Prime ®

Using FS_RECOVER

Revision 21.0 to Revision 23.2

DOC13062–3LA

Using FS_RECOVER

Third Edition

G. Gregory Dawe

This manual documents the software operation of the PRIMOS operating system on 50 Series computers and their supporting systems and utilities as implemented at Master Disk Revision Level 21.0 (Rev. 21.0).

Printing History

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About This Book

This book documents Version 3.0 of the FS_RECOVER utility. System Administrators use this utility to reduce the time for file system recovery after a system crash. The object of FS_RECOVER is to reduce the time to recover by eliminating the need to run FIX_DISK on partitions that do not need to have FIX_DISK run on them. FS_RECOVER works in conjunction with AUTOPSY to analyze crash dumps and determine the integrity of the file system.

Other Useful Books

The following books may be of help in understanding and using FS_RECOVER.

- The handbook for your CPU explains the operation of your system including how to handle halts and hangs and how to perform crash tape dumps.

- *Operator's Guide to File System Maintenance* (DOC9300–3LA or later version) describes the PRIMOS file system and explains how to format disk partitions, run the disk partition maintenance program (FIX_DISK), determine physical device numbers, and interpret disk error messages.

- *Operator's Guide to System Commands* (DOC9304–3LA or later version) serves as a reference guide for most of the operator commands that you will need.

- *DSM User's Guide* (DOC10061–1LA or later version) explains how to use the Distributed Systems Management software, including how to administer and display logs and how to manage a group of systems on a network.

- *Rev. 23.2 Software Release Document* (DOC10001–9PA) describes features added to PRIMOS at Rev. 23.2, including some features related to FS_RECOVER such as a new run vector for tape dumps.

Prime Documentation Conventions

The following conventions are used throughout this document. The examples in the table illustrate the uses of these conventions.

Convention	*Explanation*	*Example*
Uppercase	In command formats, words in uppercase bold indicate the names of commands, options, statements, and keywords. Enter them in either uppercase or lowercase.	**SLIST**
Italic	Variables in command formats, text, or messages are indicated by lowercase italic.	**LOGIN** *user-id*
Abbreviations	If a command or option has an abbreviation, the abbreviation is placed immediately below the full form.	**SET_QUOTA** **SQ**
Brackets	Brackets enclose a list of one or more optional items. Choose none, one, or several of these items.	$\textbf{LD} \begin{bmatrix} -\textbf{BRIEF} \\ -\textbf{SIZE} \end{bmatrix}$
Braces	Braces enclose a list of items. Choose one and only one of these items.	$\textbf{CLOSE} \begin{Bmatrix} \textit{filename} \\ -\textbf{ALL} \end{Bmatrix}$
Braces within brackets	Braces within brackets enclose a list of items. Choose either none or only one of these items; do not choose more than one.	$\textbf{BIND} \begin{bmatrix} \begin{Bmatrix} \textit{pathname} \\ \textit{options} \end{Bmatrix} \end{bmatrix}$
Monospace	Identifies system output, prompts, messages, and examples.	`address connected`
Underscore	In examples, user input is underscored but system prompts and output are not.	`OK, `<u>`RESUME MY_PROG`</u>
Hyphen	Wherever a hyphen appears as the first character of an option, it is a required part of that option.	**SPOOL –LIST**
Ellipsis	An ellipsis indicates that you have the option of entering several items of the same kind on the command line.	*pdev-1* [. . .*pdev-n*]
Subscript	A subscript after a number indicates that the number is not in base 10. For example, the subscript 8 is used for octal numbers.	200_8

What Is FS_RECOVER?

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This chapter describes

- The effect a crash can have on your file system

- What FS_RECOVER does

- What FS_RECOVER does with a crash dump

- Using FS_RECOVER without a crash dump

- Considerations when using FS_RECOVER

The Effects of a System Crash on Your Partitions

A system crash is an unexpected event. It can happen while PRIMOS® is updating or changing the file system. If it does, it may be impossible to access some or all of the files on the partitions that were active at the time of the crash. The only way to to correct this problem is to run FIX_DISK on the affected partitions.

Note   The term *file system*, as used here, refers to the data structures used by PRIMOS to find all the records for files on a partition.

What Does FS_RECOVER Do?

The main goal of FS_RECOVER is to reduce file system recovery time following a system crash. This allows you to make the file system available to users sooner. FS_RECOVER can assess the general state of your file system and provide an automated interface to FIX_DISK, even if your system has not crashed. If your system did crash and you took a crash dump, you can use FS_RECOVER to read and analyze the crash dump.

FS_RECOVER determines

- Which partitions need to be fixed *immediately*

- Which partitions need fixing that can be *deferred* to a more convenient time

- Which partitions were unaffected by the crash

FS_RECOVER also determines the correct FIX_DISK options for those partitions that must be fixed immediately and provides an automated facility for running FIX_DISK.

If your system has not crashed or if your system crashed but you did not take a crash dump, you can use FS_RECOVER to make a generalized assessment of the state of your partitions. FS_RECOVER determines which partitions are damaged and which partitions are *clean*. (The term *clean partition*, as used here, refers to a partition which does not cause PRIMOS to generate a warning message at the time it is mounted, or added. Refer to Appendix C for a listing of these warning messages.)

FS_RECOVER also determines the correct FIX_DISK options for the damaged partitions and provides an automated facility for running FIX_DISK.

What FS_RECOVER Does With a Crash Dump

When you reboot your system after a crash, you should allow PRIMOS.COMI to mount all your local disk partitions but not start any disk mirrors and not allow users to log in.

Note	By placing INIT_RECOVER.CPL within PRIMOS.COMI as recommended in Chapter 2, you can start FS_RECOVER by entering CONTROL-P when prompted to do so during coldstart.

When the system is running, use FS_RECOVER to read the crash tapes or the crash-dump-to-disk (CDD) partition, and perform the recovery analysis.

When performing a crash dump recovery analysis, FS_RECOVER uses two major sources of data.

- The crash dump itself, which contains detailed information about what was happening on your system at the time of the crash

- The *current* state of the disk partitions

The current state of the disk partitions is available only if each disk is mounted. The current state information is merged with the crash dump information to form a recommendation for each partition that was mounted at the time of crash.

When analyzing the crash dump, FS_RECOVER looks for three types of information, as follows.

Crash type
: The type of crash, which affects the types of recommendations FS_RECOVER makes for running FIX_DISK, is determined from the machine state.

Activity
: FS_RECOVER identifies file system activity at the time of the crash in order to indicate where damage to the integrity of the file system may be.

Prior Corruption
: FS_RECOVER looks for any information that might indicate that file system damage existed *prior* to the crash, such as flag bits set in the DSKRAT indicating that a disk was not cleanly shut down on some previous occasion. However, it's important to note that all indications of prior damage are not guaranteed to be in the crash dump. Therefore, you are encouraged to keep your partitions clean and healthy.

Generally, FS_RECOVER analyzes all this information in less than ten minutes.

After the analysis is complete, FS_RECOVER prints a recommendation for each partition that was mounted at the time of the crash. Each recommendation includes three pieces of information:

- A list of pathnames for any files on the partition that were active at the time of the crash. The pathnames may or may not be complete, depending on the amount of file system information in the PRIMOS locate buffers at the time of the crash.

- A statement telling you

  o If FIX_DISK needs to be run on the partition

  o What FIX_DISK options should be used

  o Whether you should run FIX_DISK immediately or if you can defer running FIX_DISK to a more convenient time

  A facility is provided to change the FIX_DISK recommendation, should you decide to do so.

- If a partition was mirrored, the recommendation will tell you which half of the mirrored pair is to be used as the primary when you restart the mirror with the MIRROR_ON command.

When the recommendations are complete, FS_RECOVER builds a CPL program for each partition requiring immediate FIX_DISK. These CPL programs are designed to be run by phantoms. FS_RECOVER then determines how many phantoms will be needed to execute all the CPL programs. This determination will take into account the number of available phantoms, the number of FIX_DISK sessions required, the number of disk drives containing partitions requiring FIX_DISK, and the PRIMOS limit on the number of assignable disks.

FS_RECOVER then tells you how many phantoms are required, and asks you how many phantoms you wish to use. After you have made that decision, FS_RECOVER creates a phantom called the FIX_DISK Monitor that controls the phantoms which perform the FIX_DISK sessions. These phantoms keep separate, date stamped, COMO files for each FIX_DISK session so you can monitor their progress and results. When all of the FIX_DISK sessions have completed, the FIX_DISK Monitor phantom logs out.

Using FS_RECOVER Without a Crash Dump

You can use FS_RECOVER to make a generalized assessment of the state of your locally mounted partitions. If any of these partitions are damaged, FS_RECOVER asks if you want to run FIX_DISK on the damaged partitions. If you answer YES, FS_RECOVER sets up for automated FIX_DISK the same way it does for a crash dump recovery analysis.

You can use FS_RECOVER without a crash dump. For example, if you just had a system crash but were unable to get a crash dump, you can take advantage of the automated FIX_DISK facilities of FS_RECOVER. You can also identify and repair partitions that had a defer recommendation from a previous crash dump analysis.

Considerations When Using FS_RECOVER

The crash dump recovery analysis portion of FS_RECOVER works best if you use it immediately after each crash. FS_RECOVER may not work correctly if you attempt to analyze an old crash dump or a crash dump that was taken before other crashes.

The following are other considerations for using FS_RECOVER.

- FS_RECOVER cannot always display the full pathnames of every file affected by a crash. The pathnames are generated using the contents of the locate buffers found in the crash dump. The more pathname information found in the locate buffers, the more complete the pathnames FS_RECOVER can display. Pathnames cannot be generated for CAM files on robust partitions, however.

- The automated FIX_DISK facilities of FS_RECOVER cannot be used to repair the command device (COMDEV). File system damage on the command device must be repaired by running FIX_DISK with the –COMDEV option at the supervisor terminal.

- FS_RECOVER cannot be run by phantoms.

This version of FS_RECOVER is applicable to all PRIMOS revisions from Rev. 21.0 through Rev. 23.2.

Installing FS_RECOVER

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This chapter discusses installation of FS_RECOVER on your system, including any changes you may have to make to the system.

The Installation Tape

Prime distributes FS_RECOVER on a standard 1600-bpi, MAGSAV-format tape. You mount the tape on any tape drive and restore the contents into any convenient partition. Restoring the tape contents creates a directory named FS_RECOVER, which contains about 1500 disk records. You install FS_RECOVER from that directory.

Using FS_RECOVER.INSTALL.CPL

To install FS_RECOVER, attach to the FS_RECOVER directory and execute the FS_RECOVER.INSTALL.CPL file. The installation file copies FS_RECOVER>SYSTEM_DEBUG* to a top-level directory named SYSTEM_DEBUG* on your command device (COMDEV). If you have several command devices, you may want to modify FS_RECOVER.INSTALL.CPL to install FS_RECOVER on all of them. The installation process also copies two new search rules files into SEARCH_RULES* and sets ACLs on SYSTEM_DEBUG*.

Changes to Search Rules

FS_RECOVER uses four search rules files:

AUTOPSY.SR
MAPS.SR
COMMAND$.SR
ENTRY$.SR

The FS_RECOVER.INSTALL.CPL file automatically installs the first two files in SEARCH_RULES*. The last two search rules files are part of standard PRIMOS and already exist. The installation modifies these two files as follows.

- The COMMAND$.SR search rule defines where PRIMOS looks for external commands. The default is the directory CMDNC0 on the COMDEV. The installation adds SYSTEM_DEBUG* to the list so that, as a minimum, COMMAND$.SR contains CMDNC0 and SYSTEM_DEBUG*.

- The ENTRY$.SR search rule defines where PRIMOS looks when it attempts to resolve a dynamic link. The installation adds SYSTEM_DEBUG*>AUTOPSY.RUN.

ACL Requirements

FS_RECOVER contains security checks to ensure that only the supervisor terminal (User 1), the user ID SYSTEM, or the System Administrator use FS_RECOVER. In addition, specific ACLs are set on SYSTEM_DEBUG* and SYSTEM_DEBUG*>CRASH. These ACLs are set when you install FS_RECOVER and they give user SYSTEM and the System Administrator ALL access.

Segment Requirements

The user ID SYSTEM and the System Administrator's ID must be configured for at least 128 dynamic segments. Failure to provide this minimum limit may cause unpredictable results. When you invoke FS_RECOVER, it checks the number of dynamic segments configured and prints warning messages if the number is too small.

Changes to PRIMOS.COMI

In order to complete the installation of FS_RECOVER, you must change your PRIMOS.COMI file to include running the INIT_RECOVER.CPL program in SYSTEM_DEBUG*. The placement of INIT_RECOVER.CPL within PRIMOS.COMI must occur *after* all local disk partitions are mounted (do not mount any crash-dump-to-disk (CDD) partitions), but *before* user logins are allowed:

```
STI -TZ 0500 -DLST YES                    /* Set up time-zone information.
ADD_DISKS.CPL                             /* Mount local disks.
R SYSTEM_DEBUG*>INIT_RECOVER.CPL -PAUSE   /* Invoke FS_RECOVER, if needed.
START_DSM                                 /* Startup DSM.
MAXUSR                                    /* Allow user logins.
```

Note	If you omit the –PAUSE option, you will not be able to invoke FS_RECOVER while PRIMOS.COMI is running.

Automated Recovery at Rev. 23.2

If you want INIT_RECOVER.CPL to enable automatic system recovery via the SYSTEM_RECOVER command (available at PRIMOS Rev. 23.2), add the –AUTO_RESTART option to the INIT_RECOVER.CPL command line. Refer to the PRIMOS Rev. 23.2 *READ_BEFORE_USING* file and the *Rev. 23.2 Software Release Document* for more information on the SYSTEM_RECOVER command.

If you want INIT_RECOVER.CPL to automatically load any CDD crash dumps for analysis, add the –AUTO_ANALYSIS option to the INIT_RECOVER.CPL command line. This option assumes that you are using the default FS_RECOVER working directory, <0>SYSTEM_DEBUG*>CRASH.

Note	Use of the –AUTO_ANALYSIS option causes FS_RECOVER to automatically repair any partitions requiring immediate FIX_DISK.

Additionally, if you desire to use crash-dump-to-disk (CDD), INIT_RECOVER.CPL can automatically activate and enable CDD. This is done by using a text editor (such as ED or EMACS) to create the file <0>SYSTEM_DEBUG*>CRASH>CDD_AUTO_CONFIG. This file should contain the following information (without the comments):

```
CDD_recover_path  /* The pathname for CDD -RD.
CDD_pdev_1        /* First pdev to use for CDD.
      .
      .
      .
CDD_pdev_n        /* Last pdev to use for CDD.
```

As a minimum, the CDD_AUTO_CONFIG file must contain one local crash dump partition pdev to be used for CDD. The *CDD_recover_path* (the pathname of the directory containing the crash dump in the first line) is optional. Refer to the *Rev. 23.2 Software Release Document* for more information on CDD and creating crash dump partitions.

Note	The CDD_AUTO_CONFIG file is required if you use the –AUTO_ANALYSIS option.

Note that CDD can be enabled only on split partitions that are formatted with the –SPLIT and –IC (dynamic bad spot handling) options of MAKE. If you choose to have INIT_RECOVER.CPL automatically enable CDD, there is one additional restriction: the CDD partitions must not be added, or mounted, at the time you invoke INIT_RECOVER.CPL. This is because INIT_RECOVER.CPL (and some phantoms which INIT_RECOVER.CPL may spawn to recover dumps) must be able to assign the CDD partitions. If the partitions are mounted, they cannot be assigned. They should not be mounted in any case. A subtle side-effect of this additional restriction is that you cannot use a split command device (COMDEV) partition for CDD.

The following is an example of enabling CDD for automated analysis of dumps. This occurs in the startup of PRIMOS if the INIT_RECOVER.CPL command line is in your PRIMOS.COMI file.

```
OK, R SYSTEM_DEBUG*>INIT_RECOVER.CPL -PAUSE -AUTO_ANALYSIS

[INIT_RECOVER 3.0-21.0 Copyright c 1991,Prime Computer Inc.]

Task 1: Encaching PRIMOS maps.

Task 2: Attempting to enable automated System Recovery.

Task 3: Attempting automatic CDD activation.
        Crashdump recovery path is: <0>SYSTEM_DEBUG*>CRASH
        3 immediately usable PDEVs in CDD auto config.
        Attempting to activate CDD on PDEV 110562.

Task 4: Waiting 15 seconds.  Enter CONTROL-P to invoke FS_RECOVER.
        Otherwise PRIMOS.COMI will continue.

Task 5: Reporting current System Recovery configuration:

[SYSTEM_RECOVER Rev. 23.2.0 Copyright (c) 1991, Prime Computer, Inc.]

               -- SYSTEM_RECOVER Configuration --

                    auto : yes
                      cd : disk
                     rfs : yes
                    sysv : no
                 restart : cold
OK,
```

Allocating Disk Records for Crash Dumps

FS_RECOVER cannot work on the raw data contained on the crash dump tape. You must put the data on the tape into a disk file first. FS_RECOVER has special facilities to do this, but sufficient free disk records must exist. Since crash dump files can be rather large, you should set aside some dedicated space on a partition. Ideally, you should set aside this disk space in the directory <0>SYSTEM_DEBUG*>CRASH, but this is not a requirement; you can put the crash data file on any partition.

The amount of disk space required for a crash dump file, whether it is a crash-dump-to-tape or a crash-dump-to-disk file, varies with the system configuration and the type of crash dump. The crash dump procedure outlined in Appendix A is for a *partial* dump, which is all that FS_RECOVER usually needs. *Full* crash dumps are virtually never needed and take up considerably more disk space. In either case, use the following guidelines for disk space planning purposes.

1. Use the STATUS SYSTEM command at the supervisor terminal to determine the kilobytes (KB) of memory in your system.

   ```
   OK, STATUS SYSTEM

   System STAN is currently running PRIMOS rev. 23.2
   Copyright (c) Prime Computer, Inc. 1991
   32768K bytes memory in use

   OK,
   ```

2. If you are generating *partial* crash dumps (as outlined in Appendix A) go to Step 3.

   For *full* crash dumps, calculate the base number of disk records required, as follows, and go to Step 4. The base number of records for a full tape dump is equal to the KB of memory divided by two:

   ```
   KB of memory
   in the system
   --------------  =  base number of disk records
        2
   ```

3. For *partial* crash dumps, calculate the base number of disk records required by using one of the following formulas and then go to Step 4.

   Use this formula if your system has 32768 KB *or less*:

   ```
   (KB of memory) * (0.35) = base number of disk records
   ```

Use this formula if your system has *more than* 32768 KB:

```
(KB of memory) / 4  =  base number of disk records
```

4. If your system is a 6150™, 6350™, 6450™, 6550™, or a 6650™ (a 6000 series machine), add 66 to the base number of disk records calculated in either Step 2 or Step 3.

5. If you are running PRIMOS Rev. 23.2 or later, add 64 for MAPS information.

Examples of Calculating Required Disk Records

If your system is a 6350 with 65536 KB of memory, you are running Rev. 23.2, and you use partial crash dumps, the number of disk records to set aside is as follows:

```
( 65536 / 4 ) + 66 + 64  =  16514 disk records
```

If your system is a 2550™ with 8192 KB of memory and you use partial crash dumps, the number of disk records to set aside is as follows:

```
8192 * 0.35  =  2868 disk records
```

Using FS_RECOVER

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You can invoke FS_RECOVER at the supervisor terminal, while logged in as the System Administrator, or under the user ID SYSTEM. After invocation, FS_RECOVER makes several integrity checks to ensure that is was installed correctly. If any of the checks fails, FS_RECOVER displays an error message and returns you to PRIMOS command level. Appendix B contains a list of FS_RECOVER error messages with explanations and corrective actions.

The Recommended Strategy After a System Crash

If your system crashes, follow this procedure:

1. Generate a crash dump by either automatically preconfiguring use of a CDD partition or by using a tape dump method as described in Appendix A.

2. If you are running PRIMOS Rev. 23.1 or later, run RFS *after* generating the crash dump. (RFS accomplishes a Forced Shutdown of PRIMOS and shuts down each partition in an orderly manner.)

3. Cold start your system.

4. PRIMOS.COMI executes until it encounters the INIT_RECOVER.CPL command line. It then displays the following message and pauses for 15 seconds (the default) if you included the –PAUSE option without an argument.

```
Pausing briefly to allow you to enter CONTROL-P to invoke FS_RECOVER.
Otherwise, PRIMOS.COMI will continue.
```

Enter a Control-P to abort PRIMOS.COMI and to invoke FS_RECOVER.

Note See Changes to PRIMOS.COMI in Chapter 2 for a discussion of INIT_RECOVER.CPL.

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5. Use Main Menu Option 3 of FS_RECOVER to assess the health of your disk partitions, as specified on the next page.

A. If your system crashed because of a Forced Shutdown or if you successfully ran RFS, all the partitions may be clean. If all the partitions are clean, exit FS_RECOVER and continue PRIMOS.COMI by entering CO CONTINUE 6.

B. If any of the partitions are damaged, do *not* initiate automated FIX_DISK while you are in Main Menu Option 3. Instead, go back to the Main Menu and select Option 1 to read the crash tape. (If you activated CDD, the crash dump is available on disk and you do not need to use Option 1.)

Then select Main Menu Option 2 to analyze the crash dump file. Execute all recommended *immediate* FIX_DISK sessions and then continue PRIMOS.COMI by entering CO CONTINUE 6.

C. If the crash dump analysis indicates that there are deferrable FIX_DISK sessions, you can reinvoke FS_RECOVER at a convenient time later and use Main Menu Option 3 to repair the damaged partitions. Continue PRIMOS.COMI by entering CO CONTINUE 6 at this time.

Note   You can automate this entire procedure (Steps 5 A, B, and C.) at Rev. 23.2 by using CDD and the –AUTO_ANALYSIS option of INIT_RECOVER.CPL. (You can use this option only at the supervisor terminal.)

If your command device (COMDEV) is damaged, you must use FIX_DISK at the supervisor terminal.

The Main Menu

If the installation integrity checks pass when you invoke FS_RECOVER, FS_RECOVER displays its Main Menu and prompts you for a choice:

```
[FS_RECOVER Rev 3.0 Copyright (c) 1991, Prime Computer Inc.]
[Serial #Internal Release (Prime Computer, Inc.)]

MAIN MENU:

(1) Read crash tapes
(2) Perform crash recovery analysis
(3) Display state of currently mounted disks

Enter a menu number, or (Q)uit or (M)enu:
```

You have several choices, as follows:

- Use Option 1 when you want to read a crash dump tape into a disk file.

- Use Option 2 to perform a file system recovery analysis on either a crash dump file that you created with Option 1 or on the CDD partition. You can then invoke automated FIX_DISK.

- Use Option 3 to assess the state of all currently-mounted local disk partitions. You can then invoke automated FIX_DISK.

- Enter ! *<PRIMOS command line>* to execute a PRIMOS command without leaving FS_RECOVER.

- Enter M to cause FS_RECOVER to redisplay the menu.

- Enter Q to leave FS_RECOVER and exit to PRIMOS command level.

Breaking Out of FS_RECOVER

When you select a Main Menu option, you can stop execution of FS_RECOVER at any time by using Control-P. The *only* exception to this is when you are selecting a choice from the FIX_DISK Menu. While you are in the FIX_DISK Menu, Control-P, ECL support, and PRIMOS command line support are disabled. If you do stop FS_RECOVER by entering a Control-P, you see the following:

```
**** Break! ****
(A)bort, (C)ontinue, or (R)eturn to Main Menu? A
OK,
```

You can abort FS_RECOVER, continue with the interrupted selection, or go back to the Main Menu. You can also get back to the Main Menu by simply enter Q or QUIT in most cases. For example:

```
Enter a menu number, or (Q)uit or (M)enu: 1
Mount the first reel of the crash tape(s) and enter the magtape unit number.
You may also enter:
                -"! <Primos command>"
                -"Q" or "QUIT" to return to the main menu.
Tape unit (9 track): Q

MAIN MENU:
```

Executing PRIMOS Commands Within FS_RECOVER

In some places where FS_RECOVER prompts you for input, you can also enter PRIMOS commands. In many instances, as in the previous example, FS_RECOVER explicitly tells you that you may enter PRIMOS commands. To enter a PRIMOS command line from an FS_RECOVER prompt, precede the PRIMOS command line with ! (an exclamation point). Abbreviations, wildcarding, and iteration lists are fully supported. After the PRIMOS command completes, FS_RECOVER prompts for input.

Using ECL Within FS_RECOVER

The ECL environment within FS_RECOVER is totally separate from your PRIMOS ECL environment.

ECL is automatically enabled within FS_RECOVER except in the cases:

- ECL is not installed.

- You invoke FS_RECOVER from the supervisor terminal on a system running a PRIMOS revision *prior* to Rev. 22.1.

Reading the Crash Dump From Tapes

FS_RECOVER cannot read the raw data on the crash dump tapes. You must use Main Menu Option 1 to read the data from tape into a disk file before FS_RECOVER can analyze the data. However, if you are running Rev. 23.2 and using CDD, you do not have to use Main Menu Option 1 because the crash dump is already on disk in a form that FS_RECOVER can read.

The tapes need to be successfully read only once, but individual reels with unrecovered tape errors may be reread as many times as necessary. If you stop reading tapes at the end of a reel, you can leave FS_RECOVER and then come back at some later time and continue reading the tapes, starting with the next reel. Reels must be read in the order that they were written.

To read crash dump tapes, select Option 1 from the Main Menu. Follow the prompts to mount the first reel of the crash dump tapes on a tape drive and enter the tape drive unit number:

```
[FS_RECOVER Rev 3.0 Copyright (c) 1991, Prime Computer Inc.]
[Serial #Internal Release (Prime Computer, Inc.)]

MAIN MENU:

(1) Read crash tapes
(2) Perform crash recovery analysis
(3) Display state of currently mounted disks
```

```
Enter a menu number, or (Q)uit or (M)enu: 1
Mount the first reel of the crash tape(s) and enter the magtape unit number.
You may also enter:
                    -"! <Primos command>"
                    -"Q" or "QUIT" to return to the main menu.
Tape unit (9 track): 0
```

Checking the Tape Drive

When you enter a magtape unit number, FS_RECOVER attempts to assign the tape drive. If the assign fails, you get an error message followed by another prompt for a magtape unit.

```
Tape unit (9 track): 0
PRIMOS error code 39 while assigning MT0. Device in use.
Mount the first reel of the crash tape(s) and enter the magtape unit number.
You may also enter:
                    -"! <Primos command>"
                    -"Q" or "QUIT" to return to the main menu.
Tape unit (9 track):
```

After assigning the tape drive, FS_RECOVER checks to ensure that a tape is mounted on the tape drive and that the drive is online and ready. If any of these checks fail, you get an error message followed by the magtape unit prompt.

```
Tape unit (9 track): 0
Device offline or not ready.
Mount the first reel of the crash tape(s) and enter the magtape unit number.
You may also enter:
                    -"! <Primos command>"
                    -"Q" or "QUIT" to return to the main menu.
Tape unit (9 track):
```

Crash Dump File

When the magtape drive is online and ready, FS_RECOVER prompts for the pathname of the file you want to put the crash dump data into. Ideally, this should be a file in SYSTEM_DEBUG*>CRASH, but this is not a requirement; you can put the crash dump data file on any partition. Use a unique name for each crash dump file so that the file is easy to identify. The recommended naming convention includes the system name, followed by a date/time stamp. For example, if your system is named MOLLY and the crash occurred on April 19, 1991 at 1:30 p.m., the recommended name for the crash dump data file is MOLLY.910419.1330 or *filename*.[DATE –FTAG].

Reading the Tape

After you enter the crash dump pathname, FS_RECOVER reads the tape. When the end of the crash dump is detected on tape, FS_RECOVER returns you to the Main Menu. If an end-of-tape occurs before the end of the crash dump, FS_RECOVER prompts for the next reel. At this point, you can mount the next reel and enter the magtape unit number:

```
End of reel 1; 32766 records read; 32766 records dumped; 0 errors.
Are there any more reels? YES
Tape unit number (9 track): 0
```

Reading the Crash Dump From Disk

If you are running Rev. 23.2 or later, you may configure CDD to save a crash dump on disk. If that is the case, you may do the recovery analysis directly on the CDD partition by entering the pdev of the CDD partition after you invoke Main Menu Option 2 of FS_RECOVER.

Performing the Recovery Analysis

After generating a CDD crash dump or using Main Menu Option 1 to read the crash tape, select Main Menu Option 2 (the crash recovery analysis choice) after being sure that you meet the following requirements.

- A crash dump file must exist, that is, at some point you must have used Main Menu Option 1 or be using CDD.

- When you select Main Menu Option 2, you must know the pathname of the working directory (the directory containing the FS_RECOVER CPL programs and the crash dump file) you want FS_RECOVER to use.

FS_RECOVER Working Directory

The FS_RECOVER working directory is where FS_RECOVER expects to find the CPL programs, RUN_FIX_DISK.CPL and FIX_DISK_MONITOR.CPL. FS_RECOVER also uses the working directory to keep COMO files and to build CPL programs for automated FIX_DISK. Prime recommends that you keep all your crash dump files in the working directory also, but this is not a requirement.

The default working directory is SYSTEM_DEBUG*>CRASH. However, you can create and use a different working directory. If you do use a different working directory, copy the files RUN_FIX_DISK.CPL and FIX_DISK_MONITOR.CPL from SYSTEM_DEBUG*>CRASH into the new working directory.

Here is an example of how to create a new working directory.

```
OK, A MFD 1
OK, CREATE CRASH.NEW
OK, COPY SYSTEM_DEBUG*>CRASH>RUN_FIX_DISK.CPL *>CRASH.NEW>==
OK, COPY SYSTEM_DEBUG*>CRASH>FIX_DISK_MONITOR.CPL *>CRASH.NEW>==
OK,
```

When you select Main Menu Option 2, FS_RECOVER prompts you to enter the pathname of the working directory and displays a default working directory pathname. To select the default working directory, simply press Return.

```
Enter pathname of working directory (default="<0>SYSTEM_DEBUG*>CRASH") : Return
```

Pathname or pdev of the Crash Dump File

Next, FS_RECOVER prompts you to enter the pathname of the crash-dump-to-tape file or the pdev of the partition containing the crash-dump-to-disk file that you want to analyze. If you are running Rev. 23.2 and are using CDD, simply enter the pdev of the CDD partition. If you just finished using Main Menu Option 1 to read crash dump tapes, FS_RECOVER uses the pathname of the file you read the tapes into as the default pathname. If you want to use the default pathname, simply press Return. Otherwise, enter the pathname of the crash dump file you want to analyze.

FS_RECOVER then attempts to load the crash dump, which takes about one minute.

Example of Doing the Analysis

Following is an example of the display when you select Option 2.

```
MAIN MENU:

(1) Read crash tapes
(2) Perform crash recovery analysis
(3) Display state of currently mounted disks
```

```
Enter a menu number, or (Q)uit or (M)enu: 2
----------------------------------------------------------------------
                     *** RECOVERY ANALYSIS ***

Enter pathname of working directory (default="<0>SYSTEM_DEBUG*>CRASH"): Return
Crashdump pathname or pdev: 3464
(Beginning crashdump load, please wait...)
```

The Session COMO File

After FS_RECOVER successfully loads the crash dump, it starts a session
COMO file in the working directory. The name of the COMO file is always
unique and consists of the crashed system's name and a date/time stamp.

```
(Beginning crashdump load, please wait...)

Your session COMO file is <0>SYSTEM_DEBUG*>CRASH>RES-C4.910405.100048.
```

Messages Indicating the Machine State

After FS_RECOVER starts the session COMO file, FS_RECOVER determines
the machine state at the time of the crash. *Record this information in your System
Log Book.*

The following messages indicate possible machine states:

```
    The machine was stopped by a MASTER CLEAR.

    The machine did not halt; it was STOPPED by the
    Maintenance Processor.

    The machine halted at x(0)/xxxxxx; xxxxxx+'0

    PRIMOS executed a Slow Halt at x(0)/xxxxxx; xxxxxx+'0

    PRIMOS stopped the machine using a Forced Shutdown.

    The machine was stopped using the "SHUT ALL" command at
    the System Console.
```

Messages During Analysis of Data

After determining the machine state, FS_RECOVER begins analysis of the data.
Analysis can take up to ten minutes. During this time, you see several
informational messages:

```
(Building Unit Info table, please wait...)
(Validating Disk Driver datastructures, please wait...)
(Validating state of the Locate subsystem, please wait...)
(Validating Unit Table Hash, please wait...)
(Building nllock LOCKLIST database, please wait...)
(Building nllock owners database, please wait...)
(Validating any resident DSKRATs, please wait...)
```

Occasionally you may see other warning or caution messages interspersed with the informational messages. Refer to the Runtime Warning Messages section of Appendix B for more information.

Recommendations for Running FIX_DISK

After FS_RECOVER completes the analysis, it presents a summary of each partition with a recommendation to run FIX_DISK. The recommendation falls into one of three categories:

Immediate FIX_DISK

You should run FIX_DISK before using the partition; file system and data integrity are compromised. FS_RECOVER may attempt to use either the -FAST option or the -PARTIAL option to minimize FIX_DISK session time. (The -PARTIAL option is supported but undocumented.) By default, FS_RECOVER builds CPL files to run any immediate FIX_DISK.

Deferred FIX_DISK

You can add the partition but file system integrity may be compromised. If no database recovery is required for the files on the partition, you can make the partition available for use immediately. However, at some convenient time, you *must* run full FIX_DISK on the partition.

Not Required

The partition was clean before the crash and the crash did not damage the partition. You should find all your partitions in this state after a successful Forced Shutdown or a successful invocation of RFS at Rev. 23.1. If no database recovery is required for the files on the partition, you can make the partition available for use immediately.

No Recommendation

If FS_RECOVER detects that a disk drive containing a partition that was mounted at the time of the crash has been repartitioned, no recommendation will be given.

Example of Immediate FIX_DISK

Here is an example of a partition requiring immediate FIX_DISK:

```
LDEV: '1 PDEV: '6062 NAME: <UNIX01>
Warning: The crashdump indicates 2 serious problems with this partition:
         Prior to the crash, the partition was not clean at ADDISK time.
         A file system transaction was in progress at the time of the crash.
Warning: Currently there is 1 serious problem with this partition:
         The disk was not clean at ADDISK time.

Activity File Type        Pathname
-------- ----------       --------
LT       DAM file         <UNIX01>HOPS>X.COMO

File Activity Codes:
L : file had modified unflushed records in Locate subsystem.
T : file may have had an in-progress transaction.

RECOMMENDATION: run "FIX_DISK -FIX"
```

Example of Deferred FIX_DISK

Here is an example of the summary for one partition requiring a deferred FIX_DISK:

```
------------------------------------------------------------------------
LDEV: '2 PDEV: '3462 NAME: <QUALF2>


No file system activity indicated; schedule a FIX_DISK at your convenience.
------------------------------------------------------------------------
```

In this example, there was no indication of file system activity or serious problems; an immediate FIX_DISK is not required. If no special database recovery is needed for the files on this partition, you can make it available to users. However, at some convenient time, you must run FIX_DISK to maintain the integrity of the partition's file system.

Changing a FIX_DISK Recommendation

After FS_RECOVER displays the summary and recommendation for a partition, it asks you if you agree with the recommendation. If you answer YES, FS_RECOVER continues with the next partition summary. If you answer NO, FS_RECOVER enters the FIX_DISK Menu, which then asks you what you want

to do with the partition. While you are in the FIX_DISK Menu, Control-P, ECL
support, and PRIMOS command line support are disabled.

```
LDEV: '2 PDEV: '3164 NAME: <UNIX02>

No file system activity indicated; schedule a FIX_DISK at your convenience.
Is this what you want to do? NO

FIX_DISK MENU

(1) Do nothing to this partition.
(2) Run FIX_DISK, without the -FIX option.
(3) Run "FIX_DISK -FIX -FAST" on this partition.
(4) Run "FIX_DISK -FIX" on this partition.

Enter your choice: 4
```

After you enter a valid choice, FS_RECOVER continues with the next partition
to be summarized.

The Summary Display

After all the partitions have been individually summarized, FS_RECOVER
displays a general summary of all the FIX_DISK recommendations.
FS_RECOVER then asks you if all the recommendations are satisfactory. If you
answer NO, FS_RECOVER repeats the individual partition summaries so that
you can change recommendations for running FIX_DISK.

```
    *CURRENT*              CURRENTLY    TYPE OF
 LDEV  PDEV  NAME          MOUNTED?     FIX_DISK NEEDED     COMMENTS
 ----  ----  -----         ---------    ---------------     --------
    0  6060  <UNIX00>      yes          none                COMDEV
    1  6062  <UNIX01>      yes          immediate, full
    2  3164  <UNIX02>      yes          immediate, full

3 partitions analyzed, 2 partitions require FIX_DISK.
2 immediate FIX_DISKs, 0 deferrable FIX_DISKs.

Are these FIX_DISK recommendations satisfactory? YES
```

Automated FIX_DISK

If there are no recommendations for running immediate or deferred FIX_DISK,
FS_RECOVER returns to the Main Menu. If there are deferred or immediate
FIX_DISK recommendations and you answer YES, indicating that you are
satisfied with the FIX_DISK recommendations, FS_RECOVER asks if you want

to initiate automated FIX_DISK on all partitions requiring immediate FIX_DISK (except the Command Device (COMDEV)):

```
3 partitions analyzed, 2 partitions require FIX_DISK.
2 immediate FIX_DISKs, 0 deferrable FIX_DISKs.

Are these FIX_DISK recommendations satisfactory? YES
Do you want to initiate the immediate FIX_DISKs? YES
```

If all recommendations were for deferred FIX_DISK or if the only recommendation for immediate FIX_DISK was for the command device, FS_RECOVER returns to the Main Menu.

Administrative Setup for Automated FIX_DISK

If you answer that you want to initiate the immediate FIX_DISK recommendations, FS_RECOVER displays an Administrative Setup screen. If you are running FS_RECOVER from the supervisor terminal, the Administrative Setup screen asks if you want to stop the LOGIN_SERVER. Answering YES prohibits user logins after FS_RECOVER enables MAXUSR for the FIX_DISK phantoms:

```
                    *** ADMINISTRATIVE SETUP ***

Do you want to stop the LOGIN_SERVER before starting FIX_DISK? NO
Forcing "MAXUSR ALL" for FIX_DISK sessions.
Attempting to startup the DISK_MANAGER.
```

If you are *not* running FS_RECOVER from the supervisor terminal, FS_RECOVER tells you to go to the supervisor terminal and enter the following commands:

```
                    *** ADMINISTRATIVE SETUP ***

The DISK_MANAGER must be started up prior to initiating FIX_DISK phantoms.
Enter the following command at the System Console:

"ECL -OFF"
"DISK_MANAGER -START"


In order to allow FIX_DISK phantoms to login, enter the following command
at the System Console:

"MAXUSR -PUSR 222"
```

If you want to prohibit user logins while FIX_DISK is running, enter the
following command at the System Console:

"STOP_LSR"

Press <RETURN> after this is done and/or you are ready to proceed: <u>Return</u>

Automated FIX_DISK Configuration

After you leave the Administrative Setup display, FS_RECOVER creates a
subdirectory within the working directory. FS_RECOVER then builds the CPL
programs for automated FIX_DISK in this subdirectory.

Next, FS_RECOVER determines how many phantoms are necessary to execute
all the CPL programs. It takes into account the number of available phantoms,
the number of FIX_DISK sessions required, the number of disk drives
containing partitions requiring FIX_DISK, and the PRIMOS limit on the number
of assignable disks.

FS_RECOVER then asks how many phantoms you would like to use:

*** FIX_DISK SETUP ***

(Building CPL programs for automated FIX_DISK, please wait...)

All the programs which will control the FIX_DISK sessions are located in:
<0>SYSTEM_DEBUG*>CRASH>FIX.RES-C4.910319.164508

The 2 partitions requiring FIX_DISK reside on 2 different disk drives.
Both of these disk drives can be worked on in parallel. This requires one
phantom per disk drive (each phantom will do ALL the required FIX_DISKs for
a given disk drive), plus one phantom to drive the FIX_DISK_MONITOR program.
If 3 phantoms are too much, fewer (down to a minimum of 2) may be used.

Enter the number of phantoms to use (2-3) or (Q)uit: <u>3</u>

The INIT_RECOVER −AUTO_ANALYSIS Option

FS_RECOVER does not query you, as in the preceding sections, when you use
the −AUTO_ANALYSIS option and place FS_RECOVER in automated analysis
mode. Instead, it analyzes the pre-configured CDD partition and automatically
invokes FIX_DISK sessions on those file system partitions that it determines
need immediate file structure repair.

The FIX_DISK Manager Phantom

After you tell FS_RECOVER how many phantoms to use, you are prompted to begin automated FIX_DISK. You can also quit or execute PRIMOS commands prior to beginning automated FIX_DISK, as shown in the following example.

```
FIX_DISK setup is now complete, and we're ready to begin.
Enter <RETURN> to begin, "QUIT", or "! <command>": ! m -all -now -force
The system will be available in about 20 minutes. Please standby...

Enter <RETURN> to begin, "QUIT", or "! <command>": Return
```

When you press the Return key, FS_RECOVER initiates the FIX_DISK Monitor phantom. The FIX_DISK Monitor then begins creating phantoms to run the FIX_DISK sessions.

The Disk Manager Subsystem

When running FS_RECOVER from the supervisor terminal, FS_RECOVER automatically initiates a program called the DISK_MANAGER while you are in the Administrative Setup screen. If you are *not* running from the supervisor terminal, FS_RECOVER instructs you to manually initiate the DISK_MANAGER at the supervisor terminal.

The DISK_MANAGER program services certain commands for the FIX_DISK phantoms. Due to PRIMOS restrictions, commands such as ADDISK, SHUTDN, and DISKS are *privileged* and can only be executed from the supervisor terminal. Whenever a FIX_DISK phantom needs one of these privileged commands executed, it calls the supervisor terminal. The DISK_MANAGER program allows the supervisor terminal to *listen* for these commands and then execute them on behalf of the FIX_DISK phantom.

You can still use the supervisor terminal to execute PRIMOS commands with the exception of DELSEG, ICE, and ECL, but do not enter commands that will take longer than a few seconds to execute because the DISK_MANAGER can *listen* for commands from the FIX_DISK phantoms only when the supervisor terminal is not busy.

When the DISK_MANAGER program receives a command from one of the FIX_DISK phantoms, it displays the command, along with the results, on the supervisor terminal:

```
*** DISK_MANAGER at 12 March 91 15:32
*** Starting "AD 6062" for SYSTEM (user 110).
*** Finished "AD 6062" for SYSTEM (user 110).
```

Displaying the State of Currently Mounted Disks

Main Menu Option 3 is used to make a generalized assessment of the health of all currently mounted local partitions. During this assessment, FS_RECOVER recognizes only two states that a partition can be in, as follows:

Clean   A clean partition is one in which the file system structures on the partition are completely intact. This is indicated by bits set in the partition's DSKRAT that tell PRIMOS whether or not the partition had been cleanly shut down since its last full FIX_DISK session. If the bits are not set, PRIMOS displays a warning message when the partition is mounted. (Refer to Appendix C.) However, there are exceptional instances when a clean partition can become damaged *after* it is mounted. As of Rev. 23.1, PRIMOS has specialized support to make information about these exceptions available to FS_RECOVER.

Damaged   A damaged partition is one that was either not clean at the time it was mounted, or it was damaged after it was mounted. If the damage occurred after the partition was mounted and you are running PRIMOS Rev. 23.1 or later, FS_RECOVER will tell you the type of problem that damaged the partition.

The following is an example of the use of Main Menu Option 3.

```
MAIN MENU:

(1) Read crash tapes
(2) Perform crash recovery analysis
(3) Display state of currently mounted disks

Enter a menu number, or (Q)uit or (M)enu: 3
---------------------------------------------------------------------------
                      *** SHOW LOCAL DISKS ***

                      FIX_DISK
LDEV   PDEV   NAME    NEEDED?  COMMENTS
----   ----   ----    -------  --------
0      6060   <UNIX00>  no       COMDEV
1      6062   <UNIX01>  full     *Not Clean*
2      3164   <UNIX02>  full     *Not Clean*

3 partitions displayed, 2 require full FIX_DISK.
```

FS_RECOVER now asks if you wish to run FIX_DISK on all partitions except the command device (COMDEV). If you answer NO, FS_RECOVER then asks if you want to run FIX_DISK on the damaged partitions. If you answer YES,

FS_RECOVER sets up for automated FIX_DISK the same way it does after a crash dump analysis.

Appendixes

Generating a Crash Dump Tape

A

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Follow the directions below to generate a crash dump tape. If you are running PRIMOS Revision 23.1 or later, you should then run RFS in order to cleanly shut down the disks. The last step is to coldstart the system. The following example illustrates the entire procedure:

```
CP1> SYSCLR
Really? YES
CP1> RUN 773
Enter P for PARTIAL dump, Enter F for FULL dump: P

Dump completed.
CP1> SYSCLR          /* Note: Skip the following if you don't have Rev 23.1.
Really? YES
CP1> RUN 662
     .      .     .
     .      .     . /* Output from RFS intentionally removed
     .      .     .
*** From RFS: Shutdown completed, system halting...

CP1> SYSCLR          /* Note: We're rebooting now.
Really? YES
CP1> BOOT 14114
```

How to Generate a Crash Dump Tape

You can initiate a crash dump only from the supervisor terminal and then only if the CPU is not running. Therefore, for hangs or other situations in which PRIMOS did not halt, you must stop the CPU before you initiate the crash dump.

See your CPU Handbook for a complete discussion of halts, hangs, and crash tape dumps. See the *Rev. 23.2 Software Release Document* for information on a new run vector (774_8) for doing crash dumps to tape.

Halting the Machine

Use the following procedure to stop a 50 Series machine:

1. Turn the keyswitch on the Status Panel to the *enable* position.

2. Press the Escape key on the supervisor terminal twice. The maintenance processor should respond with the CP> or CP1> prompt.

3. Enter the STOP or the HALT command. The maintenance processor should respond with a CPU halted at message.

Initiating a Partial Crash Dump

Now that the system is halted, you can initiate a crash dump. Mount a 1600-bpi or 6250-bpi magnetic tape, with a write ring, on MT0 and enter the following command sequence:

```
CP1> SYSCLR
Really? YES       /* Not all PRIME machines will ask you this.
CP1> RUN 777      /* There may be a slight pause before the tape turns.
```

6250-bpi Crash Dumps

If you have a 6250 bpi tape drive on MT0 and if your system is running at PRIMOS Rev. 22.0.3 or later, you can write the crash dump tape at 6250 bpi. This takes less time and tape than a 1600 bpi crash tape dump. The argument to the RUN command is only slightly different from the previous example:

```
CP1> SYSCLR
Really? YES       /* Not all PRIME machines will ask you this.
CP1> RUN 773      /* You only need a partial dump.
Enter P for PARTIAL dump, Enter F for FULL dump: P
```

Crash Dump Reels

The crash dump may use only part of a single reel or it may take several reels. The number of reels required depends upon:

- The amount of memory in the system
- The type of crash dump generated (full or partial)
- The number of users logged in at the time of the crash
- The tape density used (1600 or 6250 bpi)

Tape Label Information

Remember to put a label on each reel. The label should include:

- The name of the system
- The date and time of the crash
- The PRIMOS revision that the system was running
- The tape density used (1600 or 6250 bpi)
- The reel number (X of N reels)

B

FS_RECOVER
Warning and Error Messages

■ ■ ■ ■ ■ ■ ■

Warning Messages at Invocation

The following warning messages may display when you invoke FS_RECOVER.

```
Warning: The system is currently running PRIMOS Rev
"xx.xx.xx", which is a non-standard revision stamp that
FS_RECOVER does not understand. Enter the Prime compatible
revision stamp with a format like "21.0.3".
Compatible revision stamp:
```
Corrective action: If you have a customized PRIMOS, the next time you rebuild you should use a standard format revision stamp: *MajorRev.MinorRev.FixRev.YourRev.*

```
Warning: Can't open text file "xxxxxx>xxxxx>xxxxx".
```
Corrective action: Fix AUTOPSY.SR search rules, which should contain three rules: SYSTEM_DEBUG*, SYSTEM_DEBUG*>HELP, and SYSTEM_DEBUG*>FRU. If that does not work, reinstall FS_RECOVER.

```
Warning: FS_RECOVER may not work because AUTOPSY is not the
same version.
```
Corrective action: Reinstall FS_RECOVER if any problems occur.

```
Warning: Can't access DSKRAT for PDEV 'xxxxxx <xxxxxx>.
```
Corrective action: Edit the ACLs on the DSKRAT for the specified partition to ensure that the System Administrator and SYSTEM have at least LUR access. This message will also appear if you are running PRIMOS Revision 23.0 or later, and have partitions that are not mounted at the root level.

Error Messages at Invocation

The following error messages may display when you invoke FS_RECOVER.

```
*** USAGE ERROR ***
FS_RECOVER cannot be invoked by phantoms.
```
Corrective action: Do not invoke FS_RECOVER from a phantom.

```
*** USAGE ERROR ***
FS_RECOVER can only be run by the System Console or System
Administrator.
```
Corrective action: Log in as SYSTEM or as the System Administrator and reinvoke FS_RECOVER.

```
*** FATAL ERROR ***
FS_RECOVER  does not support PRIMOS revisions prior to Rev
21.0.
```
Corrective action: Upgrade PRIMOS to at least Rev. 21.0.

```
*** FATAL ERROR ***
This version of FS_RECOVER does not support Rev xx.xx.
Upgrade FS_RECOVER.
```
Corrective action: Upgrade to latest version of FS_RECOVER.

```
*** FATAL ERROR ***
Error during link to AUTOPSY.  FS_RECOVER has not been
properly installed.
```
Corrective action: Reinstall FS_RECOVER.

```
*** FATAL ERROR ***
Error initializing AUTOPSY.  Configuration or installation
is incorrect.
```
Corrective action: Reinstall FS_RECOVER.

```
*** FATAL ERROR ***
FS_RECOVER and AUTOPSY versions do not match.  Installation
is incorrect.
```
Corrective action: This error indicates that your FS_RECOVER installation failed or that your ENTRY$.SR search rules are incorrect. Enter the PRIMOS ICE command first and then retry FS_RECOVER. If FS_RECOVER still fails, then reinstall FS_RECOVER. If the failure occurs again, use the LSR ENTRY$ command to examine your ENTRY$ search rules for more than one line containing a link to AUTOPSY.RUN. Problems have been seen with early versions of DTB and FS_RECOVER on the same

system, because DTB sometimes inserts its copy of AUTOPSY into
ENTRY$.SR.

```
**** FS_RECOVER default on-unit invoked for condition
"xxxxxx".
```

Corrective action: Open a COMO a file and enter the PRIMOS DMSTK
command. Open a service call with PrimeService to report the problem.

Runtime Warning Messages

```
Warning: This crashdump is from a different PRIMOS Rev:
XX.XX.XX.XX
```

Explanation: FS_RECOVER has detected that at the time of the crash, a
different PRIMOS revision was running than is running now. This is
important if the major revision is different, and can be important for some
minor and fix revisions.

```
Warning: The crash dump is more than 24 hours old.
```

Explanation: FS_RECOVER has detected that you are attempting to
analyze a crash dump that is more than 24 hours old. It is recommended that
you use FS_RECOVER on a crash dump as soon as possible.

```
Warning: This crashdump is from system "xxxxxx".
```

Explanation: FS_RECOVER has detected that you are attempting to
analyze a crash dump from another system. The analysis will continue, but
automated FIX_DISK will not be done.

```
PRIMOS error code x while looking for xxx>xxx.CPL.  <PRIMOS
Message>
Either installation was incomplete, or wrong working
directory.
```

Explanation: FS_RECOVER was attempting to attach to and verify the
working directory. If the PRIMOS error message was Not found, then the
specified working directory either does not exist or does not contain one or
both of the required CPL programs. (Refer to the subsection entitled
FS_RECOVER Working Directory in Chapter 3.) If the PRIMOS error
message is something other than Not found, then the error probably
occurred while attempting to attach to the specified working directory. Verify
that the specified working directory exists and then check ATTACH$.SR
search rules and ACLs. If the specified working directory is the default
working directory and the CPL programs are missing, then reinstall
FS_RECOVER.

Warning: All the file system disks did not start in a
known/clean state. This means that disk corruption may have
existed BEFORE the crash occurred.

> **Explanation:** FS_RECOVER has determined that at least one of the
> partitions that was mounted at the time of the crash was not clean. This means
> that there may be file system integrity problems on the partitions that will not
> show up during the crash analysis.

Warning: PDEV 'xxxxxx <xxxxx> has been repartitioned.

> **Explanation:** While merging the state of the partitions at the time of the
> crash with the state of the currently mounted partitions, FS_RECOVER
> detected that a disk drive had been remade/repartitioned.

C

PRIMOS Disk Mount Warning Messages

The following messages may display when you add a partition to the system.

**** Disk xxxxxx: Not ready.

Disk is not powered up or has not completed spin up. Ensure you are using the correct pdev.

*** Cannot read DSKRAT of disk xxxxxx

Disk is accessible, but DSKRAT header cannot be read. Ensure you are using the correct pdev. If your pdev is correct, call PrimeService.

*** Disk xxxxxx: Old partitions not supported.

PRIMOS detects that you are attempting to mount a pre-Rev. 19 partition. If this is not so, ensure that you are using the correct pdev. If the pdev is correct, then ensure that the partition has been properly formatted.

*** Format of disk xxxxxx not supported by this revision of PRIMOS.

PRIMOS detects that you are attempting to mount a partition whose version number is greater than the latest version supported by the version of PRIMOS you are running. This can happen if you upgrade PRIMOS, upgrade the partitions with either MAKE or FIX_DISK, and then attempt to install an earlier version of PRIMOS.

*** Proper shutdown of Robust Partition xxxxxx did not take place.
*** Partition will be write protected.

PRIMOS prints this message when you force-mount a damaged robust partition. Run FIX_DISK –FAST and remount the partition.

*** Robust Partition xxxxxx has not been properly shutdown.
*** Fast Fix_disk has to be run before it can be added.

PRIMOS displays this message when you attempt to mount a damaged robust partition. Run FIX_DISK –FAST and remount the partition.

*** Disk "xxxxxx" was not shutdown properly, Run FIX_DISK.

PRIMOS displays this message, as of Revision 22.1, when you mount a standard partition that is not clean. Run FIX_DISK.

```
(Quota system may be incorrect; run FIX_DISK.)
```
Pre-Rev. 22.1 PRIMOS displays this message when you mount a standard partition that is not clean. Run FIX_DISK.

Index

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Surveys

Reader Response Form
Using FS_RECOVER
DOC13062–3LA

Your feedback will help us continue to improve the quality, accuracy, and organization of our user publications.

1. How do you rate this document for overall usefulness?

   ☐ *excellent*   ☐ *very good*   ☐ *good*   ☐ *fair*   ☐ *poor*

2. What features of this manual did you find most useful?

   _____

   _____

   _____

   _____

   _____

3. What faults or errors in this manual gave you problems?

   _____

   _____

   _____

   _____

4. How does this manual compare to equivalent manuals produced by other computer companies?

   ☐ *Much better*   ☐ *Slightly better*   ☐ *About the same*

   ☐ *Much worse*   ☐ *Slightly worse*   ☐ *Can't judge*

5. Which other companies' manuals have you read?

   _____

   _____

Name: _____

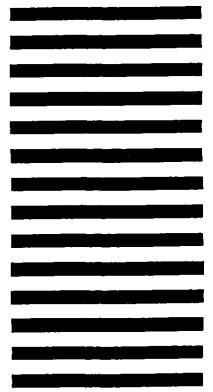Position: _____

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