR detach of the system board "sbXY".

Message	**Connect sbXY (board number=#) at the next reboot**
	Connect sbXY-N (board number=#) at the next reboot

Explanation	Attach the system board "sbXY" to the current partition at the next reboot.

Message	**Disconnect sbXY (board number=#) at the next reboot** **Disconnect sbXY-N (board number=#) at the next reboot**
Explanation	Detach the system board "sbXY" from the current partition at the next reboot.

Message	**Connecting sbXY (board number=#) is done** **Connecting sbXY-N (board number=#) is done**
Explanation	DR attach process is completed.

Message	**Disconnect sbXY (board number=#) is done** **Disconnect sbXY-N (board number=#) is done**
Explanation	DR Detach process is completed.

Message	**Cancel operation starts.**
Explanation	Cancel operation started due to error that occurred during DR or as directed by user.

Message	**Checking status of board.**
Explanation	Checking failed device on the system board.

Message	**Checking the CPU.**
Explanation	Checking the CPU status.

Message	**Checking the size of memory.**
Explanation	Checking the size of memory to ensure there is sufficient memory present to disconnect the system board.

Message	**Configuring the board.**
Explanation	Connecting system board and activating the device on the board.

Message	**Connecting the board.**
Explanation	Connecting the system board.

Message	**Connection Script #### is done.**
Explanation	Finish execution of the connection script which is named ######.

Message	**Disconnect the board.**
Cause	Disconnecting the system board.

Message	**Execute connection script ####**
Cause	Executing the connection script (script name:####).

Message	**Offline the CPU.**
Explanation	Offline the CPU.

Message	**Online the CPU.**
Explanation	Online the CPU.

Message	**Recovery successes.**
Explanation	Recovery successfully completed.

Message	**Release the CPU**
Explanation	Releasing CPU.

Message	**Release the I/O**
Explanation	Releasing the I/O.

Message	**Release the board**
Explanation	Releasing the system board.

Message	**Release the memory.**
Explanation	Releasing memory.

Message	**The number of pages to be handle #**
Explanation	The remaining number of pages will be unconfigured.

Message	**Unconfigure the CPU.**
Explanation	Unconfiguring the CPU.

Message	**Unconfigure the I/O**
Explanation	Unconfiguring the I/O.

Message	**Unconfigure the board**
Explanation	Unconfiguring the system board.

Message	**Unconfigure the memory**
Explanation	Unconfiguring the memory.

Message	**Checking if there are real time processes**
Explanation	Checking if any real time process is running or not.

Message	**Checking if there are enough swap space.**
Explanation	Checking if swap space is enough to detach the memory.

Message	**Waiting the completion of memory releasing. (XXXX / YYYY)**
Explanation	Waiting for memory releasing to complete. XXXX pages out of YYYY pages have not been released yet.

Message	**Connection scripts start. Execution states ####**
Explanation	Connection scripts which state is ### start to execute.

Message	**Configure the CPU.**
Explanation	Configure the CPU.

Message	**Configure the I/O.**
Explanation	Configure the I/O.

Message	**Configure the memory.**
Explanation	Configure the memory.

Message	**Restarting drd.**
Explanation	Restarting drd.

Message	**Restarting picld.**
Explanation	Restarting picld.

Message	**Stopping drd.**
Explanation	Stopping drd.

Message	**Configuring the I/O device [XX/YY].**
Explanation	Configuring the I/O device. (XX: Number of configured I/O devices, YY: Number of I/O devices)

Message	Checking if I/O is referenced or not.
Explanation	Checking if I/O is referenced or not.

6.1.3.3 Inquiring Messages

Message	"-keep" option is only used for system board hotswap operation Continue ? [YES]/[NO]
Explanation	This message is displayed in case "-keep" option is specified and it executes system board hotswap. If YES, DR process continues. If NO, DR process is canceled.
Action Recommended	Reply YES to this message only to execute system board hotswap operation.

The reply file for the following inquiring messages is located at /etc/opt/FJSVdr/reply/C/dr_op.

If you need to change the answers, you can edit the reply file.

Message	CPU [processor_id=#] is in the processor group. Do you remove?
Explanation	This message is displayed in case the CPU of targeted system board belongs to processor set. If Yes, CPU is removed from processor set and DR is to be continued. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	Reply Yes to this message and continue the DR process. After the completion of DR, if necessary, CPU is to be added to the processor set by psrset(1M).

Message	CPU [processor_id=######] is the last processor in the processor group. Do you remove processor group?"
Explanation	This message is displayed in case the CPU on the targeted system board belongs to processor set and the CPU is the only processor within the group. If Yes, CPU is deleted from processor set and DR is continued. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	Reply Yes to this message and continue the DR process. After the completion of DR, if necessary, processor set is created by psrset(1M).

Message	Processes[pid=######] is binded to the CPU on the detached board. Are binded processes unbinded automatically?
Explanation	This message is displayed in case the CPU on the targeted system board is bound to process(es). If Yes, the process(es) is(are) unbound from the CPU and DR is continued. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	Reply Yes to this message and continue the DR process.

Message	**Real time processes[pid=######] is running. Do you continue DR ?**
Explanation	This message is displayed in case Real time processes are running.
	|If Yes, DR is continued.
	If No, DR process is aborted.
	The adrc command chooses "No".
Action Recommended	Real time processes are not scheduled for a few seconds. Please confirm the processes are not influenced by a few second delay and continue the DR process.

Message	**Kernel memory found on the target board. Do you continue DR ?**
Explanation	This message is displayed in case the system finds kernel memory on the board which is just removed.
	If Yes, DR is continued.
	If No, DR process is aborted.
	The adrc command chooses "No".
Action Recommended	Reply Yes to this message and continue the DR process.

Message	**Target board has the no-obp-sb-cX property set. Do you continue DR ?**
Explanation	The system finds that no-obp-sb-cX is specified to the board to which the system copies kernel memory.
	If Yes, DR is continued.
	If No, DR process is aborted.
	The adrc command chooses "No".
Action Recommended	If it's no problem to copy kernel memory to the board with no-obp-sb-cX or no-obp-sb, reply Yes to this message and continue the DR process.

6.1.4   drcstat error Messages

Message	**Usage: drcstat -board [sbXY | all]**
	Usage: drcstat -board [sbXY | sbXY-N | all] [-xpar]
	Usage: drcstat -system [sbXY]
	Usage: drcstat -system [sbXY| sbXY-N] [-xpar]
	Usage: drcstat -device [sbXY] [-e]
	Usage: drcstat -device [sbXY | sbXY-N] [-e] [-xpar]
Cause	Wrong command option

Message	**drcstat: Specified system board is not installed.**
Cause	Specified system board is not installed.
Remedy	Be sure the specified system board is installed

Message	**drcstat: not super user**
Cause	Executed command by non super user
Remedy	Execute command by super user

Message	**drcstat: dr module is not found.**
Cause	DR module cannot be found.
Remedy	Ensure FJSVdrcmd package is properly installed.

Message	**drcstat: cannot open /dev/FJSVhwr/pwrctl2: system call error Message**
Cause	Cannot access to SCF driver.
Remedy	Ensure SCF driver package is properly installed.

Message	**drcstat: ioctl() failed: system call error message**
Cause	Displayed "Operation not supported": This firmware version doesn't support DR. Displayed "Device busy": Cannot access to SCF because SCF is busy. Otherwise: failed to access to SCF driver.
Remedy	Displayed the "Operation not supported": Please contact our customer service. Displayed "Device busy": Wait for a while and re-execute drcstat. Otherwise: Ensure FJSVscd2 package is properly installed.

Message	**drcstat: /dev/openprom ioctl() failed :X: system call error message**
Cause	Cannot access to openprom.
Remedy	Wait for a while and re-execute drcstat command.

Message	**drcstat: malloc() failed.**
Cause	Failed to allocate memory
Remedy	Check swap allocation or memory resources and try again.

Message	**drcstat: System call failed.**
Cause	The system call failed.
Remedy	Check swap allocation or memory resources and try again.

Message	**drcstat: dr_info terminated abnormally(X).**
Cause	dr_info command failed.
Remedy	Wait for a while and re-execute drcstat command. Otherwise respond in the manner directed by the system console message

Message	**drcstat: Specified system board does not exist in current partition.**
Cause	The specified system board does not exist in the current partition.
Remedy	Check the specified system board.

Message	**drcstat: DR is not supported.**
Cause	1) DR operation was executed with the 32bit Solaris OS system or older Solaris OS release such as Solaris 7 OS. OR 2) DR operation is executed on hardware that does not support DR.
Remedy	For requirements of DR process, please refer to "1.2 DR Requirements"

6.2   Console Messages

This section explains the console message printed out by DR driver.

The system board notation in DR driver Messages

The system board number in DR driver Messages is represented in a different notation from what is used for DR commands. The following table shows the relationship between these two different notations

The board number relationship between DR command and DR driver Message (Without XPAR)

DR command	DR driver Message
sb00	0
sb01	1
sb02	2
sb03	3
sb04	4
sb05	5
sb06	6
sb07	7
sb10	8
sb11	9
sb12	10
sb13	11
sb14	12
sb15	13
sb16	14
sb17	15
sb20	16
sb21	17
sb22	18
sb23	19
sb24	20
sb25	21
sb26	22
sb27	23

sb30	24
sb31	25
sb32	26
sb33	27
sb34	28
sb35	29
sb36	30
sb37	31

The board number relationship between DR command and DR driver Message (PRIMEPOWER900/1500 With XPAR)

DR command	DR driver Message
sb00-0	0
sb00-1	4
sb00-2	8
sb00-3	12
sb01-0	1
sb01-1	5
sb01-2	9
sb01-3	13
sb02-0	2
sb02-1	6
sb02-2	10
sb02-3	14
sb03-0	3
sb03-1	7
sb03-2	11
sb03-3	15

The board number relationship between DR command and DR driver Message (PRIMEPOWER2500 With XPAR)

DR command	DR driver Message
sb00-0	0
sb00-1	8
sb01-0	1
sb01-1	9
sb02-0	2
sb02-1	10
sb03-0	3
sb03-0	11
sb04-0	4
sb04-1	12
sb05-0	5
sb05-1	13
sb06-0	6
sb06-1	14
sb07-0	7
sb07-1	15

6.2.1　Console Message List

DR: OS attach cpu-unit (X.Y)
DR: OS attach io-unit (X.Y)
DR: OS attach mem-unit (X.Y)
DR: OS detach cpu-unit (X.Y)
DR: OS detach io-unit (X.Y)
DR: OS detach mem-unit (X.Y)

DR: PROM attach board X (cpu Y)
DR: PROM detach board
DR: resume COMPLETED
DR: resuming user threads...
DR: suspending drivers... FAILED to suspend X
DR: suspending drivers... suspending X FAILED to resume X
DR: suspending drivers... suspending X resuming X
DR: suspending kernel daemons...
DR: suspending user threads...
dr:dr_attach: #: failed to alloc soft-state
dr:dr_attach: #: failed to init psm-dr
dr:dr_attach: #: failed to init psm-dr ops
dr:dr_attach: #: failed to make nodes
dr:dr_attach_cpu: cpu_configure for cpu # failed
dr:dr_attach_cpu: failed to attach cpu node branch to node tree. (error=#)
dr:dr_attach_cpu: failed to get cpuid(#)
dr:dr_attach_io: failed to attach I/O node branch to node tree. (error=#)
dr:dr_attach_mem: failed to attach mem node branch to node tree. (error=#)
dr:dr_attach_mem: kcage_range_add failed. (#)
dr:dr_attach_mem: kphysm_add_memory_dynamic failed. (#)
dr:dr_detach_cpu: cpu_unconfigure for cpu # failed
dr:dr_detach_cpu: failed to detach cpu node branch (######) from the node tree. (error=#)
dr:dr_detach_cpu: failed to get cpuid for nodeid (0xX)
dr:dr_detach_io: failed to detach I/O node branch (######) from the node tree. (error=#)
dr:dr_detach_mem: failed to detach mem node branch (######) from the node tree. (error=#)
dr:dr_dev_disconnect: fjsv_u2_ecc_kstat_delete: wrong board number #
dr:dr_dev_disconnect: fjsv_u2ts_kstat_delete: wrong board number #
dr:dr_dev_disconnect: fjsv_upa_ecc_kstat_delete: wrong board number #
dr:dr_exec_op: unknown command (#)
dr:dr_ioctl: #: handle invalid
dr:dr_ioctl: #: handle not found
dr:dr_ioctl: #: module not yet attached
dr:dr_open: #: module not yet attached
dr:dr_release_mem: failed to get memhandle for nodeid 0xX
sfdr:adjust_phys_memory: obp-memory: can't get the property for   node 0xX
sfdr:dr_platform_init: Could not get kernel symbol address
sfdr:fjsv_alloc_map_area: can't alloc vmem.
sfdr:fjsv_alloc_map_area: can't find pagesize(0xX).
sfdr:fjsv_alloc_map_area: wrong pagesize(#).
sfdr:fjsv_cdr_add_fma_job: jobp or mlp is NULL.
sfdr:fjsv_cdr_add_fma_job: kmem_zalloc failed.

sfdr:fjsv_cdr_alloc_cache_func: fjsv_cdr_get_scf_addr failed.
sfdr:fjsv_cdr_alloc_cache_func: fma size(0xX) is bigger than PAGESIZE.
sfdr:fjsv_cdr_alloc_cache_func: jobp is NULL.
sfdr:fjsv_cdr_alloc_cache_func: kmem_zalloc failed.
sfdr:fjsv_cdr_alloc_cache_func: loop size(0xX) is bigger than PAGESIZE.
sfdr:fjsv_cdr_alloc_cache_func: startup_size(0xX) is bigger than PAGESIZE.
sfdr:fjsv_cdr_alloc_fma_job: fjsv_cdr_add failed.
sfdr:fjsv_cdr_alloc_fma_job: jobp or mlp is NULL.
sfdr:fjsv_cdr_alloc_fma_job: mlp is NULL.
sfdr:fjsv_cdr_check_cache: CPU version(#) is different.
sfdr:fjsv_cdr_check_cache: jobp is NULL.
sfdr:fjsv_cdr_check_dr_status: kmem_zalloc failed.
sfdr:fjsv_cdr_check_dr_status: prom_finddevice failed.
sfdr:fjsv_cdr_check_dr_status: prom_getprop failed.
sfdr:fjsv_cdr_check_error: reqp is NULL.
sfdr:fjsv_cdr_check_mbox: find FJSV_MBOX_FAILURE.
sfdr:fjsv_cdr_check_mbox: reqp is NULL.
sfdr:fjsv_cdr_delete_cache_func: jobp is NULL.
sfdr:fjsv_cdr_delete_fma_job: jobp is NULL.
sfdr:fjsv_cdr_delete_job: jobp is NULL.
sfdr:fjsv_cdr_delete_memlist: mlp is NULL.
sfdr:fjsv_cdr_delete_req: reqp is NULL.
sfdr:fjsv_cdr_fma_clear_data: can't get map_size.
sfdr:fjsv_cdr_fma_clear_data: CPU#: sfmmu_dtlb_lock failed.
sfdr:fjsv_cdr_fma_clear_data: CPU#: sfmmu_mtlb_unlock failed.
sfdr:fjsv_cdr_fma_clear_data: jobp is NULL.
sfdr:fjsv_cdr_fma_copy_data: can't get map_size.
sfdr:fjsv_cdr_fma_copy_data: CPU#: sfmmu_mtlb_unlock failed.
sfdr:fjsv_cdr_fma_copy_data: fjsv_cdr_check_mbox failed.
sfdr:fjsv_cdr_fma_copy_data: jobp is NULL.
sfdr:fjsv_cdr_get_jobp: reqp is NULL.
sfdr:fjsv_cdr_get_mem_range: prom_finddevice failed.
sfdr:fjsv_cdr_get_mem_range: prom_getprop failed.
sfdr:fjsv_cdr_get_mem_range: prom_getprop returns error.
sfdr:fjsv_cdr_job_disp: reqp is NULL.
sfdr:fjsv_cdr_make_job: fjsv_alloc_map_area failed.
sfdr:fjsv_cdr_make_job: kmem_zalloc failed.
sfdr:fjsv_cdr_make_job: the number of CPUs is zero.
sfdr:fjsv_cdr_make_req: jobp is NULL.
sfdr:fjsv_cdr_make_req: kmem_zalloc failed.
sfdr:fjsv_delete_map_area: wrong pagesize(#).
sfdr:fjsv_flush_cache_line: CPU#: sfmmu_dtlb_lock failed.
sfdr:fjsv_flush_cache_line: CPU#: sfmmu_mtlb_unlock failed.
sfdr:fjsv_flush_cache_line: jobp is NULL.
sfdr:fjsv_pa_is_target: jobp is NULL.
sfdr:memlist_canfit: Can't get nuclues base address
sfdr:sfdr_board_init: fail to initialize device information.
sfdr:sfdr_cancel_cpu: failed to online cpu #
sfdr:sfdr_cancel_cpu: failed to power-on cpu #

sfdr:sfdr_check_dip: ###### (driver ######   major# #) is referenced
sfdr:sfdr_check_dip: ###### (major# #) not hotplugable
sfdr:sfdr_check_io_refs: I/O devices active
sfdr:sfdr_connect: fail to initialize device information.
sfdr:sfdr_connect: no devices present on board #
sfdr:sfdr_copyin_ioarg: (32bit) failed to copyin ioctl-cmd-arg
sfdr:sfdr_copyin_ioarg: failed to copyin ioctl-cmd-arg
sfdr:sfdr_copyout_ioarg: failed to copyout ioctl-cmd-arg
sfdr:sfdr_deprobe_board: deprobe failed for board #
sfdr:sfdr_deprobe_board: fail to map the obp area   #
sfdr:sfdr_deprobe_board: fjsv_cdr_alloc_detach_mlist() failed.
sfdr:sfdr_deprobe_board: fjsv_cdr_make_job() failed.
sfdr:sfdr_deprobe_board: fjsv_cdr_make_req() failed.
sfdr:sfdr_deprobe_board: invalid state to deprobe board #
sfdr:sfdr_detach_mem: internal error: no memlist for board #
sfdr:sfdr_detach_mem: invalid state transition for mem-unit (#.#)
sfdr:sfdr_detach_mem: kphysm_del_status
sfdr:sfdr_detach_mem: mem-unit (#.#) release in-progress
sfdr:sfdr_detach_mem: protocol error: mem-unit (#.#) missing target indicator
sfdr:sfdr_detach_mem: protocol error: mem-unit (#.#) not released
sfdr:sfdr_disconnect: All devices are not unconfigured.
sfdr:sfdr_disconnect: master TOD present on board #
sfdr:sfdr_disconnect: no devices present on board #
sfdr:sfdr_disconnect_cpu: failed obp detach of cpu #
sfdr:sfdr_disconnect_cpu: failed to cpuid (#.#) for nodeid (0xX)
sfdr:sfdr_get_memlist: board # memlist already present in phys_install
sfdr:sfdr_get_memlist: can't get memlist on board #.
sfdr:sfdr_get_memlist: no ###### property for node (0xX)
sfdr:sfdr_get_memlist: no board number for nodeid (0xX)
sfdr:sfdr_get_memlist: nodeid (0xX) is not memory node
sfdr:sfdr_init_devlists: status '######' for '######'######
sfdr:sfdr_ioctl: (32bit) failed to copyin arg for board #
sfdr:sfdr_ioctl: failed to copyin arg for board #
sfdr:sfdr_make_dev_nodes: failed to create minor node (######, 0xX)
sfdr:sfdr_make_nodes: failed to create minor node (######, 0xX)
sfdr:sfdr_memscrub: address (0xX) not on page boundary
sfdr:sfdr_memscrub: size (0xX) not on page boundary
sfdr:sfdr_move_memory: CPU version(#) is different.
sfdr:sfdr_move_memory: failed to quiesce OS for copy-rename
sfdr:sfdr_move_memory: fjsv_cdr_make_job() failed.
sfdr:sfdr_move_memory: fjsv_cdr_make_req() failed.
sfdr:sfdr_move_memory: FMA failed. rtn = #.
sfdr:sfdr_move_memory: prom_fjsv_fma_end failed. rtn = #
sfdr:sfdr_move_memory: prom_fjsv_fma_start failed.
sfdr:sfdr_move_memory:can't get fma-ranges on board #.
sfdr:sfdr_move_memory:can't get s_basepa from 0xX
sfdr:sfdr_move_memory:fjsv_cdr_alloc_cache_func() failed.
sfdr:sfdr_move_memory:fjsv_cdr_alloc_fma_job() failed.
sfdr:sfdr_move_memory:fjsv_cdr_fma_clear_data() failed.

sfdr:sfdr_move_memory:fjsv_cdr_fma_copy_data() failed.
sfdr:sfdr_post_attach_cpu: cpu_get failed for cpu #
sfdr:sfdr_post_attach_cpu: failed to get cpuid for nodeid (0xX)
sfdr:sfdr_post_attach_cpu: failed to online cpu #
sfdr:sfdr_post_attach_cpu: failed to power-on cpu #
sfdr:sfdr_post_attach_mem: failed to quiesce OS for copy-rename
sfdr:sfdr_post_attach_mem: mem-unit (#.#) memlist not in phys_install
sfdr:sfdr_post_detach_mem_unit: can't get fma-ranges. No remaining memory is attached.
sfdr:sfdr_post_detach_mem_unit: failed to add back (base=0xX, npgs=0xX) = #
sfdr:sfdr_post_detach_mem_unit: failed to add back to cage (base=0xX, npgs=0xX) = #
sfdr:sfdr_post_detach_mem_unit:can't get s_basepa from 0xX
sfdr:sfdr_post_detach_mem_unit:can't get t_basepa from 0xX
sfdr:sfdr_post_release_devlist: invalid nodetype (#)
sfdr:sfdr_pre_attach_cpu: failed to get cpuid for nodeid (0xX)
sfdr:sfdr_pre_attach_cpu: failed to get unit for cpu #
sfdr:sfdr_pre_attach_mem: unexpected state (#) for mem-unit (#.#)
sfdr:sfdr_pre_detach_cpu: cpu # still active
sfdr:sfdr_pre_detach_cpu: failed to get cpuid for nodeid (0xX)
sfdr:sfdr_pre_detach_cpu: failed to power-off cpu # (errno = #)
sfdr:sfdr_pre_op: detect dr-status = ######
sfdr:sfdr_pre_op: invalid device
sfdr:sfdr_pre_op: invalid state transition
sfdr:sfdr_pre_release_cpu: failed to get cpuid for nodeid (0xX)
sfdr:sfdr_pre_release_cpu: failed to get unit (cpu #)
sfdr:sfdr_pre_release_cpu: failed to offline cpu #
sfdr:sfdr_pre_release_cpu: thread(s) bound to cpu #
sfdr:sfdr_pre_release_mem: devlist[#] empty (expected #)
sfdr:sfdr_pre_release_mem: ineligible mem-unit (#.#) for detach
sfdr:sfdr_pre_release_mem: kernel cage is disabled
sfdr:sfdr_pre_release_mem: mem-unit (#.#) has non-relocatable page(s).
sfdr:sfdr_pre_release_mem: no available target for mem-unit (#.#)
sfdr:sfdr_pre_release_mem: protocol error: kphysm_del_span_query [bd=#, bp=0xX, n=#]
sfdr:sfdr_pre_release_mem:no available target for mem-unit (#.#). The candidate has no-obp-sb-cX.
sfdr:sfdr_probe_board: board # is already connected.
sfdr:sfdr_probe_board: fail to get OBP translations
sfdr:sfdr_probe_board: fail to map the obp area   #
sfdr:sfdr_probe_board:fail to connect board with the error = 0xX.
sfdr:sfdr_probe_board:fail to connect board. retval = #.
sfdr:sfdr_release_done: unable to get unit for nodeid (0xX)
sfdr:sfdr_release_handle: handle not found in board # ref list (ref = #)
sfdr:sfdr_reserve_mem_target: kcage_range_delete(0xX, 0xX)=#, failed
sfdr:sfdr_reserve_mem_target: kphysm_del_span (0xX, 0xX) = #, failed
sfdr:sfdr_reserve_mem_target: kphysm_del_span_query(0xX, 0xX) failed
sfdr:sfdr_reserve_mem_target: unable to allocate memhandle for mem-unit (#.#)

sfdr:sfdr_select_mem_target: no memlist for mem-unit (#.#)
sfdr:sfdr_status: failed to copyout status for board #
sfdr:sfdr_stop_kernel_threads: fail to stop kernel thread
sfdr:sfdr_stop_user_threads: fail to stop process: ###### id: # state: #
sfdr:sfdr_stop_user_threads: no quiesce while real-time pid (#) present

6.2.2 Message Explanation

This section explains the console messages printed by DR driver. The output of messages that don't have output field is console.

6.2.2.1 Progress Messages

Message	**DR: PROM attach board *X* (cpu *Y)*
Explanation	Attach the system board numbered X by the CPU ID Y.

Message	**DR: PROM detach board *X*
Explanation	Detach the system board X.

Message	**DR: OS attach io-unit (*X.Y*)
Explanation	Attach the I/O unit with unit number Y mounted on system board X.

Message	**DR: OS detach io-unit (*X.Y*)
Explanation	Detach the I/O unit with unit number Y mounted on system board X.

Message	**DR: OS attach cpu-unit (*X.Y*)
Explanation	Attach the CPU unit with unit number Y mounted on system board X.

Message	**DR: OS detach cpu-unit (*X.Y*)
Explanation	Detach the CPU unit with unit number Y mounted on system board X.

Message	**DR: OS attach mem-unit (*X.Y*)
Explanation	Attach the memory unit with unit number Y mounted on system board X.

Message	**DR: OS detach mem-unit (*X.Y*)
Explanation	Detach the memory unit with unit number Y mounted on system board X.

Message	**DR: suspending user threads...**
Explanation	Before disconnecting a system board with kernel memory, suspending user threads on the system.

Message	**DR: suspending kernel daemons...**
Explanation	Before disconnecting a system board with kernel memory, suspending kernel daemons on the system.

Message	**DR: suspending drivers...**
	      suspending *X*
	      resuming *X*

Explanation	Before disconnecting system board with kernel memory, suspending each driver on the system. After the board is disconnected, resuming each driver.

Message	**DR: resuming user threads...**
Explanation	After a system board with kernel memory is disconnected, resuming user threads on the system.

Message	**DR: resume COMPLETED**
Explanation	All of resume operation is completed after a system board with kernel memory is disconnected.

6.2.2.2 Messages common to all components (CPU, Memory and I/O)

Message	**#: handle not found**
Cause	Failed to get internal data for DR process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**#: handle invalid**
Cause	Detected invalid internal data for DR. There may be a inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**invalid device**
Cause	The system board status does not allow the specified DR command.
Remedy	Check the system board status by drcstat command and re-execute correct DR command.
Output	Console and Standard Output

Message	**invalid state transition**
Cause	Invalid system board status for the command.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**(32bit) failed to copyin ioctl-cmd-arg**
Cause	Failed to perform platform dependent DR operation. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**failed to copyin ioctl-cmd-arg**
Cause	Failed to perform platform dependent DR operation. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**failed to copyout ioctl-cmd-arg**
Cause	Failed to perform platform dependent DR operation. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**handle not found in board # ref list (ref = #)**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.

Message	**board # is already connected.**
Cause	Specified system board is already connected.
Remedy	Check the system board status by drcstat command and re-execute correct DR command.
Output	Console and Standard Output

Message	**fail to get OBP translations**
Cause	Failed to get information from the firmware.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fail to map the obp area #**
Cause	The firmware failed to set the information.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**probe failed for board #**
Cause	Failed to connect the system board.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**no devices present on board #**
Cause	Any device(s) cannot be found on the system board.

Remedy	Please check if more than one DR operations have been executed in parallel.　Even if this is not the case and this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**no quiesce while real-time pid (#) present**
Cause	Real time class process was found.
Remedy	Stop real time process before DR operation or change to the other schedule class by priocntl(1M) command.
Output	Console and Standard Output

Message	**fail to stop process: ###### id: # state: #**
Cause	Fail to stop user process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**no devices present on board #**
Cause	Any device(s) cannot be found on the system board.
Remedy	Please check if more than one DR operations have been executed in parallel. Even if this is not the case and this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**invalid state to deprobe board #**
Cause	Invalid system board status.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fail to map the obp area　#**
Cause	The firmware failed to set the information.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**deprobe failed for board #**
Cause	Failed to disconnect the system board.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fail to quiesce OS for copy-rename**
Cause	Failed to suspend the system for memory copy.
Remedy	Check other error message at the same time.

Message	**fail to stop kernel thread**
Cause	Failed to stop kernel thread.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**unknown command (#)**
Cause	Received unknown command.
Remedy	Execute correct DR operation.
	If this error message appears again, please contact our customer service.

Message	**failed to copyout status for board #**
Cause	Failed to bring back the system board status to the previous status. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**Could not get kernel symbol address**
Cause	Failed to get kernel symbol due to internal data conflict.
Remedy	Please contact our customer service.

Message	**failed to create minor node (######, 0xX)**
Cause	Failed to create minor node. This may be DR Driver internal error.
Remedy	Please contact our customer service.

Message	**(32bit) failed to copyin arg for board #**
Cause	Failed to perform platform dependent DR operation. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**failed to copyin arg for board #**
Cause	Failed to perform platform dependent DR operation. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**#: failed to init psm-dr ops**
Cause	Failed to initialize platform dependent data structure.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**invalid nodetype (#)**
Cause	Invalid node type device is found on the system board.
Remedy	Please check if more than one DR operations have been executed in parallel. Even if this is not the case and this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**unable to get unit for nodeid (0xX)**
Cause	Failed to get the unit number from the firmware.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**#: failed to make nodes**
Cause	Failed to create the device node.
Remedy	Please contact our customer service.

Message	**#: module not yet attached**
Cause	Failed to attach the DR driver.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**#: failed to alloc soft-state**
Cause	Failed to allocate due to lack of the memory resource.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**#: failed to init psm-dr**
Cause	Failed to initialize the platform depend data structure.
Remedy	Please contact our customer service.

Message	**#: module not yet attached**
Cause	Failed to attach the DR driver.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**Invalid System Board Number**
Cause	Invalid system board number is specified.
Remedy	Check the system board number and repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_u2ts_kstat_delete: wrong board number #**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_u2_ecc_kstat_delete: wrong board number #**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_upa_ecc_kstat_delete: wrong board number #**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**status '######' for '######'######**
Cause	Detected a degraded device.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**All devices are not unconfigured.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**failed to create minor node (######, 0xX)**
Cause	Failed to create minor node. This may be DR driver internal error.
Remedy	Please contact our customer service.

Message	**fjsv_alloc_map_area: can't alloc vmem.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_alloc_map_area: can't find pagesize(0xX).**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_alloc_map_area: wrong pagesize(#).**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.

Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_add_fma_job: jobp or mlp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_add_fma_job: kmem_zalloc failed.**
Cause	Allocating work memory failed in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_cache_func: fjsv_cdr_get_scf_addr failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_cache_func: fma size(0xX) is bigger than PAGESIZE.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_cache_func: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_cache_func: kmem_zalloc failed.**
Cause	Allocating work memory failed in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_cache_func: loop size(0xX) is bigger than PAGESIZE.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_cache_func: startup_size(0xX) is bigger than PAGESIZE.**

Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_fma_job: fjsv_cdr_add failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_fma_job: jobp or mlp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_alloc_fma_job: mlp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_cache: CPU version(#) is different.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_cache: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_dr_status: kmem_zalloc failed.**
Cause	Allocating work memory failed in the process.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_dr_status: prom_finddevice failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_dr_status: prom_getprop failed.**

Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_error: reqp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_mbox: find FJSV_MBOX_FAILURE.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_check_mbox: reqp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_delete_cache_func: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_delete_fma_job: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_delete_job: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_delete_memlist: mlp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_delete_req: reqp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.

Output	Console and Standard Output

Message	**fjsv_cdr_fma_clear_data: CPU#: sfmmu_dtlb_lock failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_clear_data: CPU#: sfmmu_mtlb_unlock failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_clear_data: can't get map_size.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_clear_data: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_copy_data: CPU#: sfmmu_dtlb_lock failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_copy_data: CPU#: sfmmu_mtlb_unlock failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_copy_data: can't get map_size.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_copy_data: fjsv_cdr_check_mbox failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_fma_copy_data: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_get_jobp: reqp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_get_mem_range: prom_finddevice failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_get_mem_range: prom_getprop failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_get_mem_range: prom_getprop returns error.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_job_disp: reqp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_make_job: fjsv_alloc_map_area failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_make_job: kmem_zalloc failed.**
Cause	Allocating work memory failed in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_make_job: the number of CPUs is zero.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_make_req: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_cdr_make_req: kmem_zalloc failed.**
Cause	Allocating work memory failed in the process.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_delete_map_area: wrong pagesize(#).**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_flush_cache_line: CPU#: sfmmu_dtlb_lock failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_flush_cache_line: CPU#: sfmmu_mtlb_unlock failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_flush_cache_line: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**fjsv_pa_is_target: jobp is NULL.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_deprobe_board: fjsv_cdr_alloc_detach_mlist() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_deprobe_board: fjsv_cdr_make_job() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_deprobe_board: fjsv_cdr_make_req() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: CPU version(#) is different.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: FMA failed. rtn = #.**
Cause	The firmware returned the error in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: failed to quiesce OS for copy-rename**
Cause	There is a task not suspended in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: fjsv_cdr_make_job() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: fjsv_cdr_make_req() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: prom_fjsv_fma_start failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory: prom_fjsv_fma_end failed. rtn = #**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory:can't get s_basepa from 0xX**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory:fjsv_cdr_alloc_cache_func() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory:fjsv_cdr_alloc_fma_job() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory:fjsv_cdr_fma_clear_data() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_move_memory:fjsv_cdr_fma_copy_data() failed.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_pre_op: detect dr-status = ######**
Cause	dr-status is specified in OBP, and the system can't continue the DR process.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_probe_board:fail to connect board with the error = 0xX.**
Cause	The firmware returned the error in the process, and the system recovered.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_probe_board:fail to connect board. retval = #.**
Cause	The firmware returned the error in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

6.2.2.3 CPU Messages

Message	**failed to cpuid (#.#) for nodeid (0xX)**
Cause	Failed to get CPU ID corresponding to node ID from the firmware.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**failed obp detach of cpu #**
Cause	Firmware failed to detach CPU.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**failed to power-on cpu #**
Cause	Failed to power-on cpu.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**failed to online cpu #**
Cause	Failed to online cpu.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**failed to power-off cpu # (errno = #)**
Cause	Failed to power-off cpu.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**cpu # still active**
Cause	The cpu is still active.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**cpu_unconfigure for cpu # failed**
Cause	Failed to disconnect the CPU from the OS.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**failed to get cpuid for nodeid (0xX)**
Cause	Failed to get CPU ID correspond to specified node id from the firmware.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**failed to get cpuid for nodeid (0xX)**
Cause	Failed to get CPU ID correspond to specified node id from the firmware.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**failed to get unit for cpu #**
Cause	Failed to get the unit number from the CPU ID.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**cpu_configure for cpu # failed**
Cause	Failed to initialize the CPU.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**cpu_get failed for cpu #**
Cause	Failed to connect the CPU.
Remedy	Please contact our customer service.

Message	**failed to power-on cpu #**
Cause	Failed to power-on the CPU.
Remedy	Please contact our customer service.

Message	**failed to online cpu #**

Cause	Failed to online the CPU.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.

Message	**failed to get unit (cpu #)**
Cause	Failed to get the unit number from the CPU ID.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.

Message	**thread(s) bound to cpu #**
Cause	The thread in the process is bound to the detached CPU.
Remedy	Check if the process bound to the CPU exists by pbind(1M) command. If it exists, unbind from the CPU.

Message	**failed to offline cpu #**
Cause	Failed to offline CPU.
Remedy	This is the last onlined CPU in the system.
	Check all CPU status by psrinfo(1M) command.
Output	Console and Standard Output

Message	**failed to attach cpu node branch to node tree. (error=#)**
Cause	Failed to connect the CPU to the OS.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.

Message	**failed to get cpuid(#)**
Cause	Failed to get the CPU ID.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.

Message	**failed to detach cpu node branch (######) from the node tree. (error=#)**
Cause	Failed to disconnect the CPU from the OS.
Remedy	Please contact our customer service.

Message	**failed to disable interrupts on cpu #.**
Cause	Failed to disable interrupts on the CPU.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.

6.2.2.4 Memory Messages

Message	**nodeid (0xX) is not memory node**

Cause	Failed to get device type.
Remedy	When a memory nullified system board is attached, this message always appears. This message can be ignored in such a case. It the message comes out in other cases, please contact our customer service.

Message	**no board number for nodeid (0xX)**
Cause	Failed to get the system board number from the firmware. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**board # memlist already present in phys_install**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.

Message	**protocol error: mem-unit (#.#) not released**
Cause	Memory release did not successfully complete.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**protocol error: mem-unit (#.#) missing target indicator**
Cause	Memory release did not successfully complete.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**invalid state transition for mem-unit (#.#)**
Cause	Invalid memory device status.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**kphysm_del_status**
Cause	Memory release did not successfully complete.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**mem-unit (#.#) release in-progress**
Cause	Releasing the memory.
Remedy	Wait several minutes more. Release operation may wait for completing I/O. It is better to reduce system load, if you can. If this error message appears again after a while, try cancel operation and re-execute

	from the beginning.
Output	Console and Standard Output

Message	**internal error: no memlist for board #**
Cause	Detect the conflict of memory unit information. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**address (0xX) not on page boundary**
Cause	Internal data conflict is detected.
Remedy	Please contact our customer service.

Message	**size (0xX) not on page boundary**
Cause	Internal data conflict is detected.
Remedy	Please contact our customer service.

Message	**failed to add back (base=0xX, npgs=0xX) = #**
Cause	Failed to add back the memory.
Remedy	Please contact our customer service.

Message	**failed to add back to cage (base=0xX, npgs=0xX) = #**
Cause	Failed to add back the memory information to the internal data.
Remedy	Please contact our customer service.

Message	**unexpected state (#) for mem-unit (#.#)**
Cause	The memory status does not allow to connect the memory. This is DR driver internal data conflict.
Remedy	Check if more than one DR operations have been executed in parallel.
Output	Console and Standard Output

Message	**kcage_range_add failed. (#)**
Cause	Detect the internal data conflict or lack of memory resource. Memory cannot be connected to the active OS.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**kphysm_add_memory_dynamic failed. (#)**
Cause	Failed to connect the memory to the active OS.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**failed to quiesce OS for copy-rename**
Cause	Failed to suspend the system.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**mem-unit (#.#) memlist not in phys_install**
Cause	Memory unit information was not put in internal data. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**kernel cage is disabled**
Cause	Kernel cage memory function is disabled.
Remedy	Ensure /etc/system is edited to enable kernel cage memory. (See "2.3.1 How to enable DR and Kernel cage memory")
Output	Console and Standard Output

Message	**devlist[#] empty (expected #)**
Cause	Memory unit cannot be found.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**ineligible mem-unit (#.#) for detach**
Cause	The system board you chose is already used as the target system board of another detach operation.
Remedy	Check if another DR operation is in progress. If not, repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**protocol error: kphysm_del_span_query [bd=#, bp=0xX, n=#]**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**no available target for mem-unit (#.#)**
Cause	Candidate system board for the memory copy cannot be found.
Remedy	There is no candidate system board in the partition.
	If possible, connect new system board with same memory configuration as the outgoing system board.

Output	Console and Standard Output

Message	**unable to allocate memhandle for mem-unit (#.#)**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.

Message	**kcage_range_delete(0xX, 0xX)=#, failed**
Cause	Failed to setup destination system board for memory copy.
Remedy	Please contact our customer service.

Message	**kphysm_del_span (0xX, 0xX) = #, failed**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.

Message	**kphysm_del_span_query(0xX, 0xX) failed**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.

Message	**no memlist for mem-unit (#.#)**
Cause	Detected conflict of the memory unit information in DR driver's internal data.
Remedy	Please contact our customer service.

Message	**Can't get nuclues base address**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.

Message	**obp-memory: can't get the property for node 0xX**
Cause	Failed to get the memory information from the firmware.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**no ###### property for node (0xX)**
Cause	Failed to get the system board number from the firmware. There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**failed to attach mem node branch to node tree. (error=#)**
Cause	Failed to connect the memory to the OS.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**failed to detach mem node branch (######) from the node tree. (error=#)**
Cause	Failed to remove the memory node from OS.
Remedy	Please contact our customer service.

Message	**fail to initialize device information.**
Cause	Failed to initialize device information.
Remedy	Please contact our customer service.

Message	**failed to get memhandle for nodeid 0xX**
Cause	Internal data conflict detected in the system.
Remedy	Please contact our customer service.

Message	**mem-unit (#.#) has non-relocatable page(s).**
Cause	Target memory contains kernel memory or failed to reserve detached memory.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_get_memlist: can't get memlist on board #.**
Cause	The system failed to get the memory information on that board. Internal data conflict in DR driver or Firmware may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_post_detach_mem_unit: can't get fma-ranges. No remaining memory is attached.**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_post_detach_mem_unit:can't get s_basepa from 0xX**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_post_detach_mem_unit:can't get t_basepa from 0xX**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**sfdr_pre_release_mem: no available target for mem-unit (#.#). The candidate has no-obp-sb-cX.**
Cause	The system board to which the kernel memory can be copied was found. However, because of no-obp-sb-cX, it couldn't be a candidate.
Remedy	If you intentionally want to move the kernel memory to the board with no-obp-sb-cX by the drc command, please reply Yes to the inquiring message. (Please refer to section 6.1.3.3 "Inquiring Messages" in detail) When using the adrc command, because "No" is always replied automatically, please use the drc command instead.
	If you don't want to move the kernel memory to the board with no-obp-sb-cX, please change the system configuration.
Output	Console and Standard Output

Message	**sfdr_move_memory:can't get fma-ranges on board #.**
Cause	The system failed to get the memory information on that board. Internal data conflict in DR driver or Firmware may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

6.2.2.5   I/O Messages

Message	**I/O devices active**
Cause	Detect active I/O device.
Remedy	Confirm that all I/O devices are not in use and repeat the DR operation. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**###### (major# #) not hotplugable**
Cause	This driver dose not support DR.
Remedy	After closing this driver and unloading by modunload(1M) command, repeat the action.
Output	Console and Standard Output

Message	**failed to attach I/O node branch to node tree. (error=#)**
Cause	Failed to connect the I/O to the OS.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.

Message	**failed to detach I/O node branch (######) from the node tree. (error=#)**
Cause	Failed to remove the I/O node from OS.
Remedy	The failed I/O device is probably still activated. After deactivating the device, repeat the action. For more details, please refer to "2.3.3.1 I/O Device Administration".
	If this error message appears again, please contact our customer service.

Message	**###### (driver ###### major# #) is referenced**

Cause	An I/O device on the outgoing system board is still referenced.
Remedy	Confirm that the displayed I/O device is not in use and repeat the DR operation. If this error message appears again, please contact our customer service.

Message	**sfdr_disconnect: master TOD present on board #**
Cause	Internal data conflict is detected. DR driver internal data conflict may be the cause.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**DR: suspending drivers...** **FAILED to suspend *X***
Cause	While suspending drivers before disconnecting a system board with kernel memory, failed to suspend the device.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**DR: suspending drivers...**
	      suspending *X*
	      FAILED to resume *X*

Cause	While resuming drivers after disconnecting a system board with kernel memory, failed to resume the device.
Remedy	Please contact our customer service.

Chapter 7   Messages and DR Error Conditions
on Solaris 9 OS and Solaris 10 OS

7.1   Command Messages

7.1.1   Warning and Error Message List

is still referenced.
Another DR is executed.
Bad address: dr@0:SBX::memory
Board is already connected.
Cannot determine property length: PROM Node 0xX: property fma-ranges.
Cannot determine property length: PROM Node 0xX: property address in fjsv_cdr_get_tod_address.
Cannot determine property length: PROM Node 0xX: property components in fjsv_cdr_get_tod_address.
Cannot determine property length: SBX::Y: property Z
Cannot find TOD FJSV,eeprom in fjsv_cdr_get_tod_address.
Cannot proceed; Board is configured or busy: SBX
Cannot read property value: PROM Node #: property name
Cannot read property value: PROM Node 0xX: property address in fjsv_cdr_get_tod_address.
Cannot read property value: PROM Node 0xX: property components in fjsv_cdr_get_tod_address.
Cannot read property value: PROM Node 0xX: property dr-status
Cannot read property value: PROM Node 0xX: property fma-ranges.
Cannot read property value: property: name
Cannot read property value: property: scf-cmd-reg.
Cannot read property value: SBX::Y: property ######
Cannot stop user thread: <pid> <pid> ...
Connection Script returns illegal exit code. (Exit code=#)
Device busy: dr@0:SBX::cpuY
Device busy: dr@0:SBX::pciY
Device driver failure: path
Device failed to resume: <device name>@<device info>
Device failed to resume: <driver name|major #> ...
Device failed to suspend: <device name>@<device info>
Device failed to suspend: <driver name|major #> ...
Device in fatal state
DR is not enabled.

DR operation is not executed.
dr_move_memory: failed to quiesce OS for copy-rename
drc: Another drc is executed.
drc: Board Type is different (sbXY).
drc: Board Type is different (sbXY-N).
drc: cannot open /dev/FJSVhwr/pwrctl2: System call error Message
drc: CPU clock frequency is different (sbXY).
drc: CPU clock frequency is different (sbXY-N).
drc: DR is not enabled.
drc: DR is not supported.
drc: dr module is not found.
drc: dr module terminated abnormally(X).
drc: Incorrect memory mode (sbXY).
drc: Incorrect memory mode (sbXY-N).
drc: Incorrect PID.
drc: Invalid Status XX YY
drc: ioctl() failed: system call error message
drc: not super user
drc: Specified system board is not installed (sbXY).
drc: Specified system board is not installed (sbXY-N).
drc: System board is in use by another partition (sbXY).
drc: System board is in use by another partition (sbXY-N).
drc: System call failed.
drc: Time Out
drc: Unable to connect the specified system board (sbXY).
drc: Unable to connect the specified system board (sbXY-N).
drc: Unable to disconnect the specified system board (sbXY incorrect PID).
drc: Unable to disconnect the specified system board (sbXY-N incorrect PID).
drc: Unable to disconnect the specified system board (sbXY incorrect status).
drc: Unable to disconnect the specified system board (sbXY-N incorrect status).
drc: Unable to disconnect the specified system board (sbXY last system board).
drc: Unable to disconnect the specified system board (sbXY-N last system board).
drcstat: /dev/openprom ioctl() failed :X: system call error message
drcstat: cannot open /dev/FJSVhwr/pwrctl2: system call error Message
drcstat: DR is not supported.
drcstat: dr module is not found.
drcstat: dr_info terminated abnormally(X).
drcstat: ioctl() failed: system call error message
drcstat: malloc() failed.
drcstat: not super user
drcstat: Specified system board does not exist in current partition.
drcstat: Specified system board is not installed.
drcstat: System call failed.
drmach parameter is inappropriate for operation
drmach parameter is not a valid ID
error #:

error #: #
Error occurred on executing #### (Exit code=#)
Fail to assign the board.
Fail to cancel releasing the memory.
Fail to check the bound processes.
Fail to configure the board.
Fail to configure the CPU.
Fail to configure the I/O.
Fail to configure the memory.
Fail to delete the processor group.
Fail to disconnect the board.
Fail to execute cfgadm ###### I/O Device=######.
Fail to get the status of the board.
Fail to offline the CPU. [processor_id=#]
Fail to online the CPU. [processor_id=#]
Fail to release the board
Fail to release the CPU.
Fail to release the I/O.
Fail to release the memory.
Fail to remove processor from processor group.
Fail to restart picld.
Fail to stop picld.
Fail to stop drd.
Fail to unassign the board.
Fail to unbind processes.
Fail to unconfigure the board.
Fail to unconfigure the CPU.
Fail to unconfigure the I/O.
Fail to unconfigure the memory.
Failed to off-line: dr@0:SBX::cpuY
Failed to on-line: dr@0:SBX::cpuY
Failed to start CPU: dr@0:SBX::cpuY
Failed to stop CPU: dr@0:SBX::cpuY
failed to stop kernel thd: <name of thread>
Failed to resume device <device name>@<device info>
Failed to suspend device <device name>@<device info>
Firmware cannot find node.: node name /FJSV,system
Firmware cannot find node.: node name /FJSV,system/board@#
Firmware cannot find node.: <devicename or todname> in fjsv_cdr_get_tod_address
Firmware deprobe failed:
Firmware deprobe failed: SBX::cpuY
Firmware probe failed: SBX
Getproplen returns wrong size.: PROM Node 0xX: property address in fjsv_cdr_get_tod_address.   Expected #, got #.
I/O error: dr@0:SBX::memory
Illegal environment for   DR. (ftrace_atboot is set to 1.)
Insufficient memory: dr@0:SBX::cpuY
Insufficient memory: dr@0:SBX::memory

Internal error: dr@0:SBX::memory
Internal error: dr.c #
Internal error: dr_mem.c #
Invalid argument
Invalid argument: ########
Invalid argument: dr@0:SBX::cpuY
Invalid argument: dr@0:SBX::memory
Invalid board number: X
Invalid state transition
Invalid state transition: dr@0:SBX::cpuY
Invalid state transition: dr@0:SBX::memory
Invalid state transition: dr@0:SBX::pciY
Invalid Status Devices=#### Status=####
Kernel cage is disabled: dr@0:SB#::memory
Kernel memory is on the target board.
kmem_alloc failed: in fjsv_cdr_get_tod_address.
Memory is not enough to detach the board.
Memory operation cancelled: dr@0:SBX::memory
Memory operation failed: dr@0:SBX::memory
Memory operation refused: dr@0:SBX::memory
No available memory target: dr@0:SBX::memory
No device(s) on board: dr@0:SBX
No error
no error: dr@0:SBX::memory
No such device: dr@0:SBX::cpuY
Non-relocatable pages in span: dr@0:SBX::memory
Operation not supported
Operation not supported: ERROR <error string>
Operation already in progress: dr@0:SBX::cpuY
Operator confirmation for quiesce is required: dr@0:SBX::memory
Psrinfo fails.
Recovery fails
There is not enough swap space.
Unexpected internal condition: drmach.c #
Unexpected internal condition: SBX
Unrecognized platform command: #
Unsafe driver present: <driver name|major #> ...
Usage: drc -connect sbXY [-reset] Usage: drc -connect {sbXY | sbXY-N} [-reset] Usage: drc -disconnect sbXY [-reset] Usage: drc -disconnect {sbXY | sbXY-N} [-reset] Usage: drc -disconnect sbXY -next PID [-reset] Usage: drc -disconnect {sbXY | sbXY-N} -next PID [-reset] Usage: drc -disconnect sbXY -keep Usage: drc -disconnect {sbXY | sbXY-N} -keep Usage: drc -abort Usage: adrc -connect sbXY [-reset] Usage: adrc -connect {sbXY | sbXY-N} [-reset] Usage: adrc -disconnect sbXY [-reset]

Usage: adrc -disconnect {sbXY | sbXY-N} [-reset]
Usage: adrc -disconnect sbXY -next PID [-reset]
Usage: adrc -disconnect {sbXY | sbXY-N}-next PID [-reset]

Usage: drcstat -board [sbXX | all]
Usage: drcstat -board [sbXY | sbXY-N | all] [-xpar]
Usage: drcstat -system [sbXY]
Usage: drcstat -system [sbXY | sbXY-N] [-xpar]
Usage: drcstat -device [sbXY] [-e]
Usage: drcstat -device [sbXY | sbXY-N] [-e] [-xpar]

VM viability test failed: dr@0:SBX::memory

7.1.2 Progress and Inquiring Message List

"-keep" option is only used for system board hotswap operation Continue ? [YES]/[NO]
Assign the board.
Cancel operation starts.
Can't find proper board for kernel migration. Do you try migration to the board which has no-obp-sb-cx property?
Checking if I/O is referenced or not.
Checking if there are enough swap space.
Checking if there are real time processes
Checking status of board.
Checking the CPU.
Checking the size of memory.
Configure the CPU.
Configure the I/O.
Configure the memory.
Configuring the board.
Configuring the I/O device [XX/YY].
Connect sbXY (board number=#) at the next reboot Connect sbXY-N (board number=#) at the next reboot
Connecting sbXY (board number=#) is done Connecting sbXY-N (board number=#) is done
Connecting the board.
Connection Script #### is done.
Connection scripts start. Execution states ####
CPU [processor_id=#] is in the processor group. Do you remove?
CPU [processor_id=######] is the last processor in the processor group. Do you remove processor group?"
Disconnect sbXY (board number=#) at the next reboot Disconnect sbXY-N (board number=#) at the next reboot
Disconnect sbXY (board number=#) is done Disconnect sbXY-N (board number=#) is done
Disconnect the board.
Execute connection script ####
Offline the CPU.
Online the CPU.

online cpu for passthru.: CPU's internal state is offline.	
Processes[pid=######] is binded to the CPU on the detached board. Are binded processes unbinded automatically?	
Real time processes[pid=######] is running. Do you continue DR ?	
Recovery successes.	
Release the board	
Release the CPU	
Release the I/O	
Release the memory.	
Restarting drd.	
Restarting picld.	
Start connecting sbXY (board number=#) Start connecting sbXY-N (board number=#)	
Start disconnecting sbXY (board number=#) Start disconnecting sbXY-N (board number=#)	
Stopping drd.	
Stopping picld.	
The number of pages to be handle #	
Unassign the board.	
Unconfigure the board	
Unconfigure the CPU.	
Unconfigure the I/O	
Unconfigure the memory	
Waiting the completion of memory releasing. (XXXX / YYYY)	

7.1.3 drc messages

7.1.3.1 Warning Error Messages

If the remedy says "Respond in the manner directed by the system console message.", please refer to section 7.2 "Console Messages" and follow the remedy suggested to take an appropriate action.

Message	**Usage: drc -connect sbXY [-reset]**
	Usage: drc -connect {sbXY | sbXY-N} [-reset]
	Usage: drc -disconnect sbXY [-reset]
	Usage: drc -disconnect {sbXY | sbXY-N} [-reset]
	Usage: drc -disconnect sbXY -next PID [-reset]
	Usage: drc -disconnect {sbXY | sbXY-N} -next PID [-reset]
	Usage: drc -disconnect sbXY -keep
	Usage: drc -disconnect {sbXY | sbXY-N} -keep
	Usage: drc -abort
	Usage: adrc -connect sbXY [-reset]
	Usage: adrc -connect {sbXY | sbXY-N} [-reset]
	Usage: adrc -disconnect sbXY [-reset]
	Usage: adrc -disconnect {sbXY | sbXY-N} [-reset]
	Usage: adrc -disconnect sbXY -next PID [-reset]
	Usage: adrc -disconnect {sbXY | sbXY-N}-next PID [-reset]

Cause	Wrong command option

Message	**drc: not super user**
Cause	Executed command by non super user
Remedy	Execute command by super user

Message	**drc: cannot open /dev/FJSVhwr/pwrctl2: System call error Message**
Cause	Cannot access to System Control Facility (SCF) driver
Remedy	Ensure SCF driver package is properly installed

Message	**drc: Another drc is executed.**
Cause	Another drc Command is already being executed
Remedy	drc command cannot be executed simultaneously

Message	**drc: DR is not enabled.**
Cause	System is not setup to execute DR.
Remedy	Refer to "2.3 DR Configuration and Administration Issues" to enable DR.

Message	**drc: dr module is not found.**
Cause	DR module cannot be found.
Remedy	Ensure FJSVdr package is properly installed.

Message	**drc: ioctl() failed: system call error message** **SENSE: XX XX XX XX**
Cause	Displayed "Operation not supported": This firmware version doesn't support DR. Otherwise: failed to access to SCF driver. However, SENSE might not be displayed. It depends on "system call error message".
Remedy	Displayed the "Operation not supported": Please contact our customer service. SENSE was displayed except the above-mentioned: Please contact our customer service. SENSE was not displayed except the above-mentioned: Ensure SCF driver package is properly installed.

Message	**drc: Specified system board is not installed (sbXY).** **drc: Specified system board is not installed (sbXY-N).**
Cause	Specified system board is not installed.
Remedy	Be sure the specified system board is installed

Message	**drc: Incorrect memory mode (sbXY).**
	drc: Incorrect memory mode (sbXY-N).
Cause	Specified system board is running in interleaved mode
Remedy	Check the specified system board

Message	**drc: Board Type is different (sbXY).**
	drc: Board Type is different (sbXY-N).
Cause	While connecting:
	The system board type is different from other system boards in the partition.
	While transporting:
	The system board type is different from the destination system board.
Remedy	Check the specified system board

Message	**drc: CPU clock frequency is different (sbXY).**
	drc: CPU clock frequency is different (sbXY-N).
Cause	While connecting:
	The CPU type on the system board is different from the current partition.
	While transporting:
	The CPU type on the system board is different from the destination partition.
Remedy	Check the specified system board

Message	**drc: System board is in use by another partition (sbXY).**
	drc: System board is in use by another partition (sbXY-N).
Cause	Specified system board is already used in another partition
Remedy	Check the specified system board

Message	**drc: Invalid Status XX YY**
Cause	Status of the system board became invalid during the DR process
Remedy	Please contact our customer service.

Message	**drc: Time Out**
Cause	Status of system board does not change within the fixed time.
Remedy	Please contact our customer service.

Message	**drc: Unable to connect the specified system board (sbXY).**
	drc: Unable to connect the specified system board (sbXY-N).
Cause	Specified system board is not connectable status
Remedy	Check the specified system board

Message	**drc: System call failed.**
Cause	System call failed
Remedy	Check swap allocation or memory resources and try again

Message	**drc: dr module terminated abnormally(X).**
Cause	DR module terminated abnormally.
Remedy	Respond in the manner directed by the system console message

Message	**drc: Unable to disconnect the specified system board (sbXY incorrect PID).**
	drc: Unable to disconnect the specified system board (sbXY-N incorrect PID).
Cause	Specified system board does not exist in the target partition.
Remedy	Check the specified system board.

Message	**drc: Unable to disconnect the specified system board (sbXY incorrect status).**
	drc: Unable to disconnect the specified system board (sbXY-N incorrect status).
Cause	Specified system board is not able to be disconnected.
Remedy	Check the specified system board.

Message	**drc: Unable to disconnect the specified system board (sbXY last system board).**
	drc: Unable to disconnect the specified system board (sbXY-N last system board).
Cause	Specified system board is the last one
Remedy	Check the specified system board.

Message	**drc: Incorrect PID.**
Cause	Specified PID does not exist.
Remedy	Check the specified PID

Message	**drc: DR is not supported.**
Cause	1) DR operation was executed with the 32bit Solaris system or older Solaris release such as Solaris 7 OS.
	OR
	2) DR operation is executed on hardware that does not support DR.
Remedy	For requirements of DR process, please refer to "1.2 DR Requirements".

Message	**Another DR is executed.**
Explanation	Another DR is already being executed on the partition
Remedy	Additional DR processes can be executed after the current DR is completed.

Message	**Connection Script returns illegal exit code. (Exit code=#)**
Explanation	Connection Script(Script name:####)exit illegally.
Remedy	Check the connection script.

Message	**DR is not enabled.**
Explanation	System is not setup to execute DR

Remedy	Refer to "2.3 DR Configuration and Administration Issues" to enable DR.

Message	**DR operation is not executed.**
Explanation	DR operation is being canceled despite DR is not executing.
Remedy	Cancel command is only supported while DR is executing.

Message	**Error occurred on executing #### (Exit code=#)**
Cause	Connection Script(Script name:####)exit illegally
Remedy	Check the connection script

Message	**Fail to configure the CPU.**
Cause	Fail to configure the CPU.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to configure the I/O.**
Cause	Fail to configure the I/O.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to configure the board.**
Cause	Fail to configure the system board
Remedy	Respond in the manner directed by the console message.

Message	**Fail to configure the memory.**
Cause	Fail to configure the memory
Remedy	Respond in the manner directed by the console message.

Message	**Fail to delete the processor group.**
Cause	Fail to delete the processor set.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to disconnect the board.**
Explanation	Fail to disconnect the system board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to get the status of the board.**
Explanation	Fail to get the system board status.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to offline the CPU. [processor_id=#]**

Explanation	Fail to offline the CPU of processor id #
Remedy	Manually offline the processor by psradm(1M) and re-execute the DR. Refer to section 5.2.2 "DR detach failed with "Fail to offline the CPU.[processor_id=#]"".

Message	**Fail to online the CPU. [processor_id=#]**
Explanation	Fail to online the CPU of processor id #
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the CPU.**
Explanation	Fail to release the CPU.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the I/O.**
Explanation	Fail to release the I/O.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the board.**
Explanation	Fail to release the system board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to release the memory.**
Explanation	Fail to release the memory.
Remedy	Confirm whether there are enough free memory spaces. If so, respond in the manner directed by the console message. If not, after making more free memory spaces available, respond in the manner directed by the console message.

Message	**Fail to remove processor from processor group.**
Explanation	Fail to remove the CPU from the processor set.
Remedy	Manually remove the processor from the processor set by psrset(1M) and re-execute DR.

Message	**Fail to unbind processes.**
Explanation	Fail to unbind processes from the CPU.
Remedy	Manually unbind the processes by pbind(1M) and re-execute DR.

Message	**Fail to unconfigure the CPU.**
Explanation	Fail to unconfigure the CPU.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to unconfigure the I/O.**
Explanation	Fail to unconfigure the I/O.

Remedy	Respond in the manner directed by the console message.

Message	**Fail to unconfigure the board.**
Explanation	Fail to unconfigure the system board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to unconfigure the memory.**
Explanation	Fail to unconfigure the memory.
Remedy	Confirm whether there are enough free memory spaces. If so, respond in the manner directed by the console message. If not, after making more free memory spaces available, re-execute DR.

Message	**Invalid Status Devices=#### Status=####**
Explanation	The status of devices is illegal.
Remedy	Respond in the manner directed by the console message

Message	**Kernel memory is on the target board.**
Explanation	The kernel memory exists on the DR target system board.
Remedy	[GP7000F model 1000/2000 and PRIMEPOWER 800/1000/2000] The target board with kernel memory cannot be disconnected by DR. [PRIMEPOWER 900/1500/2500] Re-execute DR.

Message	**Memory is not enough to detach the board.**
Explanation	Cannot disconnect the system board due to insufficient memory.
Remedy	Increase free memory and execute again.

Message	**Psrinfo fails.**
Explanation	Fail to get the status of processor.
Remedy	Respond in the manner directed by the console message

Message	**Recovery fails.**
Explanation	Recovery failed after the interruption of DR.
Remedy	Execute error recovery directed by Chapter 5.

Message	**There is not enough swap space.**
Explanation	Cannot disconnect the system board due to insufficient swap space.
Remedy	Increase free swap space and execute again.

Message	**Fail to cancel releasing the memory.**

Explanation	Fail to cancel the memory detaching operation.
Remedy	Respond in the manner directed by the console message

Message	**Fail to check the bound processes.**
Explanation	Fail to check the status of bound processes.
Remedy	Manually unbind the processes by pbind(1M) and re-execute DR.

Message	**Illegal environment for DR. (ftrace_atboot is set to 1.)**
Explanation	DR environment is not set up.
Remedy	Please comment out "ftrace_atboot = 1" line in /etc/system to disable this configuration. After this reboot the system.

Message	**###### is still referenced.**
Explanation	An I/O device on the outgoing system board is still referenced.
Remedy	Confirm that the displayed I/O device is not in use and repeat the DR operation. If this error message appears again, please contact our customer service.

Message	**Fail to assign the board.**
Explanation	Fail to assign the board.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to unassign the board.**
Explanation	Fail to unassign the board.
Remedy	Respond in the manner directed by the console message.

Message	**Board is already connected.**
Explanation	Board is already connected.
Remedy	Check the system board status by drcstat command and re-execute correct DR command.

Message	**Failed to suspend device <device name>@<device info>**
Explanation	Device suspension failed.
Remedy	Repeat the action. If the message persists, please contact our customer service.

Message	**Failed to resume device <device name>@<device info>**
Explanation	The device cannot be resumed.
Remedy	Please contact our customer service

Message	**Device failed to suspend: <device name>@<device info>**
Explanation	Devices failed to suspend.
Remedy	Repeat the action. If the message persists, please contact our customer service.

Message	**Device failed to resume: <device name>@<device info>**
Explanation	Devices failed to resume.
Remedy	Please contact our customer service

Message	**failed to stop kernel thd: <name of thread>**
Explanation	Failed to stop kernel thread.
Remedy	Please contact our customer service

Message	**Fail to stop picld.**
Explanation	Fail to stop picld
Remedy	Respond in the manner directed by the console message.

Message	**Fail to stop drd.**
Explanation	Fail to stop drd
Remedy	If this error message appears and system board disconnect operation fails, please repeat the action.

Message	**Internal error: dr@0:SB*X*::memory**
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**VM viability test failed: dr@0:SB*X*::memory**
Explanation	There is not enough real memory to detach memory on system board *X*.
Remedy	Check the amount of available real memory, and repeat the action. If this error message appears again, please contact our customer service.

Message	**Memory operation refused: dr@0:SB*X*::memory**
Explanation	The DR operation is refused.
Remedy	Respond in the manner directed by the other message.

Message	**Memory operation cancelled: dr@0:SB*X*::memory**
Explanation	The DR operation is canceled.
Remedy	Respond in the manner directed by the other message.

Message	**Non-relocatable pages in span: dr@0:SB*X*::memory**
Explanation	There is non-relocatable (kernel) memory on the system board.
Remedy	The target board with kernel memory cannot be disconnected by DR.

Message	**drmach parameter is inappropriate for operation**
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**drmach parameter is not a valid ID**
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**Operation not supported**
Explanation	Invalid operation.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**Cannot proceed; Board is configured or busy: SB*X***
Explanation	Board is configured or busy.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**Invalid state transition**
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**Fail to execute cfgadm ###### I/O Device=######.**
Explanation	Fail to execute cfgadm for the I/O device which has ap_id ######.
Remedy	Respond in the manner directed by the console message.

Message	**Fail to restart picld.**
Explanation	Fail to restart picld.
Remedy	Respond in the manner directed by the console message.

7.1.3.2   Progress Messages

Message	**Start connecting sbXY (board number=#)**
	Start connecting sbXY-N (board number=#)
Explanation	Start DR attach of the system board "sbXY".

Message	**Start disconnecting sbXY (board number=#)**

	Start disconnecting sbXY-N (board number=#)
Explanation	Start DR detach of the system board "sbXY".

Message	**Connect sbXY (board number=#) at the next reboot**
	Connect sbXY-N (board number=#) at the next reboot
Explanation	Attach the system board "sbXY or sbXY-N" to the current partition at the next reboot.

Message	**Disconnect sbXY (board number=#) at the next reboot**
	Disconnect sbXY-N (board number=#) at the next reboot
Explanation	Detach the system board "sbXY or sbXY-N" from the current partition at the next reboot.

Message	**Connecting sbXY (board number=#) is done**
	Connecting sbXY-N (board number=#) is done
Explanation	DR attach process is completed.

Message	**Disconnect sbXY (board number=#) is done**
	Disconnect sbXY-N (board number=#) is done
Explanation	DR Detach process is completed.

Message	**Cancel operation starts.**
Explanation	Cancel operation started due to error that occurred during DR or as directed by user.

Message	**Checking status of board.**
Explanation	Checking failed device on the system board.

Message	**Checking the CPU.**
Explanation	Checking the CPU status.

Message	**Checking the size of memory.**
Explanation	Checking the size of memory to ensure there is sufficient memory present to disconnect the system board.

Message	**Configuring the board.**
Explanation	Connecting system board and activating the device on the board.

Message	**Connecting the board.**
Explanation	Connecting the system board.

Message	**Connection Script #### is done.**
Explanation	Finish execution of the connection script which is named ######.

Message	**Disconnect the board.**
Cause	Disconnecting the system board.

Message	**Execute connection script ####**
Cause	Executing the connection script (script name:####).

Message	**Offline the CPU.**
Explanation	Offline the CPU.

Message	**Online the CPU.**
Explanation	Online the CPU.

Message	**Recovery successes.**
Explanation	Recovery successfully completed.

Message	**Release the CPU**
Explanation	Releasing CPU.

Message	**Release the I/O**
Explanation	Releasing the I/O.

Message	**Release the board**
Explanation	Releasing the system board.

Message	**Release the memory.**
Explanation	Releasing memory.

Message	**The number of pages to be handle #**
Explanation	The remaining number of pages will be unconfigured.

Message	**Unconfigure the CPU.**
Explanation	Unconfiguring the CPU.

Message	**Unconfigure the I/O**

Explanation	Unconfiguring the I/O.

Message	**Unconfigure the board**
Explanation	Unconfiguring the system board.

Message	**Unconfigure the memory**
Explanation	Unconfiguring the memory.

Message	**Checking if there are real time processes**
Explanation	Checking if any real time process is running or not.

Message	**Checking if there are enough swap space.**
Explanation	Checking if swap space is enough to detach the memory.

Message	**Waiting the completion of memory releasing. (XXXX / YYYY)**
Explanation	Waiting for memory releasing to complete. XXXX pages out of YYYY pages have not been released yet.

Message	**Connection scripts start. Execution states ####**
Explanation	Connection scripts which state is ### start to execute.

Message	**Checking if I/O is referenced or not.**
Explanation	Checking if I/O is referenced or not.

Message	**Assign the board.**
Explanation	Assign the board.

Message	**Unassign the board.**
Explanation	Unassign the board.

Message	**Configure the CPU.**
Explanation	Configure the CPU.

Message	**Configure the I/O.**
Explanation	Configure the I/O.

Message	**Configure the memory.**

Explanation	Configure the memory.

Message	**Restarting drd.**
Explanation	Restarting drd.

Message	**Restarting picld.**
Explanation	Restarting picld.

Message	**Stopping drd.**
Explanation	Stopping drd.

Message	**Configuring the I/O device [XX/YY].**
Explanation	Configuring the I/O device. (XX: Number of configured I/O devices, YY: Number of I/O devices)

Message	**online cpu for passthru.: CPU's internal state is offline.**
Explanation	CPU's internal state is offline

Message	**Stopping picld.**
Explanation	Stopping picld.

7.1.3.3   Inquiring Messages

Message	**"-keep" option is only used for system board hotswap operation** **Continue ? [YES]/[NO]**
Explanation	This message is displayed in case "-keep" option is specified and it executes system board hotswap. If YES, DR process continues. If NO, DR process is canceled.
Action Recommended	Reply YES to this message only to execute system board hotswap operation.

The reply file for the following inquiring messages is located at /etc/opt/FJSVdr/reply/C/dr_op.
If you need to change the answers, you can edit the reply file.

Message	**CPU [processor_id=#] is in the processor group. Do you remove?**
Explanation	This message is displayed in case the CPU of targeted system board belongs to processor set. If Yes, CPU is removed from processor set and DR is to be continued. If No, DR process is aborted. The adrc command chooses "No".
Action	Reply Yes to this message and continue the DR process. After the completion of DR, if

Recommended	necessary, CPU is to be added to the processor set by psrset(1M).

Message	**CPU [processor_id=######] is the last processor in the processor group. Do you remove processor group?"**
Explanation	This message is displayed in case the CPU on the targeted system board belongs to processor set and the CPU is the only processor within the group. If Yes, CPU is deleted from processor set and DR is continued. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	Reply Yes to this message and continue the DR process. After the completion of DR, if necessary, processor set is created by psrset(1M).

Message	**Processes[pid=######] is binded to the CPU on the detached board.** **Are binded processes unbinded automatically?**
Explanation	This message is displayed in case the CPU on the targeted system board is bound to process(es). If Yes, the process(es) is(are) unbound from the CPU and DR is continued. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	Reply Yes to this message and continue the DR process.

Message	**Real time processes[pid=######] is running. Do you continue DR ?**
Explanation	This message is displayed in case Real time processes are running. If Yes, DR is continued. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	Real time processes are not scheduled for a few seconds. Please confirm the processes are not influenced by a few second delay and continue the DR process.

Message	**Can't find proper board for kernel migration. Do you try migration to the board which has no-obp-sb-cx property?**
Explanation	Can't find proper board for kernel migration. All system board might be configured with no-obp-sb-cX or no-obp-sb. If Yes, DR is continued with system board with no-obp-sb-cX or no-obp-sb. If No, DR process is aborted. The adrc command chooses "No".
Action Recommended	If it's no problem to copy kernel memory to the board with no-obp-sb-cX or no-obp-sb, reply Yes to this message and continue the DR process.

7.1.4   drcstat error Messages

Message	**Usage: drcstat -board [sbXX	all]** **Usage: drcstat -board [sbXY	sbXY-N	all] [-xpar]**

	Usage: drcstat -system [sbXY]
	Usage: drcstat -system [sbXY| sbXY-N] [-xpar]
	Usage: drcstat -device [sbXY] [-e]
	Usage: drcstat -device [sbXY | sbXY-N] [-e] [-xpar]
Cause	Wrong command option

Message	drcstat: Specified system board is not installed.
Cause	Specified system board is not installed.
Remedy	Be sure the specified system board is installed

Message	drcstat: not super user
Cause	Executed command by non super user
Remedy	Execute command by super user

Message	drcstat: dr module is not found.
Cause	DR module cannot be found.
Remedy	Ensure FJSVdr package is properly installed.

Message	drcstat: cannot open /dev/FJSVhwr/pwrctl2: system call error Message
Cause	Cannot access to SCF driver.
Remedy	Ensure SCF driver package is properly installed.

Message	drcstat: ioctl() failed: system call error message

Cause	Displayed "Operation not supported":
	   This firmware version doesn't support DR.
	 Displayed "Device busy":
	   Cannot access to SCF because SCF is busy.
	 Otherwise:
	   failed to access to SCF driver.

Remedy	Displayed the "Operation not supported":
	   Please contact our customer service.
	 Displayed "Device busy":
	   Wait for a while and re-execute drcstat.
	 Otherwise:
	   Ensure FJSVscd2 package is properly installed.

Message	drcstat: /dev/openprom ioctl() failed :X: system call error message
Cause	Cannot access to openprom.
Remedy	Wait for a while and re-execute drcstat command.

Message	drcstat: malloc() failed.
Cause	Failed to allocate memory

Remedy	Check swap allocation or memory resources and try again.

Message	**drcstat: System call failed.**
Cause	The system call failed.
Remedy	Check swap allocation or memory resources and try again.

Message	**drcstat: dr_info terminated abnormally(X).**
Cause	dr_info command failed.
Remedy	Wait for a while and re-execute drcstat command. Otherwise respond in the manner directed by the system console message

Message	**drcstat: Specified system board does not exist in current partition.**
Cause	The specified system board does not exist in the current partition.
Remedy	Check the specified system board.

Message	**drcstat: DR is not supported.**
Cause	1) DR operation was executed with the 32bit Solaris system or older Solaris release such as Solaris 7 OS. OR 2) DR operation is executed on hardware that does not support DR.
Remedy	For requirements of DR process, please refer to "1.2 DR Requirements"

7.2   Console Messages

This section explains the console message printed out by DR driver.

The system board notation in DR driver Messages

The system board number in DR driver Messages is represented in a different notation from what is used for DR commands. The following table shows the relationship between these two different notations

The board number relationship between DR command and DR driver Message (Without XPAR)

DR command	DR driver Message
sb00	SB0
sb01	SB1
sb02	SB2
sb03	SB3
sb04	SB4
sb05	SB5
sb06	SB6
sb07	SB7

sb10	SB8
sb11	SB9
sb12	SB10
sb13	SB11
sb14	SB12
sb15	SB13
sb16	SB14
sb17	SB15
sb20	SB16
sb21	SB17
sb22	SB18
sb23	SB19
sb24	SB20
sb25	SB21
sb26	SB22
sb27	SB23
sb30	SB24
sb31	SB25
sb32	SB26
sb33	SB27
sb34	SB28
sb35	SB29
sb36	SB30
sb37	SB31

The board number relationship between DR command and DR driver Message (PRIMEPOWER900/1500 with XPAR)

DR command	DR driver Message
sb00-0	SB0
sb00-1	SB4
sb00-2	SB8
sb00-3	SB12
sb01-0	SB1
sb01-1	SB5
sb01-2	SB9
sb01-3	SB13
sb02-0	SB2
sb02-1	SB6
sb02-2	SB10
sb02-3	SB14
sb03-0	SB3
sb03-1	SB7
sb03-2	SB11
sb03-3	SB15

The board number relationship between DR command and DR driver Message (PRIMEPOWER2500 with XPAR)

DR command	DR driver Message
sb00-0	SB0
sb00-1	SB8
sb01-0	SB1
sb01-1	SB9
sb02-0	SB2
sb02-1	SB10
sb03-0	SB3
sb03-0	SB11
sb04-0	SB4
sb04-1	SB12
sb05-0	SB5
sb05-1	SB13
sb06-0	SB6

sb06-1	SB14
sb07-0	SB7
sb07-1	SB15

7.2.1   Console Message List

megabytes not available to kernel cage
Bad address: dr@0:SBX::memory
can't delete kernel cage occupied span; basepfn = *X,* npages = *Y*
Cannot determine property length: PROM Node 0xX: property fma-ranges.
Cannot determine property length: PROM Node 0xX: property address in fjsv_cdr_get_tod_address.
Cannot determine property length: PROM Node 0xX: property components in fjsv_cdr_get_tod_address.
Cannot determine property length: SBX::Y: property Z
Cannot find TOD FJSV,eeprom in fjsv_cdr_get_tod_address.
Cannot get the translations.
Cannot read property value: SBX::Y: property ######
Cannot read property value: PROM Node #: property name
Cannot read property value: property: name
Cannot read property value: PROM Node 0xX: property address in fjsv_cdr_get_tod_address.
Cannot read property value: PROM Node 0xX: property components in fjsv_cdr_get_tod_address.
Cannot read property value: PROM Node 0xX: property dr-status
Cannot read property value: PROM Node 0xX: property fma-ranges.
Cannot read property value: property: scf-cmd-reg.
Cannot stop user thread: <pid> <pid> ...
Could not get kernel symbol address
CPU X FAILED TO SHUTDOWN
Device busy: dr@0:SBX::cpuY
Device busy: dr@0:SBX::pciY
Device driver failure: path
Device failed to resume: <driver name|major #> ...
Device failed to suspend: <driver name|major #> ...
Device in fatal state
DR: checking devices...
DR: dr_suspend invoked with force flag
DR: PROM detach board X
DR: resume COMPLETED
DR: resuming kernel daemons...
DR: resuming user threads...
DR: suspending drivers
DR: suspending user threads...
dr#: module not yet attached
dr#: failed to alloc soft-state
dr_add_memory_spans: unexpected kphysm_add_memory_dynamic return value X; basepfn=Y, npages=Z
dr_cancel_cpu: failed to disable interrupts on cpu *X*

dr_cancel_cpu: failed to online cpu X
dr_cancel_cpu: failed to power-on cpu X
dr_copyin_iocmd: (32bit) failed to copyin sbdcmd-struct
dr_copyin_iocmd: failed to copyin options
dr_copyin_iocmd: failed to copyin sbdcmd-struct
dr_copyout_errs: (32bit) failed to copyout
dr_copyout_errs: failed to copyout
dr_copyout_iocmd: (32bit) failed to copyout sbdcmd-struct
dr_copyout_iocmd: failed to copyout sbdcmd-struct
dr_dev2devset: invalid cpu unit# = #
dr_dev2devset: invalid io unit# = #
dr_dev2devset: invalid mem unit# = #
dr_exec_op: unknown command (#)
dr_move_memory: failed to quiesce OS for copy-rename
dr_post_attach_cpu: cpu_get failed for cpu X
dr_pre_release_cpu: thread(s) bound to cpu X
dr_pre_release_mem: unexpected kphysm_del_release return value #
dr_pt_ioctl: invalid passthru args
dr_release_mem: unexpected kphysm error code #, id 0xX
dr_release_mem_done: mem-unit (X.Y): deleted memory still found in phys_install
dr_release_mem_done: target :mem-unit (X.Y): deleted memory still found in phys_install
dr_release_mem_done: unexpected kphysm_del_release return value #
dr_reserve_mem_spans memory reserve failed. Unexpected kphysm_del_span return value #; basepfn=# npages=#
dr_select_mem_target: no memlist for mem-unit X, board Y
dr_status: failed to copyout status for board #
dr_status: unknown dev type (#)
dr_stop_user_threads: failed to stop thread: process=<name>, pid=#
DRMACH: PROM attach SBX CPU Y
drmach_board_connect: board X exists.
drmach_board_connect: board (X) has cpu (Y) in bad state.
drmach_board_deprobe: board (X) does not exist.
drmach_board_deprobe: cpu (X) on board (Y) has bad state (#).
drmach_log_sysevent failed (rv #) for SBX
error #:
error #: #
FAILED to suspend <device name>@<device info>
FAILED to resume <device name>@<device info>
Failed to off-line: dr@0:SBX::cpuY
Failed to on-line: dr@0:SBX::cpuY
Failed to start CPU: dr@0:SBX::cpuY
Failed to stop CPU: dr@0:SBX::cpuY
Firmware cannot find node.: <devicename or todname> in fjsv_cdr_get_tod_address
Firmware cannot find node.: node name /FJSV,system
Firmware cannot find node.: node name /FJSV,system/board@#
Firmware deprobe failed:

Firmware deprobe failed: SBX::cpuY
Firmware probe failed: SBX
FJSV,fma-cancel fails.
FMA fails due to the unknown reason.
Getproplen returns wrong size.: PROM Node 0xX: property address in fjsv_cdr_get_tod_address. Expected #, got #.
I/O error: dr@0:SBX::memory
Insufficient memory: dr@0:SBX::cpuY
Insufficient memory: dr@0:SBX::memory
Internal error: dr.c #
Internal error: dr_mem.c #
Invalid argument
Invalid argument: dr@0:SBX::cpuY
Invalid argument: dr@0:SBX::memory
Invalid argument: ########
Invalid board number: X
Invalid state transition: dr@0:SBX::cpuY
Invalid state transition: dr@0:SBX::memory
Invalid state transition: dr@0:SBX::pciY
kernel: fail to set the new scrub.
kernel: fail to sync the translations.
Kernel cage is disabled: dr@0:SB#::memory
Kernel Migration fails. 0xX
kmem_alloc failed: in fjsv_cdr_get_tod_address.
Memory operation failed: dr@0:SBX::memory
ngdrmach:drmach_attach_board: fail to connect board, but can't recover this error = 0xX.
ngdrmach:drmach_attach_board: fail to connect board with the error = 0xX.
ngdrmach:drmach_attach_board: fail to map the obp area <board #>
ngdrmach:drmach_board_deprobe: fjsv_memecc_kstat_delete: wrong board number X
ngdrmach:drmach_board_deprobe: fjsv_u2_ecc_kstat_delete: wrong board number X
ngdrmach:drmach_board_deprobe: fjsv_u2ts_kstat_delete: wrong board number X
ngdrmach:drmach_board_deprobe: fjsv_upa_ecc_kstat_delete: wrong board number X
ngdrmach: fail to connect board, errid #
ngdrmach: status ###### for ######
No available memory target: dr@0:SBX::memory
No device(s) on board: dr@0:SBX
No error
no error: dr@0:SBX::memory
OBP node # has invalid property value, board#=X
Operation not supported: ERROR <error string>
Operator confirmation for quiesce is required: dr@0:SBX::memory
OS configure dr@0:SBX::cpuY
OS configure dr@0:SBX::memory
OS configure dr@0:SBX::pciY

OS unconfigure dr@0:SBX::cpuY
OS unconfigure dr@0:SBX::memory
OS unconfigure dr@0:SBX::pciY
prom_error: fail to connect board.
prom_error: fail to disconnect board.
resuming <device name>@<device info> (aka <alias>)
resuming <device name>@<device info>
suspending <device name>@<device info> (aka <alias>)
suspending <device name>@<device info>
TOD on board X has already been attached.
TOD on board X has already been removed.
Unable to detach last available TOD on board X
Unexpected internal condition: drmach.c #
Unexpected internal condition: SBX
unexpected kcage_range_add return value #
unexpected kcage_range_delete return value #
Unrecognized platform command: #
Unsafe driver present: <driver name | major #> ...
URGENT_ERROR_TRAP is detected during FMA.

7.2.2 Message Explanation

This section explains the console messages printed by DR driver. The output of messages that don't have output field is console.

7.2.2.1 Progress Messages

Message	DR: PROM detach board X
Explanation	Detach system board X.

Message	DRMACH: PROM attach SBX CPU Y
Explanation	Attach system board X by CPU Y.

Message	OS configure dr@0:SBX::cpuY
Explanation	Configure CPU Y on system board X.

Message	OS configure dr@0:SBX::memory
Explanation	Configure memory on system board X.

Message	OS configure dr@0:SBX::pciY
Explanation	Configure PCI Y on system board X.

Message	OS unconfigure dr@0:SBX::cpuY
Explanation	Unconfigure CPU Y on system board X.

Message	OS unconfigure dr@0:SBX::memory
Explanation	Unconfigure memory on system board X.

Message	OS unconfigure dr@0:SBX::pciY
Explanation	Unconfigure PCI Y on system board X.

Message	suspending <device name>@<device info> (aka <alias>)
Explanation	Suspending the device

Message	suspending <device name>@<device info>
Explanation	Suspending the device

Message	resuming <device name>@<device info> (aka <alias>)
Explanation	Resuming the device

Message	resuming <device name>@<device info>
Explanation	Resuming the device

Message	DR: resuming kernel daemons...
Explanation	Resuming kernel daemons

Message	DR: resuming user threads...
Explanation	Resuming user threads

Message	DR: suspending user threads...
Explanation	Suspending user threads

Message	DR: resume COMPLETED
Explanation	DR resume operation completed

Message	DR: checking devices...
Explanation	checking if there are any DR unsafe device drivers loaded

Message	DR: dr_suspend invoked with force flag
Explanation	User command requests DR operation not to check for unsafe

Message	DR: suspending drivers
Explanation	Suspending device drivers

7.2.2.2 PANIC Messages

Message	Cannot get the translations.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	kernel: fail to set the new scrub.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	kernel: fail to sync the translations.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	ngdrmach: fail to connect board, errid #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	ngdrmach: timeout to connect board.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	prom_error: fail to connect board.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	prom_error: fail to disconnect board.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	FMA fails due to the unknown reason.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	FJSV,fma-cancel fails.

Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	URGENT_ERROR_TRAP is detected during FMA.
Explanation	Urgent memory error is detected during memory migration in the DR process.
Remedy	Please contact our customer service.

Message	ngdrmach:drmach_attach_board: fail to connect board, but can't recover this error = 0xX.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	CPU X FAILED TO SHUTDOWN
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

7.2.2.3 Warning Messages

Message	# megabytes not available to kernel cage
Explanation	Detect the lack of memory resource.
Remedy	Detach the board and attach this board again.

Message	can't delete kernel cage occupied span; basepfn = X, npages = Y
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	Could not get kernel symbol address
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr#: failed to alloc soft-state
Explanation	Failed to allocate due to lack of the memory resource
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr#: module not yet attached
Explanation	Failed to attach the DR driver.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_add_memory_spans: unexpected kphysm_add_memory_dynamic return value X; basepfn=Y, npages=Z
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_cancel_cpu: failed to disable interrupts on cpu X
Explanation	Fail to disable interrupt on CPU X.
Remedy	Disable interrupt on cpu X with psradm –I and if this command fails again, respond in the manner directed by command message.

Message	dr_cancel_cpu: failed to online cpu X
Explanation	Fail to online CPU X.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_cancel_cpu: failed to power-on cpu X
Explanation	Fail to power-on cpu X
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_copyin_iocmd: (32bit) failed to copyin sbdcmd-struct
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_copyin_iocmd: failed to copyin options
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_copyin_iocmd: failed to copyin sbdcmd-struct
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_copyout_errs: (32bit) failed to copyout
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_copyout_errs: failed to copyout
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_copyout_iocmd: (32bit) failed to copyout sbdcmd-struct
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_copyout_iocmd: failed to copyout sbdcmd-struct
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_status: failed to copyout status for board #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_status: unknown dev type (#)
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_dev2devset: invalid cpu unit# = #
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_dev2devset: invalid io unit# = #
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_dev2devset: invalid mem unit# = #
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_exec_op: unknown command (#)
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_post_attach_cpu: cpu_get failed for cpu X

Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_pre_release_cpu: thread(s) bound to cpu X
Explanation	The thread in the process is bound to the detached CPU X.
Remedy	Check if the process bound to the CPU exists by pbind(1M) command. If it exists, unbind from the CPU and repeat the action.

Message	dr_pre_release_mem: unexpected kphysm_del_release return value #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_pt_ioctl: invalid passthru args
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	dr_release_mem: unexpected kphysm error code #, id 0xX
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_release_mem_done: mem-unit (X.Y): deleted memory still found in phys_install
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_release_mem_done: target :mem-unit (X.Y): deleted memory still found in phys_install
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_release_mem_done: unexpected kphysm_del_release return value #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	dr_reserve_mem_spans memory reserve failed. Unexpected kphysm_del_span return value #; basepfn=# npages=#
Explanation	The selected target board can no longer fit all the kernel memory of the source board since it was last selected.
Remedy	Please repeat the action. If the problem remains, please contact our customer

	service.

Message	ngdrmach: status ###### for ######
Explanation	Detected a degraded device.
Remedy	Please contact our customer service.

Message	drmach_board_connect: board X exists.
Explanation	The board is connected.
Remedy	Please check the board status and if board is disconnected please contact our customer service.

Message	drmach_board_connect: board (X) has cpu (Y) in bad state.
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	drmach_board_deprobe: board (X) does not exist.
Explanation	The board is not connected.
Remedy	Please check the board status and if board is connected please contact our customer service.

Message	drmach_board_deprobe: cpu (X) on board (Y) has bad state (#).
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	drmach_log_sysevent failed (rv #) for SBX
Explanation	There may be minor error in the system.
Remedy	Please contact our customer service.

Message	ngdrmach:drmach_board_deprobe: fjsv_u2_ecc_kstat_delete:
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	ngdrmach:drmach_board_deprobe: fjsv_u2ts_kstat_delete:
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	ngdrmach:drmach_board_deprobe: fjsv_upa_ecc_kstat_delete:
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	OBP node # has invalid property value, board#=X
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	unexpected kcage_range_add return value #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	unexpected kcage_range_delete return value #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.

Message	**dr_select_mem_target: no memlist for mem-unit *X*, board *Y***
Cause	Detected inconsistency of the memory unit information in DR driver's internal data.
Remedy	Please contact our customer service.

Message	**FAILED to suspend <device name>@<device info>**
Cause	Device suspension failed
Remedy	Repeat the action. If the message persists, please contact our customer service.

Message	**FAILED to resume <device name>@<device info>**
Cause	The device cannot be resumed.
Remedy	Please contact our customer service.

Message	**dr_stop_user_threads: failed to stop thread: process=<name>, pid=#**
Cause	Cannot stop the user thread.
Remedy	Please contact our customer service.

Message	**Cannot stop user thread: <pid> <pid> ...**
Cause	The DR driver cannot stop all the user process in the list
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Kernel Migration fails. 0xX**
Cause	Kernel data migration failed as a result of DR detach.
Remedy	Please contact our customer service

Message	**ngdrmach:drmach_board_deprobe: fjsv_memecc_kstat_delete: wrong board**

	number *X*
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service

Message	**ngdrmach:drmach_board_deprobe: fjsv_u2ts_kstat_delete: wrong board number *X***
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service

Message	**ngdrmach:drmach_board_deprobe: fjsv_u2_ecc_kstat_delete: wrong board number *X***
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service

Message	**ngdrmach:drmach_board_deprobe: fjsv_upa_ecc_kstat_delete: wrong board number *X***
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service

Message	**TOD on board *X* has already been attached.**
Cause	Time of Date Clock on board X has been attached. This may be a minor inconsistency in the system.
Remedy	Please contact our customer service

Message	**TOD on board *X* has already been removed.**
Cause	Time of Date Clock on board X has been removed. This may be a minor inconsistency in the system.
Remedy	Please contact our customer service

Message	**Unable to detach last available TOD on board *X***
Cause	Detaching the system board will result in detaching the last available Time of Date clock.
Remedy	Attach another system board before detaching.

Message	Device in fatal state
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	I/O error: dr@0:SBX::memory
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Invalid argument
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Invalid argument: ########
Explanation	Invalid argument is passed to the driver.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	No error
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	no error: dr@0:SBX::memory
Explanation	There may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Unrecognized platform command: #
Explanation	Invalid argument is passed to the driver or there may be inconsistency in the system.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Bad address: dr@0:SBX::memory
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Cannot determine property length: SBX::Y: property Z
Explanation	Fail to get the property from OBP
Remedy	Please contact our customer service.

Output	Console and Standard Output

Message	Cannot read property value: SBX::Y: property ######
Explanation	Fail to get the property from OBP
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Cannot read property value: PROM Node #: property name
Explanation	Fail to get the property from OBP.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Cannot read property value: property: name
Explanation	Fail to get the property from OBP.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Device busy: dr@0:SBX::pciY
Explanation	Some devices are still referenced.
Remedy	Confirm that all devices in this pci slot are not in use and repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Device driver failure: path
Explanation	The device driver failed in attach or detach operation.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Failed to off-line: dr@0:SBX::cpuY
Explanation	Fail to off-line CPU Y on board X.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Failed to on-line: dr@0:SBX::cpuY
Explanation	Fail to online CPU Y on system board X.
Remedy	Online CPU with psradm(1M) –n. If it fails to online CPU, and if this command fails again, respond in the manner directed by command message.
Output	Console and Standard Output

Message	Failed to start CPU: dr@0:SBX::cpuY
Explanation	Fail to start CPU Y on system board X.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Failed to stop CPU: dr@0:SBX::cpuY
Explanation	Fail to stop CPU Y on system board X.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Firmware deprobe failed:
Explanation	Fail to deprobe the board.
Remedy	Respond in the manner directed by the other message.
Output	Console and Standard Output

Message	Firmware deprobe failed: SBX::cpuY
Explanation	Fail to deprobe the CPU.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Firmware probe failed: SBX
Explanation	Fail to probe the board.
Remedy	Respond in the manner directed by the other message.
Output	Console and Standard Output

Message	Insufficient memory: dr@0:SBX::memory
Explanation	Detect the lack of memory resource.
Remedy	Check the size of memory, detach the board and attach again. If the problem still exists, please contact our customer service.
Output	Console and Standard Output

Message	Internal error: dr.c #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Internal error: dr_mem.c #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Invalid argument: dr@0:SBX::memory
Explanation	The memory board X is currently involved in other DR operation and can't be detached.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Invalid board number: X
Explanation	Invalid board number.
Remedy	Check the board number and repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Kernel cage is disabled: dr@0:SB#::memory
Explanation	Kernel cage memory feature is disabled.
Remedy	Ensure /etc/system is edited to enable kernel cage memory. (See "2.3.1 How to enable DR and Kernel cage memory")
Output	Console and Standard Output

Message	Memory operation failed: dr@0:SBX::memory
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard output

Message	No device(s) on board: dr@0:SBX
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Operator confirmation for quiesce is required: dr@0:SBX::memory
Explanation	There is non-relocatable (kernel) memory on the board.
Remedy	The target board with kernel memory cannot be disconnected by DR.
Output	Console and Standard Output

Message	Unexpected internal condition: drmach.c #
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Unexpected internal condition: SBX
Explanation	Fail the pre-operation to call OBP.
Remedy	Repeat the action.

	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	Device busy: dr@0:SBX::cpuY
Explanation	CPU Y on system board X is busy during release operation.
Remedy	Repeat the action.
	If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	error #:
Explanation	Undefined error occurred.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	error #: #
Explanation	Undefined error occurred.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Insufficient memory: dr@0:SBX::cpuY
Explanation	Detect the lack of memory resource.
Remedy	Check the size of available memory and detach the board.
	If the problem still exists, please contact our customer service.
Output	Console and Standard Output

Message	Invalid argument: dr@0:SBX::cpuY
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Invalid state transition: dr@0:SBX::cpuY
Explanation	Invalid state transition of cpu Y on system board X
Remedy	Repeat the action.
	If the problem still exists, please contact our customer service.
Output	Console and Standard Output

Message	Invalid state transition: dr@0:SBX::memory
Explanation	Invalid state transition of memory on system board X
Remedy	Repeat the action.
	If the problem still exists, please contact our customer service.
Output	Console and Standard Output

Message	Invalid state transition: dr@0:SBX::pciY
Explanation	Invalid state transition of pci Y on system board X
Remedy	Repeat the action. If the problem still exists, please contact our customer service.
Output	Console and Standard Output

Message	No such device: dr@0:SBX::cpuY
Explanation	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Operation already in progress: dr@0:SBX::cpuY
Explanation	The operation to the cpu Y on system board X is in progress.
Remedy	Repeat the action. If the problem still exists, please contact our customer service.
Output	Console and Standard Output

Message	**dr_move_memory: failed to quiesce OS for copy-rename**
Cause	There is a task not suspended in the process.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output

Message	**No available memory target: dr@0:SBX::memory**
Cause	The system board cannot be detached because it contains kernel memory and there is no available target memory board.
Remedy	Add new system board and then try the detach operation again.
Output	Console and Standard Output

Message	**Unsafe driver present: <driver name|major #> ...**
Cause	DR driver found DR unsafe drivers in the system.
Remedy	Unload the unsafe drivers and try the DR operation again.
Output	Console and Standard Output

Message	**Device failed to resume: <driver name|major #> ...**
Cause	Devices on the list failed to resume
Remedy	Please contact our customer service
Output	Console and Standard Output

Message	**Device failed to suspend: <driver name|major #> ...**
Cause	Devices on the list failed to suspend

Remedy	Please contact our customer service
Output	Console and Standard Output

Message	**ngdrmach:drmach_attach_board: fail to map the obp area <board #>**
Cause	The firmware failed to set the information.
Remedy	Please contact our customer service.

Message	**ngdrmach:drmach_attach_board: fail to connect board with the error = 0xX.**
Cause	The firmware returned the error in the process, and the system recovered.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.

Message	**Firmware cannot find node.: <devicename or todname> in fjsv_cdr_get_tod_address**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**kmem_alloc failed: in fjsv_cdr_get_tod_address.**
Cause	There is insufficient system memory left in the system to support the requirements in fjsv_cdr_get_tod_address.
Remedy	Reduce the system load and wait a while. Repeat the action.
Output	Console and Standard Output

Message	**Cannot determine property length: PROM Node 0xX: property components in fjsv_cdr_get_tod_address.**
Cause	Fail to get property from OBP
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot read property value: PROM Node 0xX: property components in fjsv_cdr_get_tod_address.**
Cause	Fail to get property from OBP
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot find TOD FJSV,eeprom in fjsv_cdr_get_tod_address.**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot determine property length: PROM Node 0xX: property address in**

	fjsv_cdr_get_tod_address.
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Getproplen returns wrong size.: PROM Node 0xX: property address in fjsv_cdr_get_tod_address. Expected #, got #.**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot read property value: PROM Node 0xX: property address in fjsv_cdr_get_tod_address.**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Firmware cannot find node.: node name /FJSV,system/board@#**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot read property value: PROM Node 0xX: property fma-ranges.**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot determine property length: PROM Node 0xX: property fma-ranges.**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot read property value: property: scf-cmd-reg.**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Firmware cannot find node.: node name /FJSV,system**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	**Cannot read property value: PROM Node 0xX: property dr-status**
Cause	There may be inconsistency in the system.
Remedy	Please contact our customer service.
Output	Console and Standard Output

Message	Operation not supported: ERROR <error string>
Explanation	Invalid operation.
Remedy	Repeat the action. If this error message appears again, please contact our customer service.
Output	Console and Standard Output