

VMS

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VMS Backup Utility Manual

Order Number AA-LA35A-TE

VMS Backup Utility Manual

Order Number: AA-LA35A-TE

April 1988

This document describes how to use the Backup Utility on VAX processors. By duplicating files, the Backup Utility protects data from loss or corruption.

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Contents

PREFACE	ix
NEW AND CHANGED FEATURES	xi
BACKUP Description	BCK-1
1	BACKUP COMMAND LINE FORMAT BCK-2
2	BACKUP INPUT AND OUTPUT SPECIFIERS BCK-2
2.1	Input and Output Specifier Element Lists BCK-4
2.2	Using Wildcard Characters with BACKUP BCK-5
3	BACKUP SAVE SETS BCK-7
3.1	Magnetic Tape Save Sets BCK-8
3.1.1	Automatic Tape Unloading • BCK-8
3.1.2	Tape Label Processing • BCK-8
3.1.3	Initializing Magnetic Tapes • BCK-9
3.1.4	Protecting a Magnetic Tape Volume • BCK-9
3.1.5	Tape Expiration Dates • BCK-10
3.1.6	Assigning Volume Labels to Magnetic Tapes • BCK-10
3.1.7	Automatic Tape Mounting • BCK-10
3.1.8	Using the /NOREWIND Qualifier • BCK-12
3.2	Files-11 Disk Save Sets BCK-12
3.3	Network Save Sets BCK-12
3.4	Sequential-Disk Save Sets BCK-13
3.5	Multivolume Save Sets BCK-14
3.6	Protecting a BACKUP Save Set BCK-15
4	BACKUP MODES BCK-16
5	BACKUP TASKS BCK-17
5.1	Saving Files BCK-17
5.2	Restoring Files BCK-18
5.3	Copying Files BCK-19
5.4	Listing the Contents of a BACKUP Save Set BCK-19
5.5	Comparing Files BCK-21
5.6	Creating and Listing BACKUP Journal Files BCK-22
6	STANDALONE BACKUP BCK-22

Contents

7	BACKUP FATAL ERROR OPTIONS	BCK-25
----------	-----------------------------------	---------------

BACKUP Usage Summary		BCK-26
-----------------------------	--	---------------

BACKUP Qualifiers		BCK-28
--------------------------	--	---------------

/ASSIST	BCK-29
/BACKUP	BCK-30
/BEFORE	BCK-31
/BLOCK_SIZE	BCK-32
/BRIEF	BCK-33
/BUFFER_COUNT=N	BCK-34
/BY_OWNER	BCK-35
/BY_OWNER	BCK-36
/BY_OWNER	BCK-37
/COMMENT	BCK-38
/COMPARE	BCK-39
/CONFIRM	BCK-41
/CRC	BCK-42
/CRC	BCK-43
/CREATED	BCK-44
/DELETE	BCK-45
/DENSITY	BCK-46
/EXCLUDE	BCK-47
/EXPIRED	BCK-48
/FAST	BCK-49
/FULL	BCK-50
/GROUP_SIZE	BCK-52
/IGNORE=OPTION	BCK-53
/IMAGE	BCK-55
/INCREMENTAL	BCK-57
/INITIALIZE	BCK-59
/INTERCHANGE	BCK-60
/JOURNAL	BCK-61
/LABEL	BCK-64
/LIST	BCK-66
/LOG	BCK-68
/MODIFIED	BCK-69
/NEW_VERSION	BCK-70
/OVERLAY	BCK-71
/OWNER_UIC	BCK-72
/OWNER_UIC	BCK-73
/OWNER_UIC	BCK-74
/PHYSICAL	BCK-75
/PROTECTION	BCK-77

/RECORD	BCK-79
/REPLACE	BCK-80
/REWIND	BCK-81
/REWIND	BCK-82
/SAVE_SET	BCK-85
/SAVE_SET	BCK-86
/SELECT	BCK-87
/SINCE	BCK-88
/TAPE_EXPIRATION	BCK-89
/TRUNCATE	BCK-90
/VERIFY	BCK-91
/VOLUME	BCK-93

BACKUP Examples	BCK-94
------------------------	---------------

APPENDIX A VALID COMBINATIONS OF BACKUP QUALIFIERS	A-1
---	------------

INDEX

TABLES

BCK-1	BACKUP Input and Output by Operation Type _____	BCK-4
BCK-2	Save Operation Quick Reference Table _____	BCK-94
BCK-3	Restore Operation Quick Reference Table _____	BCK-95
BCK-4	Copy Operation Quick Reference Table _____	BCK-96
BCK-5	Compare Operation Quick Reference Table _____	BCK-96
BCK-6	List Operation Quick Reference Table _____	BCK-96
A-1	Command Qualifiers Used in Save Operations _____	A-2
A-2	Input File-Selection Qualifiers Used in Save Operations _____	A-3
A-3	Output Save-Set Qualifiers Used in Save Operations _____	A-4
A-4	Command Qualifiers Used in Restore Operations _____	A-5
A-5	Input Save-Set Qualifiers Used in Restore Operations _____	A-6
A-6	Output File Qualifiers Used in Restore Operations _____	A-6
A-7	Command Qualifiers Used in Copy Operations _____	A-7
A-8	Input File-Selection Qualifiers Used in Copy Operations _____	A-8

Contents

A-9	Output File Qualifiers Used in Copy Operations _____	A-9
A-10	Command Qualifiers Used in Compare Operations _____	A-10
A-11	Input File-Selection Qualifiers Used in Compare Operations _____	A-11
A-12	Input Save-Set Qualifiers Used in Compare Operations _____	A-11

Preface

Intended Audience

This manual will be useful for most users. It assumes that the reader has a fundamental knowledge of the DIGITAL Command Language (DCL).

Document Structure

This document consists of the following five sections:

- Description—Provides an overview and detailed usage information for the Backup Utility (BACKUP).
- Usage Summary—Outlines the following BACKUP information:
 - Invoking the utility
 - Exiting from the utility
 - Directing output
 - Restrictions or privileges required
- Qualifiers—Describes BACKUP qualifiers, including format, parameters, and examples.
- Examples—Provides additional BACKUP examples.
- Appendix A—Supplies tables showing valid combinations of BACKUP qualifiers in save, restore, copy, and compare operations.

Associated Documents

Chapter 4 in the *Guide to Maintaining a VMS System* provides instructions for completing BACKUP tasks frequently performed by system managers. New users of BACKUP should read this chapter before using BACKUP.

The installation and operations guide for your processor provides instructions for BACKUP operations performed during software installation procedures as well as a comprehensive discussion of standalone BACKUP.

The *Guide to VMS System Security* describes the security features available through the VMS operating system; refer to this guide for more information on data protection.

The *VMS System Messages and Recovery Procedures Reference Volume* explains error messages and, in most cases, suggests recovery procedures.

The *VAX Volume Shadowing Manual* describes how to use BACKUP on volumes that are mounted with the volume shadowing option. This manual can be purchased optionally.

The *VAX RMS Journaling Reference Manual* describes how to use BACKUP in conjunction with VAX RMS Journaling. This manual can be purchased optionally.

Preface

Conventions

The following conventions are observed in this document:

Convention	Meaning
<code>RET</code>	In examples, a key name (usually abbreviated) shown within a box indicates that you press a key on the keyboard; in text, a key name is not enclosed in a box. In this example, the key is the RETURN key. (Note that the RETURN key is not usually shown in syntax statements or in all examples; however, assume that you must press the RETURN key after entering a command or responding to a prompt.)
<code>CTRL/C</code>	A key combination, shown in uppercase with a slash separating two key names, indicates that you hold down the first key while you press the second key. For example, the key combination CTRL/C indicates that you hold down the key labeled CTRL while you press the key labeled C. In examples, a key combination is enclosed in a box.
<code>\$ SHOW TIME</code> <code>05-JUN-1988 11:55:22</code>	In examples, system output (what the system displays) is shown in black. User input (what you enter) is shown in red.
<code>\$ TYPE MYFILE.DAT</code> . . .	In examples, a vertical series of periods, or ellipsis, means either that not all the data that the system would display in response to a command is shown or that not all the data a user would enter is shown.
<code>input-file, . . .</code>	In examples, a horizontal ellipsis indicates that additional parameters, values, or other information can be entered, that preceding items can be repeated one or more times, or that optional arguments in a statement have been omitted.
<code>[logical-name]</code>	Brackets indicate that the enclosed item is optional. (Brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
quotation marks apostrophes	The term quotation marks is used to refer to double quotation marks ("). The term apostrophe (') is used to refer to a single quotation mark.

New and Changed Features

The following technical changes have been made to the Backup Utility for VMS Version 5.0:

- Automatic tape mounting — BACKUP now mounts magnetic tapes automatically. A new command qualifier, `/[NO]ASSIST`, has been added to the BACKUP command. This qualifier, like the `/[NO]ASSIST` qualifier to the DCL command MOUNT, specifies whether messages will be sent to operator terminals or the user's terminal when a tape mount request fails.
- Automatic tape unloading — BACKUP unloads a write-protected tape when a write operation to the tape is attempted.
- Tape label processing — BACKUP checks the volume label and expiration date of tapes before performing BACKUP save operations to magnetic tape.
- Improved standalone BACKUP — If your system has at least two megabytes of memory, the working set for standalone BACKUP can be locked into memory. This allows you to perform multiple standalone BACKUP operations after bootstrapping standalone BACKUP once.
- Improved command line parsing — BACKUP now returns an error message if invalid qualifiers are specified, preventing you from using the same input and output device in image BACKUP operations. BACKUP also prevents passwords from being output in save-set listings.
- New `/BY_OWNER` qualifier — This new qualifier replaces the `/OWNER_UIC` qualifier. You can, however, continue to use the output save-set qualifier `/OWNER_UIC`.

BACKUP Description

By duplicating files, the Backup Utility (BACKUP) protects data from loss or corruption. BACKUP saves files and directories from Files-11 Structure Level 1 and 2 disks to disks or magnetic tapes and restores these files and directories to Files-11 Structure Level 1 and 2 disks. You can use BACKUP to process the contents of an entire volume set in a single operation or to process selected groups of files from a volume or volume set.

BACKUP can perform the following tasks:

- Save disk files to a BACKUP save set
- Restore files to disk from a BACKUP save set
- Copy disk files to disk files
- Compare disk files created by BACKUP or files in a BACKUP save set with disk files
- List information about the files in a BACKUP save set
- Create and list journal files that record the results of BACKUP save operations

Files created by BACKUP are called *save sets*. Save sets are written in a format that only BACKUP can interpret. (A save set stored on a Files-11 disk is a standard VMS file, however, and can be copied, renamed, deleted, or backed up.) A *save-set specification* is a file specification for a BACKUP save set. There is no default file type for save-set specifications, although it is customary to use BCK or SAV.

Standalone BACKUP is a form of the Backup Utility that is bootstrapped into main memory instead of executing under the control of the VMS operating system. Standalone BACKUP uses a subset of BACKUP qualifiers and can be bootstrapped from a console storage device or from a Files-11 disk. You can use standalone BACKUP to back up your system disk or to save, copy, or restore entire disk volumes when the operating system is not running. Refer to Section 6 for instructions for building a standalone BACKUP kit on a Files-11 disk and for performing standalone BACKUP operations. Your VAX processor installation and operations guide contains comprehensive instructions for performing standalone BACKUP operations.

This manual provides reference information for the Backup Utility. Chapter 4 in the *Guide to Maintaining a VMS System* provides instructions for completing BACKUP tasks frequently performed by system managers. New users of BACKUP should read Chapter 4 before performing BACKUP operations.

BACKUP Description

1 **BACKUP Command Line Format**

Use the DCL command BACKUP to perform BACKUP operations. A BACKUP command usually includes an input parameter and an output parameter, as follows:

```
BACKUP input-specifier output-specifier
```

BACKUP evaluates the input and output specifiers to determine which type of operation to perform.

You can use several types of qualifiers to modify the default behavior of BACKUP. You can modify the action of the entire command, or you can change the way BACKUP processes the input and output specifiers. *Command qualifiers* modify the command itself, *input-specifier qualifiers* modify the processing of the input specifier, and *output-specifier qualifiers* modify the processing of the output specifier.

There are two types of input-specifier qualifiers: *input file-selection qualifiers* and *input save-set qualifiers*. Input file-selection qualifiers allow you to select specific files for processing in a save, copy, compare, or list operation. Input save-set qualifiers change the way BACKUP processes an input save set during a restore operation.

There are also two types of output-specifier qualifiers: *output file qualifiers* and *output save-set qualifiers*. Output file qualifiers affect the way BACKUP copies or restores files to a Files-11 structured disk volume. Output save-set qualifiers affect the processing of an output save set during a save operation.

To achieve optimal results from the use of BACKUP, it is important to understand the differences between the types of qualifiers. The position of qualifiers in the BACKUP command line affects the results of the command. Although command qualifiers can be placed anywhere in the command line, input- and output-specifier qualifiers are position-dependent. That is, input-specifier qualifiers must be placed immediately after the input specifier, and output-specifier qualifiers must be placed immediately after the output specifier. Additionally, several BACKUP qualifiers can be used in more than one way. To achieve the desired results from a BACKUP command, make sure you place position-dependent qualifiers correctly.

For example, the /SAVE_SET qualifier can be used as an output save-set qualifier in a BACKUP save operation and as an input save-set qualifier in a BACKUP restore operation.

2 **BACKUP Input and Output Specifiers**

BACKUP can process several different types of input and output. Depending on the type of operation being executed, input and output specifiers can be standard VMS file specifications, BACKUP save-set specifications, or device specifications. Device specifications can refer to disk or magnetic tape volumes.

File specifications used as BACKUP input or output specifiers can be any valid VMS file specification. Node names, however, are not allowed in BACKUP file specifications. You can use wildcard characters, and you can list multiple file specifications as input to a single BACKUP operation. A BACKUP file specification can include the following:

BACKUP Description

- Device specification
- Directory
- File name
- Period
- File type
- Semicolon
- Version number

A BACKUP save-set specification is a file specification for a BACKUP save set. When you direct BACKUP to save files or volumes, it creates and labels a save set and then writes your files to the save set. Thereafter, you can specify the save set as input to other BACKUP operations. When specifying a save set, follow the rules for specifying a VMS file. The *VMS DCL Concepts Manual* describes valid specifications for disk files; the *Guide to VMS Files and Devices* explains the rules for specifying magnetic tape files.

A save-set specification can include the following:

- Node name
- Device specification
- Directory
- Save-set name
- Period (the mandatory delimiter after the save-set name)
- Save-set type

The save-set name can be any valid VMS file name and type, with the following restrictions. When you create a save set on a disk, the save-set name can be up to 39 characters, and the save-set type can be up to 39 characters. However, when you create a save set on a magnetic tape, the entire save-set specification cannot exceed 17 characters. Also, BACKUP ignores version numbers on magnetic-tape save sets. Do not specify a directory in a magnetic-tape save-set specification.

A save set can be located on any of the following devices:

- Magnetic tape (called a *magnetic-tape save set*)
- Files-11 disk (called a *Files-11 save set*)
- Files-11 disk mounted with the DCL command MOUNT/FOREIGN (called a *sequential-disk save set*)
- Files-11 disk on a remote VMS node (called a *network save set*)

Device specifications used as BACKUP input or output specifiers follow the conventions for specifying devices outlined in the *VMS DCL Concepts Manual*. Valid physical device specifications for most VAX processors consist of a two-letter device code, a single-letter controller designation, and a unit number. For VAXstation 8000 processors, physical device specifications consist of a two-letter device code, a single-letter controller designation, a BI node number, and a unit number.

BACKUP Description

BACKUP treats an input or output specifier referring to a Files-11 disk as a file specification. Therefore, to identify a save set on a Files-11 volume, you must include the /SAVE_SET qualifier with the specifier. BACKUP treats input and output specifiers referring to magnetic tape as save sets.

Note: You cannot use save-set specifications as both the input and output specifiers in a BACKUP command line. Because BACKUP treats all magnetic tape files as save-set specifications, you cannot specify a magnetic tape in both the input and output specifier.

Table BCK-1 shows input and output specifiers for each type of BACKUP operation.

Table BCK-1 BACKUP Input and Output by Operation Type

Operation	Format
Save	BACKUP file-spec save-set-spec
Save (image)	BACKUP/IMAGE device-spec save-set-spec
Save (physical to disk)	BACKUP/PHYSICAL device-spec device-spec
Save (physical to tape)	BACKUP/PHYSICAL device-spec save-set-spec
Restore	BACKUP save-set-spec file-spec
Restore (image)	BACKUP/IMAGE save-set-spec device-spec
Restore (physical from disk)	BACKUP/PHYSICAL device-spec device-spec
Restore (physical from tape)	BACKUP/PHYSICAL save-set-spec device-spec
Copy	BACKUP file-spec file-spec
Copy (image)	BACKUP/IMAGE device-spec device-spec
Compare	BACKUP/COMPARE file-spec file-spec BACKUP/COMPARE save-set-spec file-spec
Compare (image)	BACKUP/COMPARE/IMAGE save-set-spec device-spec BACKUP/COMPARE/IMAGE device-spec device-spec
List ¹	BACKUP/LIST[=file-spec] save-set-spec BACKUP/LIST[=file-spec] device-spec
Create Journal	BACKUP/JOURNAL[=file-spec] file-spec save-set-spec
List Journal	BACKUP/JOURNAL[=file-spec]/LIST[=file-spec]

¹Can also be used in conjunction with any other operation listed here.

2.1 Input and Output Specifier Element Lists

An *element list* is a list of arguments specified with a command or qualifier. The arguments, or elements, in the list are separated by commas. Element lists relating to input or output specifiers are allowed only in the following circumstances:

- If an input specifier refers to a Files-11 disk, you can construct lists from standard VMS file specifications, as follows:

BACKUP Description

```
$ BACKUP
_FROM: DUAO: [DATA]A.DAT,B.DAT, [PROGRAMS]TEST.EXE
_TO: MSAO:TEST.SAV/LABEL=DLY101
```

- If an input specifier or an output specifier refers to a BACKUP save set on magnetic tape or sequential disk, you can construct a list of device names to be used in the operation. However, the save-set name must appear with the first element in the list and must not appear in subsequent elements in the list. Thus, you can process multivolume save sets efficiently by specifying the order in which devices will be used. The first volume is processed until it is full. The second (or subsequent) volume is processed while the media in the first (or previous) volume is being changed.

In the following example, BACKUP first saves data to a tape in drive MSA0, then to a tape in drive MSA1. When the tape in drive MSA1 is full, BACKUP saves data to a fresh tape in MSA0.

```
$ BACKUP
_FROM: DUAO: [DATA]*.* ,DUAO: [PROGRAMS]*.*
_TO: MSAO:TEST.SAV,MSA1:/LABEL=WKLY01
```

- If you are performing an image operation on a volume set, you can specify element lists in the input and output specifiers, as follows:

```
$ BACKUP/IMAGE
_FROM: MSAO:TEST.SAV,MSA1:
_TO: DUAO: [DATA...],DUA1:
```

2.2 Using Wildcard Characters with BACKUP

BACKUP allows you to use wildcard characters in file specifications to represent directories, file names, file types, and version numbers. Omitted file names, file types, or version numbers are assumed to be wildcard characters. For instance, if you omit the version number, BACKUP processes all versions. (For introductory information on wildcard characters, refer to the *VMS DCL Concepts Manual*.)

Any valid DCL wildcard character can be used with input specifiers that are Files-11 media or with the /SELECT and /EXCLUDE qualifiers. Note, however, that the wildcard characters denoting the latest version of files (;) and relative versions of files (-n) are processed as the all-version wildcard specification (**) when they are used with the /EXCLUDE and /SELECT qualifiers.

Wildcard characters cannot be used in BACKUP save-set specifications unless the save sets are input specifiers on tape.

BACKUP Description

Using Wildcard Characters to Represent Directories

The following types of directory wildcards are allowed for output specifiers that are Files-11 media:

Directory Wildcard	Result
omitted	If a directory name is omitted, BACKUP restores file to the current default directory [].
[* . . .]	BACKUP restores files to the directory from which they were saved.
[directory]	BACKUP restores files to the named directory.
[directory . . .]	The wildcard characters used in the specification of the input files determine the directory to which BACKUP restores the files.

If you specify directory wildcard characters incorrectly and your directories contain many levels of subdirectories, you risk losing the lower level subdirectories in BACKUP operations because VMS directory trees can have only eight levels.

The following example uses the directory wildcard format [directory . . .] for both the input and the output specifiers. BACKUP creates a directory named [JOE.RECEIVED] as well as subdirectories that correspond to the subdirectories of [OSCAR]. BACKUP copies all files from the directory [OSCAR] and its subdirectories to [JOE.RECEIVED] and its subdirectories. If [OSCAR] has eight levels of directories, however, BACKUP is unable to create a corresponding ninth-level subdirectory to [JOE.RECEIVED]; the eighth-level subdirectory to [OSCAR] is not copied.

```
$ BACKUP [OSCAR...] [JOE.RECEIVED...]
```

If you use the asterisk wildcard character (*) to represent subdirectories in the input specifier of a copy operation, BACKUP creates subdirectories to the directory specified in the output specifier that correspond to the subdirectories in the input specifier. BACKUP then copies all files from the lowest level subdirectory in the input specifier to the lowest level subdirectory in the output specifier. In the following example, the asterisk represents subdirectories named MONDAY and TUESDAY:

```
$ BACKUP [SAM.WORK.*.WEDNESDAY] [JAMES...]
```

When you execute the previous command, BACKUP creates a subdirectory named [JAMES.MONDAY.TUESDAY.WEDNESDAY]. In doing so, BACKUP copies the file MONDAY.DIR to [JAMES], copies the file TUESDAY.DIR to [JAMES.MONDAY], and copies the file WEDNESDAY.DIR to [JAMES.MONDAY.TUESDAY]. Then BACKUP copies all files from [SAM.WORK.MONDAY.TUESDAY.WEDNESDAY] to [JAMES.MONDAY.TUESDAY.WEDNESDAY].

BACKUP Description

In a restore operation, the input specifier defaults to [* . . .] if the input save-set qualifier /SELECT is not used; this is important if you use the form [directory . . .] in the output specifier. The function of the wildcard [* . . .] is to carry over the entire directory name from the first level on and to place it before the ellipsis in the output specifier. Thus, if the save set in the following example contains the directory tree [SAVE . . .], the restored directory tree will be [WORK.SAVE . . .]:

```
$ BACKUP MTAO:SAVE.BCK [WORK...]
```

Note that the result will be the same even if your output specifier has the same name as the directory in the input specifier, as in the following example:

```
$ BACKUP MTAO:SAVE.BCK [SAVE...]
```

The preceding command restores the directory tree [SAVE . . .] to a directory tree named [SAVE.SAVE . . .].

The following command restores the directory tree [SAVE . . .] to a directory tree named [WORK . . .]:

```
$ BACKUP MTAO:SAVE.BCK/SELECT=[SAVE...] [WORK...]
```

There are two ways to retain the original directory name when you restore files. You must either use the form [* . . .] for the output specifier, or you must specify the input save-set qualifier /SELECT. The following example uses the form [* . . .] in the output specifier to restore the directory tree [SAVE . . .] in save set SAVE.BCK to the directory tree [SAVE . . .].

```
$ BACKUP MTAO:SAVE.BCK [*...]
```

The input save-set qualifier /SELECT causes only the ellipsis portion of the selected file specification to be carried over to the directory tree named in the output specifier [directory . . .]. The following command restores [SAVE . . .] to [SAVE . . .]:

```
$ BACKUP MTAO:SAVE.BCK/SELECT=[SAVE...] [SAVE...]
```

3 BACKUP Save Sets

This section describes BACKUP save sets, which are special files created by BACKUP and written in a format that only BACKUP can interpret. (A save set stored on a Files-11 disk is a standard VMS file, however, and can be copied, renamed, deleted, or backed up.) A BACKUP save set contains a copy of files that were stored on a Files-11 disk. You can list the contents of a BACKUP save set, you can compare the contents of a save set with the files stored on a Files-11 disk, or you can restore the contents of a save set to a Files-11 disk.

Save sets are classified according to the media on which they reside. You can write save sets to the following types of media:

- Magnetic tape (magnetic-tape save set)
- Local Files-11 disk (Files-11 save set)
- Files-11 disk on a remote node (network save set)
- Sequential disk (sequential-disk save set)

BACKUP Description

3.1 Magnetic Tape Save Sets

Magnetic tape is the most commonly used medium for storing BACKUP save sets. It is less expensive than disk media, and its compact size makes it easy to store. You can use more than one tape device at a time to save or restore data; this allows processing to continue on another tape while the one most recently used is rewinding.

BACKUP treats all magnetic tape files as BACKUP save sets. You cannot use save-set specifications as both the input and output specifiers in a BACKUP command line. Because BACKUP treats all magnetic tape files as save sets, you cannot specify a magnetic tape in both the input and output specifier.

When restoring data from tape, if you do not include a save-set name with an input magnetic tape, BACKUP reads the next save set it encounters on the tape. (If you specify the input save-set qualifier /REWIND, BACKUP rewinds the tape and reads the first save set on the tape.)

Save-set specifications on magnetic tape are limited to 17 characters, including the period delimiter (.) and file type. The following is a valid save-set specification:

```
WKLY27SEP1988.BCK
```

3.1.1 Automatic Tape Unloading

When you attempt a BACKUP save operation to a write-protected magnetic tape, BACKUP automatically unloads the tape and displays a WRITENABLE message. After the tape unloads, you can remove it from the drive, insert a write ring, and replace the tape in the drive. BACKUP displays the WRITENABLE message on your terminal if you specified the command qualifier /NOASSIST or on the operator terminal if you did not specify /NOASSIST. From the operator terminal, enter the REPLY/TO command to restart the save operation. From your terminal, enter YES to restart the save operation.

3.1.2 Tape Label Processing

By default, BACKUP processes information stored in the volume header record of the tape before writing to a magnetic tape. The volume header record contains volume protection information, an expiration date, and a volume label. By processing the volume protection information, BACKUP ensures that you have the right to access the volume in the manner you requested. By processing the tape expiration date, BACKUP prevents you from initializing a magnetic tape that has not yet expired. By comparing the volume label specified in the BACKUP command line to the volume label of the tape, BACKUP prevents you from creating a save set on the wrong magnetic tape.

You can prevent BACKUP from processing the tape expiration date and the volume label by specifying the command qualifier /IGNORE=LABEL_PROCESSING.

3.1.3 Initializing Magnetic Tapes

You must initialize a new magnetic tape to prepare it to receive data and to write a volume label, tape expiration date, and volume protection data to the volume header record. You can initialize a used magnetic tape to remove access to data stored on the tape, change the volume label, change the tape expiration date, change the volume protection data on the tape, and prepare the tape to receive new data. If a magnetic tape contains a non-ANSI or non-ISO label, initialize the tape to write an ANSI label to the volume header record.

You can use either the DCL command INITIALIZE or the BACKUP output save-set qualifier /REWIND to initialize a magnetic tape. To initialize a volume that was previously initialized with the output save-set qualifiers /REWIND and /PROTECTION, you must either own the volume (your UIC matches the owner UIC of the volume), or you must have VOLPRO privilege.

Initializing Magnetic Tapes with the INITIALIZE Command

The DCL command INITIALIZE first searches the volume header record for a tape expiration date and verifies that the tape is expired. If the tape is expired, the INITIALIZE command writes a new volume label to the tape. By writing a new volume label to the tape, BACKUP initializes the tape, removing access to any data that previously resided on the tape and preparing the tape to receive new data. If the tape is not expired, the following error message appears:

```
%INIT-F-FILNOTEXP, file is not expired
```

Use the DCL command INITIALIZE/OVERRIDE=EXPIRATION to initialize a magnetic tape that has not yet expired.

Initializing Magnetic Tapes with the /REWIND Qualifier

The output save-set qualifier /REWIND causes BACKUP to rewind to the beginning of the magnetic tape and initialize the tape before writing the save set to the tape. See the description of the output save-set qualifier /REWIND for more information.

3.1.4 Protecting a Magnetic Tape Volume

By default, BACKUP applies no protection to magnetic tapes. You can assign a UIC protection code to a magnetic tape by specifying the /PROTECTION qualifier with the /REWIND qualifier. All save sets that you create on the tape will be protected with this protection code. If you specify no code with the /PROTECTION qualifier, BACKUP assigns the default protection of the current process to the tape. The following command specifies a protection code that allows full access to SYSTEM and OWNER and no access to GROUP and WORLD for the save set FRIDAY.DAT and all savesets created subsequently on the magnetic tape labeled DLY101:

```
$ BACKUP
  _FROM: []
  _TO: MTAO:FRIDAY.DAT/REWIND/LABEL=DLY101/OWNER_UIC=[301,211]-
  _$ /PROTECTION=(S:RWED,O:RWED,G:,W:)
```

As shown in the preceding example, you can also use the output save-set qualifier /OWNER_UIC to assign a UIC value to the output tape. If you do not specify the /OWNER_UIC qualifier, the output tape receives the UIC value of the process that created the save set.

BACKUP Description

3.1.5 Tape Expiration Dates

You can specify an expiration date for the magnetic tape by using the output save-set qualifiers /REWIND and /TAPE_EXPIRATION. For example, your daily incremental BACKUP tapes should expire in seven days, and your weekly incremental BACKUP tapes should expire in one month. If you do not specify /TAPE_EXPIRATION, today's date is used. The following example assigns an expiration date of January 1, 1989, to the output tape:

```
$ BACKUP
  _FROM: [MILADY]
  _TO: MTAO:ANNUAL.BCK/REWIND/LABEL=YLY101-
  _$ /TAPE_EXPIRATION=01-JAN-1989
```

3.1.6 Assigning Volume Labels to Magnetic Tapes

Magnetic tape volume labels can contain a maximum of six characters. You can use any ANSI "a" character in a magnetic tape volume label. The ANSI "a" characters include numbers, uppercase letters, and any one of the following nonalphanumeric characters:

! " % ' () * + , _ . / : ; < = > ?

If you use any of the preceding nonalphanumeric characters, you must enclose the volume label with quotation marks.

Label your magnetic tapes according to the data contained on the tapes. The following table presents some suggestions for labeling tapes.

Label	Type of Backup	Expiration Date
DLY101	Daily, group 1, volume number 1	Expires in 7 days
DLY102	Daily, group 1, volume number 2	Expires in 7 days
WKY101	Weekly, group 1, volume number 1	Expires in 4 weeks
WKY201	Weekly, group 2, volume number 1	Expires in 4 weeks
MTH101	Monthly, group 1, volume number 1	Expires in 12 months
YRY101	Yearly, group 1, volume number 1	Expires in 5 years

3.1.7 Automatic Tape Mounting

BACKUP requires a magnetic tape to be mounted as a foreign volume before it can perform operations using a tape. BACKUP automatically issues mount requests for the tapes it needs. Therefore, you do not need to use the DCL command MOUNT to mount magnetic tapes before performing BACKUP operations.

If no label is specified explicitly in the command line, BACKUP uses the first six characters of the save-set name as the volume label of the first tape in a multivolume save set, and the first four characters of the save-set name followed by the volume number of the tape as the volume label of subsequent tapes. To specify a label or list of labels explicitly, use the /LABEL qualifier. If you do not specify enough labels with the /LABEL qualifier, BACKUP uses the first four characters of the final label in the list followed by the volume number of the tape as the volume label of subsequent tapes.

BACKUP Description

After mounting a tape, BACKUP compares the volume label with the label you specified in the BACKUP command line (either explicitly with the /LABEL qualifier or implicitly through the save-set name) and ensures that the tape is expired. If the volume label is less than six characters long, BACKUP pads the volume label with the blank character to six characters. The first four characters of the volume label must either match the first four characters of the label specified in the BACKUP command line exactly, or the first four characters of the volume label must end with one or more underscore characters. If the first four characters of the volume label end with one or more underscore characters, and the label specified in the command line matches the part of the volume label that appears before the underscore characters, BACKUP accepts the match. (For example, the volume label ABN_ matches the command line label ABN but does not match the command line label ABNE.) If the fifth and a sixth character of the volume label are numbers between zero and nine, BACKUP does not compare these characters with corresponding characters in the label specified in the BACKUP command line. Otherwise, the fifth and sixth characters in the volume label must match the corresponding characters in the label specified in the BACKUP command line exactly. If the labels match, BACKUP performs the designated operation.

If the volume label specified in the BACKUP command line does not match the volume label of the tape, BACKUP displays the following message and prompt:

```
%BACKUP-W-MOUNTERR, volume 'number' on 'device' was not mounted because  
  its label does not match the one requested  
Specify option (QUIT, NEW tape or OVERWRITE tape)  
BACKUP>
```

Specify QUIT to abort the BACKUP operation and unload the magnetic tape. Specify NEW to direct BACKUP to prompt for a new tape. Specify OVERWRITE to ignore the label mismatch and write the save set to the tape.

By default, BACKUP applies the command qualifier /ASSIST and displays the BACKUP-W-MOUNTERR message and the associated prompt on operator terminals enabled to receive TAPES and CENTRAL messages. When using BACKUP interactively, you can specify /NOASSIST to prevent operator terminals from receiving the message and prompt; the message and prompt appear on your terminal. (The /[NO]ASSIST qualifier is the same as the Mount Utility (MOUNT) qualifier /[NO]ASSIST.) In batch mode, BACKUP ignores the /NOASSIST qualifier and sends mount failure messages to operator terminals.

You can also mount magnetic tape volumes explicitly before beginning a BACKUP operation to tape. This ensures that BACKUP command procedures that were written before automatic tape mounting was implemented execute correctly.

BACKUP Description

3.1.8 Using the /NOREWIND Qualifier

By default, BACKUP uses the output save-set qualifier /NOREWIND when you create a save set on a magnetic tape. The /NOREWIND qualifier directs BACKUP to create the save set at the logical end-of-tape, rather than rewinding and initializing the tape before creating the save set. BACKUP compares the volume label specified in the BACKUP command line with the volume label in the volume header record of the magnetic tape before creating the save set. If the labels match, BACKUP winds the tape forward to the logical end-of-tape (the end of the last save set stored on the tape) and creates the save set on the tape. If the labels do not match, you can direct BACKUP to write the save set to the tape by selecting the OVERWRITE option at the BACKUP> prompt.

You can use the input save-set qualifier /REWIND to rewind the tape before restoring the save set from a magnetic tape.

See the description of the output save-set qualifier /REWIND and the input save-set qualifier /REWIND for more information.

3.2 Files-11 Disk Save Sets

To write save sets on a Files-11 disk, you must include the output save-set qualifier /SAVE_SET. The /SAVE_SET qualifier indicates to BACKUP that you want to create a save set, rather than a copy of the selected files, on the output volume. The disk must be mounted as a Files-11 volume; all volumes in a volume set must be mounted.

BACKUP can read a Files-11 save set as either a Files-11 save set or as a sequential-disk save set. When BACKUP reads a save set as a Files-11 save set, all volumes of the save set must be mounted. To read a save set that is not located in your process default directory, you must specify the directory in which the save set is located. When BACKUP reads a Files-11 save set as a sequential-disk save set, you can mount the volumes one at a time. You must specify the master file directory [000000] in the save-set specification when reading a Files-11 save set as a sequential-disk save set.

3.3 Network Save Sets

You can create or read a *network save set* on a Files-11 disk attached to a remote node by specifying the node name of a remote node in the save-set specification. A remote node is a node that is accessible to the node you are working on (the host node) over a network. The network save set must be located on a publicly accessible disk (a disk mounted from the remote node with the /SYSTEM, /GROUP, or /CLUSTER qualifier) on the remote node. Depending on the volume and file protection at the remote node, you may need to specify an access control string in the network save-set specification. An access control string includes the user name and password, and has the following format:

```
remote_nodename"username password"::device_name:[directory]
```

The following example creates a network save set on the remote node DOUBLE:

```
$ BACKUP  
_FROM: [MY_DIR]  
_TO: DOUBLE"username password"::DBAO:SAVEIT.BCK/SAVE_SET
```

Omit the access control string if it is not required to gain access to the remote node, such as in the case of proxy network access. See the *VMS Networking Manual* for more information about access control strings and proxy network access.

3.4 Sequential-Disk Save Sets

Sequential-disk save sets allow you to treat a Files-11 disk volume sequentially, the way a magnetic tape volume is treated. The primary advantage of using sequential-disk save sets is that you can mount multivolume save sets one volume at a time. This is particularly useful on systems without tape drives that have a large fixed-media disk and a small removable disk.

When one sequential disk is full, BACKUP prompts you to mount another disk. You can use more than one disk device at a time to save or restore data; this allows processing to continue on another disk while the one most recently used is spinning down.

You need the privilege LOG_IO or PHY_IO to read or write a multivolume sequential-disk save set.

Before creating a sequential-disk save set, mount the first volume of the sequential-disk save set using the DCL command MOUNT/FOREIGN. Although the disk is mounted with the /FOREIGN qualifier, BACKUP manages the disk using Files-11 structure.

When you perform a save operation to a sequential disk, you must use the output save-set qualifier /SAVE_SET. When you perform a restore operation from a sequential disk, you must specify the input save-set qualifier /SAVE_SET. If you do not specify the /SAVE_SET qualifier, BACKUP displays the following error message:

```
%BACKUP-F-IMGFILSPE, /IMAGE specification must only have device name
```

Do not specify a directory name for the save set; sequential-disk save sets are always entered in the master file directory [000000]. Even if you specify a directory other than the master file directory in a save operation, the save set is entered in the master file directory. If you specify a directory other than the master file directory in a restore or list operation, BACKUP returns an error message indicating that it cannot locate the file.

BACKUP does not initialize the first sequential-disk volume because the default is /NOINITIALIZE; however, continuation volumes are initialized. Unless you specify the command qualifier /INITIALIZE, the following restrictions apply to the first sequential-disk volume:

- The disk must be Files-11 Structure Level 2.
- The disk must not be part of a volume set.
- The cluster factor of the disk must be 1.
- The free space on the disk cannot be fragmented into more than 100 contiguous extents.
- The index file cannot be extended.
- The master file directory cannot be extended.

BACKUP Description

Volumes to be used for sequential-disk save sets should contain only save sets. You must initialize a volume that has been used for general file processing before using it as a sequential-disk volume. You can place a maximum of 12 save sets on a single sequential disk. Use Files-11 disk save sets if you want to create more than 12 save sets on a single disk.

BACKUP can read a sequential-disk save set either as a sequential-disk save set or as a Files-11 save set. When BACKUP reads a save set as a sequential-disk save set, the save set can be mounted one volume at a time. The default directory for the save set file specification is the master file directory [000000] on the disk.

When BACKUP reads a save set as a Files-11 save set, all volumes of the save set must be mounted. The default directory is your process default directory. Therefore, you must specify the master file directory [000000] in order to read a sequential-disk save set as a Files-11 save set.

3.5 Multivolume Save Sets

A multivolume save set is a BACKUP save set that is stored on more than one magnetic tape or sequential disk. By default, BACKUP does not initialize the first volume in a multivolume save set, but it does initialize all subsequent volumes.

You must have the user privilege LOG_IO or PHY_IO to process multiple sequential-disk volumes. No special privilege is required to process multiple magnetic tape volumes.

If you have a large amount of data to process, save time by using more than one tape or disk drive. When BACKUP finishes processing a disk or tape in the first drive, it continues processing on the next drive while the media on the first drive is unloaded and replaced with fresh media.

When you create a multivolume save set on magnetic tape, you may be requested to mount another volume when the first tape is full. (When a tape is full, BACKUP rewinds the tape, unloads it, and takes the drive off line.) If you specified more than one output drive in the command line, however, and the correct tape is mounted in the second drive, BACKUP issues the following message indicating that it is resuming operation on the next volume; it does not issue a mount request message.

```
%BACKUP-I-RESUME, resuming operation on volume 'number'
```

When you create a multivolume save set on sequential disks, you will receive the following messages and prompt when a sequential disk is full. This occurs because many types of disks cannot be unloaded under software control.

```
%BACKUP-I-RESUME, resuming operation on volume 'number'  
%BACKUP-I-READYWRITE, mount volume 'number' on 'device' for writing  
Respond with YES when ready:
```

Remove the full volume and load the next volume on the drive. On disk devices, enter YES when the device is up to speed and the ready light is on. After you mount a volume and enter YES, processing continues.

When you invoke BACKUP from a batch job, you cannot specify the command qualifier /NOASSIST. The magnetic tape mounting messages READYREAD, READYWRITE, and WRITENABLE are displayed as needed at operators' terminals. Terminals enabled with REPLY/ENABLE=TAPES or REPLY/ENABLE=CENTRAL receive messages for magnetic tape operations;

BACKUP Description

terminals enabled with REPLY/ENABLE=DISKS or REPLY/ENABLE=CENTRAL receive messages for sequential-disk operations.

BACKUP continues processing when the operator replies to the mount requests using the DCL command REPLY/TO. If the operator responds with REPLY/PENDING, BACKUP waits until a REPLY/TO command is entered. If the operator responds with REPLY/ABORT or with any other qualifier to REPLY, the fatal error %BACKUP-F-OPERABORT causes BACKUP to terminate. For further information about the DCL command REPLY, refer to the *VMS DCL Dictionary*.

3.6 Protecting a BACKUP Save Set

Limiting access to BACKUP save sets is an important part of system security. The file system treats a BACKUP save set as a single file, whether it is stored on disk or on magnetic tape. Therefore, anyone who has access to a save set can read any file in the save set. BACKUP does not check protection on individual files until after they are restored to standard VMS file format.

To maintain system security, it is crucial that you protect save sets adequately. Accordingly, you should assign restrictive protection to save sets on disk and to magnetic tape volumes by using the output save-set qualifiers /BY_OWNER and /PROTECTION. Sufficient protection can prevent nonprivileged users from mounting a save-set volume or reading files from a Files-11 save set. You should also take physical security precautions with save sets stored offline by keeping BACKUP media in locked cabinets.

When you write a save set to a Files-11 disk or a sequential disk, and you do not specify /PROTECTION, BACKUP applies the process default protection to the save set. If you specify /PROTECTION, any protection categories that you do not specify default to your default process protection.

Protection information is written to the volume header record of a magnetic tape and applies to all save sets stored on the tape. Therefore, the output save-set qualifiers /BY_OWNER and /PROTECTION are effective on magnetic-tape save sets only if you specify the output save-set qualifier /REWIND. This rewinds the tape to its beginning, writes the protection data to the volume header record, and initializes the tape. If you specify /PROTECTION, any protection categories that you do not specify default to your default process protection. If you do not specify /REWIND with the /PROTECTION and /BY_OWNER qualifiers, the magnetic tape receives no protection. (By default, BACKUP applies no protection to magnetic tapes.)

The following example saves the directory [PAYROLL] to KNOX.BCK on the magnetic tape drive MFA2:

```
$ BACKUP
  _FROM: [PAYROLL]
  _TO: MFA2:KNOX.BCK/LABEL=BANK01/REWIND/BY_OWNER=[3,3]-
  _$ /TAPE_EXPIRATION=15-JAN-1989/PROTECTION=(S:RWE,O:RWED,G:RE,W)
```

The output save-set qualifier /LABEL provides the label BANK01 for the tape. The output save-set qualifier /BY_OWNER assigns an owner UIC of [3,3] to the save set. The output save-set qualifier /TAPE_EXPIRATION assigns an expiration date of January 15, 1989, to the tape. The output save-set qualifier /PROTECTION assigns the owner of the save-set volume read, write, execute, and delete access. SYSTEM users are assigned read, write, and execute access; GROUP users are assigned read and execute access; WORLD users are assigned no access.

BACKUP Description

When a nonprivileged user wants to restore a particular file, do not lend the volume containing the save set. You could give away access to all the files on the volume. The safest way to restore a particular file is to restore the file selectively, as shown in the following example:

```
$ BACKUP MTAO: JULY.BCK/SELECT=[JONES.TEXTPROC]LASTMONTH.DAT -
_$ [*...]/BY_OWNER=ORIGINAL
```

The selected file is restored with its original directory, ownership, and protection. In this way, the file system determines if the user is permitted access to the file.

4 BACKUP Modes

To select and process data for a BACKUP task, BACKUP provides the following five operating modes:

- **File** — You can process individual files or directories. For example, the following command copies a file named PHONE.LIS to a directory named [ARCHIVES]:

```
$ BACKUP PHONE.LIS [ARCHIVES]PHONE.LIS
```

- **Selective** — BACKUP can process files or volumes selectively, according to criteria such as version number, file type, UIC, date and time of creation, expiration date, or modification date. For example, the following command saves all files except WRITERS.PAY from the directory [PAYROLL] that have been modified since June 28, 1988, to a Files-11 save set named PAY.SAV:

```
$ BACKUP
_FROM: [PAYROLL]/SINCE=28-JUN-1988/EXCLUDE=WRITERS.PAY
_TO: DBA2:[PAYROLL.BACKUPS]PAY.SAV/SAVE_SET
```

Perform selective save operations by using wildcard characters and input file-selection qualifiers. The input file-selection qualifiers are: /BACKUP, /BEFORE, /BY_OWNER (/OWNER_UIC), /CREATED, /EXCLUDE, /EXPIRED, /MODIFIED, and /SINCE.

- **Incremental** — Incremental save operations save only those files that were created or modified since the last save operation. The input file-selection qualifier /SINCE=BACKUP directs BACKUP to save files that have been created or modified since the last BACKUP/RECORD operation. The command qualifier /RECORD directs BACKUP to record the current date in the BACKUP date field of each volume header record. For example, the following command saves all files on DBA1 created or modified since the last save operation and records the current date and time as their new BACKUP date:

```
$ BACKUP/RECORD DBA1:[*...]/SINCE=BACKUP MTAO:13MAY.BCK
```

Incremental restore operations restore an incremental save set. Specify the command qualifier /INCREMENTAL in an incremental restore operation.

- **Image** — An image save operation, also called a full backup, creates a save set containing an entire volume or volume set. An image restore operation initializes the output disk and restores an entire volume or volume set. An image copy operation initializes the output disk and copies an entire volume or volume set. An image compare operation compares the contents of entire volumes or volume sets. Because an

BACKUP Description

image copy or save operation copies or saves all files on the input volume, you cannot specify file-selection qualifiers with an image copy or save operation. You can, however, restore files and directories selectively from an image save set.

If the output volume of an image operation is a disk, all files on the output volume are stored contiguously. Contiguous storage of files eliminates disk fragmentation and creates contiguous free blocks of disk space. For example, the following command creates a save set of the entire disk volume DBA2 on DBA1:

```
$ BACKUP/IMAGE DBA2: DBA1:13MAY.BCK/SAVE_SET
```

- Physical — The BACKUP/PHYSICAL command copies, saves, restores, or compares an entire volume in terms of logical blocks, ignoring any file structure. For example, the following command saves an unstructured disk volume:

```
$ BACKUP/PHYSICAL DMAO: MTA1:OLIVIA.BCK/LABEL=OLIVO1
```

A save set that is created using the command qualifier /PHYSICAL must be restored using the /PHYSICAL qualifier.

5 BACKUP Tasks

This section describes how to copy, save, restore, list, and compare files using BACKUP and how to create and list BACKUP journal files. See Chapter 4 in *Guide to Maintaining a VMS System* for more information about BACKUP operations.

Appendix A contains tables listing all qualifiers that can be used in BACKUP save, restore, copy, and compare operations. The tables show valid combinations of BACKUP qualifiers.

5.1 Saving Files

A BACKUP save operation places a selected disk file or files, directory or directory tree, volume or volume set into a save set on disk or magnetic tape. When you save data to disk, you must specify the output save-set qualifier /SAVE_SET. If you do not specify /SAVE_SET, BACKUP copies files in standard VMS file format rather than creating a BACKUP save set. When you save data to tape, you do not need to specify /SAVE_SET; BACKUP treats all magnetic tape files as save sets.

The save-set name can be any valid VMS file name and type, with the following restrictions. When you create a save set on a disk, the save-set name can be up to 39 characters, and the save-set type can be up to 39 characters. However, when you create a save set on a magnetic tape, the entire save-set specification cannot exceed 17 characters. Also, BACKUP ignores version numbers on magnetic-tape save sets. Do not specify a directory in a magnetic-tape save-set specification.

To create a magnetic-tape save set named NOV13SAVE.BCK that contains all files and subdirectories of a directory tree named [LYKINS...], enter the following command:

```
$ BACKUP [LYKINS...] TAPE:NOV13SAVE.BCK/LABEL=MYTAPE
```

BACKUP Description

If you specify multiple devices to handle a multivolume save set, specify the save-set name only with the first device. Separate the other device names with commas. For example, the following command saves all files in the directory [MARCO] to a multivolume magnetic tape save set:

```
$ BACKUP [MARCO] MTA0:14AUG,MTA1:/LABEL=(WKY101,WKY102)
```

You can write a save set to a disk in one of two formats: standard Files-11 disk structure or sequential-disk structure. The appropriate procedure for mounting the target disk depends on whether the save set will be written in standard Files-11 format or in sequential-disk format. If the save set will be written in standard Files-11 format, the target disk must be mounted as a Files-11 disk. If a save set will be written in sequential-disk format, the target disk must be mounted as a foreign device by specifying the command qualifier /FOREIGN to the MOUNT command.

As shown in the following example, you can create a Files-11 save set that consists of a single file; DUA1 is already mounted:

```
$ BACKUP STRATCOL1.DAT DUA1:STRATDAT1.BCK/SAVE_SET
```

To create a sequential-disk save set on DUA0 named NOV12SAVE.BCK that consists of all files in the current default directory, enter the following commands:

```
$ MOUNT/FOREIGN DUA0:  
$ BACKUP [] DUA0:NOV12SAVE.BCK/SAVE_SET
```

5.2 Restoring Files

A BACKUP restore operation returns data from a BACKUP save set to its original VMS file format on the specified output disk. You can restore files or directories if they were inadvertently deleted. You can restore an entire disk volume or volume set if it has been lost, corrupted, or destroyed.

For example, to restore all files from a magnetic-tape save set named NOV12SAVE.BCK to the directory tree from which they were saved, enter the following command:

```
$ BACKUP TAPE:NOV12SAVE.BCK/REWIND [*...]
```

The /REWIND qualifier directs BACKUP to rewind the tape to the beginning-of-tape before beginning the restore operation. This ensures that the save set will be restored even if it is located before the current tape position.

The following example restores files from the magnetic tape save set NOV12SAVE.BCK to subdirectories of the directory [LYKINS]:

```
$ BACKUP TAPE:NOV12SAVE.BCK [LYKINS...]
```

To restore a specific file from a save set, use the input save-set qualifier /SELECT. In the following example, the file STRAT1.DAT in the directory [LYKINS.GLENDO] was deleted accidentally. The user, who previously saved the file to a save set named NOV2SAVE.BCK, uses BACKUP to restore the file to the directory. Next, the user enters the DIRECTORY command to confirm that the file has been restored to the subdirectory [LYKINS.GLENDO].

BACKUP Description

```
$ BACKUP
_From: MTAO:NOV2SAVE.BCK/SELECT=[LYKINS.GLENDO]STRAT1.DAT;5
_To: STRAT1.DAT;5
$ DIRECTORY STRAT1.DAT
Directory [LYKINS.GLENDO]

STRAT1.DAT;5

Total of 1 file.
$
```

If your save set is stored on more than one magnetic tape or sequential disk volume, it is possible to begin restore and compare operations with any volume of the save set. However, if you are restoring a save set with the command qualifier `/IMAGE`, processing must begin with the first volume. (An image restore operation restores all files to a volume or volume set.) If you attempt an image restore or compare operation and specify a tape that is not the first volume of the save set, you receive the following messages:

```
%BACKUP-W-NOT1STVOL, tape 'name' is not the start of a save set
```

Use the command qualifier `/LOG` to monitor the files as they are restored. If you want to restore only a small number of files from a large save set, press `CTRL/Y` to terminate processing once the files you need have been restored.

5.3 Copying Files

The BACKUP copy operation creates identical copies of files, directories, volumes, and volume sets on local Files-11 disks. You cannot perform a BACKUP copy operation to a Files-11 disk attached to a remote node, a sequential disk, or a magnetic tape.

Copies created with the BACKUP command are different from copies made with the DCL command COPY. The DCL command COPY produces new copies of files, updating the revision dates, and assigning protection codes from the applicable defaults. Copies created with BACKUP are identical to the originals, including revision dates and protection codes (although, by default, the owner UIC of the copies is the UIC of the current process). Also, the BACKUP command COPY can copy entire directory trees, maintaining the directory structure, while the DCL command COPY cannot.

For example, the following command copies the highest numbered version of file UPLIFT.PAS in the directory [LYKINS] to the directory [OWLCR] and names the file UPLIFT.PAS;1:

```
$ BACKUP [LYKINS]UPLIFT.PAS; [OWLCR]UPLIFT.PAS;1
```

5.4 Listing the Contents of a BACKUP Save Set

A BACKUP list operation lists information about files in a save set, displaying the list on a terminal or writing it to a specified output file. Because BACKUP save sets are written in a format that only BACKUP can interpret, the list operation is the only way to determine the contents of a save set without restoring the save set. You can perform a list operation in conjunction with any other BACKUP operation. Use the command qualifier `/LIST` to perform a list operation.

BACKUP Description

By default, a list operation supplies the same information about files in the save set as the DCL command DIRECTORY/DATE/SIZE, including the actual number of blocks saved for each file. Specify the command qualifier /FULL with the /LIST qualifier to list information about files supplied by the DCL command DIRECTORY/FULL, including the number of blocks allocated for each file.

You can also perform a BACKUP list operation to list the contents of a BACKUP journal file. BACKUP journal files, which are created during a save operation by using the command qualifier /JOURNAL[=file-spec], contain on-disk records of BACKUP save operations and the file specifications of the files saved during each operation. Section 5.6 contains more information about creating and listing BACKUP journal files.

Before you can list the contents of a save set, the media containing the save set must be inserted into an appropriate drive. If the save set is stored on a disk, the disk must be mounted as a Files-11 volume or as a foreign volume. BACKUP mounts magnetic tapes automatically as part of the list operation.

The following command displays save-set information on your terminal about a magnetic tape save set named 2MAR1555. Before entering this command, the magnetic tape containing the save set was inserted into drive MTA0.

```
$ BACKUP/LIST MTA0:2MAR1555.BCK/SAVE_SET
Listing of save set(s)

Save set:          2MAR1555.BCK
Written by:       POLYANNA
UIC:              [000200,000207]
Date:             21-AUG-1988 09:36:14.68
Command:          BACKUP/LOG [USER.SAVE] MTA0:2MAR1555.BCK/REWIND/LABEL=BACKUP
Operating system: VMS version 5.0
BACKUP version:   5.0
CPU ID register:  08000000
Node name:        _SUZI:
Written on:        _MTA0:
Block size:       8192
Group size:       10
Buffer count:     3

[USER.SAVE] ANOTHER.DAT;1          1 18-AUG-1988 14:10
[USER.SAVE] LAST.DAT;1            1 18-AUG-1988 14:11
[USER.SAVE] THAT.DAT;1           7 18-AUG-1988 14:10
[USER.SAVE] THIS.DAT;2           1 18-AUG-1988 13:44

Total of 4 files, 10 blocks
End of save set
```

The following command lists save-set information about a disk save set to an output file named INFO.LIS. Before this command was entered, the disk containing the save set was mounted in drive DLA1.

```
$ BACKUP/LIST=INFO.LIS DLA1:2MAR1555.BCK/SAVE_SET
```

The following command combines a list operation with a save operation to magnetic tape:

```
$ BACKUP/LIST=MYBACK.DAT [PRAMS] MTA0:2MAR1555.BCK/LABEL=DLY201
```

BACKUP verifies that the volume label is DLY201 and copies the contents of the directory [PRAMS] to a save set named 2MAR1555.BCK. The command qualifier LIST causes BACKUP to write save-set information to the file MYBACK.DAT as the save operation proceeds.

BACKUP Description

You do not need to know the names of save sets on magnetic tape to list their contents. Enter the device specification of the drive in which the tape is inserted with the BACKUP/LIST command. BACKUP reads the next save set it encounters on the magnetic tape and stops processing when it reaches the end of that save set. BACKUP does not automatically rewind to the beginning-of-tape marker unless you include the /REWIND qualifier in your command. Therefore, you can list the next save set (if one exists) by repeating the BACKUP/LIST command.

By including the asterisk wildcard character (*) with the device specification, you can direct BACKUP to list all save sets on the tape volume, as follows:

```
$ BACKUP/LIST MTAO:*/REWIND
```

5.5 Comparing Files

A BACKUP compare operation compares a save set with disk files or compares disk files with other disk files. Perform a compare operation to check the integrity of a file or volume after a copy, save, or restore operation. For example, you can compare a save set with the original files to verify that the files were saved correctly.

There are two ways to perform a compare operation. You can either perform a compare operation in conjunction with a save, restore, copy, or list operation by specifying the command qualifier /VERIFY, or you can perform a compare operation independently of other BACKUP operations by specifying the command qualifier /COMPARE. When you specify /VERIFY, BACKUP first performs the save, restore, copy, or list operation and then compares the output with the input. When you use /VERIFY in a copy or list operation, BACKUP displays no message when it begins the compare operation. When you use /VERIFY in a save or restore operation, BACKUP displays the following message when it begins the compare operation:

```
%BACKUP-I-STARTVERIFY, starting verification pass
```

Use the compare operation to compare a save set with original files or to compare files or volumes copied using BACKUP with original files. Because BACKUP processes files by blocks, comparing files not produced by BACKUP is likely to cause mismatch errors in files that are apparently identical.

The following example compares a save set on tape with files on disk. The command directs BACKUP to compare the contents of the save set 2MAR1555.BCK with the directory [LYKINS].

```
$ BACKUP/COMPARE MTAO:2MAR1555.BCK [LYKINS]
```

The following example compares files on disk; note the inconsistency in block 16 between UPLIFT.EXE;4 and UPLIFT.EXE;3:

```
$ BACKUP/COMPARE UPLIFT.EXE;3 UPLIFT.EXE;4
%BACKUP-E-VERIFYERR, verification error for block 16 of
WRKD$: [LYKINS]UPLIFT.EXE;4
```

To compare two entire Files-11 volumes, use an image compare operation, as follows:

```
$ BACKUP/IMAGE/COMPARE DBA1: DBA2:
```

BACKUP Description

To compare a physical save set with a Files-11 volume, use a physical compare operation, as follows. Any disks in a physical compare operation must be mounted as foreign volumes.

```
$ MOUNT/PHYSICAL DBA2:  
$ BACKUP/PHYSICAL/COMPARE MTA0:PHYSBACK.BCK/LABEL=PHYS DBA2:
```

The following example combines a compare operation with a copy operation:

```
$ BACKUP/VERIFY/LOG FRED.DAT [FRIENDS]OLDFRED.DAT  
%BACKUP-S-CREATED, created DISK$: [FRIENDS]OLDFRED.DAT;3  
%BACKUP-S-COMPARED, compared DISK$: [FRIENDS]OLDFRED.DAT;3
```

The preceding compare operation found no inconsistencies.

5.6 Creating and Listing BACKUP Journal Files

A BACKUP journal file contains records of BACKUP save operations and the file specifications of the files saved during each operation. Use the command qualifier `/JOURNAL=[file-spec]` in a BACKUP save operation to create a journal file.

To list the contents of a BACKUP journal file, enter a command in the following format:

```
BACKUP/LIST[=file-spec]/JOURNAL[=file-spec]
```

You cannot specify an input or output specifier with a BACKUP/LIST/JOURNAL command. If the file specification is from the command qualifier `/LIST`, output is directed to your terminal; if the file specification is omitted from the command qualifier `/JOURNAL`, the default BACKUP journal file (`SYS$DISK:[J]BACKUP.BJL`) is used.

For more information about creating and listing BACKUP journal files, see the description of the `/JOURNAL` qualifier.

6 Standalone BACKUP

Standalone BACKUP is a subset of the Backup Utility that is bootstrapped into main memory instead of running under the control of the VMS operating system. You can bootstrap standalone BACKUP from console media or from a Files-11 disk. The installation and operations guide for your VAX processor describes how to build a standalone BACKUP kit and bootstrap standalone BACKUP from the console medium. This section describes how to build a standalone BACKUP kit on a Files-11 disk and contains an example of a standalone BACKUP operation.

DIGITAL recommends that you use standalone BACKUP to save and restore the system disk. This is because files open for system write access will not be saved completely if you use online BACKUP to save and restore the system disk.

Standalone BACKUP employs a subset of BACKUP qualifiers and only performs image and physical operations. Before using standalone BACKUP, read the descriptions of the command qualifiers `/IMAGE` and `/PHYSICAL`.

You cannot specify the command qualifier `/NOASSIST` when using standalone BACKUP.

BACKUP Description

If you do not specify a device name in the input or output specifier of a standalone BACKUP operation, BACKUP uses the device from which you bootstrapped standalone BACKUP.

In a standalone BACKUP image operation, like an online BACKUP image operation, if the output volume is a disk, all files on the output volume are stored contiguously. Contiguous storage of files eliminates disk fragmentation and creates contiguous free blocks of disk space.

Before you bootstrap standalone BACKUP from a Files-11 disk, you must have executed the SYS\$UPDATE:STABACKIT.COM command procedure to create a standalone BACKUP kit on the disk. You must have the user privileges BYPASS, CMKRNL, CMEXEC, LOG_IO, SYSNAM, VOLPRO, and OPER (or the user privilege SETPRV) to execute STABACKIT.COM.

STABACKIT.COM prompts you for a target device and places the files in directories [SYSn.SYSEXE] and [SYSn.SYS\$LDR] on the target device. The target device can be either a system disk or a user disk. If the directories [SYSn.SYSEXE] and [SYSn.SYS\$LDR] do not already exist on the target device, STABACKIT.COM creates the directories. STABACKIT.COM lists the standalone BACKUP files at your terminal as they are copied.

The following example creates a standalone BACKUP kit on the system disk of node MANDY (the logical name for the system disk is SYS\$SYSDEVICE):

```
$ SET DEFAULT SYS$UPDATE
$ @STABACKIT

Enter the name of the device on which to build the kit: SYS$SYSDEVICE

Sysgen parameters for standalone VMS have been placed in file
  SYS$SYSROOT:[SYSUPD]VAXVMSSYS.PAR-TEMP-00000033;1
%CREATE-I-EXISTS, STA$TARGET already exists
%COPY-S-COPIED, SYS$SYSROOT:[SYSEXE]STASYSGEN.EXE;1 copied to
  _MANDY$DUAO:[SYSE.SYSEXE]SYSINIT.EXE;1 (79 blocks)
%COPY-S-COPIED, SYS$SYSROOT:[SYSEXE]SYSBOOT.EXE;1 copied to
  _MANDY$DUAO:[SYSE.SYSEXE]SYSBOOT.EXE;1 (91 blocks)
%COPY-S-COPIED, SYS$SYSROOT:[SYSUPD]VAXVMSSYS.PAR-TEMP-00000033;1 copied
  to _MANDY$DUAO:[SYSE.SYSEXE]VAXVMSSYS.PAR;1 (15 blocks)
%SET-I-ENTERED, DUAO:[000000]SYSDIR;1 entered as
  _MANDY$DUAO:[SYSE]SYSCOMMON.DIR;1
%COPY-S-COPIED, SYS$SYSROOT:[SYSEXE]STABACKUP.EXE;1 copied to
  _MANDY$DUAO:[SYSE.SYSEXE]STANDALON.EXE;1 (409 blocks)
%DELETE-I-FILDEL, SYS$SYSROOT:[SYSUPD]VAXVMSSYS.PAR-TEMP-00000033;1
  deleted (16 blocks)

Ending time 17-SEP-1988 16:22:00.85
Starting time 17-SEP-1988 16:21:13.36

The kit is complete.
```

The installation and operations guide for your processor contains instructions for bootstrapping standalone backup.

If your system has at least two megabytes of memory, you can perform more than one standalone BACKUP operation without rebooting standalone BACKUP between operations. The following example bootstraps standalone BACKUP on a MicroVAX II system from a disk named DUA0, saves the contents of DUA0 to a magnetic tape in drive MUA0, and restores the image save set from the MUA0 to DUA0:

BACKUP Description

>>> B/E0000000 DUA0:

%BACKUP-I-IDENT, Stand-alone BACKUP V5.0; the date is 29-DEC-1989 15:22:35.53

\$ BACKUP/IMAGE/VERIFY DUA0: MUA0:FULLBACK.BCK/REWIND/LABEL=DEC29

%BACKUP-I-NOBACKUP, DUA0:[SYSO.SYSEXE]PAGEFILE.SYS;1 data not copied, file marked NOBACKUP

%BACKUP-I-NOBACKUP, DUA0:[SYSO.SYSEXE]SWAPFILE.SYS;1 data not copied, file marked NOBACKUP

%BACKUP-I-STARTVERIFY, starting verification pass

%BACKUP-I-PROCDONE, Operation completed. Processing finished at 29-DEC-1989 16:34:45.20

If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do want to perform another standalone BACKUP operation,
ensure the standalone application volume is online and ready.

Enter "YES" to continue: YES

%BACKUP-I-IDENT, Stand-alone BACKUP V5.0; the date is 29-DEC-1989 15:22:35.53

\$ BACKUP/IMAGE/VERIFY MUA0:FULLBACK.BCK/REWIND/LABEL=DEC29 DUA0:

You can use the following qualifiers with standalone BACKUP:

Command Qualifiers

Command Qualifiers	Default
/BRIEF	/BRIEF
/BUFFER_COUNT	/BUFFER_COUNT=3
/COMPARE	None
/FULL	/BRIEF
/IMAGE	/IMAGE
/[NO]INITIALIZE	See text
/LIST[=filespec]	See text
/[NO]LOG	/NOLOG
/PHYSICAL	None
/RECORD	None
/[NO]TRUNCATE	/NOTRUNCATE
/VERIFY	None
/VOLUME=n	None

Input Save-Set Qualifiers

Input Save-Set Qualifiers	Default
/[NO]CRC	/CRC
/[NO]REWIND	/NOREWIND
/SAVE_SET	None

Output Save-Set Qualifiers

Output Save-Set Qualifiers	Default
/BLOCK_SIZE=n	See text
/BY_OWNER=[uic]	See text
/COMMENT=string	None
/[NO]CRC	/CRC
/DENSITY=n	See text
/GROUP_SIZE=n	/GROUP_SIZE=10
/LABEL=(string[,...])	See text
/PROTECTION[=(code)]	See text
/[NO]REWIND	/NOREWIND
/SAVE_SET	None
/TAPE_EXPIRATION	Tomorrow

7 **BACKUP Fatal Error Options**

If, in the course of writing a save set to tape, the Backup Utility or standalone BACKUP encounters fatal hardware or media-related errors or encounters more media errors than considered reasonable for data reliability, BACKUP generates the following informational message and prompt:

```
%BACKUP-I-SPECIFY, specify option (CONTINUE, RESTART, QUIT)
BACKUP>
```

If BACKUP is running interactively and you used the command qualifier /NOASSIST, enter an option in response to the BACKUP> prompt. If BACKUP is executing as a batch job or you specified the command qualifier /ASSIST, the operator must use the DCL command REPLY to enter an option.

If the output volume is the first volume in the BACKUP operation, only QUIT and CONTINUE are available as valid recovery options. (For the first volume, RESTART would be equivalent to beginning the BACKUP operation again.) If the output volume is a subsequent volume in the BACKUP operation, the RESTART option is also available.

If you select the CONTINUE option, BACKUP ignores the error and continues processing. Use the CONTINUE option only if the position of the magnetic tape has not changed since the original error and if the error does not imply that data has already been lost. By choosing the CONTINUE option, however, you may compromise data reliability.

If you select the QUIT option, the BACKUP operation terminates and must be restarted from the beginning.

If you select the RESTART option, BACKUP unloads the current tape from the drive and prompts for a replacement volume. After a new magnetic tape is loaded, BACKUP restarts the save operation from where it was when the original reel was mounted.

The following example illustrates the sequence of events that occurs when BACKUP encounters an excessive rate of media errors on Volume 3 and you choose the RESTART option:

- 1** BACKUP notices that the magnetic tape has an excessive number of media errors and displays the following error message and prompt:

```
%BACKUP-F-WRITEERRS, excessive error rate writing 'tape-drive-name'
%BACKUP-I-SPECIFY, specify option (CONTINUE, RESTART, QUIT)
BACKUP>
```

- 2** You choose the RESTART option.
- 3** BACKUP dismounts Volume 3 and prompts for a new tape. Remove Volume 3 from the drive and discard this tape.
- 4** Place a new tape in the drive and enter YES in response to the prompt for a new tape.
- 5** BACKUP restarts the save operation from the beginning of Volume 3; no data is lost.

BACKUP Usage Summary

By duplicating files or volumes of files, the Backup Utility (BACKUP) protects data from loss or corruption.

BACKUP is intended for use primarily by system managers and operators to protect public media. However, anyone can use BACKUP to make personal BACKUP copies and to transport files between VMS systems.

Standalone BACKUP is a version of the Backup Utility that is bootstrapped into main memory instead of running under the control of the VMS operating system. Standalone BACKUP uses a subset of BACKUP qualifiers to perform image and physical BACKUP operations.

FORMAT **BACKUP** *input-specifier output-specifier*

PARAMETERS *input specifier*

Specifies the input for the BACKUP operation. The input specifier can be a standard VMS file specification, a BACKUP save-set specification, or a device name. If the input specifier is a save-set specification on disk, it must include the input save-set qualifier /SAVE_SET.

DECnet-VAX node names are allowed only in save-set specifications.

Wildcards are permitted in standard VMS file specifications and in save-set specifications if they are on magnetic tape.

output specifier

Specifies the output for the BACKUP operation. The output specifier, like the input specifier, can be either a standard VMS file specification, a BACKUP save-set specification, or a device name. If the output specifier is a save set on disk, it must include the output save-set qualifier /SAVE_SET.

DECnet-VAX node names are allowed only in save-set specifications.

You can use wildcard characters if the output specifier is a Files-11 volume. You cannot use wildcard characters if the output specifier is a BACKUP save set or a volume created by a BACKUP/PHYSICAL or BACKUP/IMAGE operation. Refer to Section 2.2 for restrictions on the use of wildcard characters in BACKUP commands.

usage summary

To invoke online BACKUP, enter an appropriate BACKUP command at the DCL prompt. For instructions on invoking standalone BACKUP, refer to Section 6.

When you enter a BACKUP command, BACKUP evaluates the input and output specifier and qualifiers to determine the type of operation to perform. BACKUP uses the input specifier to locate the input to the utility and directs output to the output specifier, which can be a file or a save set on disk or a save set on magnetic tape.

BACKUP Usage Summary

After executing the command, BACKUP returns to DCL command level. If you want to halt the execution of a BACKUP command prematurely, press CTRL/Y. If BACKUP is creating a file when you press CTRL/Y, the file is closed immediately and only partially created.

You need the user privilege TMPMBX to send messages to operator terminals when using BACKUP in batch mode. If you are performing a save operation to a volume set of sequential disks, you must have the user privilege PHY_IO or LOG_IO to write to a continuation volume. The use of several BACKUP qualifiers also requires privileges; these are noted in the appropriate qualifier descriptions.

BACKUP

BACKUP Qualifiers

BACKUP QUALIFIERS

This section provides detailed descriptions of each BACKUP qualifier and includes examples. Each qualifier description identifies the qualifier type.

BACKUP has five types of qualifiers: command qualifiers, input file-selection qualifiers, input save-set qualifiers, output file qualifiers, and output save-set qualifiers, as follows:

- **Command qualifiers** allow you to modify the default action of a BACKUP command. You can place command qualifiers anywhere in the command line. Command qualifiers act upon every file in the input or output specifier.
- **Input file-selection qualifiers** select files from the input specifier. Place them immediately after the input specifier.
- **Input save-set qualifiers** affect the way BACKUP handles an input save set during a restore operation. Place them immediately after the input specifier.
- **Output file qualifiers** change the way output files are restored. Place them immediately after the output specifier.
- **Output save-set qualifiers** affect the way BACKUP processes an output save set during a save operation. Place them immediately after the output specifier.

Note: You cannot use input and output qualifiers in image operations.

/ASSIST

Command Qualifier

Allows operator or user intervention if a request to mount a magnetic tape fails during a BACKUP operation.

FORMAT **/[NO]ASSIST** *input-specifier output-specifier*

DESCRIPTION

The /ASSIST qualifier causes BACKUP to send messages to operator terminals when a failure occurs during a BACKUP mount request for a magnetic tape. BACKUP sends messages to operator terminals enabled to receive TAPES and CENTRAL messages. (See the description of the REPLY command in the *VMS DCL Dictionary* for information about enabling and disabling operator terminals.) If a failure occurs, the operator can either abort the operation or correct the error condition and allow the operation to continue.

If no operator terminal is enabled to receive TAPES and CENTRAL messages and to respond to a mount assist request, a message is displayed informing the user of the situation. If a volume is placed in the requested drive, no additional operator response is necessary. Any operator reply to a mount request is written to SYS\$OUTPUT. When BACKUP is run interactively, SYS\$OUTPUT is the user's terminal. When BACKUP is run in batch mode, SYS\$OUTPUT is the batch job log file.

If you specify /NOASSIST, mount messages appear on your terminal and are not sent to the operator.

The default is /ASSIST. Specifying /NOASSIST when BACKUP is run in batch mode has no effect.

EXAMPLE

```
$ BACKUP/NOASSIST [PAYROLL]*.*;* MTA1:PAYROLL.BCK/LABEL=WKY101
```

This command mounts the volume labeled WKY101 on the MTA1 tape drive and copies all files in the [PAYROLL] directory to a save set named PAYROLL.BCK. The /NOASSIST qualifier directs BACKUP to send mount messages to your terminal rather than to the operator terminal. The WKY101 label indicates that WKY101 is a weekly BACKUP tape in group 1, volume number 01. (If the volume label of the tape is not WKY101, you can direct BACKUP to write the save set to the tape by choosing the OVERWRITE option at the BACKUP> prompt.)

BACKUP

/BACKUP

/BACKUP

Input File-Selection Qualifier

Selects files according to the BACKUP date written in the file header record by the BACKUP/RECORD command.

FORMAT *input-specifier/BEFORE=time/BACKUP output-specifier*
input-specifier/SINCE=time/BACKUP output-specifier

DESCRIPTION The /BACKUP qualifier is valid with Files-11 Structure Level 2 volumes only and must be used with either the /BEFORE or /SINCE qualifier. You cannot use /BACKUP with the /CREATED, /MODIFIED, or /EXPIRED qualifiers, in an image operation or in a physical operation.

/BACKUP selects files by comparing the date and time recorded in the BACKUP field of the file header record with the date and time specified with the /BEFORE or /SINCE qualifier. The date and time recorded in the file header record is the date and time the file was last saved or copied using the /RECORD command qualifier.

When you use /BACKUP with /BEFORE, files with a BACKUP date prior to the specified date or time are selected. Files with no BACKUP date (/RECORD was not specified when the file was saved or copied) are also selected.

When you use /BACKUP with /SINCE, files with a BACKUP date equal to or later than the specified date or time are selected. Files with no BACKUP date (/RECORD was not specified when the file was saved or copied) are also selected.

EXAMPLES

1 \$ BACKUP/RECORD
 _FROM: [PAYROLL]*.*;*/BEFORE=01-SEP-1988/BACKUP
 _TO: MTA1:SEP01.BCK

In this command, the /BACKUP qualifier combined with the /BEFORE qualifier saves all versions of all files in the directory [PAYROLL] that have a BACKUP date written before September 1, 1988. The command qualifier /RECORD writes the date and time of the save operation to the file header record of each saved file.

2 \$ BACKUP [ACCOUNTS...]/SINCE=YESTERDAY/BACKUP MTA1:ACC.BCK

In this command, the /BACKUP qualifier combined with the /SINCE qualifier saves all files in all subdirectories of [ACCOUNTS] that have a BACKUP date written since yesterday (24 hours before midnight last night). The command qualifier /RECORD writes the date and time of the save operation to the file header record of each saved file.

/BEFORE

Input File-Selection Qualifier

Selects files dated earlier than the date and time you specify.

FORMAT *input-specifier/BEFORE=time output-specifier*

DESCRIPTION The /BEFORE qualifier selects files by comparing the date and time in the specified field of each file header record with the date and time you specify in the command line. The following list shows the other input file-selection qualifiers you can use with /BEFORE and their functions. Use only one of these other qualifiers at a time in your command line.

- /BACKUP Selects files last saved or copied by BACKUP/RECORD before the date specified. Also selects files with no BACKUP date.
- /CREATED Selects files created before the date specified.
- /EXPIRED Selects files that have expired as of the date specified.
- /MODIFIED Selects files last modified before the date specified. If you specify /BEFORE without another qualifier, /MODIFIED is used by default.

Specify the date and time as a delta time or as an absolute time using the format [dd-mmm-yyyy[:]][hh:mm:ss.cc]. You can also use one of the following reserved words to specify the date and time:

- BACKUP The BACKUP date of the file written by a previous BACKUP/RECORD operation (available only on Files-11 Structure Level 2 volumes)
- TODAY The current day, month, and year at 00:00:00.0 o'clock
- TOMORROW 24 hours after midnight last night
- YESTERDAY 24 hours before midnight last night

The /BEFORE qualifier is not valid in incremental restore operations.

EXAMPLE

```
$ BACKUP [POLICIES]*.*;*/BEFORE=TODAY/EXPIRED DMA1:OLDPOL.BCK/SAVE_SET
```

This command saves all files in the directory [POLICIES] that have expiration dates preceding today's date.

BACKUP

/BLOCK_SIZE

/BLOCK_SIZE

Output Save-Set Qualifier

Specifies the output block size in bytes for data records in a BACKUP save set.

FORMAT *input-specifier output-save-set-spec/BLOCK_SIZE=n*

DESCRIPTION The minimum block size is 2048 bytes; the maximum block size is 65,024 bytes. The actual block size written is adjusted using the constraints of the BACKUP format. The block size cannot be rounded up over the maximum block size.

If you specify /BLOCK_SIZE in a magnetic tape save operation, BACKUP ignores any block size defined by the /BLOCK_SIZE qualifier to the DCL command MOUNT.

If the block size is set to a large value for a save set on magnetic tape, it is possible for the magnetic tape to run off its reel or for a large number of write errors to be logged. If this occurs, avoid using large block sizes. If the problem recurs with the same magnetic tape, avoid using that tape for future BACKUP operations.

The default block size for magnetic tape is 8192 bytes; the default for disk is 32,256 bytes.

EXAMPLE

```
$ BACKUP/RECORD DRA2: [LEE...]/SINCE=BACKUP MTA0:SAVEWORK.BCK/BLOCK_SIZE=10000
```

This command saves a directory tree on DRA2 to a magnetic tape mounted on drive MTA0. The input file-selection qualifiers /SINCE and /BACKUP instruct BACKUP to process only those files in the specified directory tree that have been modified since the last BACKUP/RECORD operation. The output save-set qualifier /BLOCK_SIZE directs BACKUP to assign a block size of 10,240 (BACKUP rounds the specified block size of 10,000 up to the next multiple of 512).

/BRIEF

Command Qualifier

Lists the file specification, size, and creation date for each file in the save set. (The size listed is the actual size of the file saved, rather than the number of blocks allocated to the file.) The /BRIEF qualifier is valid only with the /LIST qualifier and is the default format for BACKUP listings. Specify the /FULL qualifier to list information provided by the DCL command DIRECTORY/FULL.

FORMAT **/LIST/BRIEF** *save-set-spec*

EXAMPLE

```
$ BACKUP/LIST/BRIEF DBA2:[SAVE]23MAR88.BCK/SAVE_SET
```

Listing of save set(s)

```
Save set:          23MAR88.BCK
Written by:        MOROCI
UIC:               [000200,000200]
Date:              23-MAR-1988 14:18:16.96
Command:           BACKUP [SAVE] DBA2:[SAVE]23MAR88.BCK/SAVE_SET
Operating system:  VAX/VMS version 5.0
BACKUP version:    V5.0
CPU ID register:   08000000
Node name:         _SUZI::
Written on:        _DBA2:
Block size:        32,256
Group size:        10
Buffer count:      3
```

```
[SAVE]LAST.DAT;1      1 18-AUG-1987 14:11
[SAVE]INFO.TXT;4     5  4-FEB-1988 13:12
[SAVE]WORK.DAT;3    33  1-DEC-1987 10:02
```

Total of 3 files, 39 blocks

End of save set

This command lists the BACKUP summary information and the file name, size, and creation date for each file in the save set. Note that the input save-set qualifier /SAVE_SET is required to identify the input specifier as a save set on a Files-11 medium.

BACKUP

/BUFFER_COUNT=n

/BUFFER_COUNT=n

Command Qualifier

Specifies the number of I/O buffers to be used in the BACKUP operation.

FORMAT

/BUFFER_COUNT=n *input-specifier output-specifier*

DESCRIPTION

The **/BUFFER_COUNT** qualifier is supported for save, compare, and restore operations that use streaming tape drives. The default value for this qualifier is 3; the maximum valid buffer count is 5. A buffer count larger than the default may improve performance when you are working with streaming tape drives.

EXAMPLE

```
$ BACKUP/BUFFER_COUNT=4/IMAGE DBAO: MUAO:SAVE.BCK
```

This command performs an image save operation using a pool of four I/O buffers.

/BY_OWNER

Input File-Selection Qualifier

Selects files for processing according to the user identification code (UIC).

FORMAT *input-specifier/BY_OWNER[=[uic]] output-specifier*

DESCRIPTION If you specify /BY_OWNER without a UIC, BACKUP selects all files whose UIC matches that of the current process.

Specify either a numeric UIC as octal numbers or an alphanumeric UIC in the form [g,m]. Wildcards are permitted. Note that the brackets are required.

[g,m]

g An octal number in the range 0 through 37776 representing the group number or an alphanumeric group name

m An octal number in the range 0 through 177776 representing the member number or an alphanumeric member name

If you do not specify /BY_OWNER, BACKUP processes all files specified by the input specifier.

EXAMPLES

1 \$ BACKUP [SNOW...]/BY_OWNER MT\$DRIVE:SNOW.BCK/LABEL=TAPE01

In this example, BACKUP mounts the tape with the label TAPE01 on drive MT\$DRIVE and saves all files in the directory and subdirectories of [SNOW] with the UIC of the current default process to the save set SNOW.BCK.

2 \$ BACKUP [SUNDANCE]/BY_OWNER=[727,46] DBA1:STABLE.BCK/SAVE_SET

In this example, all files in the directory [SUNDANCE] with an owner UIC of [727,46] are saved to the sequential-disk save set STABLE.BCK on DBA1.

BACKUP

/BY_OWNER

/BY_OWNER

Output File Qualifier

Redefines the owner user identification code (UIC) for restored files.

FORMAT *input-specifier output-specifier/BY_OWNER[=option]*

DESCRIPTION The following are available options:

default	Sets the owner UIC to the user's current default UIC. This option is the default if the /BY_OWNER qualifier is not specified, except in image and incremental restore operations, when ORIGINAL is the default option.
ORIGINAL	Retains the owner UIC of the file being restored. This option is the default if the /BY_OWNER qualifier is specified, but no option is selected. This option is also the default for incremental restore operations. To use this option, the UIC must be yours, or you must have the SYSPRV user privilege or be the owner of the output volume.
PARENT	Sets the owner UIC to the owner UIC of the directory to which the file is being restored or copied. To use this option, the parent UIC must be yours, or you must have the SYSPRV user privilege or be the owner of the output volume.
[uic]	Sets the owner UIC to the UIC specified. Use the [g,m] format (as described in the input file-selection qualifier /BY_OWNER). To use this option, the UIC must be yours, or you must have the SYSPRV user privilege or be the owner of the output volume.

In restore operations where the command qualifier /IMAGE or /INCREMENTAL is specified, the default is /BY_OWNER=ORIGINAL.

EXAMPLE

```
$ BACKUP DBA2:ACCOUNTS.BCK/SAVE_SET [CLEAVER...]/BY_OWNER=PARENT
```

In this example, the sequential-disk save set ACCOUNTS.BCK is restored to the directory tree [CLEAVER...], assigning each restored file the owner UIC of the [CLEAVER] directory.

/BY_OWNER

Output Save-Set Qualifier

Specifies the owner user identification code (UIC) of the save set.

FORMAT *input-specifier output-save-set-spec/BY_OWNER=*uic**

DESCRIPTION If the /BY_OWNER qualifier is omitted, the UIC of the current process is used. To use this qualifier on Files-11 save sets, you need the user privilege SYSPRV, or the UIC must be your own.

Specify either a numeric UIC as octal numbers or an alphanumeric UIC in the form [g,m]. Wildcards are permitted. Note that the brackets are required.

[g,m]

g An octal number in the range 0 through 37776 representing the group number or alphanumeric group name

m An octal number in the range 0 through 17776 representing the member number or alphanumeric member name

EXAMPLE

\$ BACKUP [CLEAVER...] MFA2:ACCOUNTS.BCK/BY_OWNER=[3,3]/LABEL=TAPE01

In this example, BACKUP mounts the tape with the label TAPE01 on drive MFA2. Next, BACKUP saves the directory tree [CLEAVER...] to a save set named ACCOUNTS.BCK. The output save-set qualifier /BY_OWNER assigns an owner UIC of [3,3] to the save set.

BACKUP

/COMMENT

/COMMENT

Output Save-Set Qualifier

Places a comment in an output save set. If the comment string is longer than one word or if it contains nonalphanumeric characters, it must be enclosed in quotation marks ("). A comment can contain up to 1024 characters.

FORMAT *input-specifier output-save-set-spec /COMMENT=string*

EXAMPLE

```
$ MOUNT/FOREIGN DMA1:
$ BACKUP [REMARKS] DMA1:20JULREM.BCK/SAVE_SET -
_$ /COMMENT="Remote operations for July 20, 1988"
$ BACKUP/LIST DMA1:20JULREM.BCK/SAVE_SET
Listing of save set

Save set:          20JULREM.BCK
Written by:        WALRUS
UIC:               [360,054]
Date:              20-JUL-1988 14:22:06.62
Command:           BACKUP [REMARKS] DMA1:20JULREM.BCK/SAVE_SET/COMMENT=Remote
operations for July 20, 1988
Operating system:  VMS Version V5.0
BACKUP version:    V4
CPU ID register:   0138084C
Node name:         _ABBEY::
Written on:        _ABBEY$DMA1:
Block size:        32256
Group size:        10
Buffer count:      3

[REMARKS]BAC.RES;1          2  30-JUL-1988 14:13
[REMARKS]COM.LIS;1         1  30-JUL-1988 14:04
[REMARKS]DTOP.DIR;1        1  30-JUL-1988 14:18
.
.
.
Total of 40 files, 535 blocks
End of save set
```

The first BACKUP command saves the directory [REMARKS] to a sequential-disk save set and records a comment. The BACKUP/LIST command displays the contents of the newly created save set. Note that the /SAVE_SET qualifier is required when creating a save set on disk.

/COMPARE

Command Qualifier

Compares the save set, device, file, or files specified by the first parameter with the contents of the Files-11 device, file, or files specified by the second parameter and displays an error message if it finds a difference.

FORMAT

/COMPARE *file-spec file-spec*
/COMPARE *save-set-spec file-spec*
/IMAGE/COMPARE *device-spec device-spec*
/PHYSICAL/COMPARE *device-spec device-spec*

DESCRIPTION

In a BACKUP compare operation, the first parameter can be a Files-11 file or a wildcard character representing a set of files, a BACKUP save set on disk or magnetic tape, a tape device, or a disk device. The second parameter must be a Files-11 disk file, a wildcard character representing a set of files or a Files-11 disk device, unless you specify the command qualifier **/PHYSICAL**. When you specify **/PHYSICAL**, and the first parameter specifies a disk device, both disks in the compare operation must be mounted with the **/FOREIGN** qualifier.

BACKUP displays the following error message if it encounters a difference between files it compares:

```
%BACKUP-E-VERIFYERR, verification error for . . .
```

Use the **/COMPARE** qualifier to compare a save set with original files or to compare files or volumes copied using BACKUP with original files. Because BACKUP processes files by blocks, comparing files not produced by BACKUP is likely to cause mismatch errors in files that are apparently identical.

If you do not specify a version number with the file specification, the default is **;* (the asterisk wildcard character)**, which processes all versions of the file.

Both parameters in a compare operation are input specifiers.

If you are comparing two entire Files-11 volumes, use an image compare operation, as follows:

```
$ BACKUP/IMAGE/COMPARE DBA1: DBA2:
```

You cannot use the command qualifier **/DELETE** or **/RECORD** in compare operations.

Do not perform compare operations on files that were restored or copied using the output file qualifier **/NEW_VERSION** because this qualifier causes version numbers to change.

BACKUP /COMPARE

EXAMPLES

1 \$ BACKUP/COMPARE JAZZ.DAT BLUES.DAT

This example compares two Files-11 files. Since no version number is specified, BACKUP compares all versions of each file.

2 \$ BACKUP/COMPARE/IMAGE MTAO:SWING.BCK DBA2:

This example compares an image save set stored on magnetic tape and a Files-11 volume.

/CONFIRM

Input File-Selection Qualifier

Displays prompts on your terminal for confirmation before processing each file. If you want the file to be processed, enter Y or YES and press RETURN.

FORMAT *input specifier/CONFIRM output specifier*

EXAMPLE

```
$ BACKUP *.LIS/CONFIRM/LOG DLA2:LIST.BCK/SAVE_SET
DISK$DEFAULT:[WONDER]CRE.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRE.LIS;1
DISK$DEFAULT:[WONDER]CRETIME.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRETIME.LIS;1
DISK$DEFAULT:[WONDER]EXC.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]EXC.LIS;1
DISK$DEFAULT:[WONDER]REB.LIS;1, copy? (Y or N): N
DISK$DEFAULT:[WONDER]SETREB.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]SETREB.LIS;1
DISK$DEFAULT:[WONDER]VERS.LIS;1, copy? (Y or N): N
```

\$

This command locates all files with a file type of LIS and prompts for confirmation before saving each file to LIST.BCK on DLA2. The command qualifier /LOG displays information about each file as it is processed. Note that the output save-set qualifier SAVE_SET qualifier is required when creating a save set on disk.

BACKUP

/CRC

/CRC

Input Save-Set Qualifier

Specifies that the software Cyclic Redundancy Check (CRC) is to be performed.

FORMAT *input-save-set-spec/[NO]CRC output-specifier*

DESCRIPTION The default is /CRC. To disable CRC checking, specify /NOCRC; note that use of /NOCRC reduces processing time but increases the risk of data error.

EXAMPLE

```
$ BACKUP MTA2:928SAVE.BCK/NOCRC []
```

This command restores the save set 928SAVE.BCK to the current default directory, indicated by ([]); the input save-set qualifier /NOCRC disables Cyclic Redundancy Checking.

/CRC

Output Save-Set Qualifier

Specifies whether the software Cyclic Redundancy Check (CRC) is to be computed and stored in the data blocks of the output save set.

FORMAT *input-specifier output-save-set-spec/[NO]CRC*

DESCRIPTION The default is /CRC. To disable checking, use /NOCRC; note that use of /NOCRC reduces processing time but increases the risk of data error.

EXAMPLE

\$ BACKUP/RECORD []/SINCE=BACKUP MTA2:928SAVE.BCK/NOCRC

This command saves all files in the current default directory that have been created or modified since the last BACKUP/RECORD operation to the save set 928SAVE.BCK; the output save-set qualifier /NOCRC disables Cyclic Redundancy Checking.

BACKUP

/CREATED

/CREATED

Input File-Selection Qualifier

Selects files according to the value of the creation date field in each file header record.

FORMAT *input-specifier*/**BEFORE=time**/**CREATED** *output-specifier*
input-specifier/**SINCE=time**/**CREATED** *output-specifier*

DESCRIPTION You must use either the /BEFORE qualifier or the /SINCE qualifier with /CREATED. The date and time you specify to /BEFORE or /SINCE determine which files should be processed.

You cannot use /CREATED with the /BACKUP, /MODIFIED, or /EXPIRED qualifiers.

EXAMPLE

```
$ BACKUP *.GNC/SINCE=YESTERDAY/CREATED DLA2:[SAVEDIR]/SAVE_SET
```

The command in this example saves all files with a file type of GNC created since yesterday (24 hours before midnight last night).

/DELETE

Command Qualifier

Specifies that a BACKUP save or copy operation is to delete the selected input files from the input volume after all files have been processed.

FORMAT **/DELETE** *file-spec save-set-spec*

DESCRIPTION The **/DELETE** qualifier is valid only when used in a BACKUP save or copy operation. You must have sufficient privilege to delete files; if you do not, files protected against deletion are not deleted. If you use the command qualifier **/VERIFY** with **/DELETE**, files that fail verification are not deleted.

You cannot use **/DELETE** with the **/RECORD** or **/COMPARE** command qualifiers.

EXAMPLES

1 \$ BACKUP/DELETE BOP.DAT MTA0:BOP.BCK/LABEL=DANCE

In this example, the file BOP.DAT will be deleted after the save set BOP.BCK is successfully created on MTA0.

2 \$ BACKUP/VERIFY/DELETE RAY.DAT,JOE.DAT,ELLA.DAT MTA0:OSCAR.BCK/LABEL=FRIEND

BACKUP deletes the selected list of files in this example after saving them to OSCAR.BCK on MTA0 and comparing the output save set with the input files. If BACKUP detects a difference between the contents of the output save set and the input file, the input file is not deleted.

BACKUP

/DENSITY

/DENSITY

Output Save-Set Qualifier

Specifies the recording density of the output magnetic tape in bits per inch (bpi). The output save-set qualifier /REWIND is required if you specify /DENSITY.

FORMAT *input-specifier output-save-set-spec/DENSITY=n*

DESCRIPTION The value you specify must be supported by your magnetic tape hardware. If you omit this qualifier, the default density is the current density on the output tape drive.

The /DENSITY qualifier is incompatible with the output save-set qualifier /NOREWIND. You must specify the output save-set qualifier /REWIND to initialize the magnetic tape when using the /DENSITY qualifier. When you specify /DENSITY/REWIND, BACKUP rewinds the tape to the beginning-of-tape. Then BACKUP initializes the tape with the new density, removing access to all data that previously resided on the tape.

EXAMPLE

\$ BACKUP *.PAS MTA2:SAVEPAS.BCK/DENSITY=1600/REWIND/LABEL=PASCAL

The magnetic tape on drive MTA2 is initialized. All files with a file type of PAS in the current default directory are saved to the save set SAVEPAS.BCK. The /DENSITY qualifier sets the recording density to 1600 bpi.

/EXCLUDE

Input File-Selection Qualifier

Excludes files that otherwise meet the selection criteria for a save operation. The excluded files are not processed.

FORMAT *input-specifier/EXCLUDE=(file-spec[,...]) output-specifier*

DESCRIPTION If you specify more than one file, separate the file specifications with commas and enclose the list in parentheses. Do not use a device specification when you define the files to be selected. You can use most standard wildcard characters, but you cannot use wildcard characters denoting latest versions of files (;) or relative versions of files (;-n).

Note that BACKUP does not apply temporary file specification defaults within the list. Each file specification independently takes its defaults from the file specification [000000 . . .]*.*;*

If you specify directory files (files with the file type DIR), your command is processed but the directory files are not excluded (they are processed). BACKUP uses directory files to facilitate incremental restore operations.

EXAMPLE

```
$ BACKUP
_FROM: DRA2:[CONTRACTS]/BEFORE=TODAY/EXCLUDE=(*.OBJ,*.MAI)
_TO: MFA0:CONTRACT.BCK/LABEL=DLY102
```

All files in the directory [CONTRACTS] that have a modification date prior to today (the current day, month, and year at 00:00:00.0 o'clock) are saved to the save set CONTRACT.BCK on drive MFA0, except for those with a file type of OBJ or MAI.

BACKUP

/EXPIRED

/EXPIRED

Input File-Selection Qualifier

Selects files according to the value of the expiration date field in each file header record.

FORMAT *input-specifier/BEFORE=time /EXPIRED output-specifier*
input-specifier/SINCE=time /EXPIRED output-specifier

DESCRIPTION You must use the input file-selection qualifier /BEFORE or /SINCE with /EXPIRED. The date and time you specify to /BEFORE or /SINCE determines which files are processed.

You cannot use /EXPIRED with the input file-selection qualifiers /BACKUP, /MODIFIED, or /CREATED.

EXAMPLE

```
$ BACKUP [CONTRACTS]/BEFORE=TOMORROW/EXPIRED MTA1:30DEC.BCK/LABEL=WK04
```

This command saves all files in the directory [CONTRACTS] that have an expiration date prior to tomorrow (24 hours after midnight last night) to a save set named 30DEC.BCK.

/FAST

Command Qualifier

Processes the input specifier using a fast file scan to reduce processing time. The input specifier must be a Files-11 disk.

FORMAT **/FAST** *input-specifier output-specifier*

DESCRIPTION

The fast file scan reads the index file on the Files-11 disk specified by the input specifier and creates a table of files that match the qualifiers you specified.

To perform a fast file scan, you need write access to the INDEXF.SYS file on the input medium, or the input medium must be write-locked. This requirement is necessary because BACKUP opens the index file to synchronize with the file system, whether or not any update is made.

A fast file scan is most useful when the input specifier includes most of the files on the volume, and file-selection qualifiers (such as those that pertain to date or owner) specify a relatively small set of the files named. Because image operations implicitly use the fast file scan, the /FAST qualifier is ignored if used with the command qualifier /IMAGE.

You cannot use /FAST in restore operations.

EXAMPLE

```
$ BACKUP/FAST
_FROM: DBA1:[*...]/MODIFIED/SINCE=TODAY
_TO: MTAO:13NOVBAK.BCK,MTA1:
```

In this example, all files on the disk DBA1 that have been modified today are saved to a multireel tape save set named 13NOVBAK.BCK. The /FAST qualifier is used to reduce processing time.

BACKUP

/FULL

/FULL

Command Qualifier

Lists the file information produced by the command qualifier /LIST in the format provided by the DCL command DIRECTORY/FULL.

FORMAT

/LIST/FULL *input-specifier [output-specifier]*

DESCRIPTION

The /FULL qualifier is valid only with the command qualifier /LIST.

If you do not specify /FULL with /LIST, the /LIST qualifier uses the default command qualifier /BRIEF and lists only the file specification, size, and creation date of each file. When you specify /FULL, the list includes more information from the file header records, such as the BACKUP date, date of last modification, number of blocks allocated to the file, file protection and organization, and record attributes.

EXAMPLE

```
$ BACKUP/LIST/FULL MTA1:ROCK.BCK
```

```
Listing of save set(s)
```

```
Save set:          ROCK.BCK
Written by:       RINGO
UIC:              [000200,000300]
Date:             20-AUG-1988 15:39:38.89
Command:          BACKUP [.STONES] MTA0:ROCK.BCK/LABEL=BACKUP
Operating system: VAX/VMS version 5.0
BACKUP version:   V5.0
CPU ID register:  08000000
Node name:        _SUZI:
Written on:       _MTAO:
Block size:       8192
Group size:       10
Buffer count:     30
```

```
[RINGO.STONES]GRAPHITE.DAT;1
```

```
Size:             1/1           Created: 18-AUG-1988 14:10
Owner: [000200,000200] Revised: 18-AUG-1988 14:10 (2)
File ID: (91,7,1)   Expires: [None specified]
Backup: [No backup done]
```

```
File protection:  System:RWED, Owner:RWED, Group:RE, World:
File organization: Sequential
File attributes:  Allocation = 1, Extend = 0
                  Global Buffer Count = 0
Record format:    Variable length, maximum 255 bytes
Record attributes: Carriage return
```

BACKUP /FULL

```
[RINGO.STONES]GRANITE.DAT;1
      Size:      1/1      Created: 18-AUG-1988 14:11
      Owner: [000200,000200] Revised: 18-AUG-1988 14:11 (2)
      File ID: (92,9,1)   Expires: [None specified]
                          Backup: [No backup done]
File protection: System:RWED, Owner:RWED, Group:RE, World:
File organization: Sequential
File attributes: Allocation = 1, Extend = 0
                  Global Buffer Count = 0
Record format:   Variable length, maximum 255 bytes
Record attributes: Carriage return
. . .
Total of 4 files, 16 blocks
End of save set
```

The command in this example lists in full format the files in save set
MTA1:ROCK.BCK.

BACKUP

/GROUP_SIZE

/GROUP_SIZE

Output Save-Set Qualifier

Defines the number of blocks BACKUP places in each redundancy group.

FORMAT *input-specifier output-save-set-spec/GROUP_SIZE=n*

DESCRIPTION BACKUP writes redundant information to output save sets to protect against data loss. Using the redundant information, BACKUP can correct one “uncorrectable” read error in each redundancy group. The /GROUP_SIZE qualifier specifies the number of output blocks written to each redundancy group. The value of *n* can be from 0 through 100. The default value is 10.

If you define a value of 0 for /GROUP_SIZE, no redundancy groups are created for the save set.

EXAMPLE

```
$ BACKUP/RECORD DBA1:[*...]/SINCE=BACKUP TAPE:SAVEWORK.BCK/GROUP_SIZE=5
```

This BACKUP command saves all files in the current default directory tree that have been modified since the last BACKUP/RECORD operation; the /GROUP_SIZE defines the redundancy group size as 5 blocks.

/IGNORE=option

Command Qualifier

Specifies that a BACKUP save or copy operation is to override restrictions placed on files or not perform tape label processing checks.

FORMAT */IGNORE=option input-specifier output-specifier*

DESCRIPTION The /IGNORE=option qualifier has three options:

INTERLOCK	Processes files that otherwise could not be processed because of file access conflicts. This option can be used to save or copy files currently open for writing. Note that no synchronization is made with the process writing the file, so the file data that is copied might be inconsistent with the input file, depending on the circumstances (for example, if another user is editing the file, the contents might change). When a file open for writing is processed, BACKUP issues the message: %BACKUP-W-ACCONFLICT, 'filename' is open for write by another user. The INTERLOCK option is especially useful if you have files that are open so much of the time that they might not otherwise be saved. The use of this option requires the user privilege SYSPRV, a system UIC, or ownership of the volume.
LABEL_PROCESSING	Saves or copies the contents of files to the specified magnetic tape volume regardless of the information contained in the volume header record. BACKUP will not verify the volume label or expiration date before writing information to the tape volume.
NOBACKUP	Causes BACKUP to save both the file header record and the contents of files marked with the NOBACKUP flag by the /NOBACKUP qualifier of the DCL command SET FILE. If you do not specify this option, BACKUP saves only the file header record of files marked with the NOBACKUP flag.

EXAMPLES

1 \$ BACKUP/IGNORE=INTERLOCK
 _FROM: [SUSAN...]
 _TO: MTAO:SONGBIRD.BCK/LABEL=TAPE01

This command saves an entire directory tree and the files in all subdirectories, including any files that are open.

BACKUP

/IGNORE=option

2 \$ BACKUP/IGNORE=LABEL_PROCESSING *.*;* MFA1:MYFILES.BCK/REWIND

This command rewinds the tape in drive MFA1 to the beginning-of-tape marker, initializes the tape, and creates a save set containing all files in the user's current directory. The command qualifier /IGNORE=LABEL_PROCESSING specifies that no tape label processing checks are done before BACKUP initializes the tape. When the tape is initialized, access to data that previously resided on the tape is lost.

/IMAGE

Command Qualifier

Directs BACKUP to process an entire volume or volume set.

FORMAT */IMAGE input-specifier output-specifier*

DESCRIPTION To use the /IMAGE qualifier, you need write access to the volume index file (INDEXF.SYS) and the bit map file (BITMAP.SYS), or the input medium must be write-locked. BACKUP opens the index file to synchronize with the file system (no update is made). Finally, you must have read access to all files on the input medium.

Note: The input and output devices in an image operation must be different except in an image save operation when the output device is a Files-11 disk save set.

If the output volume is a disk, all files on the output volume are stored contiguously. Contiguous storage of files eliminates disk fragmentation and creates contiguous free blocks of disk space.

Because all files on the input volume are processed, you cannot use input file-selection qualifiers in image copy or save operations. You can, however, restore files and directories selectively from an image save set.

When performing image operations on volume sets (more than one volume), the number of volumes specified by the output specifier must be equal to the number of volumes in the input volume set.

In an image save or copy operation, BACKUP attempts to save or copy all files on the input disk volume including files marked for deletion and lost files (files without a directory entry). However, there are two types of files that a BACKUP image operation does not save or copy by default. These are files that are flagged as NOBACKUP by the DCL command SET FILE/NOBACKUP and files that are open for write access by another user at the time of the image save operation. If you want these files to be included, specify the command qualifier /IGNORE in the BACKUP command line. The command qualifier /IGNORE=NOBACKUP directs BACKUP to save or copy files flagged as NOBACKUP. The command qualifier /IGNORE=INTERLOCK directs BACKUP to save or copy files open for write access by another user.

An image restore or copy operation initializes the output volume or volume set. The initialization data comes from the save-volume summary record of the input volume unless the command qualifier /NOINITIALIZE is specified. Specifying /NOINITIALIZE directs BACKUP to initialize the output volume using volume initialization data that already exists on the output volume.

In image restore and copy operations, every file is restored or copied. The output volume must be mounted using the /FOREIGN qualifier. The new volume is a functionally equivalent copy of the input volume; however, file placement will change. Files are stored contiguously on the output volume.

BACKUP

/IMAGE

You cannot change the structure level of the output volume in an image restore or copy operation.

EXAMPLES

```
1 $ MOUNT/FOREIGN DMA1:
%MOUNT-I-MOUNTED, mounted on NODE$DMA1:
$ BACKUP/IMAGE/LOG DLA2: DMA1:
%BACKUP-S-CREATED, created DMA1: [000000]000000.DIR;1
%BACKUP-S-CREATED, created DMA1: [000000]BACKUP.SYS;1
%BACKUP-S-CREATED, created DMA1: [000000]CONTIN.SYS;1
%BACKUP-S-CREATED, created DMA1: [000000]CORIMG.SYS;1
%BACKUP-S-CREATED, created DMA1: [000000]ELLA.DIR;1
%BACKUP-S-CREATED, created DMA1: [ELLA]SCAT.DAT;1
%BACKUP-S-CREATED, created DMA1: [000000]JOE.DIR;1
%BACKUP-S-CREATED, created DMA1: [JOE]STRINGS.DAT;1
%BACKUP-S-CREATED, created DMA1: [000000]OSCAR.DIR;1
%BACKUP-S-CREATED, created DMA1: [OSCAR]KEYS.DAT;1
%BACKUP-S-CREATED, created DMA1: [000000]VOLSET.SYS;1
.
.
$
```

The MOUNT command prepares the target disk for the image copy operation. The command qualifier /LOG directs BACKUP to display information about each file copied on your terminal. The BACKUP command initializes DMA1 and copies the disk volume DLA2 to DMA1. All files on DMA1 are stored contiguously.

```
2 $ BACKUP/IMAGE DBA2: MTA0:ET.BCK,MTA1:
```

This command saves an entire disk volume to a multivolume save set named ET.BCK using two magnetic tape drives.

```
3 $ MOUNT/FOREIGN DBA1:
%MOUNT-I-MOUNTED, mounted on NODE$DBA1:
$ BACKUP/IMAGE WORKDISK DBA1:28SEP.BCK/SAVE_SET
```

The MOUNT command prepares a Files-11 disk for processing. The BACKUP command performs an image save operation to a Files-11 save set named 28SEP.BCK.

/INCREMENTAL

Command Qualifier

Allows you to restore an incremental save set.

FORMAT **/INCREMENTAL** *save-set-spec disk-device-name*

DESCRIPTION Use **/INCREMENTAL** only in restore operations that restore incremental save sets. When you use **/INCREMENTAL**, the output specifier must specify a device only; file specifications are not allowed. Also, input save-set qualifiers are not allowed in incremental restore operations.

You can create incremental save sets with the command qualifier **/RECORD** and the file-selection qualifier **/SINCE=BACKUP** or **/SINCE=date**. Most sites perform daily incremental save operations to keep copies of files created or modified that day, and periodic full backups to keep a copy of all files on the disk volume. (DIGITAL recommends that you use the command qualifier **/IMAGE** to perform full backups.)

If a disk volume is lost, corrupted, or destroyed, its contents can be recreated by performing the following tasks:

- 1 Restore the latest full backup using the command qualifiers **/IMAGE** and **/RECORD**.
- 2 Restore any incremental save sets since the last full backup, in reverse chronological order, using the **/INCREMENTAL** qualifier.

After you restore the save sets in this order, the output disk volume contains the same files it contained when the most recent incremental save operation was performed.

When the **/INCREMENTAL** qualifier is used, the **/BY_OWNER=ORIGINAL** qualifier is assumed; therefore, you do not need to specify **/BY_OWNER** unless you want to change the original UICs. The **/INCREMENTAL** qualifier can be used only on Files-11 Structure Level 2 volumes.

EXAMPLE

If you have been performing a combination of full backups and incremental save operations on a public volume, and the public volume is lost, corrupted, or destroyed, use a procedure like the following to create a new copy of the public volume. First, restore the volume from the latest full backup with an image restore operation. Note that the **/RECORD** qualifier is necessary to perform the operation correctly.

BACKUP /INCREMENTAL

```
$ MOUNT/FOREIGN DRAO:  
%MOUNT-I-MOUNTED, mounted on _DRAO:  
$ BACKUP/IMAGE/RECORD MTAO:FULLJUN88,MTA1 DRAO:  
%BACKUP-I-RESUME, resuming operation on volume 2  
%BACKUP-I-RESUME, resuming operation on volume 3  
%BACKUP-I-RESUME, resuming operation on volume 4
```

```
$ DISMOUNT/NOUNLOAD DRAO:
```

Next, mount the disk as a file-structured volume and restore the incremental save sets in reverse chronological order. Finally, restore the weekly incremental save sets. The /INCREMENTAL qualifier must be used where shown in the following example to obtain the correct results.

```
$ MOUNT DRAO: PUBLIC  
%MOUNT-I-MOUNTED, PUBLIC mounted on _DRAO:  
$ BACKUP/INCREMENTAL MTAO:INCD17JUN DRAO:  
$ BACKUP/INCREMENTAL MTAO:INCD16JUN DRAO:  
$ BACKUP/INCREMENTAL MTAO:INCD15JUN DRAO:  
$ BACKUP/INCREMENTAL MTAO:INCW14JUN DRAO:  
$ BACKUP/INCREMENTAL MTAO:INCW7JUN DRAO:
```

Note that BACKUP restores the volume correctly regardless of the order in which the incremental save sets are applied; using reverse chronological order is most efficient.

/INITIALIZE

Command Qualifier

Initializes an output disk volume, making its entire previous contents unavailable.

FORMAT **/[NO]INITIALIZE** *input-specifier output-specifier*

DESCRIPTION

The **/[NO]INITIALIZE** qualifier is valid only when used with the command qualifier **/IMAGE** during restore or copy operations or when saving files to a sequential-disk save set.

When used with the command qualifier **/IMAGE** in a restore or copy operation, the **/INITIALIZE** qualifier directs **BACKUP** to initialize the output volume using volume initialization data from the save-volume summary record on the input volume.

The **/NOINITIALIZE** qualifier directs **BACKUP** to reinitialize the output volume using the existing initialization data on that volume; the output volume must have been previously initialized as a Files-11 volume. When the output volume is initialized, existing data on the volume is lost. The structure level of the output volume must be the same as the structure level of the save set being restored.

For image restore and copy operations on Files-11 volumes, the default is **/INITIALIZE**.

If you use the **/INITIALIZE** qualifier when creating sequential-disk save sets, **BACKUP** initializes the first output volume in the sequential-disk save set, as well as subsequent volumes. By default, **BACKUP** does not initialize the first volume of a sequential-disk save set but does initialize subsequent volumes of a multivolume sequential-disk save set.

EXAMPLES

1 \$ **BACKUP/IMAGE/NOINITIALIZE** DBA0: DBA2:

This command causes the output volume **DBA2** to be reinitialized using the volume initialization data that exists on **DBA0**. The contents of **DBA0** are then copied to **DBA2**.

2 \$ **BACKUP/IMAGE/INITIALIZE** DBA2:OLDFILES.BCK/SAVE_SET DBA6:

This command directs **BACKUP** to initialize the output volume **DBA6** using volume initialization parameters in the save-volume summary record on **DBA2**. The image save set **OLDFILES.BCK** is then restored to **DBA6**.

BACKUP

/INTERCHANGE

/INTERCHANGE

Command Qualifier

Directs BACKUP to process files in a manner suitable for data interchange (software distribution) by excluding information that would prevent other utilities or sites from reading the BACKUP save set.

FORMAT */INTERCHANGE input-specifier output-specifier*

DESCRIPTION The effects of the /INTERCHANGE qualifier are as follows:

- Directories not selected as files are not copied.
- Access control lists are not copied.
- Block size on magnetic tape is limited to 8,192 bytes.
- Normal error recovery is used to write magnetic tapes so that there are no bad records on the resulting magnetic tape.

EXAMPLE

```
$ BACKUP/RECORD/INTERCHANGE [ACCOUNTS]/SINCE=BACKUP MFAO:SAVACC.BCK
```

The command in this example saves all files in the directory [ACCOUNTS] that have been modified since the last BACKUP/RECORD operation. The /INTERCHANGE qualifier ensures that the processed files are suitable for data interchange.

/JOURNAL

Command Qualifier

Specifies that a BACKUP save operation is to create a BACKUP journal file or append information to a BACKUP journal file. Lists the contents of a BACKUP journal file when combined with the command qualifier /LIST.

FORMAT */JOURNAL[=*file-spec*] *input-specifier* *output-specifier**
*/JOURNAL[=*file-spec*]/LIST[=*file-spec*]*

DESCRIPTION

A BACKUP journal file contains records of BACKUP save operations and the file specifications of saved files. Use the command qualifier /JOURNAL[=*file-spec*] in a BACKUP save operation to create a journal file.

If you do not include a file specification with the command qualifier /JOURNAL, the name of the BACKUP journal file defaults to SYS\$DISK:[*BACKUP*.BJL. You can specify another file name, however. (The file specification of a journal file cannot include a node name; the default file type for a journal file is BJL.) If the specified journal file does not exist, it is created; if the journal file does exist, the new journal information is appended to the existing journal file.

Start a new version of a journal file by creating a zero-length file using the DCL command CREATE or a text editor.

To list the contents of a BACKUP journal file, use the /JOURNAL=[*file-spec*] qualifier with the /LIST qualifier, but do not specify an input or output specifier. By default, the list is displayed on SYS\$OUTPUT, but it is written to an output file if you specify a file with /LIST.

When listing a journal file, you can use the file-selection qualifiers /BEFORE, /SINCE, and /EXCLUDE to search for specific files. (In this context, the /BEFORE and /SINCE qualifiers refer to the time when the save set was created, not the time when the files in the save set were created.) Also, by specifying a file in a multivolume save set, you can search the journal file to find which volume the file is in. You can then mount that volume and restore the file.

Journal files are not created for physical save operations (save operations performed with the command qualifier /PHYSICAL).

EXAMPLES

1 \$ BACKUP/JOURNAL=LAR.BJL [LARRY]*.*;* MFA0:YET.BCK

This command saves all versions of all files in the directory [LARRY] to the save set YET.BCK on MFA0. The /JOURNAL qualifier creates a record of the saved files in a journal file named LAR.BJL in the current default directory.

BACKUP

/JOURNAL

2

```
$ BACKUP/LIST/JOURNAL=ARCH.BJL/SELECT=[SMITH.PROGS]/SINCE=5-OCT-1988
Listing of BACKUP journal
Journal file _DB1:[SYSMGR]:ARCH.BJL;1 ON 7-OCT-1988 00:45:43.01
Save set WKLY.BCK, created on 6-OCT-1988 00:01:34.54
Volume number 1, volume label WKL101
    [SMITH.PROGS]RUNTHIS.FOR;4
    [SMITH.PROGS]TIMER.PAS;5
    [SMITH.PROGS]REMINDER.FOR;46
.
.
```

This example displays all files in the directory [SMITH.PROGS] that were saved after October 5, 1988, and listed in the BACKUP journal file ARCH.BJL.

3

```
$ BACKUP/JOURNAL/LOG/IMAGE DRA2: MTAO:3OCT.FUL
%BACKUP-S-COPIED, copied DRA2:[COLLINS]ALPHA.DAT;4
%BACKUP-S-COPIED, copied DRA2:[COLLINS]EDTINI.EDT;5
.
.
%BACKUP-I-RESUME, resuming operation on volume 2
%BACKUP-I-READYWRITE, mount volume 2 on _MTAO: for writing
Press return when ready: <RET>
%BACKUP-S-COPIED, copied DRA2:[LANE]MAIL.MAI;1
%BACKUP-S-COPIED, copied DRA2:[LANE]MEMO.RNO;5
.
.
$ BACKUP/JOURNAL/LIST
Listing of BACKUP journal
Journal file _DB2:[SYSMGR]BACKUP.BJL;1 on 3-OCT-1988 00:40:56.36
Save set 3OCT.FUL created on 3-OCT-1988 00:40:56.36
Volume number 1, volume label 3OCT01
    [COLLINS]ALPHA.DAT;4
    [COLLINS]EDTINI.EDT;5
    [COLLINS]LOGIN.COM;46
    [COLLINS]LOGIN.COM;45
    [COLLINS]MAIL.MAI;1
    [COLLINS]MAR.DIR;1
    [COLLINS.MAR]GETJPI.EXE;9
    [COLLINS.MAR]GETJPI.LIS;14
.
.
    [LANE]LES.MAI;1
.
.
```

BACKUP /JOURNAL

Save set 3OCT.FUL created on 3-OCT-1988 00:40:56.36
Volume number 2, volume label 3OCT02

[LANE]MAIL.MAI;1
[LANE]MEMO.RNO;5
[LANE]MEMO.RNO;4

.

.

[WALTERS.VI]KD.RNO;52

End of BACKUP journal

This example shows how to create a BACKUP journal file and list the contents of the BACKUP journal file.

BACKUP

/LABEL

/LABEL

Output Save-Set Qualifier

Specifies the one- to six-character volume labels for the magnetic tapes to which the save set is written.

FORMAT

input-specifier output-save-set-spec/LABEL=(string[,...])

DESCRIPTION

You can specify a single label or a list of labels with the /LABEL qualifier. (If you do not specify the /LABEL qualifier, BACKUP uses the first six characters of the save-set name as the volume label of the first tape.) If the save set continues to another tape, and you did not specify a volume label for the tape, BACKUP uses the first four characters of the previous tape's volume label followed by the volume number of the tape. For example, if the first tape in a save set is labeled AAAABB, the second tape in a save set is labeled AAAA02, and the third tape is labeled AAAA03.

Before writing a save set to magnetic tape, BACKUP compares the label specified in the command line to the volume label of the tape. (If the tape has no volume label and you specified the output save-set qualifier /REWIND, BACKUP writes the label you specified to the volume header record of the tape.) If the volume label is less than six characters long, BACKUP pads the volume label with the blank character to six characters. The first four characters of the volume label must either match the first four characters of the label specified in the BACKUP command line exactly, or the first four characters of the volume label must end with one or more underscore characters. If the first four characters of the volume label end with one or more underscore characters, and the label specified in the command line matches the part of the volume label that appears before the underscore characters, BACKUP accepts the match. (For example, the volume label ABN_ matches the command line label ABN but does not match the command line label ABNE.) If either the fifth or sixth character of the volume label is a number between zero and nine, BACKUP does not compare these characters with corresponding characters in the label specified in the BACKUP command line. Otherwise, the fifth and sixth characters in the volume label must match the corresponding characters in the label specified in the BACKUP command line exactly. The following table illustrates volume labels that match labels specified in the BACKUP command line:

Label Specified in Command Line	Matching Volume Labels
MAR	MAR, MAR_, MAR_nn
MAR_	MAR_, MAR_nn
MARK	MARK, MARKnn
MARKER	MARKER, MARKnn

If the label you specify matches the tape's volume label, the BACKUP save operation proceeds.

BACKUP

/LABEL

If the label you specified does not match the tape's volume label, BACKUP displays the following messages and prompt on your terminal if you specified the command qualifier /NOASSIST or on the operator terminal if you did not specify /NOASSIST:

```
%BACKUP-W-MOUNTERR, volume 'number' on 'device' was not mounted because  
  its label does not match the one requested  
Specify option (QUIT, NEW tape or OVERWRITE tape)  
BACKUP>
```

Specify QUIT to abort the BACKUP operation and unload the magnetic tape. Specify NEW to direct BACKUP to prompt for a new tape. Specify OVERWRITE to direct BACKUP to ignore the label mismatch, mount the tape, initialize the tape if you specified the output save-set qualifier /REWIND, and write the save set to the tape.

You can specify the command qualifier /IGNORE=LABEL_PROCESSING to prevent BACKUP from verifying the volume label of the tape.

EXAMPLES

1 \$ BACKUP [PAYROLL] MTA0:30NOV.BCK/LABEL=PAY

This command causes BACKUP to check the volume label of the tape mounted on drive MTA0. If the volume label is PAY, BACKUP saves the directory [PAYROLL] to a save set named 30NOV.BCK.

2 \$ BACKUP DDA1: MTA0:PLAYS.BCK,MTA1,MTA2/REWIND/LABEL=ACT1,ACT2,ACT3

This example assumes that the three tapes have no volume labels. This command saves all files on the disk named DDA1 to the save set PLAYS.BCK. The first tape in the save set is labeled ACT1, the second is labeled ACT2, and the third is labeled ACT3.

BACKUP

/LIST

/LIST

Command Qualifier

Lists information about a BACKUP save set and about the files in a save set. The list can be displayed on your terminal or written to a file.

FORMAT

*/LIST[=*file-spec*] *save-set-spec**

DESCRIPTION

Use the /LIST qualifier by itself or in conjunction with any other operation (save, restore, copy, compare, or journal). If /LIST is specified by itself (not with a save, restore, copy, compare or journal operation), the input specifier must refer to a save set, and the output specifier must be omitted.

Before you can list the contents of a save set, the media containing the save set must be inserted into an appropriate drive. If the save set is stored on a disk, the disk must be mounted as a Files-11 volume or as a foreign volume. BACKUP mounts magnetic tapes automatically as part of the list operation.

By default, the list information is displayed on your terminal; however, you can specify a file to which to write the list information.

When you use the /LIST qualifier with standalone BACKUP and you direct output to a file (/LIST=*file-spec*), the file specification must refer to either a terminal or a printer.

You can use either the command qualifier /BRIEF or /FULL with the /LIST qualifier. The /BRIEF qualifier directs BACKUP to list each file's size in blocks and its creation date. The /FULL qualifier directs BACKUP to list additional information about each file in the same format as the information provided by the DCL command DIRECTORY/FULL. The default is /BRIEF.

Do not use the command qualifier /LOG with /LIST when the output for /LIST is directed to the terminal; if you do, you will receive confusing output.

EXAMPLE

\$ BACKUP/LIST DBA2: [SAVE] 23MAR88.BCK/SAVE_SET

Listing of save set(s)

Save set: 23MAR88.BCK
Written by: MOROCI
UIC: [000200,000200]
Date: 23-MAR-1988 14:18:16.96
Command: BACKUP [SAVE] DBA2: [SAVE] 23MAR88.BCK/SAVE_SET
Operating system: VAX/VMS version 5.0
BACKUP version: V5.0
CPU ID register: 08000000
Node name: _SUZI:
Written on: _DBA2:
Block size: 32,256
Group size: 10
Buffer count: 3

[SAVE]LAST.DAT;1	1	18-AUG-1987 14:11
[SAVE]INFO.TXT;4	5	4-FEB-1988 13:12
[SAVE]WORK.DAT;3	33	1-DEC-1987 10:02

Total of 3 files, 39 blocks

End of save set

This command lists the BACKUP summary information and the file name, size, and creation date for each file in the save set. Note that the /SAVE_SET qualifier is required to identify the input specifier as a save set on a Files-11 disk.

BACKUP

/LOG

/LOG

Command Qualifier

Determines whether the file specification of each file processed is displayed on SYS\$OUTPUT during the operation. The default is /NOLOG.

FORMAT **/[NO]LOG** *input-specifier output-specifier*

EXAMPLE

```
$ BACKUP/LOG [SAVE]23MAR88.BCK/SAVE_SET DBA2:[PLI.WORK]
%BACKUP-S-CREATED, created DBA2:[PLI.WORK] ANOTHER.DAT;1
%BACKUP-S-CREATED, created DBA2:[PLI.WORK] LAST.DAT;1
%BACKUP-S-CREATED, created DBA2:[PLI.WORK] THAT.DAT;1
%BACKUP-S-CREATED, created DBA2:[PLI.WORK] THIS.DAT;2
...
```

In this example, the file specifications of the files restored to the directory named [PLI.WORK] on DBA2 are logged to SYS\$OUTPUT.

/MODIFIED

Input File-Selection Qualifier

Selects files according to the value of the modified date field (the date the file was last modified) in each file header record.

FORMAT *input-specifier*/**BEFORE**=time **/MODIFIED** *output-specifier*
input-specifier/**SINCE**=time **/MODIFIED** *output-specifier*

DESCRIPTION You must use the **/MODIFIED** qualifier with either the input file-selection qualifier **/BEFORE** or **/SINCE**. The date and time you specify with **/BEFORE** or **/SINCE** determines which files are processed.

You cannot use **/MODIFIED** with the input file-selection qualifiers **/BACKUP**, **/CREATED**, or **/EXPIRED**.

EXAMPLE

```
$ BACKUP [SUNDANCE...]/BEFORE=TODAY/MODIFIED MFA1:MOD.BCK
```

This command saves all files in the directory tree of the root [SUNDANCE], whose modification dates precede today (00:00:00.0 o'clock of the current day, month, and year).

BACKUP

/NEW_VERSION

/NEW_VERSION

Output File Qualifier

Creates a new version of a file if a file with an identical specification already exists at the location to which the file is being restored or copied.

FORMAT *input-specifier output-specifier/NEW_VERSION*

DESCRIPTION If BACKUP attempts to copy or restore a file when a file with an identical directory name, file name, type, and equal or higher version number already exists, a new file is created with the same name and type and a version number one higher than the highest existing version.

If you do not use /NEW_VERSION, /REPLACE, or /OVERLAY, and the version number of the file being restored is identical or less than the version number of the existing file, BACKUP reports an error in copying or restoring the file.

Note that when copying or restoring files using the /NEW_VERSION qualifier, files are processed in decreasing version number order and are created in ascending order. The result is that the version numbers are inverted.

Because this qualifier causes version numbers to change, using it with the /COMPARE or /VERIFY qualifiers will cause unpredictable results. DIGITAL recommends that you do not use the /NEW_VERSION qualifier with the /COMPARE or /VERIFY qualifiers.

EXAMPLE

```
$ BACKUP MTA1:NOV30REC.BCK/SELECT=*.DAT [RECORDS...]/NEW_VERSION
```

This example restores all files with the file type of DAT from the magnetic-tape save set NOV30REC.BCK to the directory [RECORDS]. The /NEW_VERSION qualifier instructs BACKUP to restore each file with the file type DAT regardless of whether a file with the same file specification already exists.

/OVERLAY

Output File Qualifier

Writes the input file over a file with an identical specification at the output location.

FORMAT *input-specifier output-specifier/OVERLAY*

DESCRIPTION

If BACKUP attempts to copy or restore a file when a file with an identical directory name, file name, type, and version number already exists, the new version of the file is written over the existing version. The file identification of the new version is the same as the file identification of the file that is overwritten.

The physical location of the file on disk does not change. If /OVERLAY is specified, and the new file is larger than the one already present, BACKUP allocates more blocks on the disk and extends the file.

When you do not use /OVERLAY, /REPLACE, or /NEW_VERSION, and the version number of the file being restored is identical to the version number of the existing file, BACKUP reports an error in copying or restoring the file.

EXAMPLE

```
$ BACKUP DRA1:MAR30SAV.BCK/SAVE_SET [RECORDS...]/OVERLAY
```

The sequential-disk save set MAR30SAV.BCK is restored to the directory tree [RECORDS...]. If a file from the save set has a specification that is identical to a file that already exists in [RECORDS...], the /OVERLAY qualifier directs BACKUP to write over the existing version.

BACKUP

/OWNER_UIC

/OWNER_UIC

Input File-Selection Qualifier

Selects files for processing according to the specified user identification code (UIC).

The /OWNER_UIC qualifier has been superseded by /BY_OWNER. DIGITAL recommends that you substitute /BY_OWNER for /OWNER_UIC in command procedures and operator instructions. See the description of /BY_OWNER for more information.

/OWNER_UIC

Output File Qualifier

Redefines the owner user identification code (UIC) for restored files.

The /OWNER_UIC qualifier has been superseded by /BY_OWNER. DIGITAL recommends that you substitute /BY_OWNER for /OWNER_UIC in command procedures and operator instructions. See the description of /BY_OWNER for more information.

BACKUP

/OWNER_UIC

/OWNER_UIC

Output Save-Set Qualifier

Specifies the owner user identification code (UIC) of the save set.

FORMAT *input-specifier output-save-set-spec/OWNER_UIC=[uic]*

DESCRIPTION If the /OWNER_UIC qualifier is omitted in a save operation, the UIC of the current process is used. To use this qualifier on Files-11 save sets, you need the user privilege SYSPRV, or the UIC must be your own.

Specify either a numeric UIC as octal numbers or an alphanumeric UIC in the form [g,m]. Wildcards are permitted. A UIC must be specified as octal numbers, in the form [g,m]. Note that the brackets are required.

[g,m]

- g An octal number in the range 0 through 37776 representing the group number or an alphanumeric group name
- m An octal number in the range 0 through 17776 representing the member number or an alphanumeric member name

EXAMPLE

```
$ BACKUP [CLEAVER...] MFA2:ACCOUNTS.BCK/OWNER_UIC=[3,3]/LABEL=TAPE01
```

In this example, BACKUP mounts the tape with the label TAPE01 on drive MFA2. Next, BACKUP saves the directory tree [CLEAVER...] to a save set named ACCOUNTS.BCK. The output save-set qualifier /OWNER_UIC assigns an owner UIC of [3,3] to the save set.

/PHYSICAL

Command Qualifier

Specifies that a BACKUP operation is to ignore any file structure on the input volume and to process the volume in terms of logical blocks.

FORMAT **/PHYSICAL** *input-specifier output-specifier*

DESCRIPTION In a physical operation, BACKUP saves, restores, copies, or compares the entire volume in terms of logical blocks.

The input and output specifiers for physical volumes must be device names, and they cannot be the same device. Also, the following qualifiers are ignored if specified with /PHYSICAL: /DELETE, /IMAGE, /INCREMENTAL, /JOURNAL, and /RECORD.

For physical copy operations between disks, the output disk must be the same type of device as the input disk; for example, a BACKUP/PHYSICAL operation cannot be performed between an RP05 input disk and an RP06 output disk. The output disk must not have a bad block in any location that corresponds to a good block on the input disk. (This restriction does not apply to RA-series disks.)

For physical save operations between disks, the output disk must be the same type of disk as the input disk or a larger-capacity disk. The output disk must not have a bad block in any location that corresponds to a good block on the input disk. (This restriction does not apply to RA-series disks.)

For physical restore operations between disks, the output disk must be the same type of device as the disk from which the save set was created. The output disk must not have a bad block in any location that corresponds to a good block on the disk from which the save set was created. (This restriction does not apply to RA-series disks.)

An output disk of a physical operation must be mounted using the DCL command MOUNT/FOREIGN. An input disk of a physical operation must either be mounted using the DCL command MOUNT/FOREIGN, or the user must have the user privilege LOG_IO or PHY_IO.

You can perform physical save and restore operations using magnetic tapes. BACKUP mounts magnetic tapes automatically as foreign devices.

A save set written using the /PHYSICAL qualifier can only be read as a physical save set; conversely, a file-structured save set can only be read with file-structured restore or compare operations.

Note: BACKUP/PHYSICAL does not copy the first track (track 0) of RX01 and RX02 diskettes; DIGITAL does not support track 0.

BACKUP /PHYSICAL

EXAMPLES

1

```
$ MOUNT/FOREIGN DYAO:  
$ MOUNT/FOREIGN DYAI:  
$ BACKUP/PHYSICAL DYAO:  DYAI:
```

This example mounts RX02 diskettes in DYAO and DYAI as foreign devices and copies the contents of the diskette mounted in DYAO to the diskette mounted in DYAI.

2

```
$ MOUNT/FOREIGN DBA1:  
$ BACKUP/PHYSICAL MTA0:28SEP.BCK DBA1:
```

This command restores a physical save set named 28SEP.BCK to DBA1.

/PROTECTION

Output Save-Set Qualifier

When you create a save set on disk, this qualifier defines the protection to be applied to an output save set. When you create a save set on magnetic tape, this qualifier defines the protection to be applied to the magnetic tape volume. (All save sets created subsequently on the tape will receive this same protection until the tape is initialized.)

FORMAT	<i>input-specifier</i> <i>output-save-set-spec/PROTECTION[=(code)]</i>
---------------	---

DESCRIPTION	Because the file system treats a BACKUP save set as a single file, it is crucial that you protect save sets adequately. If you do not specify adequate protection, anyone who has access to a save set can access any file in the save set.
--------------------	---

The protection code indicates the type of access (read, write, execute, and delete) available to the four categories of users (system, owner, group, and world). For more information on specifying protection codes, see the *VMS DCL Concepts Manual*.

If the save set is written to either a Files-11 disk or a sequential disk and /PROTECTION is not specified, BACKUP applies the process default protection to the save set. If /PROTECTION is specified, any protection categories not specified default to your default process protection.

Protection information is written to the volume header record of a magnetic tape, and applies to all save sets stored on the tape. Therefore, you must specify the output save-set qualifier /REWIND in order to specify the /PROTECTION qualifier for a magnetic tape. (If you do not specify /REWIND with /PROTECTION, the protection information, if any, in the volume header record is not changed.) If the save set is written to magnetic tape and /PROTECTION is not specified, BACKUP applies *no* protection to the tape. If you specify /PROTECTION, any protection categories that you do not specify default to your default process protection.

In order to initialize a magnetic tape volume that was previously initialized with the /PROTECTION qualifier, you must own the volume (your UIC matches the UIC of the volume) or have the VOLPRO privilege.

BACKUP

/PROTECTION

EXAMPLE

```
$ BACKUP  
_FROM: [CLEAVER...]  
_TO: MFA2:ACCOUNTS.BCK/BY_OWNER=[3,3]/REWIND/LABEL=BANK01/PROTECTION=(S:RWE,O:RWED,G:RE,W)
```

This command saves the directory tree [CLEAVER...] to a save set named ACCOUNTS.BCK on the magnetic tape labeled BANK01. The output save-set qualifier /REWIND directs BACKUP to rewind the tape and initialize it before performing the save operation. The output save-set qualifier /BY_OWNER assigns an owner UIC of [3,3] to the magnetic tape. The /PROTECTION qualifier assigns the owner of the magnetic tape read, write, execute, and delete access. SYSTEM users are assigned read, write, and execute access; GROUP users are assigned read and execute access; WORLD users are assigned no access.

/RECORD

Command Qualifier

Records the current date and time in the BACKUP date field of each file header record once a file is successfully saved or copied.

FORMAT **/RECORD** *input-specifier output-specifier*

DESCRIPTION The **/RECORD** qualifier can be used only on Files-11 Structure Level 2 volumes. The user privilege SYSPRV is required to use the **/RECORD** qualifier on files other than those owned by your UIC.

When you use **/RECORD** in a copy or save operation, BACKUP writes the date and time that the copy or save set was created in the BACKUP date field of each file header record.

When you use **/RECORD** to perform incremental save operations on a disk volume, do not allow other users to use **/RECORD** in their BACKUP operations on the same disk volume. If other users specify **/RECORD**, the dates in the BACKUP date fields of file header records will change. This will make it impossible for you to save all files created or modified since you last performed a save operation.

If you use the command qualifier **/VERIFY** with **/RECORD**, files that fail verification are not recorded.

If **/RECORD** is not specified, the BACKUP date field of each processed file is not changed.

You cannot use the **/RECORD** qualifier with the command qualifier **/DELETE** or **/COMPARE**.

EXAMPLE

```
$ BACKUP/RECORD DBA1:[*...]/SINCE=BACKUP MTA0:13MAY.BCK
```

This command saves all files on DBA1 that have been created or modified since the last save operation and records the current date and time in each file header record.

BACKUP

/REPLACE

/REPLACE

Output File Qualifier

Replaces a file on the output specifier with an identically-named file from the input specifier.

FORMAT

input-specifier output-specifier/REPLACE

DESCRIPTION

When you use /REPLACE in a copy or restore operation, and an identically-named file exists in both the input and output specifier, BACKUP does the following:

- Copies or restores a new version of the file with the same directory specification, file name, type, and version number
- Deletes the copy of the file that previously existed on the output disk

In this way, the previous copy of the file is replaced with the restored version. Note that the version number is not incremented because the old copy of the file is deleted. If you want to keep the versions from both the input and the output specifiers, use the output file qualifier /NEW_VERSION.

If you do not use /REPLACE, /OVERLAY, or /NEW_VERSION, and the version number of the file being restored is identical to the version number of the existing file, BACKUP reports an error and does not restore the file.

EXAMPLE

```
$ BACKUP MUAO:SAVEWORK.BCK/SELECT=[LEE...] DUAO:[LEE...]/REPLACE
```

The command in this example restores the directory tree [LEE...] (and all files in the directory tree) from a magnetic-tape save set to disk. The input save-set qualifier /SELECT specifies the directory tree to be selected from the save set, and the output file qualifier /REPLACE instructs BACKUP to first create a new version of an input file if there is a file on the output medium with the same file specification and then to delete the file that originally existed on the output medium.

/REWIND

Input Save-Set Qualifier

Rewinds the input tape reel to the beginning-of-tape marker before reading the input volume.

FORMAT *input-save-set-spec/[NO]REWIND output-specifier*

DESCRIPTION The */[NO]REWIND* qualifier is for magnetic tape volumes only.

/REWIND directs BACKUP to rewind the input magnetic tape to the beginning-of-tape marker before reading the input volume. Then BACKUP locates the input save set. In this way, BACKUP can find the input save set if it is located before the current tape position.

/NOREWIND indicates that BACKUP should not rewind the input volume before processing the command. Instead, BACKUP proceeds toward the logical end-of-tape (the end of the last save set stored on the tape). Therefore, if the specified save set is located before the current position of the tape, BACKUP is unable to find it.

The default is */NOREWIND*. You must specify */REWIND* to rewind the tape.

EXAMPLE

\$ BACKUP MFA1:CONTRACTS.BCK/REWIND/NOCRC DBA2:[*...]/BY_OWNER=ORIGINAL

In this example, the save set CONTRACTS.BCK is restored to the disk volume mounted on DBA2. The */REWIND* qualifier rewinds the magnetic tape to the beginning-of-tape marker before reading the input volume to search for CONTRACTS.BCK. The input save-set qualifier */NOCRC* disables CRC checking. The output file qualifier */BY_OWNER* restores the original owner UICs.

BACKUP

/REWIND

/REWIND

Output Save-Set Qualifier

Rewinds the output tape to the beginning-of-tape marker and initializes the output tape. The /NOREWIND qualifier causes the tape to wind forward to the logical end-of-tape (the end of the last save set stored on the tape) and to begin writing the save set there.

FORMAT

input-specifier output-save-set-spec/[NO]REWIND

DESCRIPTION

The /[NO]REWIND qualifier is for magnetic tape volumes only.

If you specify /REWIND, BACKUP rewinds to the beginning of the magnetic tape and searches the volume header record for a volume label. If the volume header record contains no volume label, BACKUP writes the label specified in the BACKUP command to the volume header record, initializes the tape, and creates the save set on the tape.

If no label is specified explicitly in the command line, BACKUP uses the first six characters of the save-set name as the volume label of the first tape in a multivolume save set and the first four characters of the save-set name followed by the volume number of the tape as the volume label of subsequent tapes. You can also specify a label or list of labels explicitly with the /LABEL qualifier. If you do not specify enough labels with the /LABEL qualifier, BACKUP uses the first four characters of the final label in the list followed by the volume number of the tape as the volume label of subsequent tapes.

If BACKUP finds a volume label on the tape, it compares the volume label with the label you specified in the BACKUP command line (either explicitly with the /LABEL qualifier or implicitly through the save set name) and ensures that the tape is expired. If the volume label is less than six characters long, BACKUP pads the volume label with the blank character to six characters. The first four characters of the volume label must either match the first four characters of the label specified in the BACKUP command line exactly, or the first four characters of the volume label must end with one or more underscore characters. If the first four characters of the volume label end with one or more underscore characters, and the label specified in the command line matches the part of the volume label that appears before the underscore characters, BACKUP accepts the match. (For example, the volume label ABN_ matches the command line label ABN but does not match the command line label ABNE.) If either the fifth or sixth character of the volume label is a number between zero and nine, BACKUP does not compare these characters with corresponding characters in the label specified in the BACKUP command line. Otherwise, the fifth and sixth characters in the volume label must match the corresponding characters in the label specified in the BACKUP command line exactly. The following table illustrates volume labels that match labels specified in the BACKUP command line:

BACKUP /REWIND

Label Specified in the Command Line	Matching Volume Labels
MAR	MAR, MAR_, MAR_nn
MAR_	MAR_, MAR_nn
MARK	MARK, MARKnn
MARKER	MARKER, MARKnn

If the label in the BACKUP command line matches the volume label of the tape and the tape is expired, BACKUP overwrites the volume label of the tape with the same volume label.

By overwriting the tape's volume label, BACKUP initializes the tape, removing access to any data that previously resided on the tape and preparing the tape to receive new data. During the initialization process, BACKUP writes the values specified with the output save-set qualifiers /TAPE_EXPIRATION, /PROTECTION, and /OWNER_UIC to the volume header record. (If these qualifiers are not specified, the default tape expiration date is today, the default protection is none, and the owner UIC of the tape is the UIC of the current process.) After initializing the tape, BACKUP writes the save set to the tape.

If the label in the BACKUP command line did not match the volume label of the tape, BACKUP displays the following message and prompt on your terminal if you specified the command qualifier /NOASSIST or on the operator terminal if you did not specify /NOASSIST:

```
%BACKUP-W-MOUNTERR, volume 'number' on 'device' was not mounted because  
  its label does not match the one requested  
Specify option (QUIT, NEW tape or OVERWRITE tape)  
BACKUP>
```

If you enter QUIT at the BACKUP> prompt, BACKUP aborts, unloads the magnetic tape, and issues the following message:

```
%BACKUP-F-ABORT, operator requested abort on fatal error
```

If you enter NEW at the BACKUP> prompt, BACKUP unloads the magnetic tape and issues the following prompt for a new tape:

```
%BACKUP-I-READYWRITE, mount volume 'volume-number' on '_device-name': for writing  
Enter "YES" when ready:
```

If you enter OVERWRITE at the BACKUP> prompt, BACKUP overwrites the old volume label with the new volume label. (OVERWRITE instructs BACKUP to ignore the fact that either the tape has not expired or that the labels do not match.) By overwriting the tape's volume label, BACKUP initializes the tape, removing access to any data that previously resided on the tape and preparing the tape to receive new data. During the initialization process, BACKUP writes the values specified with the output save-set qualifiers /TAPE_EXPIRATION, /PROTECTION, and /OWNER_UIC to the volume header record. After initializing the tape, BACKUP writes the save set to the tape.

BACKUP

/REWIND

If the tape is not expired, BACKUP displays the following message and prompt on your terminal if you specified the command qualifier /NOASSIST or on the operator terminal if you did not specify /NOASSIST:

```
%BACKUP-W-MOUNTERR, volume 'number' on 'device' was not mounted because
  its expiration date is in the future
Specify option (QUIT, NEW tape or OVERWRITE tape)
BACKUP>
```

Always specify /REWIND when the output tape has a non-ANSI or non-ISO label or when the output tape has never been initialized

The /NOREWIND qualifier directs BACKUP to compare the volume label of the tape with the label you specified in the BACKUP command before performing the save operation. You can specify a label explicitly with the /LABEL qualifier; otherwise, BACKUP uses the first six characters of the save-set name as the volume label. If the volume label does not match the label you specified, BACKUP displays the following message and prompt on your terminal if you specified the command qualifier /NOASSIST or on the operator terminal if you did not specify /NOASSIST:

```
%BACKUP-W-MOUNTERR, volume 'number' on 'device' was not mounted because
  its label does not match the one requested
Specify option (QUIT, NEW tape or OVERWRITE tape)
BACKUP>
```

If you choose the OVERWRITE option, BACKUP ignores the fact that the volume labels do not match. If the labels match, or if you choose the OVERWRITE option, BACKUP winds the tape forward to the logical end-of-tape (the end of the last save set stored on the tape) and writes the save set to the tape. If the logical end-of-tape is also the physical end of the tape, BACKUP requests a new tape. Because BACKUP searches for the end of data on the tape, you cannot write a new save set to a tape if it ends with a save set that is continued onto another tape.

Although the /NOREWIND qualifier does not initialize the first tape in a multivolume save set, BACKUP initializes subsequent tapes in a multivolume save set. BACKUP ensures that the tape is expired and that the tape labels match before initializing subsequent volumes in a multivolume save set.

The default is /NOREWIND. You must specify /REWIND to rewind and initialize a magnetic tape volume.

EXAMPLE

```
$ BACKUP
 _FROM: *.RNO
 _TO: MTAO:DSRSAVE.BCK/REWIND/LABEL=DSR01/TAPE_EXPIRATION=29-DEC-1989
```

The command in this example initializes a new magnetic tape and writes the volume label DSR01 and a tape expiration date of December 29, 1989, to the tape's volume header record. Then this command saves all files in the current default directory with a file type of RNO to the magnetic tape save set named DSRSAVE.BCK.

/SAVE_SET

Input Save-Set Qualifier

Directs BACKUP to treat the input file as a BACKUP save set. You must specify /SAVE_SET when the input specifier refers to a BACKUP save set on disk.

FORMAT *input-save-set-spec/SAVE_SET output-specifier*

DESCRIPTION The /SAVE_SET qualifier allows you to refer to a BACKUP save set on a local Files-11 disk, a remote Files-11 disk, or a sequential disk. If you do not specify /SAVE_SET, an input specifier that refers to a disk is treated as a Files-11 file. An input specifier that refers to tape is always treated as a BACKUP save set.

EXAMPLES

1 \$ BACKUP DBA2:[BACKUP]1212MAR3.BCK/SAVE_SET DBA1:[*...]

This command restores a save set named 1212MAR3.BCK from DBA2 to DBA1.

2 \$ BACKUP/LIST DBA2:[SAVE]23MAR88.BCK/SAVE_SET

This command lists the BACKUP summary information and the file name, size, and creation date for each file in the save set named 23MAR88.BCK. The /SAVE_SET qualifier is required to identify the input specifier as a save set on a disk.

3 \$ BACKUP/LOG [SAVE]23MAR88.BCK/SAVE_SET [PLI.WORK]

This command restores the directory that was listed in Example 2. File specifications are logged to SYS\$OUTPUT as the files are restored.

BACKUP

/SAVE_SET

/SAVE_SET

Output Save-Set Qualifier

Directs BACKUP to treat the output file as a BACKUP save set. You must specify the /SAVE_SET qualifier when the output specifier refers to a BACKUP save set on disk.

FORMAT *input-specifier output-save-set-spec/SAVE_SET*

DESCRIPTION The /SAVE_SET qualifier allows you to create a BACKUP save set on a local Files-11 disk, a remote Files-11 disk, or a sequential disk. If you do not specify /SAVE_SET, an output specifier that refers to disk is treated as a Files-11 file. An output specifier that refers to tape is always treated as a BACKUP save set.

EXAMPLES

1 \$ BACKUP [HILL] DBA1:[BACKUP]SEP28.BCK/SAVE_SET

This command saves the directory [HILL] to a save set named SEP28.BCK on a Files-11 disk.

2 \$ BACKUP DBA2:[PLI.WORK]*.*; [SAVE]23MAR88.BCK/SAVE_SET

This command saves the highest-numbered version of each file in directory [PLI.WORK] in a save set named 23MAR88.BCK on the same disk. The /SAVE_SET qualifier is required because the output save set is on a Files-11 disk.

3 \$ BACKUP
 _FROM: []
 _TO: MILO"FRANKIE THISISMINE": :DUAO:[FRANKIE]MYDIR.BCK/SAVE_SET

This command saves all files in the current default directory to a network save set named MYDIR.BCK on node MILO.

4 \$ MOUNT/FOREIGN DBAO:
 \$ BACKUP [SIMS] DBAO:SIMS.BCK/SAVE_SET

This command saves all files in the directory [SIMS] to a sequential-disk save set named SIMS.BCK.

/SELECT

Input Save-Set Qualifier

Selects the specified files for processing.

FORMAT *input-save-set-spec/SELECT=(file-spec[,...])*
 output-specifier

DESCRIPTION If you specify more than one file, separate the file specifications with commas and enclose the list in parentheses. Do not use a device specification when you define the files to be selected. You can use most standard wildcard characters, but you cannot use wildcard characters denoting latest version of files (;) and relative versions of files (;-n).

Note that BACKUP does not apply temporary file specification defaults within the list. Each file specification independently takes its defaults from the file specification [000000 . . .]*.*.*.

You cannot use /SELECT in image restore operations.

EXAMPLE

```
$ BACKUP DBA1:JUL20.BCK/SAVE_SET/SELECT=[SNOW]BALL.PAS [WINTER.GAME]BALL.PAS
```

This command selects a file named [SNOW]BALL.PAS from a sequential-disk save set and restores it to the directory [WINTER.GAME] on the current default device.

BACKUP

/SINCE

/SINCE

Input File-Selection Qualifier

Selects files dated equal to or later than the specified date and time.

FORMAT

input-specifier/SINCE=time output-specifier

DESCRIPTION

The /SINCE qualifier selects files by comparing the date and time in the specified field of each file header record with the date and time you specify in the command line. The following table shows the input file-selection qualifiers you can use with /SINCE and their functions. Use only one of these qualifiers at a time in your command line.

/BACKUP	Selects files last saved or copied by BACKUP/RECORD since the date specified. Also selects files with no BACKUP date.
/CREATED	Selects files created since the date specified.
/EXPIRED	Selects files that have expired since the date specified.
/MODIFIED	Selects files last modified since the date specified. If you specify /SINCE without another qualifier, /MODIFIED is used by default.

Specify the date and time as a delta time or as an absolute time using the format [dd-mmm-yyyy[:]][hh:mm:ss.cc]. You can also use one of the following reserved words to specify the date and time:

BACKUP	The BACKUP/RECORD operation (available only on Files-11 Structure Level 2 volumes)
TODAY	The current day, month, and year at 00:00:00.0 o'clock
TOMORROW	24 hours after midnight last night
YESTERDAY	24 hours before midnight last night

EXAMPLE

```
$ BACKUP [PLI.WORK]/SINCE=YESTERDAY/MODIFIED [PLI.SAV]
```

This command copies selected files in the directory [PLI.WORK] to the directory [PLI.SAV]. Only those files that have been modified since 24 hours preceding midnight last night are processed. Note that the /MODIFIED qualifier is not required because its action is the default when the /SINCE qualifier is specified.

/TAPE_EXPIRATION

Output Save-Set Qualifier

Writes the date on which the tape will expire to the volume header record. The output save-set qualifier `/REWIND` must be specified with the `/TAPE_EXPIRATION` qualifier.

FORMAT *input-specifier*
 output-save-set-spec/TAPE_EXPIRATION[=date]

DESCRIPTION When you specify the output save-set qualifier `/REWIND` during a save operation to magnetic tape, BACKUP checks that the tape has expired before initializing the tape. Initializing the tape removes access to data previously stored on the tape.

DIGITAL recommends that you specify an expiration date whenever you create a BACKUP save set on magnetic tape using `/REWIND`. Daily BACKUP tapes should expire in seven days, weekly BACKUP tapes should expire in one month, and monthly BACKUP tapes should expire in one year.

Specify the date in the following format:

`dd : mmm : yyyy`

where:

`dd` is the date.

`mmm` is a three-letter abbreviation of the month.

`yyyy` is the year.

If you do not specify an expiration date, today's date is written to the volume header record when you perform a save operation using `/REWIND`.

EXAMPLE

`$ BACKUP DBA1: MTAO:13NOVBAK.BCK/REWIND/TAPE_EXPIRATION=20-NOV-1988`

In this example, the entire contents of the disk DBA1 are saved to a save set named 13NOVBAK.BCK. The tape will expire in seven days on November 20, 1988.

BACKUP

/TRUNCATE

/TRUNCATE

Command Qualifier

Controls whether a copy or restore operation truncates a sequential output file at the end-of-file (EOF) when restoring it.

FORMAT *[/[NO]TRUNCATE input-specifier output-specifier*

DESCRIPTION By default, a copy or restore operation uses the allocation of the input file to determine the size of the output file. Specify /TRUNCATE if you want the output files to be truncated at the end-of-file (EOF).

EXAMPLE

```
$ DIRECTORY/SIZE [FRANKIE]ORIGINAL.DAT
Directory DMA0: [FRANKIE]
ORIGINAL.DAT            35
Total of 1 file, 35 blocks
$ COPY ORIGINAL.DAT EXTENDED.DAT/ALLOCATION=500
$ BACKUP [FRANKIE]EXTENDED.DAT MFA0:20JUL.BCK/LABEL=WKLY03
$ BACKUP/TRUNCATE MFA0:20JUL.BCK/LABEL=WKLY03 DMA0:[FRANKIE]
```

This sequence of commands does the following:

- Determines that the file ORIGINAL.DAT is 35 blocks long
- Copies ORIGINAL.DAT to EXTENDED.DAT, allocating 500 blocks for EXTENDED.DAT
- Saves the file EXTENDED.DAT to a save set named 20JUL.BCK on MFA0. BACKUP writes the file allocation size in the file header record of the saved file but saves only 35 blocks in the save set.
- Restores the save set file on MFA0 to a volume mounted on DMA0 and truncates the output files at the EOF. The restored file is 35 blocks long.

/VERIFY

Command Qualifier

Specifies that the contents of the output specifier be compared with the contents of the input specifier after a save, restore, or copy operation is completed.

FORMAT ***/VERIFY** input-specifier output-specifier*

DESCRIPTION

The **/VERIFY** qualifier is different from the command qualifier **/COMPARE**. Unlike the **/VERIFY** qualifier, the command qualifier **/COMPARE** cannot be used in a save, restore, copy, or list operation. The **/VERIFY** qualifier directs **BACKUP** to perform the copy, save, or restore operation first and then to perform the compare operation.

On file-structured copy operations, each file is compared after it is copied. On physical copy operations, the volume is compared after it is copied. For a save or restore operation, the verification is performed in a separate pass and is preceded by the following informational message:

`%BACKUP-I-STARTVERIFY, starting verification pass`

If a file does not compare successfully, **BACKUP** displays the following error message:

`%BACKUP-E-VERIFYERR, verification error for block 'block-number'
of 'disk:[directory]file_name.file_type;version_number'`

The **/VERIFY** qualifier does not work on a restore or copy operation when the **/NEW_VERSION** output file qualifier is also used. Because the **/NEW_VERSION** qualifier reassigns output file versions, it is not possible to correctly associate the created output files with the input files from which they were copied.

BACKUP

/VERIFY

EXAMPLE

```
$ BACKUP/VERIFY/LOG *.LIS MFA0:LIST.BCK
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRE.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRETIME.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]EXC.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]NOREB.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]REB.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]SETREB.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]VERS.LIS;1
%BACKUP-I-STARTVERIFY, starting verification pass
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]CRE.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]CRETIME.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]EXC.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]NOREB.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]REB.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]SETREB.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]VERS.LIS;1
```

This example creates a magnetic-tape save set on MFA0 and starts the verification pass after the save operation is completed. The /LOG qualifier displays the file names as they are processed.

/VOLUME

Command Qualifier

Indicates that a specific disk volume in a disk volume set is to be processed. The /VOLUME qualifier is valid only when used with the /IMAGE qualifier.

FORMAT */IMAGE/VOLUME=*n* input-specifier output-specifier*

DESCRIPTION The /VOLUME qualifier allows you to perform an image save, restore, or copy operation using one more disk drive than the number of disks in the input volume set. When you use /VOLUME, you must write-lock the entire input volume set.

When performing an image copy or save operation with the /VOLUME qualifier, all disks in the input volume set must be mounted. Mount the volumes of the target volume set one at a time. Enter a separate BACKUP command for each disk in the input volume set. A save set created with the /VOLUME qualifier must be restored using the /VOLUME qualifier.

You can restore any image save set with the /VOLUME qualifier. All disks in the output volume set must be mounted. Mount the disks in the input volume set one at a time. You cannot use the command qualifier /NOINITIALIZE in the restore operation with the command qualifier /VOLUME.

In a compare operation that uses the /VOLUME qualifier to compare two disk volume sets, all disks in both volume sets must be mounted. In a selected-volume compare operation between a save set on tape and a disk volume set, all disks in the disk volume set must be mounted.

EXAMPLE

`$ BACKUP/IMAGE/VOLUME=3 DISK$PUBLIC DRA1:`

This command creates a functionally equivalent copy of the third volume of a volume set named DISK\$PUBLIC to DRA1. The disk mounted in DRA1 becomes the third volume of the image-copy volume set.

BACKUP

BACKUP Examples

BACKUP EXAMPLES

Table BCK-2 shows BACKUP command formats for save operations and some of the qualifiers you can use with a save operation.

Table BCK-2 Save Operation Quick Reference Table

Command Action	Command Format
Saves a file to a save set on magnetic tape	BACKUP file-spec save-set-specifier/LABEL=label \$ BACKUP STRATDAT1.DAT MTA0:STRATDAT1.BCK/LABEL=TAPE01
Saves the most recent versions of files in a directory to magnetic tape	BACKUP [directory]*.*; save-set-specifier/LABEL=label \$ BACKUP [LYKINS...]*.*; MTA0:1409MAR17.BCK/LABEL=WKY102
Saves a disk volume to a save set on magnetic tape	BACKUP/IMAGE ddcu: save-set-specifier/LABEL=label \$ BACKUP/IMAGE DBA1: MTA0:930FEB4.BCK/LABEL=MTH101
Saves a disk volume to a multivolume save set on more than one magnetic tape drive	BACKUP/IMAGE ddcu: save-set-specifier,ddcu: . . . /LABEL=(label1, . . .) \$ BACKUP/IMAGE DBA1: MTA0:17MAR.BCK,MTA1:/ - _-\$ LABEL=(WKY101,WKY102)
Saves a list of files to a save set on magnetic tape	BACKUP file-spec,file-spec,... save-set-specifier/LABEL=label \$ BACKUP DBA1:[LYKINS...]*.PAS,DMA0:[DAKOTA...]*.PAS - _-\$ MTA0:PAS17MAR.BCK/LABEL=TAPE01
Saves a disk volume for incremental backups for the first time	BACKUP/RECORD/IMAGE/LOG ddcu: save-set-specifier/LABEL=label \$ BACKUP/RECORD/IMAGE/LOG DBA1: MTA0:925FEB4.BCK/ - _-\$ LABEL=DLY101
Saves a disk volume for incremental backups (not the first time)	BACKUP/RECORD/FAST/LOG ddcu:[*...]/SINCE=BACKUP save-set-specifier /LABEL=label \$ BACKUP/RECORD/FAST/LOG DBA1:[*...]/SINCE=BACKUP - _-\$ MTA0:928FEB4.BCK/LABEL=DLY101
Saves an unstructured disk volume	BACKUP/PHYSICAL ddcu: save-set-specifier/LABEL=label \$ BACKUP/PHYSICAL DMA1: MTA0:935FEB4.BCK/LABEL=MTH101
Saves a directory to a save set on a Files-11 disk	BACKUP [directory] save-set-specifier/SAVE_SET \$ BACKUP [LYKINS] DBA2:[BACKUP]1609FEB3.BCK/SAVE_SET
Saves a directory tree to a save set on magnetic tape	BACKUP [directory...] save-set-specifier/LABEL=label \$ BACKUP [LYKINS...] MTA0:1612FEB3.BCK/LABEL=TAPE01
Saves a directory tree to a save set on magnetic tape and creates a listing file	BACKUP/LIST=file-spec [directory...] save-set-specifier/LABEL=label \$ BACKUP/LIST=8SEP.LOG [LYKINS...] MTA0:8SEP.BCK/LABEL=WKL101

Table BCK-3 shows BACKUP command formats for restore operations and some of the qualifiers you can use with restore operations. In the examples in this table, it is assumed that save sets already exist on the magnetic tape and disk.

Table BCK-3 Restore Operation Quick Reference Table

Command Action	Command Format
Restores from save set on disk to Files-11 disk with original UICs	BACKUP save-set-specifier/SAVE_SET ddcu:[*...]/BY_OWNER=ORIGINAL \$ BACKUP DBA2:[BACKUP]FEB2.BCK/SAVE_SET DBA1:[*...] - _ \$ /BY_OWNER=ORIGINAL
Restores from a save set on magnetic tape to a Files-11 disk with original UICs	BACKUP save-set-specifier ddcu:[*...]/BY_OWNER=ORIGINAL \$ BACKUP MTA0:1618FEB2.BCK DBA1:[*...]/BY_OWNER=ORIGINAL
Restores a selected file in a save set on magnetic tape to a Files-11 disk	BACKUP save-set-specifier/SELECT=file-spec file-spec \$ BACKUP MTA0:FEB2.BCK/SELECT=[POUDRE]UPLIFT.PAS - _ \$ [GEO.PAS]UPLIFT.PAS
Restores files with a specific UIC to a Files-11 disk	BACKUP save-set-specifier/BY_OWNER=[uic] file-spec \$ BACKUP MTA0:1641FEB2.BCK/BY_OWNER=[360,052] [LYKINS...]
Restores files to a Files-11 disk with a new UIC	BACKUP save-set-specifier file-spec/BY_OWNER=[uic] \$ BACKUP MTA0:1641FEB2.BCK [TESTS...]/BY_OWNER=[100,150]
Restores files to a Files-11 disk; if file exists, create new version	BACKUP save-set-specifier file-spec/NEW_VERSION \$ BACKUP MTA0:1641FEB2.BCK [LYKINS...]/NEW_VERSION
Restores files to a Files-11 disk; if file exists, replace with new version	BACKUP save-set-specifier file-spec/REPLACE \$ BACKUP MTA0:1641FEB2.BCK [LYKINS...]/REPLACE
Restores files to a Files-11 disk selecting certain files	BACKUP save-set-specifier/SELECT=file-spec file-spec \$ BACKUP MTA0:1641FEB2.BCK/SELECT=[LYKINS.PAS] [LYKINS...]
Restores a directory tree, placing files in a different subtree	BACKUP save-set-specifier/SELECT=[directory...] [directory2...] \$ BACKUP MTA0:1641FEB2.BCK/SELECT=[FIELD...] [LYKINS.NEWDATA...]
Restores a Files-11 volume from a physical save set	BACKUP/PHYSICAL save-set-specifier ddcu: \$ BACKUP/PHYSICAL MTA0:26MAR.BCK DMA3:
Restores a Files-11 volume from an image save set	BACKUP/IMAGE save-set-specifier ddcu: \$ BACKUP/IMAGE MTA0:17AUG.BCK DRA3:
Restores a Files-11 volume, maintaining the initialization parameters specified in the DCL command INITIALIZE	INITIALIZE ddcu: volume-name/new-parameters MOUNT/FOREIGN ddcu: BACKUP/IMAGE save-set-specifier ddcu:/NOINITIALIZE/TRUNCATE \$ INITIALIZE DBA1: UTTLPACK/CLUSTER=5 \$ MOUNT/FOREIGN DBA1: \$ BACKUP/IMAGE MTA0:17AUG.BCK DBA1:/NOINITIALIZE/TRUNCATE

Table BCK-4 shows BACKUP command formats for copy operations, including some of the qualifiers you can use with a copy operation.

BACKUP

BACKUP Examples

Table BCK-4 Copy Operation Quick Reference Table

Command Action	Command Format
Copies a directory tree to another directory tree	BACKUP [directory...] [directory...] \$ BACKUP [DAKOTA...] [SUNDANCE...]
Copies a file to another file	BACKUP file-spec file-spec \$ BACKUP LOGIN.COM [.SAVE]OLDLOGIN.COM
Copies a disk volume to another disk volume	BACKUP/IMAGE ddcu: ddcu: \$ BACKUP/IMAGE DBA1: DBA2:
Copies a disk volume to another disk volume using the /PHYSICAL qualifier	BACKUP/PHYSICAL ddcu: ddcu: \$ BACKUP/PHYSICAL DYA1: DYA2:
Copies two disk volume set using the /IMAGE qualifier	BACKUP/IMAGE volume-set-name ddcu:,ddcu: \$ BACKUP/IMAGE USER\$: DBA1:,DBA2:

Table BCK-5 shows BACKUP command formats for compare operations, including some of the qualifiers you can use with a compare operation.

Table BCK-5 Compare Operation Quick Reference Table

Command Action	Command Format
Compares two Files-11 files	BACKUP/COMPARE file-spec file-spec \$ BACKUP/COMPARE UPLIFT.EXE;3 UPLIFT.EXE;2
Compares a selected file from a save set save set and a Files-11 file	BACKUP/COMPARE save-set-specifier/select=file-spec file-spec \$ BACKUP/COMPARE MTA0:FEB2.BCK/SELECT=[POUDRE]UPLIFT.PAS - _ \$ UPLIFT.PAS
Compares an image save set and Files-11 files	BACKUP/COMPARE/IMAGE save-set-specifier ddcu: \$ BACKUP/COMPARE/IMAGE MTA0:12OCT.BCK DRA3:

Table BCK-6 shows BACKUP command formats for a list operation, including some of the qualifiers you can use with a list operation.

Table BCK-6 List Operation Quick Reference Table

Command Format	Command Action
Lists the files in a save set at the terminal	BACKUP/LIST save-set-specifier \$ BACKUP/LIST MTA0:1618FEB2.BCK
Lists the files in a save set, write to a file	BACKUP/LIST=file-spec save-set-specifier \$ BACKUP/LIST=NEWLIST.LIS MTA0:1618FEB2.BCK
Lists the files in a save set in full format	BACKUP/LIST/FULL save-set-specifier \$ BACKUP/LIST/FULL MTA0:1618FEB2.BCK
Lists selected files in a journal file	BACKUP/LIST/JOURNAL=journal-name/selection-qualifiers \$ BACKUP/LIST/JOURNAL=SYSS\$MANAGER:INCBACKUP - _ \$ /SELECT=[LYKINS.WORK...]/SINCE=1-JAN-1987

A **Valid Combinations of BACKUP Qualifiers**

The following tables list the qualifiers that can be used in BACKUP save, restore, copy and compare operations. The tables also indicate valid combinations of BACKUP qualifiers.

Valid Combinations of BACKUP Qualifiers

Table A-1 Command Qualifiers Used in Save Operations

Command Qualifiers	/[NO]ASSIST	/BRIEF	/BUFFER_COUNT	/DELETE	/FAST	/FULL	/IGNORE	/IMAGE	/[NO]INITIALIZE	/INTERCHANGE	/JOURNAL	/LIST	/[NO]LOG	/PHYSICAL	/RECORD	/VERIFY	/VOLUME
/[NO]ASSIST ¹	—	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
/BRIEF ²	Y	—	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y
/BUFFER_COUNT ³	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/DELETE	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y
/FAST	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
/FULL ²	Y	N	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
/IGNORE	Y	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/IMAGE	Y	Y	Y	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	N	Y	Y	Y
/[NO]INITIALIZE	N	Y	N	Y	Y	Y	Y	Y	—	Y	Y	Y	Y	N	Y	Y	Y
/INTERCHANGE	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y	Y	Y	N	Y	Y	Y
/JOURNAL	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y	Y	N	Y	Y	Y
/LIST	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y ⁴	N	Y	Y	Y
/[NO]LOG	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	N	Y	Y	Y
/PHYSICAL	Y	N	Y	N	N	N	Y	N	N	N	N	N	N	—	N	Y	N
/RECORD	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y	N
/VERIFY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y
/VOLUME ⁵	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	—
Input File-Selection Qualifiers																	
/BACKUP	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/BEFORE	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/BY_OWNER	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/CONFIRM	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/CREATED	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/EXCLUDE	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/EXPIRED	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/MODIFIED	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
/SINCE	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N
Output File Qualifiers																	
/BLOCK_SIZE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/BY_OWNER	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
/COMMENT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/[NO]CRC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/DENSITY ^{1,7}	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
/GROUP_SIZE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/LABEL ¹	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
/PROTECTION	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/[NO]REWIND ¹	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
/SAVE_SET ⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/TAPE_EXPIRATION ¹	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y

¹Use only when saving to magnetic tape save sets.
²You must specify the /LIST qualifier with this qualifier.
³Use only when saving to streaming magnetic tapes.
⁴When you specify /LIST with /LOG, direct the output from the list operation to a file.
⁵You must specify /IMAGE with this qualifier.
⁶Required when creating save sets on disk.
⁷You must specify /REWIND with this qualifier.

Valid Combinations of BACKUP Qualifiers

Table A-2 Input File-Selection Qualifiers Used in Save Operations

Input File-Selection Qualifiers	/BACKUP	/BEFORE	/BY_OWNER	/CONFIRM	/CREATED	/EXCLUDE	/EXPIRED	/MODIFIED	/SINCE
/BACKUP	—	Y	Y	Y	N	Y	N	N	Y
/BEFORE	Y	—	Y	Y	Y	Y	Y	Y	N
/BY_OWNER	Y	Y	—	Y	Y	Y	Y	Y	Y
/CONFIRM	Y	Y	Y	—	Y	Y	Y	Y	Y
/CREATED	N	Y	Y	Y	—	Y	N	N	Y
/EXCLUDE	Y	Y	Y	Y	Y	—	Y	Y	Y
/EXPIRED	N	Y	Y	Y	N	Y	—	N	Y
/MODIFIED	N	Y	Y	Y	N	Y	N	Y	Y
/SINCE	Y	N	Y	Y	Y	Y	Y	Y	—
Output Save-Set Qualifiers									
/BLOCK_SIZE	Y	Y	Y	Y	Y	Y	Y	Y	Y
/BY_OWNER	Y	Y	Y	Y	Y	Y	Y	Y	Y
/COMMENT	Y	Y	Y	Y	Y	Y	Y	Y	Y
/[NO]CRC	Y	Y	Y	Y	Y	Y	Y	Y	Y
/DENSITY ^{1,2}	Y	Y	Y	Y	Y	Y	Y	Y	Y
/GROUP_SIZE	Y	Y	Y	Y	Y	Y	Y	Y	Y
/LABEL ¹	Y	Y	Y	Y	Y	Y	Y	Y	Y
/PROTECTION	Y	Y	Y	Y	Y	Y	Y	Y	Y
/[NO]REWIND ¹	Y	Y	Y	Y	Y	Y	Y	Y	Y
/SAVE_SET ³	Y	Y	Y	Y	Y	Y	Y	Y	Y
/TAPE_EXPIRATION ¹	Y	Y	Y	Y	Y	Y	Y	Y	Y

¹Use only when saving to magnetic tape save sets.

²You must specify /REWIND with this qualifier.

³Required when creating save sets on disk.

Valid Combinations of BACKUP Qualifiers

Table A-3 Output Save-Set Qualifiers Used in Save Operations

Input File-Selection Qualifiers	/BLOCK_SIZE	/BY_OWNER	/COMMENT	/[NO]CRC	/DENSITY	/GROUP_SIZE	/LABEL	/PROTECTION	/[NO]REWIND	/SAVE_SET	/TAPE_EXPIRATION
/BACKUP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/BEFORE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/BY_OWNER	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/CONFIRM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/CREATED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/EXCLUDE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/EXPIRED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/MODIFIED	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/SINCE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Output Save-Set Qualifiers											
/BLOCK_SIZE	—	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/BY_OWNER	Y	—	Y	Y	Y	Y	Y	Y	Y	Y	Y
/COMMENT	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y
/[NO]CRC	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y
/DENSITY ^{1,2}	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	Y
/GROUP_SIZE	Y	Y	Y	Y	Y	—	Y	Y	Y	Y	Y
/LABEL ¹	Y	Y	Y	Y	Y	Y	—	Y	Y	Y	Y
/PROTECTION	Y	Y	Y	Y	Y	Y	Y	—	Y	Y	Y
/[NO]REWIND ¹	Y	Y	Y	Y	Y ²	Y	Y	Y	—	Y	Y
/SAVE_SET ³	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y
/TAPE_EXPIRATION ¹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—

¹Use only when saving to magnetic tape save sets.

²You must specify /REWIND with this qualifier.

³Required when creating save sets on disk.

Valid Combinations of BACKUP Qualifiers

Table A-4 Command Qualifiers Used in Restore Operations

Command Qualifiers	/[NO]ASSIST	/BRIEF	/BUFFER_COUNT	/FULL	/IMAGE	/INCREMENTAL	/[NO]INITIALIZE	/LIST	/[NO]LOG	/PHYSICAL	/[NO]TRUNCATE	/VERIFY	/VOLUME
[NO]ASSIST ¹	—	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
/BRIEF ²	Y	—	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y
/BUFFER_COUNT ³	Y	Y	—	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
/FULL ²	Y	N	Y	—	Y	Y	Y	Y	Y	N	Y	Y	Y
/IMAGE	Y	Y	Y	Y	—	N	Y	Y	Y	N	Y	Y	Y
/INCREMENTAL	Y	Y	Y	Y	N	—	N	Y	Y	N	Y	Y	Y
/[NO]INITIALIZE	N	Y	N	Y	Y	N	—	Y	Y	N	Y	Y	Y
/LIST	Y	Y	Y	Y	Y	Y	Y	—	Y ⁴	N	Y	Y	Y
/[NO]LOG	Y	Y	Y	Y	Y	Y	Y	Y ⁴	Y	N	Y	Y	Y
/PHYSICAL	Y	N	Y	N	N	N	N	N	N	—	N	Y	N
/[NO]TRUNCATE	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	—	Y	Y
/VERIFY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y
/VOLUME ⁵	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	—
Input													
Save-Set Qualifiers													
/[NO]CRC	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
/LABEL ¹	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
/[NO]REWIND ¹	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
/SAVE_SET ⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/SELECT	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	Y	N
Output													
File Qualifiers													
/BY_OWNER	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
/NEW_VERSION	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	Y
/OVERLAY	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y
/REPLACE	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y

¹Use only when restoring from magnetic tape save sets.

²You must specify the /LIST qualifier with this qualifier.

³Use only when restoring save sets from streaming magnetic tape.

⁴When you specify /LIST with /LOG, direct the output from the list operation to a file.

⁵You must specify /IMAGE with this qualifier.

⁶Required when restoring save sets from disk.

Valid Combinations of BACKUP Qualifiers

Table A-5 Input Save-Set Qualifiers Used in Restore Operations

Input Save-Set Qualifiers	/[NO]CRC	/[NO]REWIND	/SAVE_SET	/SELECT
/[NO]CRC	—	Y	Y	Y
/[NO]REWIND ¹	Y	—	Y	Y
/SAVE_SET ²	Y	Y	—	Y
/SELECT	Y	Y	Y	—

Output File Qualifiers				
/BY_OWNER	Y	Y	Y	Y
/NEW_VERSION	Y	Y	Y	Y
/OVERLAY	Y	Y	Y	Y
/REPLACE	Y	Y	Y	Y

¹Use only when restoring from magnetic tape save sets.

²Required when restoring save sets from disk.

Table A-6 Output File Qualifiers Used in Restore Operations

Input Save-Set Qualifiers	/BY_OWNER	/NEW_VERSION	/OVERLAY	/REPLACE
/[NO]CRC	Y	Y	Y	Y
/[NO]REWIND ¹	Y	Y	Y	Y
/SAVE_SET ²	Y	Y	Y	Y
/SELECT	Y	Y	Y	Y

Output File Qualifiers				
/BY_OWNER	—	Y	Y	Y
/NEW_VERSION	Y	—	N	N
/OVERLAY	Y	N	—	N
/REPLACE	Y	N	N	—

¹Use only when restoring from magnetic tape save sets.

²Required when restoring save sets from disk.

Valid Combinations of BACKUP Qualifiers

Table A-7 Command Qualifiers Used in Copy Operations

Command Qualifiers	/BRIEF	/DELETE	/FAST	/FULL	/IGNORE	/IMAGE	/[NO]INITIALIZE	/LIST	/[NO]LOG	/PHYSICAL	/RECORD	/[NO]TRUNCATE	/VERIFY	/VOLUME
/BRIEF ¹	—	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
/DELETE	Y	—	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
/FAST	Y	Y	—	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
/FULL ¹	N	Y	Y	—	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
/IGNORE	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y	Y
/IMAGE	Y	Y	Y	Y	Y	—	Y	Y	Y	N	Y	Y	Y	Y
/[NO]INITIALIZE	Y	Y	Y	Y	Y	Y	—	Y	Y	N	Y	Y	Y	Y
/LIST	Y	Y	Y	Y	Y	Y	Y	—	Y ²	Y	Y	Y	Y	Y
/[NO]LOG	Y	Y	Y	Y	Y	Y	Y	Y ²	—	N	Y	Y	Y	Y
/PHYSICAL	N	N	N	N	Y	N	N	N	N	—	N	N	Y	N
/RECORD	Y	N	Y	Y	Y	Y	Y	Y	Y	N	—	Y	Y	Y
/[NO]TRUNCATE	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	—	Y	Y
/VERIFY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	Y
/VOLUME ³	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	—
Input File-Selection Qualifiers														
/BACKUP	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/BEFORE	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/BY_OWNER	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/CONFIRM	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/CREATED	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/EXCLUDE	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/EXPIRED	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/MODIFIED	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/SINCE	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
Output File Qualifiers														
/BY_OWNER	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/NEW_VERSION	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N	N
/OVERLAY	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
/REPLACE	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N

¹You must specify the /LIST qualifier with this qualifier.

²When you specify /LIST with /LOG, direct the output from the list operation to a file.

³You must specify /IMAGE with this qualifier.

Valid Combinations of BACKUP Qualifiers

Table A-8 Input File-Selection Qualifiers Used in Copy Operations

Input File-Selection Qualifiers	/BACKUP	/BEFORE	/BY_OWNER	/CONFIRM	/CREATED	/EXCLUDE	/EXPIRED	/MODIFIED	/SINCE
/BACKUP	—	Y	Y	Y	N	Y	N	N	Y
/BEFORE	Y	—	Y	Y	Y	Y	Y	Y	N
/BY_OWNER	Y	Y	—	Y	Y	Y	Y	Y	Y
/CONFIRM	Y	Y	Y	—	Y	Y	Y	Y	Y
/CREATED	N	Y	Y	Y	—	Y	N	N	Y
/EXCLUDE	Y	Y	Y	Y	Y	—	Y	Y	Y
/EXPIRED	N	Y	Y	Y	N	Y	—	N	Y
/MODIFIED	N	Y	Y	Y	N	Y	N	—	Y
/SINCE	Y	N	Y	Y	Y	Y	Y	Y	—
Output File Qualifiers									
/BY_OWNER	Y	Y	Y	Y	Y	Y	Y	Y	Y
/NEW_VERSION	Y	Y	Y	Y	Y	Y	Y	Y	Y
/OVERLAY	Y	Y	Y	Y	Y	Y	Y	Y	Y
/REPLACE	Y	Y	Y	Y	Y	Y	Y	Y	Y

ZK-6532-HC

Valid Combinations of BACKUP Qualifiers

Table A-9 Output File Qualifiers Used in Copy Operations

Input File- Selection Qualifiers	/BY_OWNER	/NEW_VERSION	/OVERLAY	/REPLACE
/BACKUP	Y	Y	Y	Y
/BEFORE	Y	Y	Y	Y
/BY_OWNER	Y	Y	Y	Y
/CONFIRM	Y	Y	Y	Y
/CREATED	Y	Y	Y	Y
/EXCLUDE	Y	Y	Y	Y
/EXPIRED	Y	Y	Y	Y
/MODIFIED	Y	Y	Y	Y
/SINCE	Y	Y	Y	Y
Output File Qualifiers				
/BY_OWNER	—	Y	Y	Y
/NEW_VERSION	Y	—	N	N
/OVERLAY	Y	N	—	N
/REPLACE	Y	N	N	—

Valid Combinations of BACKUP Qualifiers

Table A-10 Command Qualifiers Used in Compare Operations

Command Qualifiers	/[NO]ASSIST	/BRIEF	/BUFFER COUNT	/COMPARE	/FAST	/FULL	/IMAGE	/LIST	/[NO]LOG	/PHYSICAL	/VOLUME
/[NO]ASSIST ¹	—	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
/BRIEF ²	Y	—	Y	Y	Y	N	Y	Y	Y	Y	Y
/BUFFER_COUNT ³	Y	Y	—	Y	Y	Y	Y	Y	Y	Y	Y
/COMPARE	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y
/FAST	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	Y
/FULL ²	Y	N	Y	Y	Y	—	Y	Y	Y	Y	Y
/IMAGE	Y	Y	Y	Y	Y	Y	—	Y	Y	N	Y
/LIST	Y	Y	Y	Y	Y	Y	Y	—	Y ⁴	Y	Y
/[NO]LOG	Y	Y	Y	Y	Y	Y	Y	Y ⁴	—	Y	Y
/PHYSICAL	Y	Y	Y	Y	Y	Y	N	Y	Y	—	Y
/VOLUME ⁵	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	—
Input File-Selection Qualifiers											
/BY_OWNER	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N
/BEFORE	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N
/EXCLUDE	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N
/SINCE	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N

¹Use only when comparing magnetic tape save sets.
²You must specify the /LIST qualifier with this qualifier.
³Use only when comparing save sets on streaming magnetic tapes.
⁴When you specify /LIST with /LOG, direct the output from the list operation to a file.
⁵You must specify /IMAGE with this qualifier.

Valid Combinations of BACKUP Qualifiers

Table A–11 Input File-Selection Qualifiers Used in Compare Operations

Input File-Selection Qualifiers				
Qualifiers	/BY_OWNER	/BEFORE	/EXCLUDE	/SINCE
/BY_OWNER	—	Y	Y	Y
/BEFORE	Y	—	Y	N
/EXCLUDE	Y	Y	—	Y
/SINCE	Y	No	Y	—

Input Save-Set Qualifiers				
/[NO]REWIND ¹	Y	Y	Y	Y
/SAVE_SET ²	Y	Y	Y	Y
/SELECT	Y	Y	Y	Y

¹Use only when comparing magnetic tape save sets.

²Required when comparing save sets on disk.

Table A–12 Input Save-Set Qualifiers Used in Compare Operations

Input File-Selection Qualifiers			
Qualifiers	/[NO]REWIND	/SAVE_SET	/SELECT
/BY_OWNER	Y	Y	Y
/BEFORE	Y	Y	Y
/EXCLUDE	Y	Y	Y
/SINCE	Y	Y	Y

Input Save-Set Qualifiers			
/[NO]REWIND ¹	—	Y	Y
/SAVE_SET ²	Y	—	Y
/SELECT	Y	Y	—

¹Use only when comparing magnetic tape save sets.

²Required when comparing save sets on disk.

Index

A

/ASSIST qualifier • BCK-11, BCK-29

B

BACKUP media

- Files-11 disk save set • BCK-7, BCK-12
- magnetic tape save set • BCK-8
- multivolume save set • BCK-14
- network save set • BCK-12
- on Files-11 disk attached to a remote node • BCK-7
- sequential-disk save set • BCK-13

BACKUP operation modes • BCK-16

/BACKUP qualifier • BCK-30

Backup Utility (BACKUP)

- directing output from • BCK-26
- exiting from • BCK-27
- invoking • BCK-26

/BEFORE qualifier • BCK-31

Beginning-of-tape marker • BCK-81, BCK-84

/BLOCK_SIZE qualifier • BCK-32

/BRIEF qualifier • BCK-33

/BUFFER_COUNT qualifier • BCK-34

/BY_OWNER qualifier

- as input file qualifier • BCK-35
 - as output file qualifier • BCK-36
 - as output save-set qualifier • BCK-37
-

C

Command syntax • BCK-2

/COMMENT qualifier • BCK-38

Compare operations • BCK-21, BCK-39

/COMPARE qualifier • BCK-39

/CONFIRM qualifier • BCK-41

Copy operations • BCK-19

/CRC qualifier

- as input save-set qualifier • BCK-42
- as output save-set qualifier • BCK-43

/CREATED qualifier • BCK-44

D

/DELETE qualifier • BCK-45

/DENSITY qualifier • BCK-46

E

Element lists • BCK-4

End-of-tape • BCK-84

Error options

- for fatal errors • BCK-25

Examples

- comparing files • BCK-21, BCK-39
- copying files • BCK-16, BCK-19
- creating a journal file • BCK-61
- image mode • BCK-56
- incremental save operation • BCK-16, BCK-57
- initializing an output disk • BCK-59
- physical save operation • BCK-17
- protecting an output save-set • BCK-77
- restoring files • BCK-18
- saving entire volumes • BCK-17
- saving files • BCK-18
- selective save operation • BCK-16
- specifying a save-set label • BCK-65
- specifying block size • BCK-32
- specifying density for magnetic tape • BCK-46
- specifying I/O buffers • BCK-34
- specifying redundancy group blocks • BCK-52
- using wildcards • BCK-6

/EXCLUDE qualifier • BCK-47

/EXPIRED qualifier • BCK-48

F

/FAST qualifier • BCK-49

Files-11 disk

- save set • BCK-12

Full backup

- see Image mode

/FULL qualifier • BCK-20, BCK-50

Index

G

/GROUP_SIZE qualifier • BCK-52

I

/IGNORE qualifier • BCK-53
 LABEL_PROCESSING option • BCK-8
Image mode • BCK-17, BCK-55
/IMAGE qualifier • BCK-55
Incremental mode • BCK-16
 restoring files • BCK-57
/INCREMENTAL qualifier • BCK-57
/INITIALIZE qualifier • BCK-59
Input specifier • BCK-2
/INTERCHANGE qualifier • BCK-60

J

Journal file
 definition of • BCK-22
 listing contents of • BCK-20, BCK-22
/JOURNAL qualifier • BCK-20, BCK-22, BCK-61

L

/LABEL qualifier • BCK-64
List operations • BCK-19, BCK-20
/LIST qualifier • BCK-66
Logical end-of-tape marker • BCK-84
/LOG qualifier • BCK-68

M

Magnetic tape
 automatic tape loading • BCK-8
 automatic tape mounting • BCK-10
 initializing • BCK-9
 save set • BCK-8
 tape label processing • BCK-8
Modes of operation • BCK-16
 file • BCK-16

Modes of operation (cont'd.)
 image • BCK-17, BCK-55
 incremental • BCK-16
 physical • BCK-17, BCK-75
 selective • BCK-16
/MODIFIED qualifier • BCK-69
Mount error message • BCK-83

N

Network save set • BCK-12
/NEW_VERSION qualifier • BCK-70
/NOREWIND qualifier
 as output save-set qualifier • BCK-82

O

Operations • BCK-17
 compare • BCK-21, BCK-39
 copy • BCK-19
 list • BCK-20, BCK-66
 performed by BACKUP • BCK-1
 restore • BCK-18
 save • BCK-17
Output specifier • BCK-2
/OVERLAY qualifier • BCK-71
/OWNER_UIC qualifier
 as input file qualifier • BCK-72
 as output file qualifier • BCK-73
 as output save-set qualifier • BCK-74

P

Physical mode • BCK-17, BCK-75
/PHYSICAL qualifier • BCK-75
Privileges
 needed to perform BACKUP
 operations • BCK-27
/PROTECTION qualifier • BCK-77

Q

Qualifier
 input file-selection • BCK-2

Qualifier (cont'd.)

- input save-set • BCK-2
- output file • BCK-2
- output save-set • BCK-2
- position-dependent • BCK-2

R

- /RECORD qualifier • BCK-79
- /REPLACE qualifier • BCK-80
- REPLY command
 - restarting BACKUP operations with • BCK-8
- Restore operations • BCK-18
- /REWIND qualifier • BCK-12
 - as input save-set qualifier • BCK-81
 - as output save-set qualifier • BCK-82

S

- Save operations • BCK-17
- Save set • BCK-7
 - creating • BCK-17
 - description of • BCK-1
 - directing output to • BCK-26
 - Files-11 disk • BCK-12
 - listing contents of • BCK-19
 - magnetic tape • BCK-8
 - media used for storing • BCK-3
 - multivolume • BCK-14, BCK-19
 - network • BCK-12
 - protection of • BCK-15
- Save-set specification • BCK-3
 - /SAVE_SET qualifier
 - as input save-set qualifier • BCK-85
 - as output save-set qualifier • BCK-86
- Selective mode • BCK-16
 - /SELECT qualifier • BCK-87
- Sequential-disk save set • BCK-13
 - initializing • BCK-13
 - mounting • BCK-13
- /SINCE qualifier • BCK-88
- Specifier
 - input and output • BCK-2
 - using element lists in • BCK-4
 - using wildcard characters in • BCK-5
- SPECIFY error options • BCK-25
- Standalone BACKUP
 - building kit on a disk • BCK-22

Standalone BACKUP (cont'd.)

- description of • BCK-1
- qualifiers • BCK-24
- Syntax
 - of BACKUP commands • BCK-2

T

- Tape label processing • BCK-8
 - /TAPE_EXPIRATION qualifier • BCK-10, BCK-89
 - /TRUNCATE qualifier • BCK-90

V

- /VERIFY qualifier • BCK-91
- Volume label
 - definition • BCK-9
- /VOLUME qualifier • BCK-93
- Volume set
 - image save operation • BCK-17, BCK-55
 - saving contents of • BCK-14

W

- Wildcard characters • BCK-5

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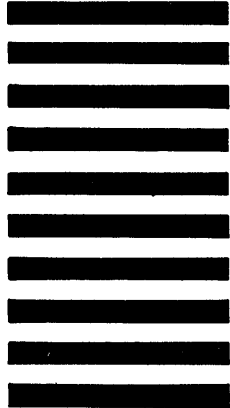
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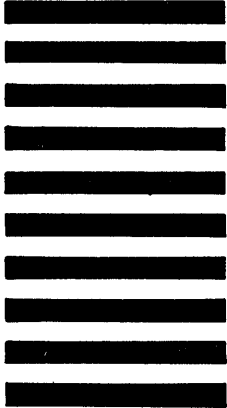
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