Oracle9*i*

Recovery Manager Reference

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Oracle9*i* Recovery Manager Reference, Release 1 (9.0.1)

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Preface

This guide contains command syntax, recovery catalog views descriptions, and related reference information about the Recovery Manager utility.

This preface contains these topics:

Audience

This manual is intended for database administrators who perform the following tasks:

- Back up, restore, and recover Oracle databases
- Perform maintenance on backups and copies of database files

To use this document, you need to know the following:

- Relational database concepts and basic database administration as described in *Oracle9i Database Concepts* and the *Oracle9i Database Administrator's Guide*
- Basic backup and recovery concepts and strategies as described in the *Oracle9i Backup and Recovery Concepts*
- Basic RMAN concepts and tasks as described in *Oracle9i Recovery Manager User's Guide*
- The operating system environment under which you are running Oracle

Organization

This document contains:

Chapter 1, "About RMAN Commands"

This chapter describes the basic conventions of RMAN syntax.

Chapter 2, "RMAN Commands"

This chapter displays the RMAN syntax diagrams, describes the elements of the syntax, and provides examples.

Chapter 3, "Recovery Catalog Views"

This chapter describes the recovery catalog views.

Appendix A, "Deprecated RMAN Commands"

This appendix describes RMAN syntax that is deprecated (that is, no longer supported) but still functional.

Appendix B, "RMAN Compatibility"

This appendix shows the compatible combinations of the RMAN executable, target database, recovery catalog database, and recovery catalog schema.

Related Documentation

For more information, see these Oracle resources:

- *Oracle9i Recovery Manager User's Guide*
- *Oracle9i Backup and Recovery Concepts*
- *Oracle9i User-Managed Backup and Recovery Guide*
- *Oracle9i Database Utilities*
- `http://www.oracle.com/database/recovery`

You can access information about the Backup Solutions Program at

`http://www.oracle.com/ip/deploy/database/features/recovery/index.html?backupsp.html`

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`http://technet.oracle.com/docs/index.htm`

Conventions

This section describes the conventions used in the text and code examples of this documentation set. It describes:

- Conventions in Text
- Conventions in Code Examples

Conventions in Text

We use various conventions in text to help you more quickly identify special terms. The following table describes those conventions and provides examples of their use.

Convention	Meaning	Example
Bold	Bold typeface indicates terms that are defined in the text or terms that appear in a glossary, or both.	When you specify this clause, you create an **index-organized table**.
Italics	Italic typeface indicates book titles or emphasis.	*Oracle9i Database Concepts* Ensure that the recovery catalog and target database do *not* reside on the same disk.
`UPPERCASE monospace (fixed-width font)`	Uppercase monospace typeface indicates elements supplied by the system. Such elements include parameters, privileges, datatypes, RMAN keywords, SQL keywords, SQL*Plus or utility commands, packages and methods, as well as system-supplied column names, database objects and structures, usernames, and roles.	You can specify this clause only for a `NUMBER` column. You can back up the database by using the `BACKUP` command. Query the `TABLE_NAME` column in the `USER_TABLES` data dictionary view. Use the `DBMS_STATS.GENERATE_STATS` procedure.
`lowercase monospace (fixed-width font)`	Lowercase monospace typeface indicates executables, filenames, directory names, and sample user-supplied elements. Such elements include computer and database names, net service names, and connect identifiers, as well as user-supplied database objects and structures, column names, packages and classes, usernames and roles, program units, and parameter values. **Note:** Some programmatic elements use a mixture of UPPERCASE and lowercase. Enter these elements as shown.	Enter `sqlplus` to open SQL*Plus. The password is specified in the `orapwd` file. Back up the datafiles and control files in the `/disk1/oracle/dbs` directory. The `department_id`, `department_name`, and `location_id` columns are in the `hr.departments` table. Set the `QUERY_REWRITE_ENABLED` initialization parameter to `true`. Connect as `oe` user. The `JRepUtil` class implements these methods.
`lowercase monospace (fixed-width font) italic`	Lowercase monospace italic font represents placeholders or variables.	You can specify the *`parallel_clause`*. Run `U`*`old_release`*`.SQL` where *`old_release`* refers to the release you installed prior to upgrading.

Conventions in Code Examples

Code examples illustrate SQL, PL/SQL, SQL*Plus, or other command-line statements. They are displayed in a monospace (fixed-width) font and separated from normal text as shown in this example:

```
SELECT username FROM dba_users WHERE username = 'MIGRATE';
```

The following table describes typographic conventions used in code examples and provides examples of their use.

Convention	Meaning	Example
[ ]	Brackets enclose one or more optional items. Do not enter the brackets.	`DECIMAL (digits [ , precision ])`
{ }	Braces enclose two or more items, one of which is required. Do not enter the braces.	`{ENABLE | DISABLE}`
|	A vertical bar represents a choice of two or more options within brackets or braces. Enter one of the options. Do not enter the vertical bar.	`{ENABLE | DISABLE}` `[COMPRESS | NOCOMPRESS]`
...	Horizontal ellipsis points indicate either:	
	■ That we have omitted parts of the code that are not directly related to the example	`CREATE TABLE ... AS subquery;`
	■ That you can repeat a portion of the code	`SELECT col1, col2, ... , coln FROM employees;`
. . .	Vertical ellipsis points indicate that we have omitted several lines of code not directly related to the example.	
Other notation	You must enter symbols other than brackets, braces, vertical bars, and ellipsis points as shown.	`acctbal NUMBER(11,2);` `acct CONSTANT NUMBER(4) := 3;`
Italics	Italicized text indicates placeholders or variables for which you must supply particular values.	`CONNECT SYSTEM/system_password` `DB_NAME = database_name`

Convention	Meaning	Example

UPPERCASE	Uppercase typeface indicates elements supplied by the system. We show these terms in uppercase in order to distinguish them from terms you define. Unless terms appear in brackets, enter them in the order and with the spelling shown. However, because these terms are not case sensitive, you can enter them in lowercase.	`SELECT last_name, employee_id FROM employees;`
		`SELECT * FROM USER_TABLES;`
		`DROP TABLE hr.employees;`

lowercase	Lowercase typeface indicates programmatic elements that you supply. For example, lowercase indicates names of tables, columns, or files.
	Note: Some programmatic elements use a mixture of UPPERCASE and lowercase. Enter these elements as shown.
		`SELECT last_name, employee_id FROM employees;`
		`sqlplus hr/hr`
		`CREATE USER mjones IDENTIFIED BY ty3MU9;`

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`http://www.oracle.com/accessibility/`

JAWS, a Windows screen reader, may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, JAWS may not always read a line of text that consists solely of a bracket or brace.

1

About RMAN Commands

This chapter describes the basic elements of RMAN syntax. It includes the following sections:

- Conventions Used in this Reference
- Command Entries

Conventions Used in this Reference

This section explains the conventions used in this chapter including:

- Text Conventions
- Syntax Diagrams and Notation
- RMAN Code Examples

Text Conventions

The text in this reference adheres to the following conventions:

`UPPERCASE monospace`	Uppercase monospace text calls attention to RMAN keywords, SQL keywords, column headings in tables and views, and initialization parameters.
`lowercase monospace`	Lowercase monospace text calls attention to variable text in RMAN examples.
`italics`	Italicized monospace text calls attention to RMAN or SQL placeholders, that is, text that should not be entered as-is but represents a value to be entered by the user.

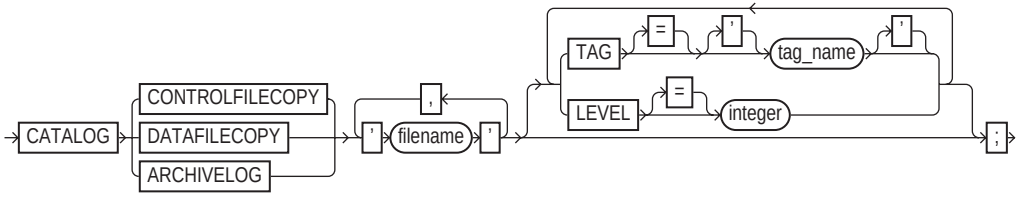
Syntax Diagrams and Notation

This section describes the conventions for RMAN command syntax.

Syntax Diagrams

This reference uses syntax diagrams to show Recovery Manager commands. These syntax diagrams use lines and arrows to show syntactic structure, as shown in Figure 1–1.

Figure 1–1 CATALOG Command



This section describes the components of syntax diagrams and gives examples of how to write RMAN commands. Syntax diagrams are made up of these items:

- Keywords
- Placeholders

Keywords Keywords have special meanings in Recovery Manager syntax. In the syntax diagrams, keywords appear in rectangular boxes and an uppercase font, like the word CATALOG in Figure 1–1. When used in text and code examples, RMAN keywords appear in uppercase, monospace font, for example, `CATALOG DATAFILECOPY`. You must use keywords in RMAN statements exactly as they appear in the syntax diagram, except that they can be either uppercase or lowercase.

The RMAN language is free-form. Keywords must be separated by at least one white space character, but otherwise there are no restrictions. A command can span multiple lines.

Placeholders Placeholders in syntax diagrams indicate non-keywords. In the syntax diagrams, they appear in ovals, as in the word *integer* in Figure 1–1. When described in text, RMAN placeholders appear in lowercase italic, for example, *'filename'*. Placeholders are usually:

- Names of database objects (*tablespace_name*)
- Oracle datatype names (*date_string*)
- subclauses (*datafileSpec*)

When you see a placeholder in a syntax diagram, substitute an object or expression of the appropriate type in the RMAN statement. For example, to write a `DUPLICATE TARGET DATABASE TO` *'database_name'* command, use the name of the duplicate database you want to create, such as `dupdb`, in place of the *database_name* placeholder in the diagram.

Some placeholder values are enclosed in required or optional quotes. The syntax diagrams show single quotes, though in all cases double quotes are also legal in RMAN syntax. For example, you specify either *'filename'* or *"filename"*. For the SQL command, it is recommended that you use double quotes because the SQL statement itself may also contain a quote, and the most common type of quote in a SQL statement is a single quote. Single and double quotes do not mean the same in SQL as they do in RMAN.

The following table shows placeholders that appear in the syntax diagrams and provides examples of the values you might substitute for them in your statements.

Placeholder	Description	Examples
quoted strings such as *'filename'*, *'tablespace_name'*, *'channel_name'*, *'channel_parms'*	A string of characters contained in either single or double quotes. A quoted string may contain white space, punctuation, and RMAN and SQL keywords.	`"?/dbs/cf.f"` `'dev1'`
nonquoted strings such as *channel_id*, *tag_name*, *date_string*	A sequence of characters containing no white space and no punctuation characters and starting with an alphabetic character.	`ch1`
integer	Any sequence of only number characters.	`67843`

Reserved Words

Table 1–1 is a list of RMAN reserved words. If you use one of these words by itself without surrounding it in quotes, then RMAN generates an error. These are examples of correct and incorrect entries:

```
ALLOCATE CHANNEL backup DEVICE TYPE DISK;        # incorrect
ALLOCATE CHANNEL 'backup' DEVICE TYPE DISK;      # correct
BACKUP DATABASE TAG full;                        # incorrect
BACKUP DATABASE TAG 'full';                      # correct
```

Table 1–1 RMAN Reserved Words **(Page 1 of 2)**

ABORT	AFFINITY	AFTER	ALL	ALLOCATE	ALTER	AND
APPEND	ARCHIVELOG	AT	AUXILIARY	AUXNAME	AVAILABLE	BACKSLASH
BACKUP	BACKUPPIECE	BACKUPSET	BEFORE	BEGINLINE	BETWEEN	CANCEL
CATALOG	CHANGE	CHANNEL	CHANNEL_ID	CHECK	CLONE	CLONE_CF

Table 1–1 RMAN Reserved Words **(Page 2 of 2)**

CLONENAME	CMDFILE	CHECK	CLONE	CLONE_CF	CLONENAME	CMDFILE
COMMAND	COMPLETED	CONNECT	CONTROLFILE	CONTROLFILECOPY	COPY	CREATE
CROSSCHECK	CUMULATIVE	CURRENT	DATABASE	DATAFILE	DATAFILECOPY	DAYS
DBA	DBID	DEBUG	DEFINE	DELETE	DESTINATION	DEVICE
DISK	DISKRATIO	DROP	DUMP	DUPLEX	DUPLICATE	ECHO
EQUAL	EXECUTE	EXIT	EXPIRED	FILESPERSET	FOR	FORCE
FOREVER	FORMAT	FROM	FULL	GROUP	HIGH	HOST
ID	INACCESSIBLE	INCARNATION	INCLUDE	INCREMENTAL	INPUT	INTEGER
IMMEDIATE	JOB	K	KBYTES	LEVEL	LIBPARM	LIBRARY
LIKE	LIMIT	LIST	LOG	LOGFILE	LOGICAL	LOGSEQ
LOW	MAXCORRUPT	MAXOPENFILES	MSGLOG	MASK	MSGNO	MAINTENANCE
MOUNT	M	NAME	NEED	NEWNAME	NOCHECKSUM	NOCATALOG
NEWLINE	NOREDO	NORMAL	NOMOUNT	NOFILENAMECHECK	NULL	OF
OFFLINE	ORPHAN	OBSOLETE	OPEN	ON	OFF	ONLY
PARMS	PLSQL	PRINT	PFILE	PROXY	POOL	PIPE
RCVCAT	RELEASE	RELOAD	REPLACE	REPLICATE	REPORT	RECOVERABLE
RESET	RESTART	RESTORE	RESYNC	RMAN	RPCTESTRUN	READONLY
READRATE	RECOVER	REDUNDANCY	REGISTER	REUSE	SCHEMA	SCN
SCRIPT	SEND	SET	SETLIMIT	SETSIZE	SHUTDOWN	SIZE
SKIP	SLAXDEBUG	SQL	STARTUP	STEP	TABLESPACE	TAG
TARGET	TEST	THREAD	TIME	TIMEOUT	TO	TRACE
TRANSACTIONAL	TYPE	UNAVAILABLE	UNCATALOG	UNDERSCORE	UNRECOVERABLE	UNTIL
UPGRADE	VALIDATE					

RMAN Code Examples

This reference contains many examples of RMAN commands. These examples show you how to use elements of RMAN. This example shows the use of a BACKUP command:

```
RUN
{
  ALLOCATE CHANNEL ch1 DEVICE TYPE sbt;
```

```
  BACKUP DATABASE;
}
```

Note that examples are set off from the text and appear in a monospace font.

Command Entries

The description of each command or subclause contains the following sections:

Syntax	Shows the keywords and parameters that make up the statement. **Note:** Not all keywords and parameters are valid in all circumstances. Be sure to refer to the "Keywords and Parameters" section of each statement to learn about any restrictions on the syntax.
Purpose	Describes the basic uses of the statement.
Restrictions and Usage Notes	Lists requirements, restrictions, and guidelines for proper use of the command.
Keywords and Parameters	Describes the purpose of each keyword and parameter. Restrictions and usage notes also appear in this section.
Examples	Shows how to use various clauses and options of the statement. **Note:** Optional sections following the examples provide more information on how and when to use the statement.

2

RMAN Commands

This chapter describes, in alphabetical order, Recovery Manager commands and subclauses. For a summary of the RMAN commands and command-line options, refer to "Summary of RMAN Commands" on page 2-2.

Summary of RMAN Commands

Table 2–1 provides a functional summary of RMAN commands that you can execute at the RMAN prompt, within a RUN command, or both. All commands from previous RMAN releases work with the current release. For RMAN options that you can specify on the operating system command line, refer to "cmdLine" on page 2-57.

Table 2–1 Recovery Manager Commands

Command	Purpose
"@" on page 2-6	Run a command file.
"@@" on page 2-7	Run a command file in the same directory as another command file that is currently running. The @@ command differs from the @ command only when run from within a command file.
"ALLOCATE CHANNEL" on page 2-9	Establish a channel, which is a connection between RMAN and a database instance.
"ALLOCATE CHANNEL FOR MAINTENANCE" on page 2-13	Allocate a channel in preparation for issuing maintenance commands such as DELETE.
"allocOperandList" on page 2-16	A subclause that specifies channel control options such as PARMS, FORMAT, and MAXOPENFILES.
"ALTER DATABASE" on page 2-20	Mount or open a database.
"archivelogRecordSpecifier" on page 2-22	Specify a range of archived redo logs files.
"BACKUP" on page 2-26	Back up a database, tablespace, datafile, archived log, or backup set.
"BLOCKRECOVER" on page 2-46	Recover an individual data block or set of data blocks within one or more datafiles.
"CATALOG" on page 2-50	Add information about a datafile copy, archived redo log, or control file copy to the repository.
"CHANGE" on page 2-53	Mark a backup piece, image copy, or archived redo log as having the status UNAVAILABLE or AVAILABLE; remove the repository record for a backup or copy; override the retention policy for a backup or copy.
"completedTimeSpec" on page 2-61	Specify a time range during which the backup or copy completed.
"CONFIGURE" on page 2-63	Configure persistent RMAN settings. These settings apply to all RMAN sessions until explicitly changed or disabled.

Table 2–1 Recovery Manager Commands

Command	Purpose
"CONNECT" on page 2-76	Establish a connection between RMAN and a target, auxiliary, or recovery catalog database.
"connectStringSpec" on page 2-79	Specify the username, password, and net service name for connecting to a target, recovery catalog, or auxiliary database. The connection is necessary to authenticate the user and identify the database.
"COPY" on page 2-81	Create an image copy of a datafile, control file, or archived redo log.
"CREATE CATALOG" on page 2-86	Create the schema for the recovery catalog.
"CREATE SCRIPT" on page 2-88	Create a stored script and store it in the recovery catalog.
"CROSSCHECK" on page 2-92	Determine whether files managed by RMAN, such as archived logs, datafile copies, and backup pieces, still exist on disk or tape.
"datafileSpec" on page 2-95	Specify a datafile by filename or absolute file number.
"DELETE" on page 2-96	Delete backups and copies, remove references to them from the recovery catalog, and update their control file records to status DELETED.
"DELETE SCRIPT" on page 2-100	Delete a stored script from the recovery catalog.
"deviceSpecifier" on page 2-101	Specify the type of storage device for a backup or copy.
"DROP CATALOG" on page 2-102	Remove the schema from the recovery catalog.
"DUPLICATE" on page 2-103	Use backups of the target database to create a duplicate database that you can use for testing purposes or to create a standby database.
"EXECUTE SCRIPT" on page 2-112	Run an RMAN stored script.
"EXIT" on page 2-113	Quit the RMAN executable.
"HOST" on page 2-114	Invoke an operating system command-line subshell from within RMAN or run a specific operating system command.
"keepOption" on page 2-116	Specify that a backup or copy should or should not be exempt from the current retention policy.
"LIST" on page 2-118	Produce a detailed listing of backup sets or copies.
"listObjList" on page 2-135	A subclause used to specify which items will be displayed by the LIST command.
"maintQualifier" on page 2-137	A subclause used to specify additional options for maintenance commands such as DELETE and CHANGE.

Table 2–1 Recovery Manager Commands

Command	Purpose
"obsOperandList" on page 2-139	A subclause used to determine which backups and copies are obsolete.
"PRINT SCRIPT" on page 2-141	Display a stored script.
"QUIT" on page 2-143	Exit the RMAN executable.
"recordSpec" on page 2-144	A subclause used to specify which objects the maintenance commands should operate on.
"RECOVER" on page 2-146	Apply redo logs or incremental backups to a restored backup set or copy in order to update it to a specified time.
"REGISTER" on page 2-152	Register the target database in the recovery catalog.
"RELEASE CHANNEL" on page 2-154	Release a channel that was allocated with an `ALLOCATE CHANNEL` command.
"releaseForMaint" on page 2-155	Release a channel allocated with an `ALLOCATE CHANNEL FOR MAINTENANCE` command.
"REPLACE SCRIPT" on page 2-156	Replace an existing script stored in the recovery catalog. If the script does not exist, then `REPLACE SCRIPT` creates it.
"REPLICATE" on page 2-160	Copy the control file to all the locations specified in the `CONTROL_FILES` initialization parameter.
"REPORT" on page 2-162	Perform detailed analyses of the content of the recovery catalog.
"RESET DATABASE" on page 2-170	Inform RMAN that the SQL statement `ALTER DATABASE OPEN RESETLOGS` has been executed and that a new incarnation of the target database has been created, or reset the target database to a prior incarnation.
"RESTORE" on page 2-172	Restore files from backup sets or from disk copies to the default or a new location.
"RESYNC" on page 2-182	Perform a full resynchronization, which creates a snapshot control file and then copies any new or changed information from that snapshot control file to the recovery catalog.
"RUN" on page 2-184	Execute a sequence of one or more RMAN commands, which are one or more statements executed within the braces of `RUN`.
"SEND" on page 2-187	Send a vendor-specific quoted string to one or more specific channels.

Table 2–1 Recovery Manager Commands

Command	Purpose
"SET" on page 2-189	Make the following session-level settings: ■ Control whether RMAN commands are displayed in the message log ■ Set the DBID when restoring a control file ■ Specify new filenames for restored datafiles ■ Specify a limit for the number of permissible block corruptions ■ Override default archived redo log destinations ■ Specify the number of copies of each backup piece ■ Determine which server session corresponds to which channel ■ Control where RMAN searches for backups when using an Oracle Real Application Clusters configuration ■ Override the default format of the control file autobackup
"SHOW" on page 2-196	Displays the current `CONFIGURE` settings.
"SHUTDOWN" on page 2-199	Shut down the target database. This command is equivalent to the SQL*Plus `SHUTDOWN` command.
"SPOOL" on page 2-202	Write RMAN output to a log file.
"SQL" on page 2-204	Execute a SQL statement from within Recovery Manager.
"STARTUP" on page 2-206	Start up the target database. This command is equivalent to the SQL*Plus `STARTUP` command.
"SWITCH" on page 2-208	Specify that a datafile copy is now the **current datafile**, that is, the datafile pointed to by the control file. This command is equivalent to the SQL statement `ALTER DATABASE RENAME FILE` as it applies to datafiles.
"untilClause" on page 2-210	A subclause specifying an upper limit by time, SCN, or log sequence number. This clause is usually used to specify the desired point in time for an incomplete recovery.
"UPGRADE CATALOG" on page 2-212	Upgrade the recovery catalog schema from an older version to the version required by the RMAN executable.
"VALIDATE" on page 2-214	Examine a backup set and report whether its data is intact. RMAN scans all of the backup pieces in the specified backup sets and looks at the checksums to verify that the contents can be successfully restored.

@

Syntax

Purpose

To execute a series of RMAN commands stored in an operating system file with the specified full path name, for example, `@$ORACLE_HOME/dbs/cmd/cmd1.rman`. If you do not specify the full path name, the current working directory is assumed, for example, `@cmd1.rman`. Do not use quotes around the string or leave whitespace between the @ and filename. RMAN processes the specified file as if its contents had appeared in place of the @ command.

> **Note:** The file must contain complete RMAN commands; partial commands generate syntax errors.

Restrictions and Usage Notes

Execute at the RMAN prompt or within the braces of a RUN command.

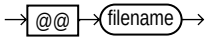
Example

Running a Command File: Example This example executes the command file `bkup_db` two times:

```
@bkup_db
RUN { @bkup_db }
```

@@

Syntax



Purpose

To execute a series of RMAN commands stored in an operating system file with the specified filename, for example, `@@cmd2.rman`. The `@@` command is identical to the `@` command unless it is used within a script. If contained in a script, then `@@`*`filename`* directs RMAN to look for the specified filename in the same directory as the command file from which it was called.

For example, assume that the working directory on UNIX is `$ORACLE_HOME`, and you invoke RMAN as follows:

```
% rman @$ORACLE_HOME/rdbms/admin/dba/scripts/cmd1.rman
```

Assume that the command `@@cmd2.rman` appears inside the `cmd1.rman` script. In this case, the `@@` command directs RMAN to look for the file `cmd2.rman` in the directory `$ORACLE_HOME/rdbms/admin/dba/scripts`.

> **Note:** The file must contain complete RMAN commands; partial commands generate syntax errors.

Restrictions and Usage Notes

Execute at the RMAN prompt or within the braces of a RUN command.

Example

Calling a Script Within a Script: Example Assume that the command file `bkup_db` contains the following two lines:

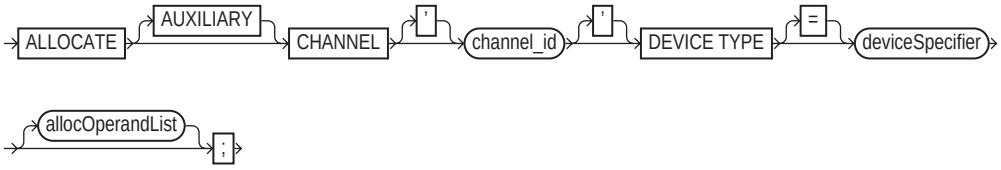
```
BACKUP DATABASE;
@@bkup_logs
```

The following example executes the command file `bkup_db` and specifies that it should look for the `bkup_logs` script in the `/scripts` directory.

```
@/scripts/bkup_db
```

ALLOCATE CHANNEL

Syntax



Purpose

To manually allocate a **channel**, which is a connection between RMAN and a database instance. Each connection initiates an Oracle server session on the target or auxiliary instance: this server session performs the work of backing up, restoring, or recovering backup sets and copies.

Manually allocated channels (allocated by using ALLOCATE) are mutually exclusive with automatically allocated channels (specified by using CONFIGURE). Manually allocated channels apply only to the RUN job in which you issue the command. Automatic channels apply to any RMAN job in which you do *not* manually allocate channels. You can always override automatic channel configurations by manually allocating channels within a RUN command.

Each channel operates on one backup set at a time (for BACKUP, RESTORE, or RECOVER) or one image copy at a time (for COPY). RMAN automatically releases the channel at the end of the job.

You can control the degree of parallelism within a job by the number of channels. You can allocate multiple channels simultaneously, thus allowing a single job to read or write multiple backup sets or copies in parallel. If you establish multiple connections, then each connection operates on a separate backup set or file copy.

Whether ALLOCATE CHANNEL causes operating system resources to be allocated depends on the operating system. On some platforms, operating system resources are allocated at the time the command is issued. On other platforms, operating system resources are not allocated until you open a file for reading or writing.

Note: When you specify DEVICE TYPE DISK, no operating system resources are allocated other than for the creation of the server session.

Restrictions and Usage Notes

- Execute ALLOCATE only within the braces of a RUN command.
- The target instance must be started.
- You cannot make a connection to a shared server session.
- You must allocate either a manually allocated or automatic channel when executing a BACKUP, DUPLICATE, COPY, RESTORE, RECOVER, or VALIDATE command.
- You cannot specify BACKUP DEVICE TYPE or RESTORE DEVICE TYPE after running ALLOCATE CHANNEL.
- You must use a recovery catalog when backing up a standby database.
- You cannot prefix ORA_ to a channel name. RMAN reserves channel names beginning with the ORA_ prefix for its own use.

Keywords and Parameters

AUXILIARY	Specifies a connection between RMAN and an auxiliary database instance. An auxiliary instance is used when executing the DUPLICATE command or performing TSPITR. An auxiliary database can reside on the same host as its parent or on a different host. When specifying this option, the auxiliary database must be mounted but not open. **See Also:** "DUPLICATE" on page 2-103 to learn how to duplicate a database, and "CONNECT" on page 2-76 to learn how to connect to a duplicate database
CHANNEL *'channel_id'*	Specifies a connection between RMAN and the target database instance. Each connection initiates an Oracle server session on the database instance: this server session performs the work of backing up, restoring, and recovering backups and copies. Specify a channel id, which is the case-sensitive name of the channel, after the CHANNEL keyword. Oracle uses the to report I/O errors.

	DEVICE TYPE = *deviceSpecifier*	Specifies the type of storage device. **See Also:** "deviceSpecifier" on page 2-101 **Note:** If you do not specify the DEVICE TYPE parameter, then you must specify the NAME parameter to identify a particular sequential I/O device. Query the V$BACKUP_DEVICE view for information about available device types and names.
	NAME = *'channel_name'*	Specifies the name of a sequential I/O device. If you do not specify a device name, then the system uses any available device of the specified type. Do not use NAME in conjunction with the DEVICE TYPE parameter. Currently, no platform supports the NAME parameter.
allocOperandList	Specifies control options for the allocated channel. **See Also:** "allocOperandList" on page 2-16	

Examples

Allocating a Single Channel for a Backup: Example This command allocates a tape channel for a whole database backup:

```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE sbt;
  BACKUP DATABASE;
}
```

Spreading a Backup Set Across Multiple Disks: Example When backing up to disk, you can spread the backup across several disk drives. Allocate one DEVICE TYPE DISK channel for each disk drive and specify the format string so that the filenames are on different disks:

```
RUN
{
  ALLOCATE CHANNEL disk1 DEVICE TYPE DISK FORMAT '/disk1/%d_backups/%U';
  ALLOCATE CHANNEL disk2 DEVICE TYPE DISK FORMAT '/disk2/%d_backups/%U';
  ALLOCATE CHANNEL disk3 DEVICE TYPE DISK FORMAT '/disk3/%d_backups/%U';
  BACKUP DATABASE;
}
```

Creating Multiple Copies of a Backup Set: Example When creating multiple copies of a backup set, you can specify the SET BACKUP COPIES command. The

following example generates a single backup of the database, and then creates four identical backups of datafile 1 to four file systems:

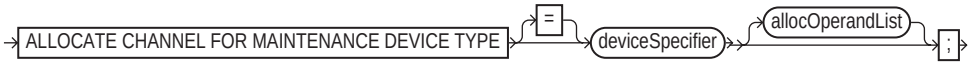
```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE DISK MAXPIECESIZE 2M;
  BACKUP DATABASE;
  SET BACKUP COPIES = 4;
  BACKUP DATAFILE 1 FORMAT '/dsk1/bp/%U', '/dsk2/sv/%U', '/dsk3/bp/%U', '/dsk3/sv/%U';
}
```

Allocating an Auxiliary Channel for Database Duplication: Example When creating a duplicate database, allocate a channel by using the AUXILIARY option:

```
RUN
{
  ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE DISK;
  ALLOCATE AUXILIARY CHANNEL c2 DEVICE TYPE DISK;
  DUPLICATE TARGET DATABASE TO ndbnewh
    LOGFILE
      '/oracle/dbs/log_1.f' size 200K,
      '/oracle/dbs/log_2.f' size 200K
  SKIP READONLY
  NOFILENAMECHECK;
}
```

ALLOCATE CHANNEL FOR MAINTENANCE

Syntax



Purpose

To manually allocate a channel in preparation for issuing a CHANGE, DELETE, or CROSSCHECK command. Note that if you use CONFIGURE to set up automatic channels, then RMAN can use these automatic channels for maintenance operations; you do not have to manually allocate them.

If RMAN allocates the an automatic maintenance channel, then it uses the same naming convention as any other automatically allocated channel. If you manually run ALLOCATE CHANNEL FOR MAINTENANCE, then RMAN uses the following convention for channel naming: ORA_MAINT_*devicetype*_*n*, where *devicetype* refers to DISK or sbt and *n* refers to the channel number. For example, RMAN uses these names for two manually allocated disk channels:

```
ORA_MAINT_DISK_1
ORA_MAINT_DISK_2
```

You can allocate multiple maintenance channels for a single job, but you should only use this feature in these scenarios:

- To allow crosschecking or deletion of all backup pieces or proxy copies, both on disk and tape, with a single command
- To make crosschecking and deleting work correctly in an Oracle Real Application Clusters configuration in which each backup piece or proxy copy exists only on one node

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to crosscheck and delete on multiple channels

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- The target instance must be started.

- Do not specify a channel ID.
- You cannot allocate a maintenance channel to a shared session.
- You cannot prefix ORA_ to a channel name. RMAN reserves channel names beginning with the ORA_ prefix for its own use.

Keywords and Parameters

DEVICE TYPE = *deviceSpecifier*	Specifies the type of storage device. **See Also:** "deviceSpecifier" on page 2-101 **Note:** If you do not specify the DEVICE TYPE parameter, then you must specify the NAME parameter to identify a particular sequential I/O device. Query the V$BACKUP_DEVICE view for information about available device types and names.
allocOperandList	Specifies control options for the allocated channel. **See Also:** "allocOperandList" on page 2-16

Examples

Deleting a Backup Piece: Example This example deletes a backup piece from the media management catalog:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
DELETE BACKUPPIECE '/oracle/dbs/01aj3q5012';
```

Crosschecking a Backup Set: Example This example crosschecks the backup set with primary key 828:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE DISK;
CROSSCHECK BACKUPSET 828;
```

Crosschecking on Multiple Nodes of an Oracle Real Application Clusters Configuration: Example In this example, you perform a crosscheck of backups on two nodes of an Oracle Real Application Clusters configuration:

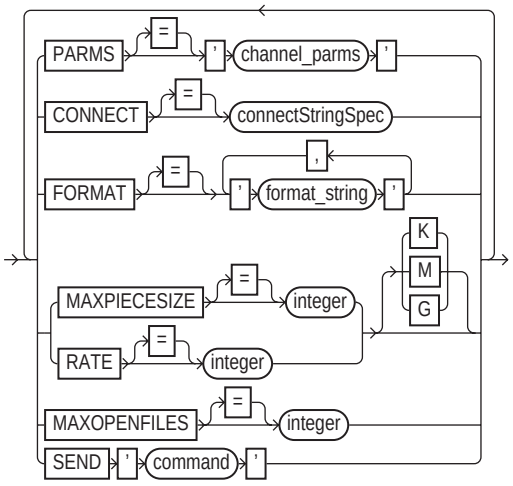
```
RUN
{
  SET AUTOLOCATE ON;
  ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE DISK CONNECT 'SYS/change_on_install@inst1';
  ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE DISK CONNECT 'SYS/change_on_install@inst2';
  CROSSCHECK BACKUP;
}
```

Deleting on Disk and sbt Channels with One Command: Example In this example, you delete five backup sets from both disk and tape:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE DISK;
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
DELETE BACKUPSET 1,2,3,4,5;
```

allocOperandList

Syntax



Purpose

A subclause specifying control options on a **channel**, which is a connection between RMAN and a database instance. Specify this clause on the following commands:

- `ALLOCATE CHANNEL`
- `ALLOCATE CHANNEL FOR MAINTENANCE`
- `CONFIGURE`

Keywords and Parameters

PARMS = *'channel_parms'*

Specifies parameters for the device to allocate. Do not use this port-specific string if you have specified DEVICE TYPE DISK.

If you use PARMS in conjunction with DEVICE TYPE sbt, then you can specify the following environment variables within a quoted string. The maximum length of the quoted string containing *channel_parms* is 1000 bytes. For example, you can specify:

```
PARMS="BLKSIZE=16384,ENV=(NSR_SERVER=tape_server,
      NSR_CLIENT=oracleclnt,NSR_GROUP=oracle_tapes)"
```

See Also: *Oracle9i Recovery Manager User's Guide* to learn how Oracle links to media management libraries

'ENV=(*var1*=*val1*,...)'

Specifies one or more environment variables required by the media management vendor in the Oracle server session corresponding to this RMAN client. Because RMAN is a client program, the ENV parameter can be used to set server session specific variables that perform backup and restore operations on behalf of the RMAN client. For example:

```
PARMS="ENV=(NSR_SERVER=srv1)"
```

'BLKSIZE=*integer*'

Specifies the level of granularity for I/O on this channel. The value should be a multiple of the default device block factor. On Solaris, this value is 16 K. For example:

```
PARMS="BLKSIZE=16384"
```

'SBT_LIBRARY=*lib_name*'

Specifies which media library should be used on this sbt channel. The default library is operating system specific (for example, libobk.so on Solaris and ORASBT.DLL on Windows NT). For example:

```
PARMS="SBT_LIBRARY=/oracle/lib/mmv.so"
```

CONNECT = *connectStringSpec*

Specifies a connect string to the database instance where RMAN should conduct the backup or restore operations. Use this parameter to spread the work of backup or restore operations across different instances in an Oracle Real Application Clusters configuration.

If you do not specify this parameter, and if you did not specify the AUXILIARY option, then RMAN conducts all operations on the target database instance specified by the command-line parameter or the instance connected to when you issued the CONNECT command. Typically, you should not use the CONNECT parameter in conjunction with the AUXILIARY option.

See Also: "connectStringSpec" on page 2-79 and "cmdLine" on page 2-57

FORMAT = '*format_string*'	Specifies the format to use for the names of backup pieces that are created on this channel. If you do not specify a format, RMAN uses %U by default, which guarantees a unique identifier. Because the channels correspond to server sessions on the target database, the FORMAT string must use the conventions of the target host, not the client host. For example, if the RMAN client runs on a Windows machine and the target database runs on a UNIX machine, then the FORMAT string must adhere to the naming conventions of a UNIX file system or raw device. You can specify up to four FORMAT strings. RMAN uses the second, third, and fourth values only when BACKUP COPIES, SET BACKUP COPIES, or CONFIGURE . . . BACKUP COPIES is in effect. When choosing which format to use for each backup piece, RMAN uses the first format value for copy 1, the second format value for copy 2, and so forth. If the number of format values exceeds the number of copies, then the extra formats are not used. If the number of format values is less than the number of copies, then RMAN reuses the format values, starting with the first one. This parameter is useful if you allocate multiple disk channels and want each channel to write to a different directory. If you specify the FORMAT parameter in the BACKUP command, then it overrides the FORMAT parameter specified in CONFIGURE CHANNEL or ALLOCATE CHANNEL. **See Also:** "BACKUP" on page 2-26 for available FORMAT parameters
MAXPIECESIZE = *integer*	Specifies the maximum size of each backup piece created on this channel. Specify the size in bytes, kilobytes (K), megabytes (M), or gigabtyes (G). The default setting is in bytes and is rounded down into kilobtyes. For example, if you set MAXPIECESIZE to 5000, RMAN sets the maximum piece size at 4 kilobytes, which is the lower kilobyte boundary of 5000 bytes.
RATE = *integer*	Sets the maximum number of bytes (default), kilobtyes (K), megabytes (M), or gigabtyes (G) that RMAN reads on this channel. This parameter sets an upper limit for bytes read so that RMAN does not consume too much disk bandwidth and degrade performance. Note that decimals are not permitted in the *integer* value.
MAXOPENFILES = *integer*	Controls the maximum number of input files that a BACKUP command can have open at any given time (the default is 8). Use this parameter to prevent "Too many open files" error messages when backing up a large number of files into a single backup set.
SEND '*command*'	Sends a vendor-specific command string to all allocated channels. **See Also:** Your media manager documentation to see whether this feature is supported

Examples

Configuring an Automatic Channel: Example This example configures a persistent disk channel:

```
CONFIGURE CHANNEL DEVICE TYPE DISK RATE = 1500K FORMAT = '/backup/%U';
```

Configuring a Channel for a Backup: Example This example manually allocates an `sbt` channel and then runs a whole database backup:

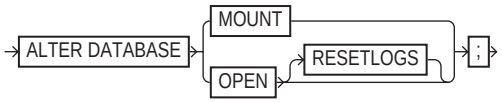
```
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE sbt MAXOPENFILES 20 RATE 2M MAXPIECESIZE 800M;
  BACKUP DATABASE;
}
```

Allocating a Channel for a Backup: Example This example configures a default media management library, then makes a database backup by using this library. Then, the example backs up the database again using a different library, then finally makes a third backup using the default library:

```
CONFIGURE DEFAULT DEVICE TYPE TO sbt;
CONFIGURE CHANNEL DEVICE TYPE sbt PARMS="SBT_LIBRARY=/oracle/lib/mm_lib1.so";
BACKUP DATABASE;
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE sbt PARMS="SBT_LIBRARY=/oracle/lib/mm_lib2.so";
  BACKUP DATABASE;
}
BACKUP ARCHIVELOG ALL;
```

ALTER DATABASE

Syntax



Purpose

To mount or open a database.

See Also: *Oracle9i SQL Reference* for ALTER DATABASE syntax

Restrictions and Usage Notes

- Execute this command either within the braces of a RUN command or at the RMAN prompt.
- The target instance must be started.

Keywords and Parameters

MOUNT	Mounts the database without opening it. This option is equivalent to the SQL statement ALTER DATABASE MOUNT.	
OPEN	Opens the database.	
	RESETLOGS	Resets the online redo logs to log sequence 1. The RMAN RESETLOGS option is equivalent to the SQL statement ALTER DATABASE OPEN RESETLOGS. If you use a recovery catalog, then RMAN performs an implicit RESET DATABASE after the database is opened to make this new incarnation the current one in the catalog. If you execute the SQL statement ALTER DATABASE OPEN RESETLOGS (not the RMAN command of the same name), then you must manually run the RESET DATABASE command.

Examples

Opening the Database after a Backup: Example This example mounts the database, takes a whole database backup, then opens the database. At the RMAN prompt enter:

```
STARTUP MOUNT;
BACKUP DATABASE;
# now that the backup is complete, open the database.
ALTER DATABASE OPEN;
```

Mounting the Database after Restoring the Control File: Example To restore the control file to its default location enter the following:

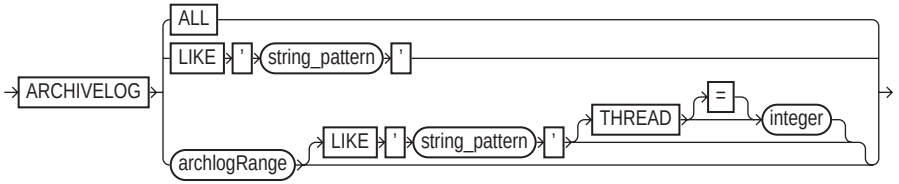
```
STARTUP NOMOUNT;
RESTORE CONTROLFILE;
ALTER DATABASE MOUNT;
```

Performing RESETLOGS after Incomplete Recovery: Example This example uses a manually allocated channel to perform incomplete recovery and then resets the online redo logs:

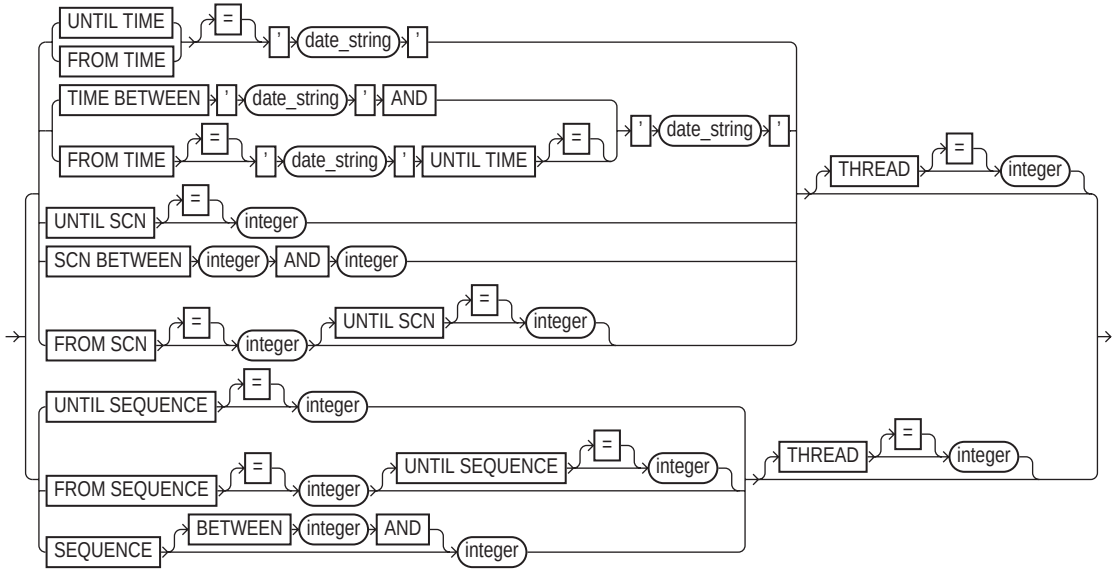
```
RUN
{
  ALLOCATE CHANNEL ch1 DEVICE TYPE sbt;
  SET UNTIL SCN 1024;
  RESTORE DATABASE;
  RECOVER DATABASE;
  ALTER DATABASE OPEN RESETLOGS;
}
```

archivelogRecordSpecifier

Syntax



archlogRange::=



Purpose

A subclause used to specify an archived log or range of archived redo logs files for use in backup, restore, and maintenance operations.

When backing up archived redo logs, RMAN can perform archived log failover automatically. RMAN backs up the log when at least one archived log corresponding to a given log sequence number and thread is available. Also, if the

copy that RMAN is backing up contains corrupt blocks, then it searches for good copies of these blocks in other copies of the same archived logs.

Specifying a range of archived redo logs does not guarantee that RMAN includes all redo data in the range: for example, the last available archived log file may end before the end of the range, or an archived log file in the range may be missing from all archiving destinations. RMAN includes the archived redo logs it finds and does not issue a warning for missing files.

> **Note:** Query the V$ARCHIVED_LOG view or RC_ARCHIVED_LOG recovery catalog view to determine the time stamps, SCNs, and log sequence numbers for an archived log. For information on how to use the NLS_LANG and NLS_DATE_FORMAT environment variables to specify the format for the time, see *Oracle9i Database Reference*.

Keywords and Parameters

ALL	Specifies all available archived logs.
LIKE '*string_pattern*'	Specifies all archived logs that match the specified *string_pattern*. The same pattern matching characters that are valid in the LIKE operator in the SQL language can be used to match multiple files. **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to make archived log backups in an Oracle Real Application Clusters configuration, and *Oracle9i Parallel Server Administration, Deployment, and Performance* for more information about the Oracle Real Application Clusters configuration
UNTIL TIME = '*date_string*'	Specifies the end date for a sequence of archived redo log files. The time specified in the string must be formatted according to the Globalization Technology date format specification currently in effect, but can also be any SQL expression with the same datatype, such as SYSDATE. The TO_DATE function can be used to specify hard-coded dates that work regardless of the current Globalization Technology settings. If you do not specify the FROM TIME parameter, then the beginning time for the sequence will be the earliest available archived redo log. **See Also:** *Oracle9i Database Reference* for information on how to use the NLS_LANG and NLS_DATE_FORMAT environment variables to specify the format for the time

FROM TIME = '*date_string*'	Specifies the beginning date for a sequence of archived redo log files. The time specified in the string must be formatted according to the Globalization Technology date format specification currently in effect, but can also be any SQL expression with the same datatype, such as SYSDATE. The TO_DATE function can be used to specify hard-coded dates that work regardless of the current Globalization Technology settings. If you do not specify the UNTIL TIME parameter, RMAN will include all available log files beginning with the date specified in the FROM TIME parameter.Use the V$ARCHIVED_LOG data dictionary view to determine the time stamps for the first and last entries in a log file. **See Also:** *Oracle9i Database Reference* for information on how to use the NLS_LANG and NLS_DATE_FORMAT environment variables to specify the format for the time
TIME BETWEEN 'date_string' AND '*date_string*'	Specifies a range of times. Note that TIME BETWEEN '*date_string*' AND '*date_string*' is exactly equivalent to FROM TIME '*date_string*' UNTIL TIME '*date_string*'.
UNTIL SCN = *integer*	Specifies the ending SCN for a sequence of archived redo log files. If you do not specify the FROM SCN parameter, then RMAN will start with the earliest available archived log.
SCN BETWEEN *integer* AND *integer*	Specifies a range of SCNs. SCN BETWEEN *integer1* AND *integer2* is exactly equivalent to FROM SCN *integer1* UNTIL SCN *integer2*.
FROM SCN = *integer*	Specifies the beginning SCN for a sequence of archived redo log files. If you do not specify the UNTIL SCN parameter, RMAN will include all available log files beginning with SCN specified in the from SCN parameter.
UNTIL SEQUENCE = *integer*	Specifies the terminating log sequence number for a sequence of archived redo log files. If you do not specify the FROM SEQUENCE parameter, RMAN uses the lowest available log sequence number to begin the sequence.
FROM SEQUENCE *integer*	Specifies the beginning log sequence number for a sequence of archived redo log files. If you do not specify the UNTIL SEQUENCE parameter, RMAN will include all available log files beginning with log sequence number specified in the FROM SEQUENCE parameter. **Note:** You can specify all log sequence numbers in a thread by using the following syntax, where *thread_number* is an integer referring to the thread: `... ARCHIVELOG FROM SEQUENCE 0 THREAD thread_number`
SEQUENCE	Specifies either a single log sequence number or a range of sequence numbers.
integer	Specifies a single log sequence number.
BETWEEN *integer* AND *integer*	Specifies a range of log sequence numbers. SEQUENCE BETWEEN *integer1* AND *integer2* is exactly equivalent to FROM SEQUENCE *integer1* UNTIL SEQUENCE *integer2*.

THREAD = *integer*	Specifies the thread containing the archived redo log files you wish to include. You only need to specify this parameter when running the database in an Oracle Real Application Clusters configuration. THREAD is only valid when SEQUENCE is also specified. Note also that although the SEQUENCE parameter does not require that THREAD be specified, a given log sequence always implies a thread. The thread defaults to 1 if not specified. Query V$ARCHIVED_LOG to check the thread number for an archived log.

Examples

Specifying Records by Time: Example This example deletes all archived redo logs older than two weeks:

```
DELETE ARCHIVELOG ALL UNTIL TIME 'SYSDATE-14';
```

Specifying Records by SCN: Example This example restores backup archived redo log files from tape that fall within a range of SCNs:

```
RESTORE ARCHIVELOG SCN BETWEEN 500 AND 700;
```

Specifying a Single Log Sequence Number: Example This example backs up only archived log 1372 of thread 1 and then deletes it.

```
BACKUP ARCHIVELOG SEQUENCE 1372 DELETE INPUT;
```

Specifying a Range of Records by Log Sequence Number: Example This example backs up all archived logs from sequence 288 to sequence 301 on thread 1 and deletes the archived logs after the backup is complete. If the backup fails, the logs are not deleted.

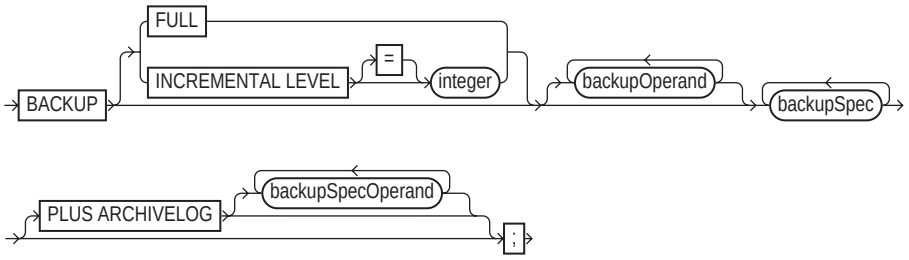
```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE sbt;
  BACKUP ARCHIVELOG
    SEQUENCE BETWEEN 288 AND 301 THREAD 1
    # delete original archived redo logs after backup completes
    DELETE INPUT;
}
```

Specifying All Log Sequence Numbers in a Thread This example crosschecks all archived redo logs in thread 1:

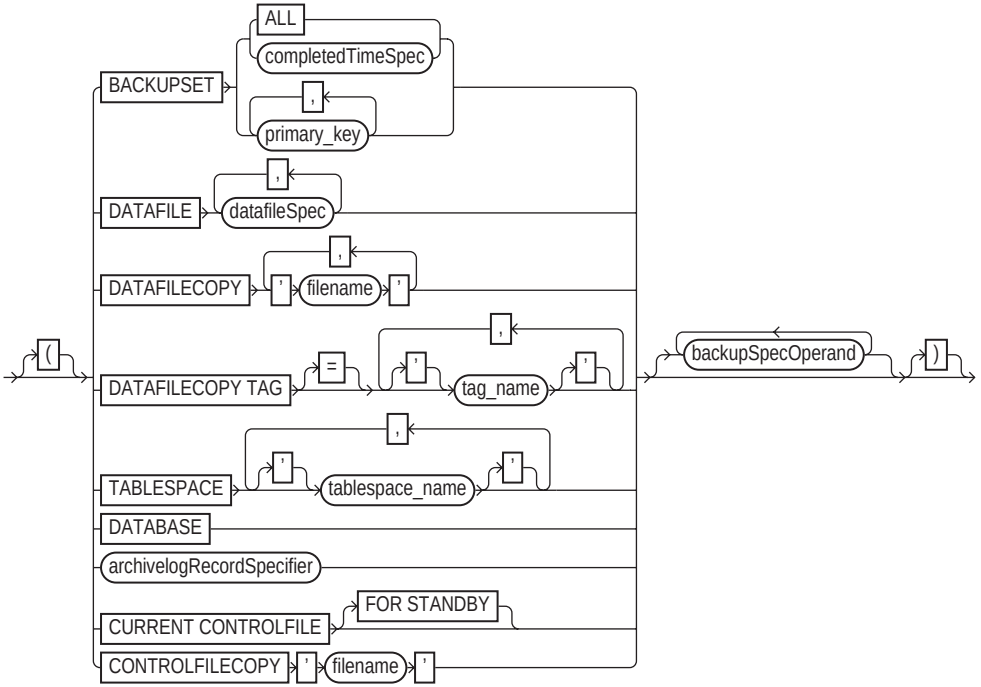
```
CROSSCHECK ARCHIVELOG FROM SEQUENCE 0 THREAD 1;
```

BACKUP

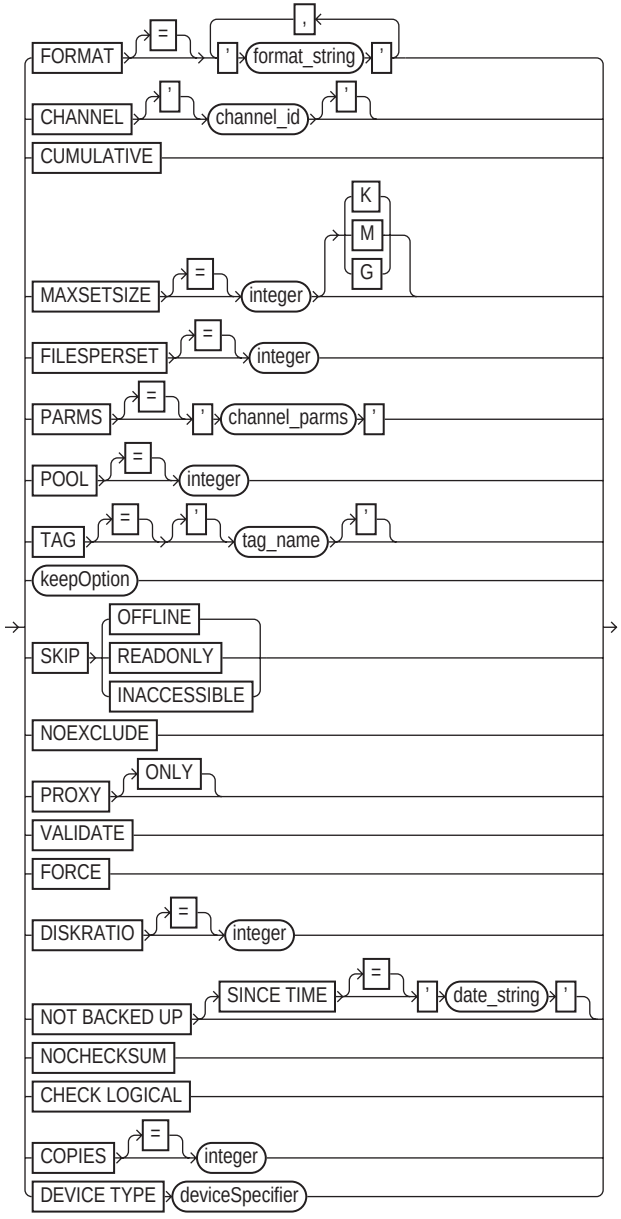
Syntax



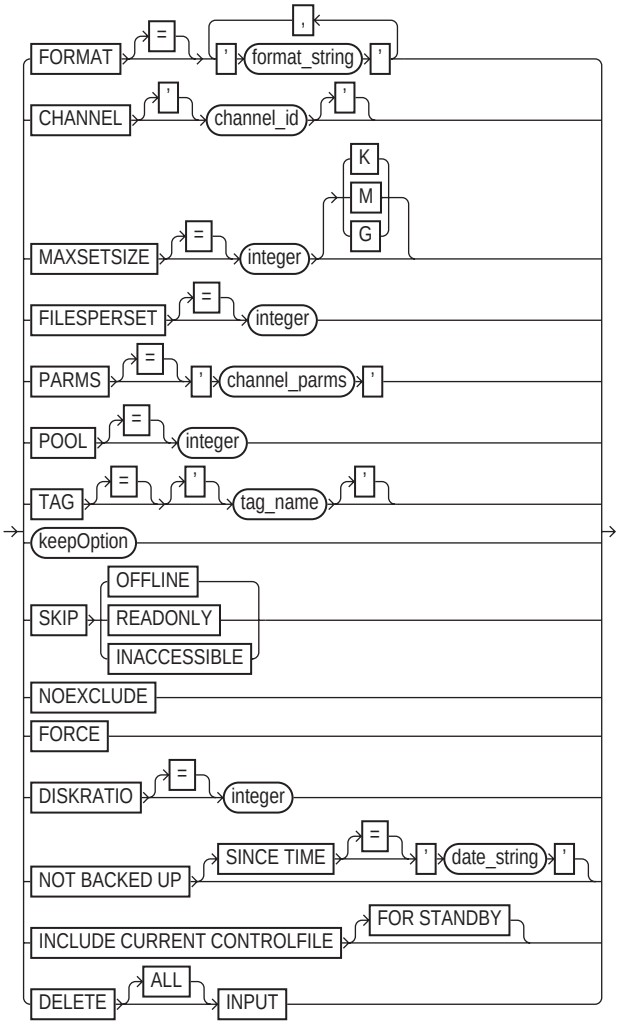
backupSpec::=



backupOperand::=



backupSpecOperand::=



Purpose

To back up a database, tablespace, datafile (current or copy), control file (current or copy), archived log, or backup set. You can back up a target or standby database.

When performing a backup, specify the files that you want to back up. RMAN puts the input files into one or more **backup sets**, which are RMAN-specific logical

structures. The backup set is the smallest unit of a backup. RMAN only records backup sets in the repository that complete successfully.

Each backup set contains at least one **backup piece**, which is a physical file containing the backed up data. You can also use the BACKUP command to generate a **proxy copy**, which is a backup to a third-party medium in which the entire data transfer is conducted by a media manager.

You control the number of backup sets that Oracle produces as well as the number of input files that RMAN places into a single backup set. Any I/O errors when reading files or writing backup pieces cause Oracle to abort the job.

If CONFIGURE CONTROLFILE AUTOBACKUP is ON, then RMAN performs a control file autobackup in these circumstances:

- After every BACKUP or COPY command issued at the RMAN prompt.
- Whenever a BACKUP or COPY command within a RUN block is followed by a command that is neither BACKUP nor COPY.
- At the end of every RUN block if the last command in the block was either BACKUP or COPY.

The BACKUP command optimizes backups, that is, does not back up files that are identical to files that are already backed up, when the following conditions are met:

- The CONFIGURE BACKUP OPTIMIZATION ON command has been run.
- You run BACKUP DATABASE, BACKUP ARCHIVELOG with ALL or LIKE options, or BACKUP BACKUPSET ALL.
- You specify a channel of only one device type, that is, you do not mix channels that use different device types.

> **See Also:** *Oracle9i Recovery Manager User's Guide* for a conceptual overview of RMAN backup sets, and *Oracle9i Recovery Manager User's Guide* to learn how to back up files

Restrictions and Usage Notes

When using the BACKUP command you must:

- Mount or open the target database. RMAN can make an **inconsistent backup** when the database is in ARCHIVELOG mode, but you must apply redo logs to make the backups consistent for use in restore operations.
- Use a current control file.

- Manually allocate a channel for each execution of the BACKUP command if no automatic channel is configured for the specified device type. Note that RMAN comes with a preconfigured DISK channel.

  Note: Backups that use the disk test API are not supported for production backups (refer to *Oracle9i Recovery Manager User's Guide*). Instead, use the preconfigured DISK channel or manually allocate a DISK channel.

- Give each backup piece a unique name.
- Back up files onto valid media. If you specify DEVICE TYPE DISK, then RMAN will back up to random access disks. You can make a backup on any device that can store an Oracle datafile: in other words, if the statement CREATE TABLESPACE *tablespace_name* DATAFILE *'filename'* works, then *'filename'* is a valid backup path name. If you specify DEVICE TYPE sbt, then you can back up to any media supported by the media management software.
- Set the BACKUP_TAPE_IO_SLAVES initialization parameter to TRUE in order to perform duplexed backups. Otherwise, an error is signaled. RMAN configures as many spawned processes as needed for the number of backup copies you request.

When using the BACKUP command, you *cannot* do the following:

- Make a backup (either normal or incremental) in NOARCHIVELOG mode when the database is open or is closed after a crash or SHUTDOWN ABORT. You can only make a NOARCHIVELOG backup when the database after a consistent shutdown.
- Stripe a single backup set across multiple channels.
- Stripe a single input file across multiple backup sets.
- Combine archived redo log files and datafiles into a single backup.
- Back up files with different block sizes into the same backup set. RMAN can back up tablespaces with different block sizes, but puts each differently sized datafile into its own backup set.
- Back up temporary tablespaces
- Back up transportable tablespaces that were not made read / write after being transported.

- Use the DELETE INPUT option when backing up objects other than datafile copies, archived redo logs, or backup sets.
- Specify the number of backup pieces that should go in a backup set.
- Back up a backup set on tape to disk or on tape to tape.
- Specify the PLUS ARCHIVELOG clause on the BACKUP ARCHIVELOG command.
- Automate the creation of unique tag names for each backup. To create unique tag names every time, write a backup script and then edit it before execution by using an operating system utility, or use a shell script to generate the backup script.
- Open a NOARCHIVELOG mode database while it is being backed up. If you do, and some data blocks in the files being backed up are modified before being read by the backup session, then the backup is not usable after being restored because it requires recovery.
- Make the length of a backup piece filename longer than the port-specific length limit. If you use a media manager, then the limit is partially governed by the version of the media management API. Vendors that use:
  - SBT 1.1 must support filenames up to 14 characters, but may support longer filenames.
  - SBT 2.0 must support filenames up to 512 characters, but may support longer filenames.
- Specify the DEVICE TYPE option if you have not already configured a device type by using CONFIGURE (except for DISK, which is preconfigured).
- Manually allocate channels and run BACKUP with the DEVICE TYPE option.
- Validate the backup of backup sets.
- Use CONFIGURE BACKUP COPIES to duplex backup sets.

Keywords and Parameters

FULL	copies all blocks into the backup set, skipping only datafile blocks that have never been used. RMAN makes full backups by default if neither FULL nor INCREMENTAL is specified. The server session does not skip blocks when backing up archived redo logs or control files. A full backup has no effect on subsequent incremental backups, so it is not considered a part of the incremental backup strategy.

INCREMENTAL LEVEL = *integer*

Copies only those data blocks that have changed since the last incremental *integer* backup, where *integer* is any integer from 1 to 4. For example, in a level 2 backup RMAN backs up all blocks used since the most recent level 2, level 1, or level 0 backup. This type of incremental backup is also called a **differential backup** to distinguish it from a cumulative backup.

A level 0 backup must exist as the base backup for an incremental strategy. An incremental backup at level 0 is identical in content to a full backup, but unlike a full backup the level 0 backup is considered a part of the incremental strategy. If no level 0 backup exists when you run a level 1 or higher backup, RMAN makes a level 0 backup automatically.

Oracle performs checks when attempting to create an incremental backup at a level greater than 0. These checks ensure that the incremental backup will be usable by a subsequent RECOVER command. Among the checks performed are:

- A level 0 backup set must exist, or level 0 datafile copies must exist for each datafile in the BACKUP command. These backup sets must not be marked UNAVAILABLE. If no level 0 backup exists, RMAN automatically makes one.
- Sufficient incremental backups taken since the level 0 must exist and be available such that the incremental backup to be created is usable.

If you specify INCREMENTAL, then in the *backupSpec* clause you must set one of the following parameters: DATAFILE, DATAFILECOPY, TABLESPACE, or DATABASE. RMAN does not support incremental backups of control files, archived redo logs, or backup sets.

Note that you cannot make inconsistent incremental backups when the database is in NOARCHIVELOG mode. Hence, you cannot generate incremental backups when a NOARCHIVELOG database is open and in use.

See Also: "CHANGE" on page 2-53

PLUS ARCHIVELOG

When you specify PLUS ARCHIVELOG, RMAN performs these steps:

1. Runs an ALTER SYSTEM ARCHIVE LOG CURRENT statement.
2. Runs the BACKUP ARCHIVELOG ALL command. Note that if backup optimization is enabled, then RMAN only backs up logs that have not yet been backed up.
3. Backs up the files specified in the BACKUP command.
4. Runs an ALTER SYSTEM ARCHIVE LOG CURRENT statement.
5. Backs up any remaining archived redo logs.

The *backupSpecPlus* clause includes the same options as the *backupSpec* clause.

backupSpec

A BACKUP specification list contains a list of one or more *backupSpec* clauses. A *backupSpec* clause minimally contains a list of one or more objects to be backed up.

Each *backupSpec* clause generates one or more backup sets. A *backupSpec* clause generates multiple backup sets if the number of datafiles specified in or implied by its list of objects exceeds the FILESPERSET limit.

BACKUPSET	Backs up either ALL backup sets or backup sets specified by *primary_key* or completion time. Use this parameter in conjunction with the DEVICE TYPE sbt clause to back up all backups on disk to tape. You cannot back up from tape to tape or from tape to disk: only from disk to disk or disk to tape. Note if you specify the DELETE INPUT option, then RMAN deletes all copies of the backup set that exist on disk. For example, if you duplexed a backup to 4 locations, then RMAN deletes all 4 backup sets. The ALL option is redundant, that is, it does not add any functionality. RMAN performs **backup set failover** when backing up backup sets. RMAN searches for all available backup copies when the copy that it is trying to back up is corrupted or missing. This behavior is similar to RMAN's behavior when backing up archived logs that exist in multiple archiving destinations. **Note:** You can duplex backups of backup sets by using BACKUP COPIES and SET BACKUP COPIES. **See Also:** "completedTimeSpec" on page 2-61
DATAFILE *datafileSpec*	Specifies a list of one or more datafiles. **Note:** If you back up datafile 1, which is the first file of the SYSTEM tablespace, RMAN includes the control file in the backup set. **See Also:** "datafileSpec" on page 2-95
DATAFILECOPY '*filename*'	Specifies the filenames of one or more datafile image copies.
DATAFILECOPY TAG = *tag_name*	Specifies a list of one or more datafile copies, identified by tag. If multiple datafile copies with this tag exist, then Oracle backs up only the most current datafile copy of any particular datafile.
TABLESPACE *tablespace_name*	Specifies the names of one or more tablespaces. RMAN backs up all datafiles that are currently part of the tablespaces. This keyword is provided merely as a convenience; Oracle translates the tablespace name internally into a list of datafiles.
DATABASE	Specifies datafiles in the database. To include the current control file in the backup set, specify the INCLUDE CURRENT CONTROLFILE clause. You can include only datafiles and the standby control file in the backup set: you cannot include archived redo logs.

archivelogRecordSpecifier clause	Specifies a range of archived redo logs to be backed up. RMAN does not signal an error if the command finds no logs to back up, because this situation probably exists because no new logs were generated after the previous BACKUP ARCHIVELOG ALL DELETE INPUT command. If you specify BACKUP ARCHIVELOG ALL, then RMAN backs up exactly one copy of each distinct log sequence number. For example, if you archive logs to multiple destinations, RMAN backs up *one* copy of each log sequence number—not each archived copy of each log sequence number. For other commands, such as DELETE, ALL does refer to every log, even duplicate log sequences. **See Also:** "archivelogRecordSpecifier" on page 2-22 for syntax, and *Oracle9i Recovery Manager User's Guide* for explanations of backup failover for logs and automatic log switching
CURRENT CONTROLFILE	specifies the current control file. If you specify FOR STANDBY, then RMAN generates a backup of the control file that is usable during creation of a standby database. The backup contains only the standby control file. **Note:** You cannot assign a tag to a current control file.
CONTROLFILECOPY '*filename*'	specifies the filename of a control file copy. The control file copy can be: ■ A copy of a normal control file (that is, not a standby control file) ■ A standby control file copy created using the COPY STANDBY CONTROLFILE command or the SQL statement ALTER DATABASE CREATE STANDBY CONTROLFILE RMAN inspects the header of the control file copy to determine whether it is a standby or nonstandby control file.

FORMAT = '*format_string*'

Specifies a filename to use for the backup piece. Any name that is legal as a sequential filename on the platform is allowed, if each backup piece has a unique name. If backing up to disk, then any legal disk filename is allowed, provided it is unique. If you do not specify the FORMAT parameter, RMAN stores the backup pieces in a port-specific directory ($ORACLE_HOME/dbs on UNIX).

You can specify up to four FORMAT strings. RMAN uses the second, third, and fourth values only when BACKUP COPIES, SET BACKUP COPIES, or CONFIGURE . . . BACKUP COPIES is in effect. When choosing the format for each backup piece, RMAN uses the first format value for copy 1, the second format value for copy 2, and so on. If the number of format values exceeds the number of copies, then the extra formats are not used. If the number of format values is less than the number of copies, then RMAN reuses the format values, starting with the first one.

Specify FORMAT in any of these places, listed in order of precedence:

1. The *backupSpec* clause
2. The BACKUP command
3. The ALLOCATE CHANNEL command
4. The CONFIGURE CHANNEL command

If specified in more than one of these places, then RMAN searches for the FORMAT parameter in the order shown.

Note that the entire FORMAT string is processed in a port-specific manner by the target instance to derive the final backup piece name. The following substitution variables are available in FORMAT strings to aid in generating unique filenames. The formatting of this information varies by platform.

%c	Specifies the copy number of the backup piece within a set of duplexed backup pieces. If you did not duplex a backup, then this variable is 1 for backup sets and 0 for proxy copies. If one of these commands is enabled, then the variable shows the copy number. The maximum value for %c is 256.
%d	Specifies the name of the database.
%D	Specifies the current day of the month from the Gregorian calendar in format DD.
%F	Combines the DBID, day, month, year, and sequence into a unique and repeatable generated name.
%M	Specifies the month in the Gregorian calendar in format MM.
%n	Specifies the name of the database, padded on the right with x characters to a total length of eight characters. For example, if the prod1 is the database name, then the padded name is prod1xxx.

	%p	Specifies the piece number within the backup set. This value starts at 1 for each backup set and is incremented by 1 as each backup piece is created. **Note:** If you specify PROXY, then the %p variable must be included in the FORMAT string either explicitly or implicitly within %U.
	%s	Specifies the backup set number. This number is a counter in the control file that is incremented for each backup set. The counter value starts at 1 and is unique for the lifetime of the control file. If you restore a backup control file, then duplicate values can result. Also, CREATE CONTROLFILE initializes the counter back to 1.
	%t	Specifies the backup set time stamp, which is a 4-byte value derived as the number of seconds elapsed since a fixed reference time. The combination of %s and %t can be used to form a unique name for the backup set.
	%T	Specifies the year, month, and day in this format: YYYYMMDD.
	%u	Specifies an 8-character name constituted by compressed representations of the backup set number and the time the backup set was created.
	%U	Specifies a convenient shorthand for %u_%p_%c that guarantees uniqueness in generated backup filenames. If you do not specify a format, RMAN uses %U by default.
	%Y	Specifies the year in this format: YYYY.
	%%	Specifies the '%' character. For example, %%Y translates to the string %Y.

CHANNEL *channel_id*

Specifies the case-sensitive name of a channel to use when creating backup sets. Use any name that is meaningful, for example *ch1* or *dev1*. Oracle uses the channel ID to report I/O errors. If you do not specify this parameter, then RMAN dynamically assigns the backup sets to any available channels during job execution.

Note: You can also specify this parameter in the *backupSpec* clause.

CUMULATIVE

Copies the data blocks used since the most recent backup at level *n*-1 or lower, where *n* is an integer from 1 to 4. For example, in a cumulative level 2 backup RMAN backs up all blocks used since the most recent level 1 or level 0 backup.

MAXSETSIZE = *integer*	Specifies a maximum size for a backup set in bytes (default), kilobytes (K), megabytes (M), and gigabtyes (G). Thus, to limit a backup set to 3 Mb, specify MAXSETSIZE = 3M. The default size is in bytes, rounded down from kilobtyes. For example, MAXSETSIZE = 3000 is rounded down to 2 K (2048 bytes). The minimum value must be >= the database block size. RMAN attempts to limit all backup sets to this size. Use MAXSETSIZE to configure backup sets so that each fits on one tape rather than spans multiple tapes. Otherwise, if one tape of a multivolume backup set fails, then you lose the data on all the tapes rather than just one. When files are located on one disk and do not create an I/O distribution problem, the MAXSETSIZE parameter is easier to use than FILESPERSET. The FILESPERSET parameter is more useful for managing I/O distribution for backups of files on multiple disks. **Note:** Because FILESPERSET has a default, both MAXSETSIZE and FILESPERSET take effect when MAXSETSIZE is set. RMAN attempts to limit the size in bytes of the backup sets according to the MAXSETSIZE parameter, treating FILESPERSET as an upper limit for the number of files to include in each set.
FILESPERSET = *integer*	Specifies the maximum number of input files in each backup set. If you set FILESPERSET = *n*, then RMAN never includes more than *n* files in a backup set. The default for FILESPERSET is the lesser of these two values: 64, number of input files divided by the number of channels. For example, if you back up 100 datafiles by using two channels, RMAN sets FILESPERSET to 50. RMAN always attempts to create enough backup sets so that all allocated channels have work to do. An exception to the rule occurs when there are more channels than files to back up. For example, if RMAN backs up two datafiles when three channels are allocated and FILESPERSET = 1, then one channel is necessarily idle. **See Also:** The MAXSETSIZE parameter, which limits backup sets by total bytes rather than number of files included
PARMS = '*channel_parms*'	Specifies a quoted string containing operating system-specific information. RMAN passes the string to the operating system-dependent layer each time a backup piece is created. Currently, no PARMS settings are available when specified in the BACKUP command, although you can specify PARMS in the ALLOCATE CHANNEL or CONFIGURE CHANNEL command.
POOL = *integer*	Specifies the media pool in which the backup should be stored. Consult your media management documentation to see whether the POOL option is supported.
TAG *tag_name*	Creates a user-specified tag for the backup set. Typically, a tag is a meaningful name such as monday_evening_backup or weekly_full_backup. Tags must be 30 characters or less. Note that tags are reusable, so that backup set 100 can have the tag monday_evening_backup one week while backup set 105 has the same tag the next week.

You can also specify the tag at the *backupSpec* level. If you specify the tag at:

- The command level, then all backup sets created by this command are given this tag.
- The *backupSpec* level, then backup sets created as a result of different backup specifications can have different tags.
- Both levels, then the tag in the *backupSpec* takes precedence.

Note: You cannot automatically assign a different tag name to each backup. The easiest way to give each backup a new tag is to write a backup script and then edit it with an operating system utility before each execution.

keepOption

Overrides any configured retention policy for this backup so that the backup is not considered obsolete. You can use CHANGE to alter the keep status. Note that you must be connected to a recovery catalog when you specify KEEP FOREVER.

See Also: "keepOption" on page 2-116

SKIP

excludes datafiles or archived redo logs from the backup set.

Note: You can also specify this option in the *backupSpec* clause.

OFFLINE

specifies that offline datafiles should be excluded from the backup set.

READONLY

specifies that read-only datafiles should be excluded from the backup set.

INACCESSIBLE

specifies that datafiles or archived redo logs that cannot be read due to I/O errors should be excluded from the backup set.

A datafile is only considered inaccessible if it cannot be read. Some offline datafiles can still be read because they still exist on disk. Others have been deleted or moved and so cannot be read, making them inaccessible.

NOEXCLUDE

When specified on BACKUP DATABASE command, RMAN backs up all tablespaces, including any for which a CONFIGURE EXCLUDE command has been entered. This option does not override SKIP OFFLINE or SKIP READONLY.

PROXY

Backs up the specified files by using the proxy copy functionality, which gives the media management software control over the data transfer between storage devices and the Oracle datafiles on disk. The media manager—not RMAN—decides how and when to move data.

When you run BACKUP with the PROXY option, RMAN performs these steps:

1. Searches for a channel of the specified device type that is proxy-capable. If no such channel is found, then RMAN issues an error message. RMAN attempts a conventional (that is, nonproxy) backup of the specified files unless the ONLY option is specified, in which case it does not attempt a conventional backup.
2. If RMAN locates a proxy-capable channel, it calls the media manager to determine whether it can proxy copy the file. If the media manager cannot proxy copy the file, then RMAN uses conventional backup sets to back up the file.

Note: If you specify PROXY, then the %p variable must be included in the FORMAT string either explicitly or implicitly within %U.

ONLY — Causes Oracle to issue an error message when it cannot proxy copy rather than creating conventional backup sets.

VALIDATE

Causes RMAN to scan the specified files and verify their contents. RMAN creates no output files. Use this command periodically to check for physical and logical errors in database files.

Note: You cannot validate backups of backup sets.

FORCE

Causes RMAN to ignore backup optimization. In other words, even if CONFIGURE BACKUP OPTIMIZATION is set to ON, RMAN backs up all specified files.

Note: You can also specify this option in the *backupSpecOperand* clause.

`DISKRATIO = integer`

Directs RMAN to assign datafiles to each backup set and spread them across the specified number of drives. For example, assume that you use 10 disks, the disks supply data at 10 bytes/second, and the tape drive requires 50 bytes/second to keep streaming. You can set `DISKRATIO = 5` to spread the backup load across five disks for each backup set.

If you set `FILESPERSET` but not `DISKRATIO`, then `DISKRATIO` defaults to the same value as `FILESPERSET`. If you specify neither parameter, `DISKRATIO` defaults to 4. RMAN compares the `DISKRATIO` value to the actual number of devices involved in the backup and uses the lowest value. For example, if `DISKRATIO = 4` and the datafiles are on three disks, then RMAN attempts to spread the backup load for each set among three disks.

The `DISKRATIO` parameter is easier for datafile backups when the datafiles are striped or reside on separate disk spindles and you either:

- Use a high-bandwidth tape drive that requires several datafiles to be multiplexed in order to keep the tape drive streaming
- Make backups while the database is open and you need to spread the I/O load across several disk spindles in order to leave bandwidth for online operations

Note: Do not spread I/O over more than the minimum number of disks to keep the tape streaming. Otherwise, you increase restore time for a file without increasing performance.

`NOT BACKED UP`

Backs up only those files (of the files specified on the command) that RMAN has not backed up since the specified time. If `SINCE TIME` is not specified, then only those files that have never been backed up will be backed up. This option is a convenient way to back up new files after adding them to the database.

This clause is a useful way to back up files that were not backed up during a previous aborted backup. For example, you back up the database, but the instance crashes halfway through. You can then restart the backup by using the `NOT BACKUP UP` clause and avoid backing up those files that you already backed up. This feature is only useful if RMAN generates multiple backup sets during the backup. Consequently, you may want to set the `FILESPERSET` parameter to a low value so that RMAN generates multiple backup sets.

`SINCE TIME = 'date_string'`

Specifies the date after which RMAN should back up files that have no backups. The *`date_string`* is either a date in the current `NLS_DATE_FORMAT`, or a SQL date expression such as `'SYSDATE-1'`.

When determining whether a file has been backed up or not, the `SINCE` date that was entered is compared with the completion time of the most recent backup. The completion time for a file in a backup set is the completion time of the entire backup set. In other words, all files in the same backup set have the same completion time.

NOCHECKSUM

Suppresses block checksums. A checksum is a number that is computed from the contents of a data block. If the DB_BLOCK_CHECKSUM initialization parameter is `true`, then Oracle computes a checksum for each block and stores it in the block before writing the block to disk. When Oracle reads the block from disk later, it makes sure that the block generates the same checksum. If it does not, then the block is damaged.

Unless you specify the NOCHECKSUM option, Oracle computes a checksum for each block and stores it in the backup. The checksum is verified when restoring from the backup and written to the datafile when restored. If the database is already maintaining block checksums, then this flag has no effect. The checksum is always verified and stored in the backup in this case.

See Also: *Oracle9i Database Reference* for more information about the DB_BLOCK_CHECKSUM initialization parameter

CHECK LOGICAL

Tests data and index blocks that pass physical corruption checks for logical corruption, for example, corruption of a row piece or index entry. If RMAN finds logical corruption, then it logs the block in the `alert.log` and server session trace file.

If the sum of physical and logical corruptions detected for a file remain below its MAXCORRUPT setting, then the RMAN command completes and Oracle populates V$BACKUP_CORRUPTION with corrupt block ranges. If MAXCORRUPT is exceeded, then the command terminates without populating the views.

Note: For COPY and BACKUP the MAXCORRUPT setting represents the total number of physical and logical corruptions permitted on a file.

COPIES = *integer*

Specifies the number of identical backups (1 - 4) that RMAN should generate. The default value is 1. You can specify duplexing on more than one command. The order of precedence is as follows, with settings higher on the list overriding settings lower on the list:

- BACKUP COPIES
- SET BACKUP COPIES
- CONFIGURE . . . BACKUP COPIES

DEVICE TYPE *deviceSpecifier*

Allocates automatic channels for the specified device type only. This option is valid only if you have configured channels and have not manually allocated channels. For example, if you configure disk and tape channels, then configure `sbt` as the default device type, this command allocates disk channels only:

```
BACKUP DEVICE TYPE DISK DATABASE;
```

See Also: "deviceSpecifier" on page 2-101

backupSpecOperand

Specifies a variety of options and parameters that affect the *backupSpec* clause. Most of the *backupSpecOperand* options are the same as the *backupOperand* options. Only the options unique to this clause are described below.

INCLUDE CURRENT CONTROLFILE	creates a snapshot of the current control file and places it into each backup set produced by this clause. If you specify FOR STANDBY, then RMAN creates a backup of the control file usable for creation of a standby database. The backup set includes the standby control file and the object backed up.
DELETE INPUT	deletes the input files upon successful creation of the backup set. Specify this option only when backing up archived logs, datafile copies, or backup sets. It is equivalent to issuing DELETE for the input files. The ALL option applies only to archived logs. If you run DELETE ALL INPUT, then the command deletes all copies of corresponding archived redo logs or datafile copies that match the selection criteria. For example, if you specify the SEQUENCE *n* clause, then RMAN deletes all archive logs with same sequence number *n*, including duplicate archived logs (that is, logs with same log sequence number and thread). **Note:** The BACKUP ARCHIVELOG command only backs up one copy of each distinct log sequence number, so if the DELETE INPUT option is requested *without* the ALL keyword, RMAN only deletes the copy of the file that it backs up. **See Also:** "CONNECT" on page 2-76 for information on the effect of recovery catalog compatibility on this command

Examples

Backing Up a Database: Example This command backs up the database to tape and then backs up the control file that contains the record of the database backup:

```
BACKUP DATABASE;
BACKUP CURRENT CONTROLFILE;
```

Backing Up Tablespaces and Datafiles: Example This command uses two *backupSpec* clauses to back up tablespaces and datafiles and lets RMAN perform automatic parallelization of the backup:

```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE DISK FORMAT '/fs1/%U';
  ALLOCATE CHANNEL dev2 DEVICE TYPE DISK FORMAT '/fs2/%U';
  BACKUP
    (TABLESPACE SYSTEM,sales1,sales2,sales3 FILESPERSET 20)
    (DATAFILE 12,14,15);
}
```

Backing Up Multiple Copies of Archived Redo Logs: Example This example backs up the archived redo logs in `/oracle/arch/dest1` to one set of tapes and the logs from `/oracle/arch/dest2` to another set of tapes. This scenario assumes that you have two tape drives available.

```
# channel configuration
CONFIGURE DEVICE TYPE sbt PARALLELISM 2;
CONFIGURE CHANNEL 1 DEVICE TYPE sbt PARMS="ENV=(NSR_SERVER=tape_server_1)";
CONFIGURE CHANNEL 2 DEVICE TYPE sbt PARMS="ENV=(NSR_SERVER=tape_server_2)";

# backup
BACKUP
  FILESPERSET=20
  FORMAT='AL_%d/%t/%s/%p'
  (ARCHIVELOG LIKE '/oracle/arch/dest1/%' CHANNEL ORA_SBT_TAPE_1)
  (ARCHIVELOG LIKE '/oracle/arch/dest2/%' CHANNEL ORA_SBT_TAPE_2);
```

Backing Up Multiple Copies of Archived Logs and Deleting the Input: Example This example assumes that you have two archive destinations set: `/arch/dest1` and `/arch/dest2`. The command backs up one log for each unique sequence number and then deletes all logs from both archiving directories.

```
BACKUP ARCHIVELOG LIKE '/arch/dest%' DELETE ALL INPUT;
```

Backing Up Backup Sets to Tape: Example In this example, you want to keep recent backup sets on disk and older backup sets on tape. You do not want backup sets to exist on disk and tape simultaneously. Hence, you execute this command to back up older backups created more than two weeks ago to tape and then delete the input backup pieces:

```
BACKUP DEVICE TYPE sbt BACKUPSET CREATED BEFORE 'SYSDATE-14'
  DELETE INPUT;
```

Specifying DEVICE TYPE on the BACKUP Command: Example This example configures `DISK` as the default device type, then backs up archived logs to tape:

```
CONFIGURE DEFAULT DEVICE TYPE TO DISK;
BACKUP DEVICE TYPE sbt ARCHIVELOG ALL;
```

Performing a Cumulative Incremental Backup: Example This example backs up all blocks changed in the database since the most recent level 0 or level 1 backup:

```
BACKUP INCREMENTAL LEVEL 2 CUMULATIVE SKIP INACCESSIBLE DATABASE;
```

Duplexing a Backup Set: Example This example duplexes a backup of datafile 1 to separate file systems:

```
BACKUP COPIES 2 DATAFILE 1 FORMAT '/fs1/df1_%U', '/fs2/df1_%U';
```

Specifying How Channels Divide a Workload: Example This example parallelizes a backup operation by specifying which channels should back up which files and to which location:

```
RUN
{
  ALLOCATE CHANNEL ch1 DEVICE TYPE sbt PARMS="ENV=(NSR_SERVER=tape_server_1)";
  ALLOCATE CHANNEL ch2 DEVICE TYPE DISK RATE 1500K;
  ALLOCATE CHANNEL ch3 DEVICE TYPE sbt PARMS="ENV=(NSR_SERVER=tape_server_2)";
  BACKUP
    (DATAFILE 1,2,3,4        # channel ch1 backs up datafiles to tape drive #1
    CHANNEL ch1)
    (CONTROLFILECOPY '/oracle/copy/cf.f'
    CHANNEL ch2)             # channel ch2 backs up control file copy to disk
    (ARCHIVELOG FROM TIME 'SYSDATE-14'
    CHANNEL ch3);            # channel ch3 backs up archived redo logs to tape drive #2
}
```

Performing an Oracle Real Application Clusters Backup: Example The following script distributes datafile and archived log backups across two nodes in an Oracle Real Application Clusters environment:

```
RUN
{
  ALLOCATE CHANNEL node_1 DEVICE TYPE sbt
    CONNECT 'SYS/sys_pwd@node_1'
    PARMS 'ENV=(DSMO_NODE=KDFDWD01_ORACLE)'
    FORMAT '%d_set%s_%t_piece%p';
  SET LIMIT CHANNEL node_1 KBYTES=1000000;
  SET COMMAND ID TO 'node_1';
  ALLOCATE CHANNEL node_2 DEVICE TYPE sbt
    CONNECT 'SYS/sys_pwd@node_2'
    PARMS 'ENV=(DSMO_NODE=KDFDWD01_ORACLE)'
    FORMAT '%d_set%s_%t_piece%p';
  SET LIMIT CHANNEL node_2 KBYTES=1000000;
  SET COMMAND ID TO 'node_2';
  BACKUP FILESPERSET 1
    (TABLESPACE SYSTEM, rbs, data1, data2
    CHANNEL node_1)
    (TABLESPACE temp, reccat, data3, data4
    CHANNEL node_2);
  BACKUP FILESPERSET 20
    (ARCHIVELOG UNTIL TIME 'SYSDATE' LIKE '/node1/arc/%'
    DELETE ALL INPUT   # deletes all logs that match LIKE criteria
```

```
    CHANNEL node_1);
    (ARCHIVELOG UNTIL TIME 'SYSDATE' LIKE '/node2/arc/%'
    DELETE ALL INPUT   # deletes all logs that match LIKE criteria
    CHANNEL node_2);
}
```

Creating a Control File for a Standby Database: Example This example creates a backup of the current control file that can be used to create a standby database:

```
BACKUP STANDBY CONTROLFILE;
```

Checking for Corruption: Example This example backs up datafile 3 and specifies that no more than two blocks with corruption should be tolerated:

```
RUN
{
  SET MAXCORRUPT FOR DATAFILE 3 TO 2;
  BACKUP CHECK LOGICAL
    DATAFILE 3;
}
```

Creating a Long-Term Backup: Example This example creates a consistent backup of the database that is exempt from the retention policy and tells RMAN to keep the backup for the next year, but not to keep the archived logs necessary to recover it:

```
SHUTDOWN;
STARTUP MOUNT;
BACKUP DATABASE UNTIL 'SYSDATE+365' NOLOGS;
```

Backing Up Files with No Recent Backups: Example This example backs up all database files and archived logs that have not been backed up in the last month:

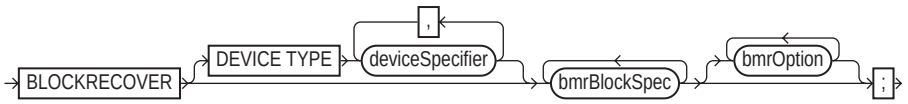
```
BACKUP DATABASE, ARCHIVELOG ALL NOT BACKED UP SINCE TIME 'SYSDATE-31';
```

Using a UNIX Shell Script to Generate Unique Tag Names: Example This sample UNIX shell script can generate RMAN backups with unique backup tag names:

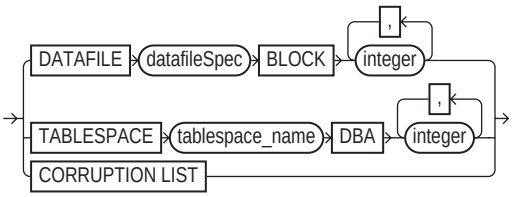
```
#!/bin/sh
today=`date +%a`
rman <<EOF
CONNECT TARGET /;
CONNECT CATALOG rman/rman@rcdb;
BACKUP DATABASE PLUS ARCHIVELOG TAG '$today';
EOF
```

BLOCKRECOVER

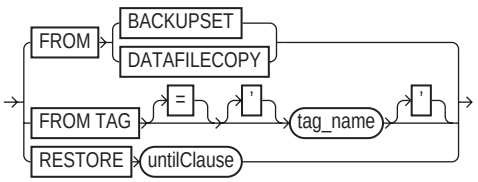
Syntax



bmrBlockSpec::=



bmrOption::=



Purpose

Block media recovery recovers an individual data block or set of data blocks within a datafile. This type of recovery is useful if the data loss or corruption applies to a small number of blocks rather than to an entire datafile.

You can also use block media recovery to validate the integrity of redo generated after a backup. For example, you can do a trial-run block media recovery to detect problems in the archived redo stream.

Typically, block corruption is reported in Oracle error messages in trace files. Block-level data loss usually results from:

- I/O errors causing minor data loss
- Memory corruptions that get flushed to disk

You need to specify the datafile number and block number or the tablespace and data block address (DBA) when executing the BLOCKRECOVER command, or use the CORRUPTION LIST keyword to recover all blocks reported in the V$BACKUP_CORRUPTION and V$COPY_CORRUPTION views.

> **See Also:** *Oracle9i Recovery Manager User's Guide* for concepts and *Oracle9i Recovery Manager User's Guide* for procedures

Restrictions and Usage Notes

- This command is available only in the Enterprise Edition of Oracle9*i*.
- The target database must be mounted or open. Note that you do not have to take a datafile offline if you are performing block recovery on it.
- You can only perform complete recovery of individual blocks. Point-in-time recovery of individual data blocks is not supported.
- You can only perform block media recovery on corrupt blocks.
- Blocks marked media corrupt are not accessible until recovery completes.
- You cannot perform block media recovery by using a backup control file.
- You must have a full backup of the file containing the corrupt blocks: block media recovery cannot use incremental backups.
- Block media recovery cannot survive a missing or inaccessible archived log, although it can sometimes survive missing or inaccessible records (see *Oracle9i Recovery Manager User's Guide*).
- The datafile header block (block 1) cannot be recovered.

Keywords and Parameters

DEVICE TYPE *deviceSpecifier*	Specifies the device type for the backup used in the block recovery. **See Also:** "deviceSpecifier" on page 2-101
bmrBlockSpec	Specifies the data blocks that require recovery.

	DATAFILE *datafileSpec*	Specifies a list of one or more datafiles that contain blocks requiring media recovery. **See Also:** "datafileSpec" on page 2-95
	BLOCK *integer*	Specifies the block number of the block requiring media recovery. Typically, the block number is obtained from error message output.
	TABLESPACE *tablespace_name*	Specifies the tablespace name or number containing the corrupt blocks.
	DBA *integer*	Specifies the data block address (DBA) of the corrupt block.
	CORRUPTION LIST	Recovers all blocks listed in the V$BACKUP_CORRUPTION and V$COPY_CORRUPTION views. This view is populated by BACKUP (with or without the VALIDATE option), VALIDATE, and COPY. Two types of corruption result in rows added to these views: ■ Physical corruption (sometimes called media corruption). Oracle does not recognize the block at all: the checksum is invalid, the block contains all zeros, or the header and footer of the block do not match. Physical corruption checking is on by default, and can be turned off with the NOCHECKSUM option. ■ Logical corruption. The block has a valid checksum, the header and footer match, and so forth, but the contents are logically inconsistent. Logical corruption checking is off by default, and can be turned on with the CHECK LOGICAL option.
bmrOption	Specifies various restore options relating to the block recovery.	
	FROM BACKUPSET	indicates that only backup set should be restored.
	FROM DATAFILECOPY	indicates that only datafile image copies should be restored.
	FROM TAG = *'tag_name'*	indicates that only the backup set with the specified tag should be restored.
	RESTORE *untilClause*	Specifies that only backups and copies created before the specified time, SCN, or log sequence number should be restored. **See Also:** "untilClause" on page 2-210

Examples

Recovering a Group of Corrupt Blocks: Example This example recovers corrupt blocks in three datafiles:

```
BLOCKRECOVER DATAFILE 2 BLOCK 12, 13 DATAFILE 7 BLOCK 5, 98, 99 DATAFILE 9 BLOCK 19;
```

Limiting Block Media Recovery by Type of Restore: Example The following example recovers a series of blocks and restores only from datafile copies:

```
RUN
{
  BLOCKRECOVER
    DATAFILE 3 BLOCK 2,3,4,5
    TABLESPACE sales DBA 4194405, 4194409, 4194412
  FROM DATAFILECOPY;
}
```

Limiting Block Media Recovery by Backup Tag: Example This example recovers blocks and restores only from the backup set with the tag `weekly_backup`:

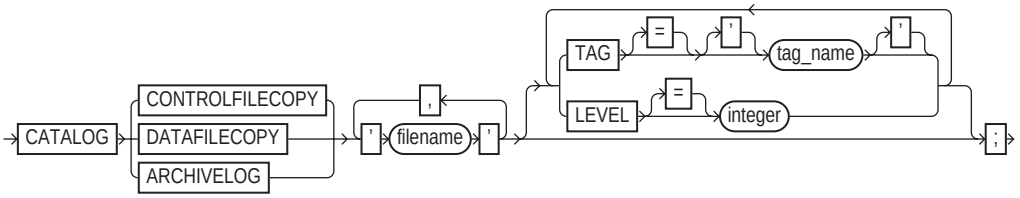
```
BLOCKRECOVER TABLESPACE SYSTEM DBA 4194404, 4194405 FROM TAG "weekly_backup";
```

Limiting Block Media Recovery by Time: Example The following example recovers two blocks in the SYSTEM tablespace and forces the blocks to be restored from backups created at least two days ago:

```
BLOCKRECOVER TABLESPACE SYSTEM DBA 4194404, 4194405 RESTORE UNTIL TIME 'SYSDATE-2';
```

CATALOG

Syntax



Purpose

Use the CATALOG command to:

- Add metadata about a user-managed datafile, control file, or archived log copy to the recovery catalog and control file.
- Record a datafile copy as a level 0 backup in the RMAN repository, which enables you to use it as part of an incremental backup strategy.
- Record the existence of user-managed copies of Oracle release 8.0 or later databases created before RMAN was installed.
- Record the existence of the last user-managed datafile copies made after the final shutdown in Oracle version 7 and before running the migration utility.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to manage target database records stored in the catalog

Restrictions and Usage Notes

- Execute the CATALOG command within the braces of a a RUN command or at the RMAN prompt.
- You must be connected to the target database, and the database must be mounted or open. If you use a recovery catalog, then the catalog must be open.
- For a user-managed backup to be cataloged, it must be:
  - Accessible on disk.
  - A complete image copy of a single file.

– A datafile, control file, or archived log backup. If the datafile backup is inconsistent, then it must have been created with the BEGIN BACKUP / END BACKUP statements.

RMAN treats all user-managed backups as image copies. Note that during cataloging, RMAN does not check whether the file was correctly copied by the operating system utility: it just checks the header.

You *cannot* use CATALOG to perform the following operations:

- Catalog any datafile copies that were created in Oracle7 unless they were made after the final consistent shutdown in Oracle7 and before running the migration utility, or were made of a tablespace that was offline normal or read-only at the time of the migration. In other words, no Oracle7 redo must need to be applied to the backups to roll them forward.
- Recatalog backup pieces or backup sets. If you run CHANGE . . . UNCATALOG against an RMAN backup, then it is permanently unusable by RMAN.
- Rename a backup piece or move a backup piece from one place to another.

Keywords and Parameters

CONTROLFILECOPY '*filename*'	Specifies the filename of a control file copy to be added to or updated in the recovery catalog and control file. The control file copy can be: ■ A copy of a normal control file (that is, not a standby control file) created with the RMAN command COPY CURRENT CONTROLFILE command or the SQL statement ALTER DATABASE CREATE CONTROLFILE ■ A standby control file copy created with the RMAN command COPY STANDBY CONTROLFILE or the SQL statement ALTER DATABASE CREATE STANDBY CONTROLFILE
DATAFILECOPY '*filename*'	Specifies the filename of a datafile copy to be added to or updated in the recovery catalog and control file.
ARCHIVELOG '*filename*'	Specifies the filename of an archived log to be added to or updated in the recovery catalog and control file.
TAG = *tag_name*	Specifies the tag that will be assigned to this file in the control file and recovery catalog, for example, Sunday_PM_Backup.
LEVEL = *integer*	Indicates that the file copy should be recorded as an incremental backup at the specified level. Only level 0 is supported. You can perform incremental backups by using a datafile copy as the base level 0 backup.

Examples

Cataloging an Archived Redo Log: Example This statement catalogs the archived redo logs `/arc/log1`, `/arc/log2`, and `/arc/log3`:

```
CATALOG ARCHIVELOG '/arc/log1', '/arc/log2', '/arc/log3';
```

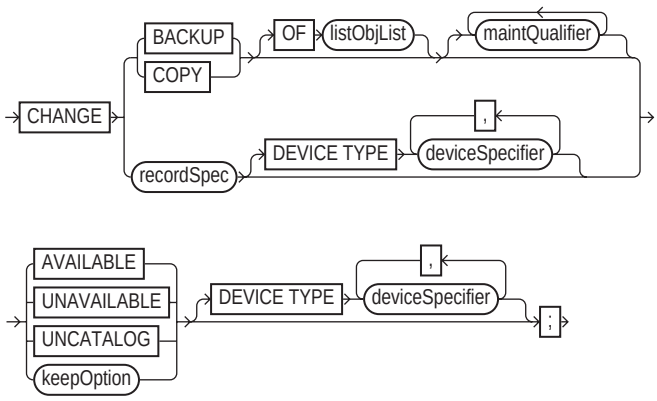
Cataloging a File Copy as an Incremental Backup: Example The following example catalogs datafile copy `tbs_2.dbf` as an incremental level 0 backup:

```
CATALOG DATAFILECOPY '/oracle/copy/tbs_2.dbf' LEVEL 0;
```

Note that the datafile copy could have been created with ALTER TABLESPACE BEGIN/END BACKUP.

CHANGE

Syntax



Purpose

To make the following changes:

- Change the status of backups, copies, and archived logs in the repository to `AVAILABLE` or `UNAVAILABLE`. This feature is useful when a previously unavailable file is made available again, or you do not want a specific backup or copy to be eligible to be restored but also do not want to delete it.
- Remove catalog records for backups and copies, and update the corresponding records in the target control file to status `DELETED`. This feature is useful when you remove a file by using an operating system command rather than the RMAN `CHANGE` command, and want to remove its repository record as well.
- Specify that a backup or copy should either abide by the currently configured retention policy or be exempt from it.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to change the availability status of a backup or copy, and *Oracle9i Recovery Manager User's Guide* to learn how to make a backup or copy exempt from the retention policy

Restrictions and Usage Notes

- Execute the CHANGE command within the braces of a a RUN command or at the RMAN prompt.
- The target instance must be started.
- Use CHANGE only on files that are recorded in the RMAN repository and belong to the current database incarnation.
- The KEEP FOREVER clause requires use of a recovery catalog.
- The only CHANGE command that requires either a manual or automatic maintenance channel is the CHANGE ... AVAILABLE command. However, a maintenance channel is not required when CHANGE ... AVAILABLE is used with a file that is disk only (that is, an ARCHIVELOG, DATAFILECOPY, or CONTROLFILECOPY).

  If you use CHANGE ... AVAILABLE on files that are not disk-only, and have objects created on device types that are not configured for automatic channels, then issue manual maintenance commands on these channels. For example, if you created a backup on an sbt channel, but have only a DISK channel automatically configured, then you must manually allocate an sbt channel before CHANGE ... AVAILABLE can operate on the backup.

Keywords and Parameters

To obtain the primary keys of the records whose status you want to change, run a LIST command or query the recovery catalog views.

BACKUP

Operates on the specified backups: backup sets, backup pieces, and proxy copies. If you do not specify an option for BACKUP, then CHANGE BACKUP operates on all backups recorded in the repository.

Note: Use the KEY column of the LIST output to obtain the primary key usable in the CHANGE command.

OF *listObjList*

Restricts the list of objects operated on to the object type specified in the *listObjList* clause. If you do not specify an object, then CHANGE defaults to all copies.

See Also: "listObjList" on page 2-135

maintQualifier

restricts the command based on the specified options.

See Also: "maintQualifier" on page 2-137

COPY	Operates on datafile copies, archived redo logs, and image copies of archived redo logs. If you do not specify an option for COPY, then CHANGE COPY operates on all copies recorded in the repository. OF *listObjList* — restricts the list of objects operated on to the object type specified in the *listObjList* clause. If you do not specify an object, then CHANGE defaults to all copies. **See Also:** "listObjList" on page 2-135 *maintQualifier* — restricts the command based on the specified options. **See Also:** "maintQualifier" on page 2-137
recordSpec	Specifies the object whose availability status you are changing. See "recordSpec" on page 2-144.
AVAILABLE	Changes the status of a backup or copy to AVAILABLE in the repository**.** View the status in the LIST output or recovery catalog views.
UNAVAILABLE	Changes the status of a backup or copy to UNAVAILABLE in the repository. View the status in the LIST output or recovery catalog views. This option is provided for cases when the file cannot be found or has migrated offsite. RMAN does not use a file that is marked UNAVAILABLE in a RESTORE or RECOVER command. If the file is later found or returns to the main site, then you can use the AVAILABLE option to reflect this change.
UNCATALOG	Removes references to a datafile copy or archived redo log (but not a backup piece or backup set) from the recovery catalog, and updates records in the target control file to status DELETED. The CHANGE . . . UNCATALOG command does not touch physical backups and copies. Use this command to notify RMAN when a file is deleted by some means other than a DELETE command. **Caution:** If you resynchronize from a backup control file, or upgrade the recovery catalog, then uncataloged records can sometimes reappear in the catalog metadata. DEVICE TYPE *deviceSpecifier* — executes the CHANGE for the specified device type only (see "deviceSpecifier" on page 2-101). This option is valid only if you have configured automatic channels and have not manually allocated channels. For example, if you run CHANGE UNCATALOG . . . DEVICE TYPE DISK, then RMAN only uncatalogs files on disk.
keepOption	Changes the exemption status of a backup or copy in relation to the configured retention policy. For example, specify CHANGE . . . NOKEEP to make a backup that is currently exempt from the retention policy eligible for OBSOLETE status. **Note:** You can also specify KEEP in the *backupSpec* clause. **See Also:** "keepOption" on page 2-116

Examples

Updating a Backup Set to Status UNAVAILABLE: Example This example changes the status of a backup set to UNAVAILABLE. You do not need to allocate a maintenance channel:

```
CHANGE BACKUPSET 100 UNAVAILABLE;
```

Uncataloging a Datafile Copy: Example This example uncatalogs a datafile copy that was removed by an operating system utility:

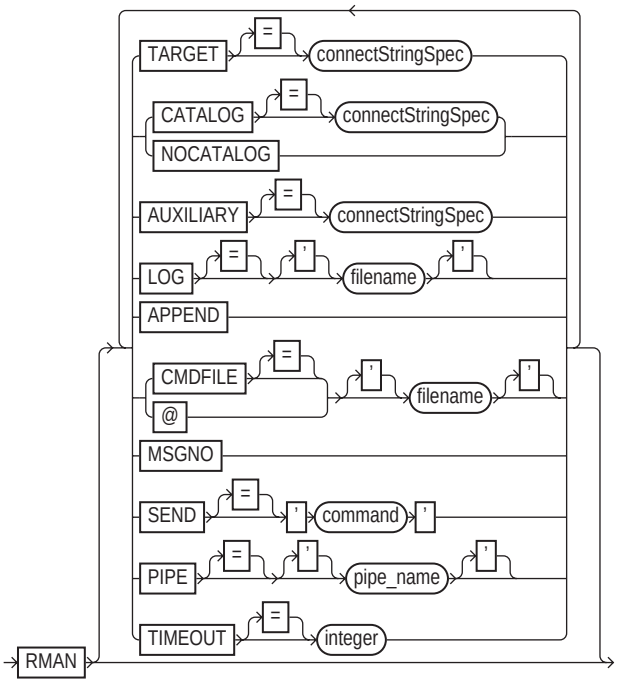
```
% rm /dir1/df1_copy.f
% rman target / nocatalog
RMAN> CHANGE DATAFILECOPY '/dir1/df1_copy.f' UNCATALOG;
```

Changing the Retention Status of a Backup Set: Example This example changes an ordinary backup into a long-term backup:

```
CHANGE BACKUPSET 231 KEEP FOREVER NOLOGS;
```

cmdLine

Syntax



Purpose

To start RMAN from the operating system command line. Use these arguments to:

- Connect to the target, recovery catalog, or auxiliary database.

  Note: On some platforms, you may not want to connect at the operating system command line because the password is visible to other users on the system. The `CONNECT` command is an alternative method that avoids this problem.

- Specify that you are using RMAN without a recovery catalog.

- Run a command file, which is a user-defined file containing RMAN commands.
- Specify the file in which RMAN records the results of processed commands.
- Append output to the existing RMAN log file.
- Send a command to the media manager.
- Cause RMAN to print message numbers in the RMAN output.

If you start RMAN without specifying either CATALOG or NOCATALOG on the command line, then RMAN makes no connection to a repository. If you run a command that requires the repository, and if no CONNECT CATALOG command has been issued yet, then RMAN automatically connects in the default NOCATALOG mode. After that point, the CONNECT CATALOG command is not valid in the session.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to use RMAN to connect to databases

Restrictions and Usage Notes

Use these arguments at the operating system command line rather than at the RMAN prompt.

Keywords and Parameters

TARGET = *connectStringSpec*	Specifies a connect string to the target database, for example, TARGET SYS/change_on_install@inst1. **See Also:** "connectStringSpec" on page 2-79
CATALOG = *connectStringSpec*	Specifies a connect string to the database containing the recovery catalog, for example, CATALOG rman/rman@inst2. **See Also:** "connectStringSpec" on page 2-79
NOCATALOG	Indicates that you are using RMAN without a recovery catalog. **Note:** If you do not specify either CATALOG or NOCATALOG on the command line, then RMAN defaults to NOCATALOG mode when it requires a repository connection (assuming that you have not issued CONNECT CATALOG).
AUXILIARY = *connectStringSpec*	Specifies a connect string to an auxiliary database, for example, AUXILIARY SYS/change_on_install@dupdb. **See Also:** "connectStringSpec" on page 2-79

LOG = *'filename'*	Specifies the file where Recovery Manager will record RMAN output, that is, the commands that were processed and their results. If you do not specify this argument, then RMAN writes its message log file to standard output. The LOG parameter does not cause RMAN to abort if the specified file cannot be opened. Instead, the output goes to standard output.
APPEND	Causes new output to be appended to the end of the message log file. If you do not specify this parameter, and if a file with the same name as the message log file already exists, then RMAN overwrites it.
CMDFILE = *'filename'*	Runs a file containing a user-defined list of RMAN commands. If the first character of the filename is alphabetic, then you can omit the quotes around the filename. The contents of the command file should be identical to commands entered at the RMAN prompt. For example, the following file contents will cause RMAN to connect to a target database and recovery catalog rcat, then back up the target: `CONNECT TARGET; CONNECT CATALOG rman/rman@rcat; BACKUP DATABASE PLUS ARCHIVELOG;` RMAN terminates after running the command file.
@*filename*	Equivalent to CMDFILE.
MSGNO	Causes RMAN to print message numbers, that is, RMAN-*xxxx*, for the output of all commands. By default, RMAN does not print the RMAN-*xxxx* prefix.
SEND = '*command*'	Sends a vendor-specific command string to all allocated channels. **See Also:** Your media management documentation to determine whether this feature is supported, and "SEND" on page 2-187
PIPE = *'pipe_name'*	Invokes the RMAN pipe interface. RMAN uses two public pipes: one for receiving commands and the other for sending output. The names of the pipes are derived from the value of the PIPE parameter. For example, you can invoke the RMAN pipe interface with the following options: PIPE rpi TARGET SYS/pwd@tdb. RMAN opens the following pipes in the target database: ■ ORA$RMAN_RPI_IN, which RMAN uses to receive user commands ■ ORA$RMAN_RPI_OUT, which RMAN uses to send all output All messages on both the input and output pipes are of type VARCHAR2. **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to pass commands to RMAN through a pipe
TIMEOUT = *integer*	Causes RMAN to exit automatically if it does not receive input from an input pipe within *integer* seconds. The PIPE parameter must be specified when using TIMEOUT. **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to pass commands to RMAN through a pipe

Examples

Connecting Without a Recovery Catalog: Example This example connects to the target database `prod1` without a recovery catalog:

```
% rman TARGET SYS/sys_pwd@prod1 NOCATALOG
```

Connecting in Default NOCATALOG mode: Example This example connects to the target database `prod1` without specifying catalog options. Because `CONNECT CATALOG` is not run at the RMAN prompt, RMAN connects in default `NOCATALOG` mode when the first command requiring a repository connection is run:

```
% rman
RMAN> CONNECT TARGET
RMAN> BACKUP DATABASE;
```

Connecting to an Auxiliary Instance: Example This example connects to the target database `prod1`, the recovery catalog database `rcat`, and the auxiliary instance `aux1`:

```
% rman TARGET SYS/sys_pwd@prod1 CATALOG rman/rman@rcat AUXILIARY sys/aux_pwd@aux1
```

Specifying a Command File: Example This example connects to the target database `prod1` and the recovery catalog database `rcat`, and then runs the command file `b_whole_10.rcv`:

```
% rman TARGET SYS/sys_pwd@prod1 CATALOG rman/rman@rcat @'/oracle/dbs/b_whole_l0.rcv'
```

Specifying a Message Log in Append Mode: Example This example connects to the target database `prod1` without a recovery catalog and then specifies that RMAN should append messages to the message log:

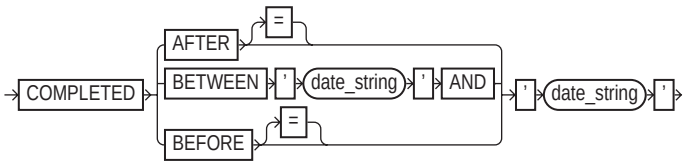
```
% rman TARGET / NOCATALOG LOG = $ORACLE_HOME/dbs/log/msglog.f APPEND
```

Invoking the RMAN Pipe Interface: Example This example invokes the RMAN pipe `newpipe` with a 90 second timeout option:

```
% rman PIPE newpipe TARGET SYS/sys_pwd@prod1 TIMEOUT = 90
```

completedTimeSpec

Syntax



Purpose

A subclause that specifies when a backup or copy completed.

Restrictions and Usage Notes

All date strings must be either:

- Formatted according to the Global Technology date format specification currently in effect.
- Created by a SQL expression that returns a `DATE` value, as in the following examples:
  - `'SYSDATE-30'`
  - `TO_DATE('09/30/2000 08:00:00','MM/DD/YY HH24:MI:SS')`.

  The `TO_DATE` technique specifies dates independently of the current Global Technology environment variable settings.

> **Note:** In Oracle8*i*, the `FROM/UNTIL ... TIME` syntax in the `LIST`, `CROSSCHECK`, and `DELETE` commands was replaced with *`completedTimeSpec`*. If you are adapting an RMAN script from before Oracle8*i* for use in the current release, then you must update these commands for the script to work correctly.

Keywords and Parameters

AFTER '*date_string*'	Specifies the time after which the backup was completed.
BETWEEN '*date_string*' AND '*date_string*'	Specifies a time range during which the backup was completed. Note that BETWEEN *'date1'* AND *'date2'* is exactly equivalent to AFTER *'date1'* BEFORE *'date2'*.
BEFORE '*date_string*'	Specifies the time before which the backup was completed.

Examples

Crosschecking Backups Within a Time Range: Example This example crosschecks the backup sets of the database made last month:

```
CROSSCHECK BACKUP OF DATABASE COMPLETED BETWEEN 'SYSDATE-62' AND 'SYSDATE-31';
```

Deleting Expired Backups: Example This example deletes expired backup sets of `datafile 1` made in the last two weeks:

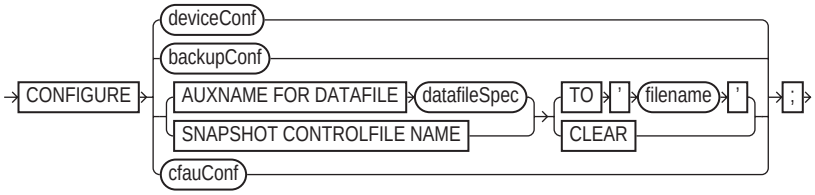
```
DELETE EXPIRED BACKUP OF DATAFILE 1 COMPLETED AFTER 'SYSDATE-14';
```

Listing Copies: Example This example lists image copies of datafile `/oracle/dbs/tbs_22.f` made before October 13, 2000:

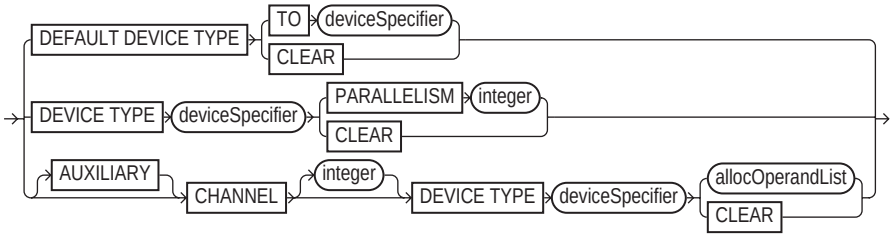
```
LIST COPY OF DATAFILE '/oracle/dbs/tbs_22.f' COMPLETED BEFORE 'Oct 13 2000 20:31:10';
```

CONFIGURE

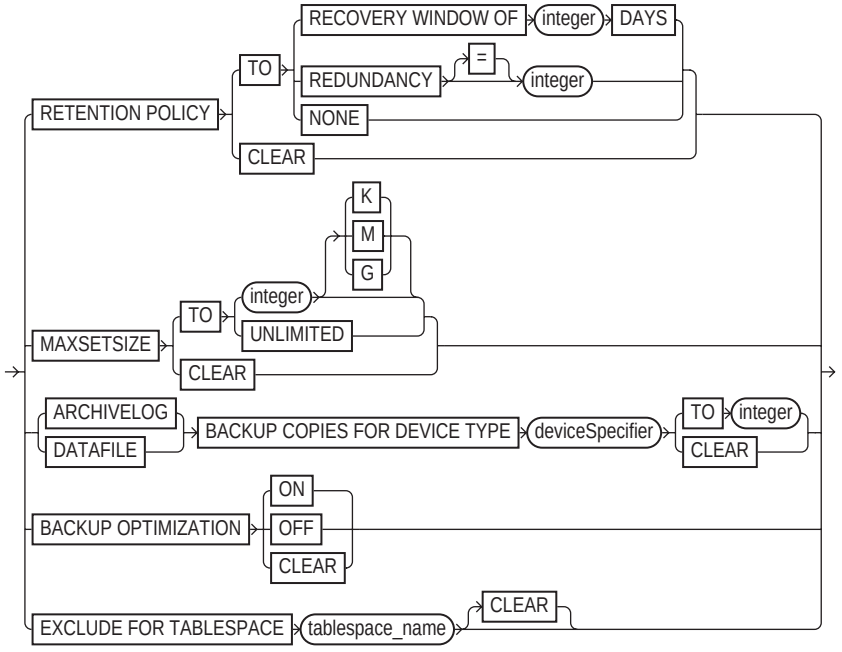
Syntax



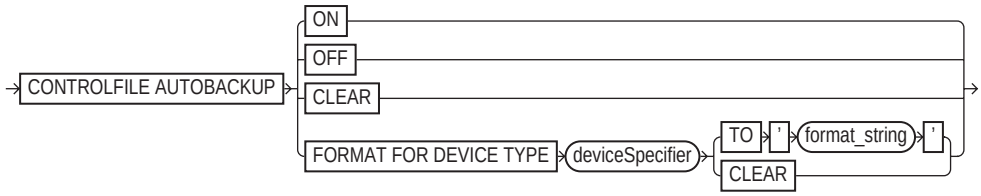
deviceConf::=



backupConf::=


RETENTION POLICY
TO
RECOVERY WINDOW OF
integer
DAYS
REDUNDANCY
=
integer
NONE
CLEAR
MAXSETSIZE
TO
integer
K
M
G
UNLIMITED
CLEAR
ARCHIVELOG
DATAFILE
BACKUP COPIES FOR DEVICE TYPE
deviceSpecifier
TO
integer
CLEAR
BACKUP OPTIMIZATION
ON
OFF
CLEAR
EXCLUDE FOR TABLESPACE
tablespace_name
CLEAR

cfauConf::=



Purpose

To configure persistent settings affecting RMAN backup, restore, duplication, and maintenance jobs. These configurations are in effect for any RMAN session until the configuration is cleared or changed.

Use `CONFIGURE` to set the following:

- An ongoing retention policy that automatically determines which backups and copies are eligible for deletion because they are no longer needed
- The device type (for example, `DISK` or `sbt`) for RMAN jobs
- The default number of channels of each device type that RMAN should allocate for automated backup and restore jobs
- The settings for automatic channels for a specified device type
- The maximum size of backup pieces and sets created on automatic channels
- Backup optimization either `ON` or `OFF`
- The exclusion policy for tablespaces in whole database backups
- The filename of the snapshot control file
- Filenames for files in an auxiliary database
- The control file autobackup feature to `ON` or `OFF`
- The default format for the control file autobackup output files

RMAN uses default settings for `CONFIGURE` options. You can return to the default value for any `CONFIGURE` command by running the same command with the `CLEAR` option.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to configure the RMAN environment

Restrictions and Usage Notes

- Execute this command at the RMAN prompt.
- The target database must be mounted or open.
- Channels allocated with ALLOCATE CHANNEL override any configured automatic channels.
- RMAN does not simultaneously allocate automatic channels for multiple device types in BACKUP and COPY jobs.
- To direct backups or restores to specific channels, use the RMAN-generated channel names. If you specify channel numbers in the CONFIGURE CHANNEL command, then RMAN uses the same numbers in the system-generated channel names.
- If you configure channels by using the nondefault CONNECT or PARMS options to create backups or copies, then you must either use the same configured channels or manually allocate channels with the same options to restore or crosscheck these backups.
- You cannot exclude the SYSTEM tablespace from whole database backups.
- The REDUNDANCY and RECOVERY WINDOW options are mutually exclusive. Only one type of retention policy can be in effect at any time.
- You cannot clear individual parameters when running CONFIGURE . . . CLEAR. For example, you can run CONFIGURE CHANNEL DEVICE TYPE sbt CLEAR but not CONFIGURE CHANNEL DEVICE TYPE sbt RATE 1000 CLEAR.
- The channel number in a manually numbered channel must be less than 255.
- You must specify at least one channel option when running CONFIGURE CHANNEL. In other words, you cannot issue a command such as CONFIGURE CHANNEL 2 DEVICE TYPE DISK, but you can issue a command such as CONFIGURE CHANNEL 2 DEVICE TYPE DISK MAXPIECESIZE 2500K.
- The CONFIGURE CONTROLFILE AUTOBACKUP FORMAT format string must include the %F substitution variable.

Keywords and Parameters

DEFAULT DEVICE TYPE TO *deviceSpecifier*

Specifies the default device type for automatic channels. By default, DISK is the default device type. The CLEAR option returns the default device type to DISK.

By default, the BACKUP and COPY commands only allocate channels of the default device type. For example, if you configure automatic channels of type DISK and sbt, and set the default device type to DISK, then RMAN only allocates disk channels when you run the BACKUP DATABASE command. You can override this behavior either by manually allocating channels in a RUN command, or by specifying the DEVICE TYPE clause on the BACKUP command itself.

The RESTORE command allocates automatic channels of all configured device types, regardless of the default device type. The RESTORE command obeys the PARALLELISM setting for each configured device type.

DEVICE TYPE *deviceSpecifier* PARALLELISM *integer*

Configures the device types that are eligible for use in jobs that use automatic channels and sets the degree of parallelism. The DISK device type is the default. Specifying CLEAR for a device type resets its settings to the default values (PARALLELISM = 1).

The PARALLELISM parameter specifies the number of automatic channels of the specified device type allocated for RMAN jobs. By default, PARALLELISM = 1. For example, you can set PARALLELISM for disk backups to 3. If you configure automatic channels of type disk and tape, and set the default device type as disk, then RMAN allocates three disk channels when you run BACKUP DATABASE at the RMAN prompt.

To change the parallelism for a device type to *n*, run a new CONFIGURE DEVICE TYPE . . . PARALLELISM *n* command. For example, you can change configure PARALLELISM to 3 for sbt and then change it to 2 as follows:

```
CONFIGURE DEVICE TYPE sbt PARALLELISM 3;
CONFIGURE DEVICE TYPE sbt PARALLELISM 2;
```

Note: If you configure *n* manually numbered channels, the PARALLELISM setting can be greater than or less than *n*. For example, you can manually number ten automatic channels and configure parallelism to any value such as 2 or 12.

CHANNEL *integer* DEVICE TYPE *deviceSpecifier*

Specifies the standard or AUXILIARY channel that you are configuring or clearing, as well as the device type (DISK or sbt) of the channel. You can either configure a generic channel or specify a channel by number, where *integer* is less than 255.

If you configure a generic channel (that is, if you do not specify a channel number), then RMAN uses the generic settings for every parallelized channel *except* any channel number that you have explicitly configured. In other words, a generic channel setting specifies options for all channels not configured explicitly.

For generic channels of a specified device type, a new command erases all the previous settings for this device type. Assume that you run these two commands:

```
CONFIGURE CHANNEL DEVICE TYPE sbt MAXPIECESIZE 1G;
CONFIGURE CHANNEL DEVICE TYPE sbt RATE 1700K;
```

The second command erases the MAXPIECESIZE setting of the first command.

If AUXILIARY is specified, then this configuration is used only for channels allocated at the auxiliary instance. If no auxiliary device configuration is specified, and if RMAN needs to automatically allocate auxiliary channels, then RMAN uses the target database device configuration. It is not necessary to specify configuration information for auxiliary channels unless they require different parameters from the target channels.

See Also: *Oracle9i Recovery Manager User's Guide* to learn how configure automatic channels specified by channel number

allocOperandList — Specifies control options for the allocated channel.

See Also: "allocOperandList" on page 2-16

CLEAR — Clears the specified channel. For example, CONFIGURE CHANNEL 1 DEVICE TYPE DISK CLEAR returns only channel 1 to its default, whereas CONFIGURE CHANNEL DEVICE TYPE DISK CLEAR returns the generic disk channel to its default.

Note that you cannot specify any other channel options (for example, PARMS) when you specify CLEAR.

RETENTION POLICY TO

Specifies a persistent, ongoing policy for datafile and control file backups and copies that RMAN marks as obsolete, that is, not needed and eligible for deletion. As time passes, RMAN marks backups and copies as obsolete according to the criteria you specify in the retention policy. RMAN does not automatically delete any backups or copies: manually run the DELETE OBSOLETE command to remove obsolete files. By default, RETENTION POLICY is configured to REDUNDANCY 1.

For backups, the basic unit of the retention policy is a backup set, not a backup piece. For example, BACKUP COPIES 4 TABLESPACE users generates a single backup set that is duplexed into four identical backup pieces. The retention policy considers this as one backup, not four separate backups.

	RECOVERYWINDOWOF *integer* DAYS	specifies a time window in which RMAN should be able to recover the database. The window stretches from the current time (SYSDATE) to the **point of recoverability**, which is the earliest date to which you want to recover. The point of recoverability is *integer* days in the past, that is, SYSDATE - *integer*.
	REDUNDANCY *integer*	Specifies that RMAN should retain *integer* backups or copies of each datafile and control file. If more than *integer* backups or copies exist, RMAN marks these extra files as obsolete. Then, RMAN determines the oldest of the retained backups and copies, and marks all archived logs and log backups older than this backup or copy as obsolete. The DELETE OBSOLETE command removes obsolete backups and copies as well as archived log backups and copies.
	NONE	Disables the retention policy feature. RMAN does not consider any backups or copies as obsolete.
	CLEAR	Resets the retention policy to its default (REDUNDANCY = 1).
MAXSETSIZE	specifies the maximum size of each backup set created on a channel. By default MAXSETSIZE is set to UNLIMITED, meaning that it is disabled.	
	TO *integer*	Specifies the maximum set size in bytes, kilobytes (K), megabytes (M), or gigabtyes (G). The default setting is in bytes and is rounded down to kilobtyes. For example, if you set MAXSETSIZE to 5000, RMAN sets the maximum set size at 4 kilobytes (that is, 4096 bytes), which is the lower kilobyte boundary of 5000. The minimum value must be greater than or equal to the database block size.
	TO UNLIMITED	Specifies that there is no size limit for backup sets.
	CLEAR	Resets the maximum set size to its default value (UNLIMITED).
{ARCHIVELOG|DATAFILE} BACKUP COPIES FOR DEVICE TYPE *deviceSpecifier* TO *integer*	Specifies the number of copies of each backup set for DATAFILE (both datafiles and control files) or ARCHIVELOG files on the specified device type, from 1 (default) to 4. If duplexing is specified in the BACKUP command or in a SET BACKUP COPIES command, then the CONFIGURE setting is overridden.	

BACKUP OPTIMIZATION	Toggles backup optimization ON or OFF (default). Specify CLEAR to return optimization to its default value of OFF. Optimization does not back up a file to a device type if the identical file is already backed up on the device type. For two files to be identical, their content must be exactly the same. You can override backup optimization by using the FORCE option of the BACKUP command. RMAN does not signal an error if optimization causes all files to be skipped during a backup. Note also that BACKUP . . . DELETE INPUT deletes all specified files whether or not optimization would skip these files during a backup. Backup optimization is enabled when all of the following conditions are satisfied: ■ The CONFIGURE BACKUP OPTIMIZATION ON command has been run. ■ You run BACKUP DATABASE, BACKUP ARCHIVELOG with ALL or LIKE options, or BACKUP BACKUPSET ALL. ■ The RMAN job uses a channel of only one device type. The retention policy has an effect on which files backup optimization skips. **See Also:** *Oracle9i Recovery Manager User's Guide* for a description of how RMAN determines that it can skip the backup of a file
EXCLUDE FOR TABLESPACE *tablespace_name*	Excludes the specified tablespace from BACKUP DATABASE commands. Note that you cannot exclude the SYSTEM tablespace. By default, each tablespace is not excluded, that is, the exclude functionality is disabled. The exclusion is stored as an attribute of the tablespace, not the individual datafiles, so the exclusion applies to any files that are added to this tablespace in the future. If you run CONFIGURE . . . CLEAR on a tablespace after excluding it, then it returns to the default configuration of "not excluded." You can still back up the configured tablespace by explicitly specifying it in a BACKUP command or by specifying the NOEXCLUDE option on a BACKUP DATABASE command. **See Also:** *Oracle9i Recovery Manager User's Guide* for more information about snapshot control files

AUXNAME FOR DATAFILE *datafileSpec* TO '*filename*'	Configures the auxiliary filename for the specified target datafile to *'filename'*. For example, you can set the auxiliary name for datafile 2 to /df2.f, and then unspecify this auxiliary name by running CONFIGURE AUXNAME FOR DATAFILE 2 NULL. If you are performing TSPITR or running the DUPLICATE command, then by setting AUXNAME you can preconfigure the filenames for use on the auxiliary database without manually specifying the auxiliary filenames during the procedure. For example, use this command during TSPITR if the datafiles are on raw disk and you need to restore auxiliary datafiles to raw disk for performance reasons. Typically, you set the AUXNAME parameter in TSPITR for the datafiles of the SYSTEM tablespace and the tablespaces containing rollback segments. Do not overlay files which are in use by the production database and can be discarded after TSPITR completes. In essence, the AUXNAME of a datafile is the location where TSPITR can create a temporary copy of it. When renaming files with the DUPLICATE command, CONFIGURE AUXNAME is an alternative to SET NEWNAME. The difference is that after you set the AUXNAME the first time, you do not need to reset the filename when you issue another DUPLICATE command: the AUXNAME setting remains in effect until you issue CONFIGURE AUXNAME ... CLEAR. In contrast, you must reissue the SET NEWNAME command every time you rename files. **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to perform RMAN TSPITR, and *Oracle9i Recovery Manager User's Guide* to learn how to duplicate a database
SNAPSHOT CONTROLFILE NAME TO '*filename*'	Configures the snapshot control file filename to *'filename'*. If you run CONFIGURE SNAPSHOT CONTROLFILE NAME CLEAR, then RMAN sets the snapshot control file name to its default. The default value for the snapshot control file name is platform-specific and dependent on the Oracle home. For example, the default on some UNIX system is $ORACLE_HOME/dbs/snapcf_@.f. If you clear the control file name, and you change the Oracle home, then the default location of the snapshot control file changes as well. **See Also:** *Oracle9i Recovery Manager User's Guide* for more information about snapshot control files
CONTROLFILE AUTOBACKUP	Controls the control file autobackup feature. By default, this feature is not enabled.

ON	Enables the control file autobackup feature. When ON, then RMAN automatically performs a **control file autobackup** in these situations: ■ After every BACKUP or COPY command issued at the RMAN prompt ■ Whenever a BACKUP or COPY command within a RUN block is followed by a command that is neither BACKUP nor COPY. ■ At the end of every RUN block if the last command in the block was either BACKUP or COPY. The control file autobackup occurs in addition to any backup or copy of the current control file that has been performed during these commands. RMAN automatically backs up the current control file using the default format of %F (see entry for CONFIGURE CONTROLFILE AUTOBACKUP FORMAT for an explanation of this substitution variable). You can change this format using the CONFIGURE CONTROLFILE AUTOBACKUP FORMAT and SET CONTROLFILE AUTOBACKUP FORMAT commands.
OFF	disables the autobackup feature.
CLEAR	returns the feature to its default setting of OFF.
CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE *deviceSpecifier* TO '*format_string*'	Configures the default filename format for the control file autobackup on the specified device type. By default, the initial format is %F for all devices. Any default format string specified with CONFIGURE must include the %F substitution variable (see BACKUP). This variable translates into *c-IIIIIIIII-YYYYMMDD-QQ*, where: ■ *IIIIIIIII* stands for the DBID. The DBID is printed in decimal so that it can be easily associated with the target database. ■ *YYYYMMDD* is a time stamp in the Gregorian calendar of the day the backup is generated ■ *QQ* is the sequence in hexadecimal number that starts with 00 and has a maximum of 'FF' (256) Specify CLEAR to return the format to the default %F.

CLEAR	Clears all user settings and returns the specified CONFIGURE command to its default value. For example, CONFIGURE RETENTION POLICY CLEAR returns the retention policy configuration to its default value of REDUNDANCY = 1. CLEAR affects only the CONFIGURE command on which it is an option. For example, the second command does not clear the configuration for the first command, whereas the last command does clear the first command: CONFIGURE DEVICE TYPE sbt PARALLELISM 3; CONFIGURE CHANNEL DEVICE TYPE sbt CLEAR; CONFIGURE DEVICE TYPE sbt CLEAR;

Examples

Configuring Backup Optimization: Example This example configures RMAN so that the BACKUP command does not back up files to a device type if the identical file has already been backed up to the device type:

```
CONFIGURE BACKUP OPTIMIZATION ON;
```

Configuring a Retention Policy: Example This example configures a retention policy with a recovery window of 2 weeks, and then resets the retention policy to REDUNDANCY = 1:

```
CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 14 DAYS;
CONFIGURE RETENTION POLICY CLEAR;
```

Configuring Automatic Disk and Tape Channels: Example This example configures generic DISK and sbt channels, sets the default device type to sbt, and sets PARALLELISM to 3:

```
CONFIGURE CHANNEL DEVICE TYPE DISK RATE 5M;
CONFIGURE CHANNEL DEVICE TYPE sbt PARMS 'ENV=(NSR_SERVER=bksrv1)';
CONFIGURE DEFAULT DEVICE TYPE TO sbt;
CONFIGURE DEVICE TYPE sbt PARALLELISM 3;
```

Overriding the Default Device Type: Example This example configures the default device type to sbt, backs up the archived logs on the default sbt channel, and then backs up the database to disk on the default disk channel:

```
CONFIGURE CHANNEL DEVICE TYPE sbt PARMS 'ENV=(NSR_SERVER=bksrv1)';
CONFIGURE DEFAULT DEVICE TYPE TO sbt;
BACKUP ARCHIVELOG ALL;
BACKUP DEVICE TYPE DISK DATABASE;
```

Configuring Automatic Channels Across File Systems: Example This example configures automatic disk channels across three file systems:

```
CONFIGURE CHANNEL 1 DEVICE TYPE DISK FORMAT '/disk1/backup/%U';
CONFIGURE CHANNEL 2 DEVICE TYPE DISK FORMAT '/disk2/backup/%U';
CONFIGURE CHANNEL 3 DEVICE TYPE DISK FORMAT '/disk3/backup/%U';
```

Configuring Automatic Channels in an Oracle Real Application Clusters Configuration: Example This example allocates automatic `sbt` channels for two nodes of an Oracle Real Application Clusters database:

```
CONFIGURE DEVICE TYPE sbt PARALLELISM 2;
CONFIGURE DEFAULT DEVICE TYPE TO sbt;
CONFIGURE CHANNEL 1 DEVICE TYPE sbt CONNECT 'SYS/change_on_install@node1'
  PARMS 'ENV=(NSR_SERVER=bkserv1)';
CONFIGURE CHANNEL 2 DEVICE TYPE sbt CONNECT 'SYS/change_on_install@node2'
  PARMS 'ENV=(NSR_SERVER=bkserv2)';
```

Clearing Automatic Channels: Example This example clears manually numbered `DISK` channels 2 and 3 and the generic `sbt` channel:

```
CONFIGURE CHANNEL 2 DEVICE TYPE DISK CLEAR;
CONFIGURE CHANNEL 3 DEVICE TYPE DISK CLEAR;
CONFIGURE CHANNEL DEVICE TYPE sbt CLEAR;
```

Configuring and Clearing Parallelism: Example This example sets `DISK` parallelism to `2`, then changes it to `3`, then returns it to the default parallelism of `1`:

```
CONFIGURE DEVICE TYPE DISK PARALLELISM 2;
CONFIGURE DEVICE TYPE DISK PARALLELISM 3;
CONFIGURE DEVICE TYPE DISK CLEAR;
```

Configuring Backup Copies: Example This example configures duplexing to `3` for `DISK` backups of datafiles and control files and then runs a database backup:

```
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 3;
BACKUP DATABASE FORMAT '/fs1/%U', '/fs2/%U', '/fs3/%U';
```

Configuring the Snapshot Control File Location: Example This example configures a new location for the snapshot control file and then resynchronizes the recovery catalog.

```
CONFIGURE SNAPSHOT CONTROLFILE NAME TO '/oracle/dbs/snap.cf';
```

Excluding a Tablespace from a Whole Database Backup: Example This example excludes the read-only `reports` tablespace from whole database backups, and then returns the `reports` tablespace to the default behavior of "not excluded":

```
CONFIGURE EXCLUDE FOR TABLESPACE reports;
CONFIGURE EXCLUDE FOR TABLESPACE reports CLEAR;
```

Specifying Auxiliary Filenames: Example This example duplicates a database to a remote host with a different directory structure, by using CONFIGURE AUXNAME to specify new filenames for the datafiles:

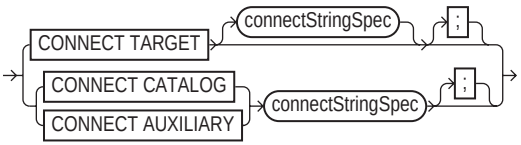
```
# set auxiliary names for the datafiles
CONFIGURE AUXNAME FOR DATAFILE 1 TO '/oracle/auxfiles/aux_1.f';
CONFIGURE AUXNAME FOR DATAFILE 2 TO '/oracle/auxfiles/aux_2.f';
CONFIGURE AUXNAME FOR DATAFILE 3 TO '/oracle/auxfiles/aux_3.f';
CONFIGURE AUXNAME FOR DATAFILE 4 TO '/oracle/auxfiles/aux_4.f';

RUN
{
  ALLOCATE AUXILIARY CHANNEL dupdb1 tYPE DISK;
  DUPLICATE TARGET DATABASE TO dupdb
  LOGFILE
    GROUP 1 ('$ORACLE_HOME/dbs/dupdb_log_1_1.f',
             '$ORACLE_HOME/dbs/dupdb_log_1_2.f') SIZE 200K,
    GROUP 2 ('$ORACLE_HOME/dbs/dupdb_log_2_1.f',
             '$ORACLE_HOME/dbs/dupdb_log_2_2.f') SIZE 200K REUSE;
}
# Un-specify the auxiliary names for the datafiles so that they are not overwritten
# by mistake:
CONFIGURE AUXNAME FOR DATAFILE 1 CLEAR;
CONFIGURE AUXNAME FOR DATAFILE 2 CLEAR;
CONFIGURE AUXNAME FOR DATAFILE 3 CLEAR;
CONFIGURE AUXNAME FOR DATAFILE 4 CLEAR;
```

Specifying the Default Format for the Control File Autobackup: Example This example turns on the autobackup feature, then changes the default format for the DISK and sbt devices, then clears the autobackup setting:

```
CONFIGURE CONTROLFILE AUTOBACKUP ON;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '/backup_dir/%F';
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE sbt TO 'cf_auto_%F';
CONFIGURE CONTROLFILE AUTOBACKUP CLEAR;   # returns to default setting of OFF
```

CONNECT

Syntax



Purpose

To establish a connection between RMAN and a target, auxiliary, or recovery catalog database.

Note: When connecting from the command line, the password may be visible to other users on the system. The CONNECT command avoids this problem.

See Also: "cmdLine" on page 2-57 for command line connection options

Restrictions and Usage Notes

- You can only run the CONNECT TARGET, CONNECT CATALOG, and CONNECT AUXILIARY commands if you are at the RMAN prompt and if you are not already connected to the specified databases.
- After being connected to a target database, you must exit and restart RMAN to connect to a different target database.
- If you need to connect to a different target, catalog, or auxiliary database, then you should start a new RMAN session.
- You cannot specify the NOCATALOG option on the command line and then run CONNECT CATALOG at the RMAN prompt.
- You cannot run CONNECT CATALOG command when RMAN is in the default NOCATALOG mode, that is, when these conditions are met:

- You started RMAN at the command without specifying either CATALOG or NOCATALOG.
- You have already run a command such as BACKUP that requires a repository connection.

Keywords and Parameters

CONNECT TARGET *connectStringSpec*	Establishes a connection between RMAN and the target database.
CONNECT CATALOG *connectStringSpec*	Establishes a connection between RMAN and the recovery catalog database. You must run this command *before* running any command that requires a repository. Otherwise, RMAN defaults to NOCATALOG mode and invalidates the use of CONNECT CATALOG in the session.
CONNECT AUXILIARY *connectStringSpec*	Establishes a connection between RMAN and an auxiliary instance. An auxiliary instance can be used with the DUPLICATE command or used during TSPITR.

Examples

Connecting Without a Recovery Catalog: Example This example starts RMAN and then connects to the target database with an Oracle Net service name prod1:

```
% rman NOCATALOG
RMAN> CONNECT TARGET sys/change_on_install@prod1;
```

Connecting in the Default NOCATALOG Mode: Example This example starts RMAN and then connects to the target database with an Oracle Net service name prod1. Because BACKUP is run and no CONNECT CATALOG has been run, RMAN defaults to NOCATALOG mode:

```
% rman
RMAN> CONNECT TARGET sys/change_on_install@prod1;
RMAN> BACKUP DATAFILE 7;
# You cannot run CONNECT CATALOG after this point because RMAN has defaulted to NOCATALOG
```

Connecting with a Recovery Catalog: Example This example starts RMAN and then connects to the target database prod1 by using operating system authentication and the recovery catalog database rcat by using a password file:

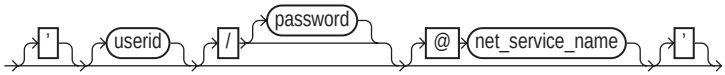
```
% rman
RMAN> CONNECT TARGET /
RMAN> CONNECT CATALOG rman/rman@rcat
```

Connecting to Target, Recovery Catalog, and Duplicate Databases: Example This example connects to three different databases specifying a username and password for each:

```
% rman
RMAN> CONNECT TARGET SYS/sysdba@prod1
RMAN> CONNECT CATALOG rman/rman@rcat
RMAN> CONNECT AUXILIARY SYS/sysdba@dupdb
```

connectStringSpec

Syntax



Purpose

A subclause specifying the username, password, and net service name for connecting to a target, recovery catalog, or auxiliary database. The connection is necessary to authenticate the user and identify the database.

Restrictions and Usage Notes

- You must have SYSDBA privileges on the target and auxiliary databases.
- Do not connect to the recovery catalog database as user SYS.

Keywords and Parameters

/	If you do not specify a user ID or password when connecting to the target database, then a forward slash establishes a connection as user SYS by using operating system authentication. For example, enter the following to connect to the target database: `% rman TARGET /` **Note:** The forward slash depends on platform-specific environment variables.
userid	Establishes a connection to the database for the specified user. If you do not specify a password, RMAN obtains the password interactively by displaying a prompt. The characters will not be echoed to the terminal. You must have SYSDBA authority when connecting to the target or auxiliary database, but must *not* connect as SYS to the recovery catalog database. **Note:** The connect string must not contain any white space, but it can contain punctuation characters such as a forward slash (/) and an at sign (@). */password* — establishes a connection for the specified user by using a password. If the target database is not open, then a password file must exist.
@net_service_name	Establishes a connection to the database through an optional Oracle Net net service name.

Examples

Connecting Without a Recovery Catalog: Example This example connects to the target database by using a password and the Oracle Net service name `prod1` in the default `NOCATALOG` mode:

```
% rman TARGET SYS/change_on_install@prod1
```

Entering the Password Interactively: Example This example connects to the target database as user `SYS` but without specifying a password at the command line:

```
% rman TARGET SYS

Recovery Manager: Release 9.0.1.0.0

target database Password:
```

Connecting with Operating System Authentication: Example This example starts RMAN and then connects to the target database `prod1` by using operating system authentication and the recovery catalog database `rcat` using a net service name:

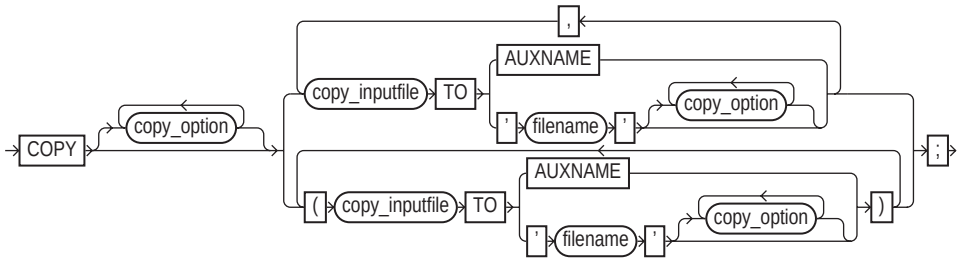
```
% rman
RMAN> CONNECT TARGET /
RMAN> CONNECT CATALOG rman/rman@rcat
```

Connecting to a Target Database, Recovery Catalog, and Auxiliary Instance: Example This example connects to three different databases from the command line, specifying a username, password, and net service name for each:

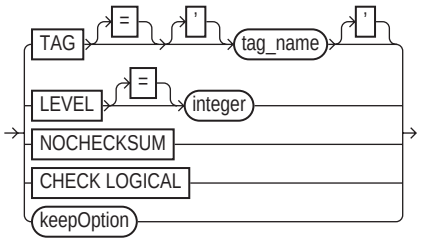
```
% rman TARGET SYS/pwd1@prod1 CATALOG rman/rman@rcat AUXILIARY SYS/pwd2@dupdb
```

COPY

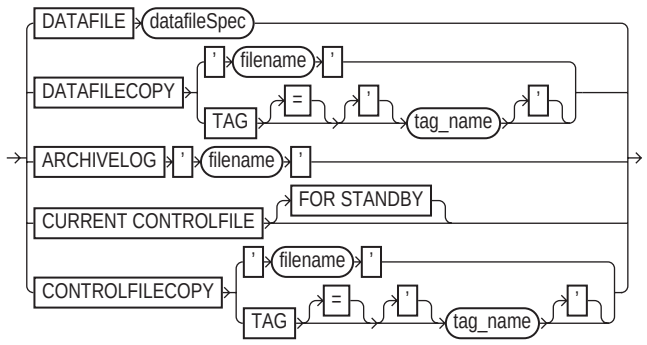
Syntax



copy_option::=



copy_inputfile::=



Purpose

Create an image copy of a file. The output file is always written to disk. You can copy the following types of files:

- Datafiles (current or copies)
- Archived redo logs
- Control files (current or copies)

In many cases, copying datafiles is more beneficial than backing them up, since the output is suitable for use without any additional processing. In contrast, you must process a backup set with a RESTORE command before it is usable. So, you can perform media recovery on a datafile copy, but not directly on a backup set, even if it backs up only one datafile and contains a single backup piece.

If CONFIGURE CONTROLFILE AUTOBACKUP is set to ON, then RMAN automatically performs a **control file autobackup** in these situations:

- After every BACKUP or COPY command issued at the RMAN prompt
- Whenever a BACKUP or COPY command within a RUN block is followed by a command that is neither BACKUP nor COPY.
- At the end of every RUN block if the last command in the block was either BACKUP or COPY.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to copy files with RMAN

Restrictions and Usage Notes

- The target database must be mounted or open.
- You cannot make incremental copies.

Keywords and Parameters

copy_option

Specifies optional parameters affecting either the input or output files or both.

TAG = *'tag_name'*

Specifies the tag of the input file or output file copy. You cannot apply a tag to a copy of an archived log, current control file, or standby control file.

	LEVEL = *integer*	Includes the input file or output file copy in the incremental backup strategy by making it serve as a basis for subsequent incremental backup sets. Typically, you specify LEVEL 0. If you do not use the LEVEL option, then the datafile copy has no impact on the incremental backup strategy.
	NOCHECKSUM	Suppresses block checksums. Unless you specify this option, Oracle computes a checksum for each block. RMAN verifies the checksum when restoring the copy. If the database is already maintaining block checksums, then this flag has no effect.
	CHECK LOGICAL	Tests data and index blocks that pass physical corruption checks for logical corruption, for example, corruption of a row piece or index entry. If RMAN finds logical corruption, then it logs the block in the alert.log and server session trace file. Provided the sum of physical and logical corruptions detected for a file remain below its MAXCORRUPT setting, the RMAN command completes and Oracle populates V$BACKUP_CORRUPTION and V$COPY_CORRUPTION with corrupt block ranges. If MAXCORRUPT is exceeded, then the command terminates without populating the views. **Note:** For COPY and BACKUP, the MAXCORRUPT setting represents the total number of physical and logical corruptions permitted on a file.
	keepOption	Overrides any configured retention policy for this copy so that the copy is not considered obsolete. **See Also:** "keepOption" on page 2-116
copy_inputfile	specifies the type of input file, that is, the file that you want to copy.	
	DATAFILE *datafileSpec*	Specifies a list of one or more datafiles as input. **See Also:** "datafileSpec" on page 2-95 **Note:** If you specify a filename, then it must be the name of a current datafile as listed in the control file.
	DATAFILECOPY '*filename*'	Specifies a list of one or more datafile copies as input. Specify the datafile copies by '*filename*' or TAG = *'tag_name'*. The filename must *not* be the name of a current datafile listed in the control file. The existing copy may have been created by either a previous COPY command or by an external operating system utility.
	ARCHIVELOG '*filename*'	Specifies the filename of an input archived redo log. The archived log may have been created by the Oracle archiving session or by a previous copy command. Specify the archived redo log by filename.

	CURRENT CONTROLFILE	Specifies the current control file. If you specify the FOR STANDBY option, RMAN makes a control file that can be used for creation of a standby database.
	CONTROLFILECOPY '*filename*'	Specifies the filename of a control file copy. You can also set TAG = *'tag_name'* to specify a list of one or more control file copies. This command copies a control file copy. The copy can be: ■ A copy of a normal control file (that is, not a standby control file) ■ A standby control file copy created by using the COPY STANDBY CONTROLFILE command or the SQL statement ALTER DATABASE CREATE STANDBY CONTROLFILE RMAN inspects the header of the control file copy to determine whether it is a standby or nonstandby control file. **Note:** The control file copy is marked as a backup control file, so media recovery will be necessary if you mount the control file copy. This command is equivalent to the ALTER DATABASE BACKUP CONTROLFILE TO '...' statement.
TO AUXNAME		Specifies that Oracle should copy the input datafile to the filename specified in an earlier SET AUXNAME command for the input datafile.
TO '*filename*'		Specifies the filename of the output file copy.

Examples

Copying a Datafile: Example This example copies the datafile `tbs_01.f` with the NOCHECKSUM option to the output file `temp3.f`, marking it as a level 0 backup:

```
COPY
  NOCHECKSUM
  DATAFILE '$ORACLE_HOME/dbs/tbs_01.f' TO '$ORACLE_HOME/copy/temp3.f'
  LEVEL 0;
```

Copying the Control File: Example This example copies the current control file and gives the copy the tag `weekly_cf_copy`:

```
COPY
  CURRENT CONTROLFILE TO '$ORACLE_HOME/copy/cf1.f'
  TAG = weekly_cf_copy;
```

Creating a Long-Term Database Copy: Example This example copies the database and exempts it from the current retention policy:

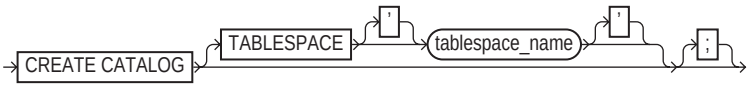
```
COPY
  KEEP FOREVER NOLOGS
  CURRENT CONTROLFILE TO '/archive/cf1.f',
  DATAFILE 1 TO '/archive/df1.copy',
  DATAFILE 2 TO '/archive/df2.copy';
```

Creating a Standby Control File: Example This example uses the preconfigured DISK channel to create a copy of the current target control file that can be used as a standby control file:

```
COPY CURRENT CONTROLFILE FOR STANDBY TO '/cf_standby.f';
```

CREATE CATALOG

Syntax



Purpose

To create a schema for the recovery catalog. Typically, you create this schema in a separate recovery catalog database.

Note: In releases prior to 8.1.5, you created the recovery catalog schema by connecting to the recovery catalog database and executing the `catrman.sql` script.

See Also: *Oracle9i Recovery Manager User's Guide* to learn how to create the recovery catalog

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- RMAN must be connected to the recovery catalog either through the `CATALOG` command-line option or the `CONNECT CATALOG` command, and the catalog database must be open. A connection to the target database is not required.
- The recovery catalog owner must be granted the `RECOVERY_CATALOG_OWNER` role, and also be granted space privileges in the tablespace where the recovery catalog tables will reside.
- Do not create the recovery catalog in the `SYS` schema.

See Also:

- *Oracle9i Database Administrator's Guide* for more information about the `RECOVERY_CATALOG_OWNER` role
- "cmdLine" on page 2-57 for information about RMAN command-line options

Keywords and Parameters

TABLESPACE *'tablespace_name'*	Specifies the tablespace in which to store the recovery catalog schema. The catalog owner must be granted quota privileges. If you do not specify a tablespace, RMAN stores the recovery catalog in the default tablespace of the catalog owner.

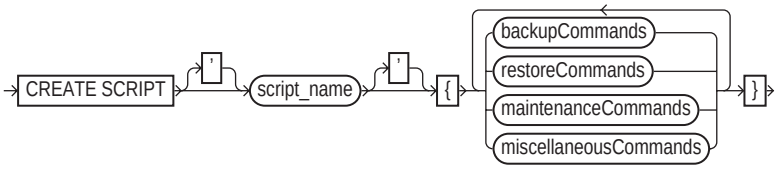
Example

Creating a Catalog Schema: Example This example creates a user `rman`, grants `rman` the `RECOVERY_CATALOG_OWNER` role, then creates the recovery catalog in the schema `rman.cattbs` of the database `rcat`:

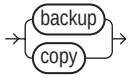
```
% sqlplus sys/change_on_install@rcat;

SQL> CREATE USER rman IDENTIFIED BY rman
  2> DEFAULT TABLESPACE cattbs QUOTA UNLIMITED ON cattbs;
SQL> GRANT recovery_catalog_owner TO rman;
SQL> exit

% rman CATALOG rman/rman@rcat;
RMAN> CREATE CATALOG;
```

CREATE SCRIPT

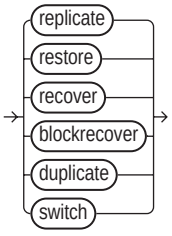
Syntax



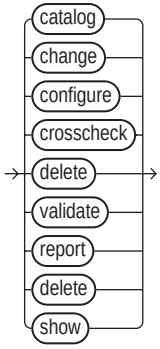
backupCommands::=



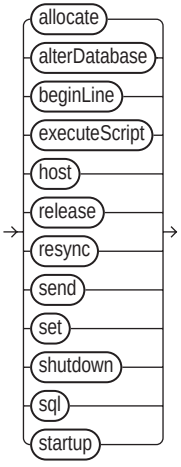
restoreCommands::=



maintenanceCommands::=



miscellaneousCommands::=



Purpose

To create a script and store it in the recovery catalog for future reference. Stored scripts provide a common repository for frequently executed collections of RMAN commands. Any command that is legal within a RUN command is permitted in the stored script. The script is not executed immediately; run the script with @.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to store scripts in the recovery catalog

Restrictions and Usage Notes

Note the following restrictions:

- Execute CREATE SCRIPT only at the RMAN prompt.
- RMAN must be connected to the recovery catalog either through the CATALOG command-line option or the CONNECT CATALOG command, and the catalog database must be open. A connection to the target database is not required.
- You cannot execute a RUN command within a stored script.
- The @ and @@ commands do not work within CREATE SCRIPT.
- Quotes must be used around the script name when the name contains either spaces or reserved words.

Keywords and Parameters

For descriptions of the individual commands that you can use in a stored script, refer to the appropriate entry, for example, "BACKUP" on page 2-26.

'script_name'	Creates a stored script with the specified name. The statements allowable within the brackets of the CREATE SCRIPT *'script_name'* { ... } command are the same allowable within the RUN command. The statements within the braces constitute the *job_command_list*. **Note:** To run the stored script, specify EXECUTE SCRIPT within the braces of the RUN command.

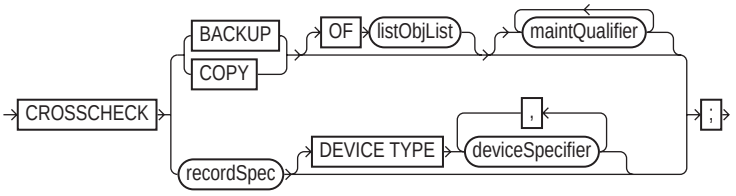
Example

Creating a Script: Example This example creates a script called `b_whole_10` that backs up the database and archived redo logs, then executes it:

```
CREATE script b_whole_l0
{
    ALLOCATE CHANNEL d1 DEVICE TYPE sbt;
    BACKUP INCREMENTAL LEVEL 0 TAG b_whole_l0 DATABASE PLUS ARCHIVELOG;
}

RUN { EXECUTE script b_whole_10; }
```

CROSSCHECK

Syntax



Purpose

To verify the existence of backups (backup sets or media-managed proxy copies) and copies (both archived logs and image copies) stored on disk or tape.

The CROSSCHECK command checks only objects marked AVAILABLE or EXPIRED, either by examining the files on disk for DISK channels or by querying the media manager for sbt channels. The CROSSCHECK command only processes files created on the same device type as the channels running the crosscheck.

RMAN does not delete any files that it is unable to find, but updates their repository records to EXPIRED. You can determine which files are marked EXPIRED by issuing a LIST EXPIRED command. Then, you can run DELETE EXPIRED to remove the repository records for all expired files.

If some backup pieces or copies were erroneously marked as EXPIRED, for example, because the media manager was misconfigured, then after ensuring that the files really do exist in the media manager, run the CROSSCHECK BACKUP command again to restore those files to AVAILABLE status. Note that the DELETE EXPIRED command removes both the repository records as well as any existing physical files whose records show the status EXPIRED.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to manage target database records in the catalog

Restrictions and Usage Notes

- The target instance must be started.
- A maintenance channel is not required when CROSSCHECK is used with a file that is on disk. If you use CROSSCHECK on nondisk files, and have objects

created on device types that are not configured for automatic channels, then you must manually allocate maintenance channels for these objects. For example, if you created a backup on an `sbt` channel, but have only a `DISK` channel automatically configured, then you must manually allocate an `sbt` channel before the `CROSSCHECK` command can check the backup.

Keywords and Parameters

BACKUP

Crosschecks backup sets, backup pieces, and proxy copies. By default, RMAN crosschecks backups of the whole database. Both usable and unusable backups are included in the output, even those that cannot be restored, are expired or unavailable, or are incremental backups that cannot be restored because their parent full backup or copy no longer exists.

See Also: The tables describing columns in the `LIST` output. Use the `KEY` column of the output to obtain the primary key usable in the `CHANGE` and `DELETE` commands

COPY

Crosschecks datafile copies, control file copies, archived redo logs, and image copies of archived redo logs. By default, `CROSSCHECK` checks copies of all files in the database with status `AVAILABLE` or `EXPIRED`.

`OF` *`listObjList`*

Restricts the list of objects operated on to the object type specified in the *`listObjList`* clause. If you do not specify an object, `CROSSCHECK` defaults to all copies.

See Also: "listObjList" on page 2-135

`maintQualifier`

Restricts the command based on the specified options.

See Also: "maintQualifier" on page 2-137

Note: *`listObjList`* and *`maintQualifier`* are valid options on both the `BACKUP` and `COPY` commands.

`recordSpec`

Specifies the object whose availability status you are changing. See "recordSpec" on page 2-144.

`DEVICE TYPE` *`deviceSpecifier`*

Allocates automatic channels for the specified device type only. This option is valid only if you have configured automatic channels and have not manually allocated channels. For example, if you configure automatic disk and tape channels and run `CROSSCHECK ... DEVICE TYPE DISK`, then RMAN allocates only disk channels.

See Also: "deviceSpecifier" on page 2-101

Examples

Crosschecking All Backups: Example The following example queries the status of all backups and copies on tape and disk (note that because RMAN preconfigures a disk channel, you do not need to manually allocate a disk channel):

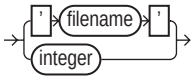
```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
CROSSCHECK BACKUP;
CROSSCHECK COPY;
```

Crosschecking Within a Range of Dates: Example The following example queries the media manager for the status of the backup sets in a given six month range. Note that RMAN uses the date format specified in the NLS_DATE_FORMAT parameter, which is 'DD-MON-YY' in this example:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
CROSSCHECK BACKUP DEVICE TYPE sbt COMPLETED BETWEEN '01-JAN-00' AND '01-JUL-00';
```

datafileSpec

Syntax



Purpose

A subclause that specifies a datafile by filename or absolute file number.

Restrictions and Usage Notes

You cannot use environment variables such as $ORACLE_HOME in filenames. You must specify the relative or absolute path name.

Keywords and Parameters

'filename'	Specifies the datafile by using either the full path or a relative filename. If you specify a relative filename, the filename is qualified in a port-specific manner by the target database.
integer	Specifies the datafile by using its absolute file number. Obtain the file number from the V$DATAFILE, V$DATAFILE_COPY, or V$DATAFILE_HEADER views or REPORT SCHEMA command output.

Examples

Specifying a Datafile by Filename: Example This example copies datafile /oracle/dbs/tbs_12.f to disk, specifying it by filename:

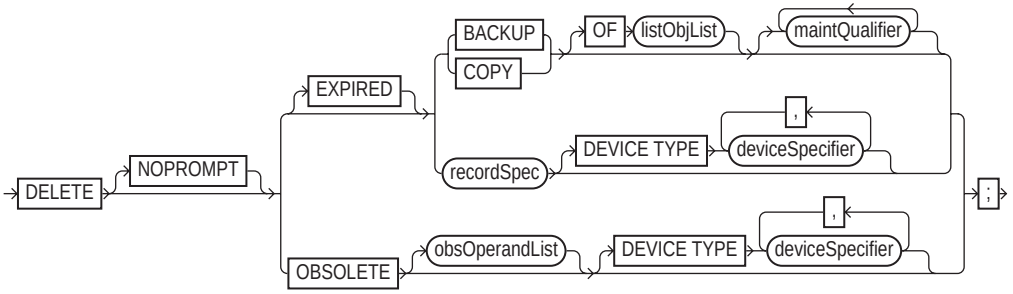
```
COPY DATAFILE '/oracle/dbs/tbs_12.f' TO '/oracle/copy/tbs_1.copy';
```

Specifying a Datafile by Absolute File Number: Example This example copies datafile /oracle/dbs/tbs_31.f to disk, specifying it by file number:

```
RUN
{
  ALLOCATE CHANNEL ch1 DEVICE TYPE DISK;
  COPY DATAFILE 10 TO '/oracle/copy/tbs_31.copy';
}
```

DELETE

Syntax



Purpose

To delete physical backups and copies as well as do the following:

- Update their records in the target control file to status DELETED
- Remove their records from the recovery catalog (if you use a catalog)

By default, DELETE displays a list of the files and prompts you for confirmation before deleting any file in the list, unless you are running a command file.

If you specify the EXPIRED option, then DELETE only removes files marked EXPIRED, that is, "not found," by the CROSSCHECK command. Use the LIST command or query the recovery catalog views to determine which backups or copies are expired.

> **Caution:** If for some reason a backup or copy marked EXPIRED exists when you run the DELETE EXPIRED command, then RMAN deletes the physical files.

If you specify the OBSOLETE option, then DELETE removes files considered OBSOLETE, that is, "not needed," by the retention policy or because it is orphaned. You can specify a retention policy by using CONFIGURE RETENTION POLICY, or specify the REDUNDANCY and RECOVERY WINDOW options on the DELETE command.

See Also: "BACKUP" on page 2-26 to learn about the BACKUP . . . DELETE INPUT command

Restrictions and Usage Notes

- The target instance must be started.
- A maintenance channel is not required when DELETE is used with a file that is disk-only (that is, an ARCHIVELOG, DATAFILECOPY, CONTROLFILECOPY). Otherwise, you must use a manual or automatic maintenance channel.

  If you use DELETE on files that are not disk-only, and if you have objects created on device types that are not configured for automatic channels, then run manual maintenance commands on these channels. For example, if you created a backup using an sbt channel, but have only a DISK channel automatically configured, you must manually allocate an sbt channel for DELETE.

Keywords and Parameters

NOPROMPT

Deletes specified files without first listing the files or prompting for confirmation. The DELETE NOPROMPT command still displays each item as it is deleted.

By default, DELETE displays files and then prompts for confirmation. If the user confirms, then RMAN shows each item as it is deleted. If you are running commands from a command file, then NOPROMPT is the default.

EXPIRED

Removes only files whose status in the repository is EXPIRED. RMAN marks backups and copies as expired when you run a CROSSCHECK command and the files are absent or inaccessible. To determine which files are expired, run a LIST EXPIRED command.

Note: Beginning in Oracle9*i*, RMAN's default behavior is to prompt for confirmation when you run DELETE EXPIRED. In releases previous to Oracle9*i*, RMAN did not prompt.

OBSOLETE

Deletes backups and datafile copies recorded in the RMAN repository that are obsolete, that is, no longer needed. In addition to obsolete datafile backups, RMAN deletes obsolete archived logs and archived log backups. RMAN determines which backups and copies of datafiles are no longer needed, which in turn determines when logs (and backups of logs) are no longer needed. RMAN considers the creation of a datafile is as a backup when deciding which logs to keep.

RMAN first uses the options that you specify with *obsOperandList* to determine what is obsolete. If you do not specify options in *obsOperandList*, then RMAN uses the options specified in CONFIGURE RETENTION POLICY.

obsOperandList

Specifies the criteria for determining which backups and copies are obsolete.

See Also: "obsOperandList" on page 2-139

	DEVICE TYPE *deviceSpecifier*	Restricts the deletion to obsolete backups and copies created on the specified device type only. **See Also:** "deviceSpecifier" on page 2-101
BACKUP		Deletes backup sets, backup pieces, and proxy copies. By default, RMAN deletes backups of the whole database. Specify the EXPIRED option to remove only backups that are marked EXPIRED in the repository. The KEY column of the LIST output indicates the primary key usable in the CHANGE and DELETE commands.
COPY		Deletes datafile copies, archived redo logs, and image copies of archived redo logs. By default, DELETE ... COPY removes copies of all files in the database. Specify the EXPIRED option to remove only copies that are marked EXPIRED in the repository.
	OF *listObjList*	restricts the list of objects operated on to the object type specified in the *listObjList* clause. See "listObjList" on page 2-135. If you do not specify an object, CHANGE defaults to all copies.
	maintQualifier	restricts the command based on the specified options (see "maintQualifier" on page 2-137).
	Note: *listObjList* and *maintQualifier* are valid options on both the BACKUP and COPY commands.	
recordSpec		Specifies the object that you are deleting. **See Also:** "recordSpec" on page 2-144
	DEVICE TYPE *deviceSpecifier*	allocates automatic channels for the specified device type only (see "deviceSpecifier" on page 2-101). This option is valid only if you have configured channels and have not manually allocated channels. For example, if you configure disk and tape channels, and run DELETE ... DEVICE TYPE DISK, then RMAN allocates only disk channels.

Examples

Deleting Expired Backups: Example The following example uses a configured sbt channel to check the media manager for expired backups of the tablespace user_data that are more than one month old and removes their catalog records:

```
CONFIGURE CHANNEL DEVICE TYPE sbt;
CROSSCHECK BACKUP OF TABLESPACE user_data COMPLETED BEFORE 'SYSDATE-31';
DELETE NOPROMPT EXPIRED BACKUP OF TABLESPACE user_data COMPLETED BEFORE 'SYSDATE-31';
```

Deleting Obsolete Backups: Example The following example deletes backups and copies that are not needed to recover the database to a random point within the last week. RMAN also deletes archived redo logs that are no longer needed:

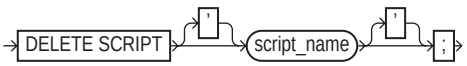
```
DELETE NOPROMPT OBSOLETE RECOVERY WINDOW OF 7 DAYS;
```

Deleting a Backup Set Specified by Primary Key: Example The following example deletes backup set 503 from disk:

```
DELETE BACKUPSET 503;
```

DELETE SCRIPT

Syntax



Purpose

To delete a stored script from the recovery catalog.

Restrictions and Usage Notes

- Execute `DELETE SCRIPT` only at the RMAN prompt.
- RMAN must be connected to the recovery catalog either through the `CATALOG` command-line option or the `CONNECT CATALOG` command, and the catalog database must be open. A connection to the target database is not required.
- Quotes must be used around the script name when the name contains either spaces or reserved words.

Keywords and Parameters

'script_name'	Deletes the specified script. The script name must be a name used in a previous `CREATE SCRIPT` or `REPLACE SCRIPT` command. **See Also:** "CREATE SCRIPT" on page 2-88

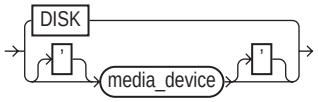
Example

Deleting a Script: Example This example deletes the script `b_whole_10`:

```
DELETE SCRIPT b_whole_10;
```

deviceSpecifier

Syntax



Purpose

A subclause specifying the type of storage for a backup or copy.

Keywords and Parameters

`DISK`	Specifies disk storage.
'media_device'	Specifies a sequential I/O device or access method for storage. The syntax and semantics of sequential I/O device types are platform-specific. Example values are `sbt` and `sbt_tape` (with or without quotes). These values are synonymous. The *media_device* variable specifies a media management device such as a third-party tape subsystem interface. Note that media device names are not case sensitive. The `sbt` variable is legal as input, but RMAN output always displays its synonym `sbt_tape`. It is stored in the catalog as `sbt_tape` for backwards compatibility.

Examples

Allocating a Tape Channel: Example This example allocates a maintenance channel for a media management device:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
```

Backing Up to Disk: Example This example backs up the database to disk:

```
BACKUP DEVICE TYPE DISK DATABASE;
```

Restoring from Disk and Tape: Example This example restores the database:

```
RUN
{
  ALLOCATE CHANNEL t1 DEVICE TYPE 'sbt_tape';
  RESTORE DATABASE;
}
```

DROP CATALOG

Syntax

Purpose

To remove the schema from the recovery catalog.

Caution: This command deletes all metadata from the recovery catalog. If you have no backups of the catalog, then all backups of all databases managed by this recovery catalog become unusable.

See Also: *Oracle9i Recovery Manager User's Guide* to learn how to drop the recovery catalog schema

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- You must be connected to the recovery catalog database through the CATALOG command-line option or the CONNECT CATALOG command. The catalog database must be open. You do not have to be connected to the target database.
- Enter the command twice to confirm that you want to drop the schema.

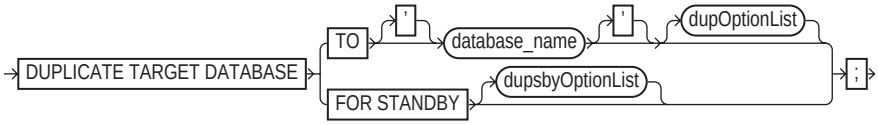
Example

Deleting the Catalog: Example This example drops the schema from the recovery catalog (you must enter the command twice to confirm):

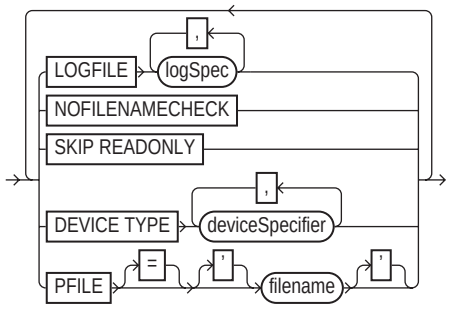
```
RMAN> DROP CATALOG

recovery catalog owner is rman
enter DROP CATALOG command again to confirm catalog removal

RMAN> DROP CATALOG
```

DUPLICATE

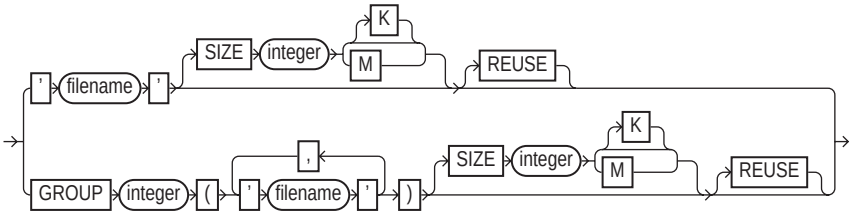
Syntax



dupOptionList::=



logSpec::=



dupsbyOptionList::=

Purpose

To use backups of the target database to create either of the following:

- A **duplicate database**, which is a copy of the target database with a unique DBID. Because a duplicate database has a unique DBID, it is entirely independent of the primary database and can be registered in the same recovery catalog as the primary database. Typically, duplicate databases are used for testing.
- A **standby database**, which is a special copy of the primary database that is updated by applying archived redo logs from the primary database. A standby database does *not* get a new DBID.

To create a standby database with the DUPLICATE command you must specify the FOR STANDBY option. The DUPLICATE ... FOR STANDBY command creates the standby database by restoring a standby control file, mounting the standby control file, and then restoring and recovering backups of the target datafiles. The standby database is left mounted after duplication is complete. Note that backups of the standby database are interchangeable with backups of the primary database.

When duplicating a database that is currently in NOARCHIVELOG mode, recovery occurs with the NOREDO option. Hence, if incremental backups exist, RMAN applies only these backups to the restored files during recovery. For databases in ARCHIVELOG mode, DUPLICATE recovers by default up to the last archived redo log generated at the time the command was executed—unless the SET UNTIL clause is specified, in which case recovery is bounded by the parameter setting.

See Also:

Oracle9i Recovery Manager User's Guide to learn how to create a duplicate database with the DUPLICATE command

Oracle9i Recovery Manager User's Guide to learn how to create a standby database with the DUPLICATE ... FOR STANDBY command

Oracle9i Data Guard Concepts and Administration to learn how to create and manage standby database

Restrictions and Usage Notes

These restrictions apply to all uses of the DUPLICATE command (both for creation of a standby database and creation of a nonstandby duplicate database):

- Issue one or more ALLOCATE AUXILIARY CHANNEL commands before executing the DUPLICATE command, or CONFIGURE automatic auxiliary channels. RMAN uses the automatic target channel configuration for auxiliary channels in the following circumstances:
  - You have not manually allocated auxiliary channels.
  - You have not configured automatic auxiliary channels.
  - The automatic target channels do not have CONNECT strings.

  Note that the DUPLICATE command does not require non-AUXILIARY channels (that is, normal target database channels).
- You must be connected to both the target database and auxiliary instance. The auxiliary instance must be started with the NOMOUNT option, and the target database must be mounted or open.
- You cannot duplicate a database when some backups of the target database do not exist. RMAN attempts to duplicate the following:
  - All datafiles in online tablespaces, whether or not the datafiles are online.
  - All tablespaces taken offline with an option *other than* NORMAL. For example, RMAN attempts to duplicate tablespaces taken offline with the IMMEDIATE option. You cannot duplicate OFFLINE NORMAL tablespaces, although you can add these tablespaces manually after duplication.

  If no valid backups exist of any tablespace or datafile, then the DUPLICATE command fails.
- If the target and duplicate databases reside on the same host, set the CONTROL_FILES parameter appropriately so that the DUPLICATE command does not generate an error because the target control file is in use.
- If the target and duplicate databases share the same host, set all *_PATH and *_DEST initialization parameters appropriately so that the target database files are not overwritten by the duplicate database files.
- You cannot set the DB_NAME parameter in the duplicate parameter file to a value different from the database name specified in the DUPLICATE command.
- You cannot use the same database name for the target and duplicate databases when the duplicate database resides in the same Oracle home as the target.

Note that if the duplicate database resides in a different Oracle home from the target, then its database name just has to differ from other database names in that same Oracle home.

- If the target and duplicate databases reside on different hosts, then you must do one of the following for duplication to be successful:
  - Move backups and disk copies from the target host to the duplicate host and CATALOG the image copies.
  - Make sure that all backups and copies (disk or sbt) on the target host are remotely accessible from the duplicate host. Make sure that the archived redo logs are available in the expected location in the new host.
- If you can make an operating system copy of a database file on one platform and then restore it to another platform, then it is also possible to duplicate a database from one platform to another. Otherwise, duplication is not possible.
- You cannot recover the duplicate database to the current point in time, that is, the most recent SCN. RMAN recovers the duplicate database up to or before the most recent available archived redo log.
- Specify new filenames or convert target filenames for the datafiles and online redo logs when the duplicate filenames must be different from the target filenames (as when duplicating to the same host as the primary). If you do not specify filenames for duplicate online redo logs and datafiles, then RMAN reuses the target datafile names.
- If you want the duplicate filenames to be the same as the target filenames, and if the databases are in different hosts, then you must specify NOFILENAMECHECK.
- If duplicating a database on the same host as the target database, do not specify the NOFILENAMECHECK option. Otherwise, RMAN may signal this error:

```
RMAN-10035: exception raised in RPC: ORA-19504: failed to create file
            "/oracle/dbs/tbs_01.f"
ORA-27086: skgfglk: unable to lock file - already in use
SVR4 Error: 11: Resource temporarily unavailable
Additional information: 8
RMAN-10031: ORA-19624 occurred during call to
DBMS_BACKUP_RESTORE.RESTOREBACKUPPIECE
```

The following restrictions apply when you use the DUPLICATE command with the FOR STANDBY option:

- All backups and copies located on disk must be available at the standby host with the same path names as in the target host.

- Backups on tape must be accessible from the standby host.
- If archived logs have not been backed up, then archived logs must be available at the standby host with the same path names as in the target host.
- If RMAN recovers the standby database, then the checkpoint SCN of the control file must be included in an archived redo log that is either available at the standby site or included in an RMAN backup. For example, assume that you create the standby control file and then immediately afterward archive the current log, which has a sequence of 100. You must recover the standby database up to at least log sequence 100, or Oracle signals an ORA-1152 error message because the standby control file backup or copy was taken after the point in time.
- You cannot use SET NEWNAME or CONFIGURE AUXNAME to transform the filenames for the online redo logs on the standby database.
- You cannot use the DUPLICATE command to activate a standby database.
- You cannot connect to the standby database and then DUPLICATE ... FOR STANDBY to create an additional standby database. To create additional standby databases, connect to the original *primary* database and run DUPLICATE ... FOR STANDBY.
- Do not attempt to register the standby database in the primary database repository.

Keywords and Parameters

TO *'database_name'*	Specifies the name of the duplicate database. The name should match the name in the initialization parameter file of the duplicate database or Oracle signals an error when creating the control file.	
dupOptionList	Specifies options that apply when creating a nonstandby duplicate database.	
	LOGFILE *logSpec*	Specifies the online redo logs when creating a nonstandby duplicate database. The syntax is the same used in the LOGFILE option of the CREATE DATABASE statement. Refer to the description of *logSpec* for the legal options.

NOFILENAMECHECK	Prevents RMAN from checking whether target datafiles sharing the same names as the duplicated files are in use. The user is responsible for determining that the duplicate operation will not overwrite useful data. This option is necessary when you are creating a duplicate database in a different host that has the same disk configuration, directory structure, and filenames as the host of the target database. For example, assume that you have a small database located in the /dbs directory of host1: /oracle/dbs/system_prod1.dbf /oracle/dbs/users_prod1.dbf /oracle/dbs/tools_prod1.dbf /oracle/dbs/rbs_prod1.dbf Assume that you want to duplicate the database in machine host2, which has the same file system /oracle/dbs/*, and you want to use the same filenames in the duplicate database as in the primary. In this case, specify the NOFILENAMECHECK option to avoid an error message. Because RMAN is not aware of the different hosts, RMAN cannot determine automatically that it should not check the filenames.
SKIP READONLY	Excludes datafiles in read-only tablespaces from the duplicate database. **Note:** A record for the skipped read-only tablespace still appears in DBA_TABLESPACES. By using this feature, you can activate the read-only tablespace later. For example, you can store the read-only tablespace data on a CD-ROM, then mount the CD-ROM later and view the data.
DEVICE TYPE *deviceSpecifier*	Allocates automatic channels for the specific *deviceSpecifier* only (for example, DISK or sbt). This option is valid only if you have configured automatic channels and have *not* manually allocated channels. For example, if you CONFIGURE automatic disk and tape channels, and if you run DUPLICATE ... DEVICE TYPE DISK, then RMAN allocates only disk channels. **See Also:** "deviceSpecifier" on page 2-101
PFILE = *'filename'*	Specifies a client-side initialization parameter used by the auxiliary instance. RMAN automatically shuts down and restarts the auxiliary instance during duplication. If the auxiliary does not use a server-side parameter file in the default location, you must specify the client-side parameter file that RMAN should use when starting the auxiliary instance. Otherwise, you do not need to specify PFILE.

logSpec	Specifies the online redo logs when creating a nonstandby duplicate database. If you do not specify LOGFILE, then RMAN uses LOG_FILE_NAME_CONVERT if it is set. If neither LOGFILE nor LOG_FILE_NAME_CONVERT is set, then RMAN uses the original target log filenames for the duplicate files. You must specify the NOFILENAMECHECK option in this case. **See Also:** *Oracle9i SQL Reference* for CREATE DATABASE syntax
'*filename*'	Specifies the filename of the online redo log member.
SIZE *integer*	Specifies the size of the file in kilobytes (K) or megabytes (M). The default is in bytes. If you omit this parameter, then the file must already exist.
REUSE	Allows Oracle to reuse an existing file. If the file already exists, then Oracle verifies that its size matches the value of the SIZE parameter. If the file does not exist, then Oracle creates it. If you omit the SIZE parameter, then the file must already exist. The REUSE option is significant only when used in conjunction with the SIZE parameter. If you omit the SIZE parameter, then Oracle expects the file to exist already.
GROUP *integer*	Specifies the group containing the online redo log members.
FOR STANDBY	Specifies that database being duplicated is to be used as a standby database. RMAN restores the most recent files (unless SET UNTIL is specified). If DORECOVER is specified, then RMAN also recovers database. RMAN always leaves standby database in mounted state after executing DUPLICATE command.
dupsbyOptionList	Specifies options that only apply when creating a standby database.
DORECOVER	Specifies that RMAN should recover the database after creating it. If you specify an *untilClause*, then RMAN recovers to the specified point and leaves the database mounted.
NOFILENAMECHECK	Prevents RMAN from checking whether target datafiles sharing the same names as the duplicated files are in use. Note that the NOFILENAMECHECK option is required when the standby and primary datafiles and logs have identical filenames. **See Also:** The description in *dupOptionList*

Examples

Setting New Filenames Manually: Example This example assumes that the target database is on host1 and you wish to duplicate the database to newdb on host2 with the file structure /oracle/dbs/*. Because the filenames in host1 are

irregularly named and located in various subdirectories, you use SET NEWNAME commands to rename the files consistently. The DUPLICATE command uses backup sets stored on tape to duplicate the target database to database newdb:

```
RUN
{
  ALLOCATE AUXILIARY CHANNEL newdb1 DEVICE TYPE sbt;
  SET NEWNAME FOR DATAFILE 1 TO '$ORACLE_HOME/dbs/newdb_data_01.f';
  SET NEWNAME FOR DATAFILE 2 TO '$ORACLE_HOME/dbs/newdb_data_02.f';
  SET NEWNAME FOR DATAFILE 3 TO '$ORACLE_HOME/dbs/newdb_data_11.f';
  SET NEWNAME FOR DATAFILE 4 TO '$ORACLE_HOME/dbs/newdb_data_12.f';
  SET NEWNAME FOR DATAFILE 5 TO '$ORACLE_HOME/dbs/newdb_data_21.f';
  SET NEWNAME FOR DATAFILE 6 TO '$ORACLE_HOME/dbs/newdb_data_22.f';
  DUPLICATE TARGET DATABASE TO newdb
    PFILE = /oracle/dbs/initNEWDB.ora
  lOGFILE
    GROUP 1 ('$ORACLE_HOME/dbs/newdb_log_1_1.f',
             '$ORACLE_HOME/dbs/newdb_log_1_2.f') SIZE 200K,
    GROUP 2 ('$ORACLE_HOME/dbs/newdb_log_2_1.f',
             '$ORACLE_HOME/dbs/newdb_log_2_2.f') SIZE 200K REUSE;
}
```

Reusing the Target Filenames: Example This example assumes the following:

- You are restoring to a new host without a catalog.
- You have configured automatic channels.
- The target host and duplicate host have the same file structure.
- You wish to name the duplicate files exactly like the target database files.
- You do not want to duplicate read-only tablespaces.
- You want to prevent RMAN from checking whether files on the target database that have the same names as the duplicated files are in use.

```
CONNECT TARGET
CONNECT AUXILIARY sys/aux_pwd@newdb
DUPLICATE TARGET DATABASE TO ndbnewh
  LOGFILE
    '$ORACLE_HOME/dbs/log_1.f' size 200K,
    '$ORACLE_HOME/dbs/log_2.f' size 200K
  SKIP READONLY
  NOFILENAMECHECK;
}
```

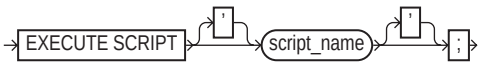
Creating a Standby Database: Example This example creates a standby database on a remote host with the same directory structure as the primary host. In this example, the NOFILENAMECHECK option is specified because the standby and

primary datafiles and logs have the same names. Note that an automatic auxiliary channel is already configured, so you do not need to manually allocate a channel:

```
DUPLICATE TARGET DATABASE FOR STANDBY
  NOFILENAMECHECK;
```

EXECUTE SCRIPT

Syntax



Purpose

To run an RMAN script stored in the recovery catalog. Use the CREATE SCRIPT command to generated stored scripts.

When you run an EXECUTE SCRIPT command within a RUN command, RMAN places the contents of the script between the braces of RUN. For this reason, you should not allocate a channel at the RUN command level if you already allocated it in the script.

> **See Also:** *Oracle9i Recovery Manager User's Guide*, and "CREATE SCRIPT" on page 2-88

Restrictions and Usage Notes

Execute this command only within the braces of a RUN command.

Keywords and Parameters

'script_name'	Runs the specified stored script. To obtain a listing of all stored scripts, use SQL*Plus to connect to the recovery catalog database as the catalog owner and run the following query: `SQL> SELECT * FROM RC_STORED_SCRIPT;` **See Also:** "RC_STORED_SCRIPT" on page 3-27 for more information about RC_STORED_SCRIPT, and "CREATE SCRIPT" on page 2-88 for information about creating scripts

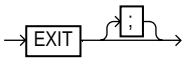
Example

Executing a Script: Example This example runs a stored script:

```
RUN { EXECUTE script b_whole_10; }
```

EXIT

Syntax



Purpose

To shut down the Recovery Manager utility.

Restrictions and Usage Notes

Execute only at the RMAN prompt.

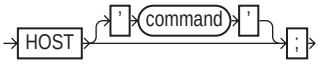
Example

Exiting RMAN: Example This example starts RMAN and then shuts it down:

```
% rman
RMAN> EXIT
```

HOST

Syntax



Purpose

To invoke an operating system command-line sub-shell from within RMAN.

Restrictions and Usage Notes

Execute this command at the RMAN prompt or within the braces of a RUN command.

Keywords and Parameters

HOST	Enables you to execute an operating system command. Use this parameter: ■ With a '*command*', in which case RMAN runs the command in the specified string and then continues. ■ Without a '*command*', in which case RMAN displays a command prompt and resumes after you exit the subshell.

Examples

Executing an Operating System Copy Within RMAN: Example This example shuts down the database, makes a backup of datafile tbs_01.f by using a media manager, then makes an image copy of the same file on disk by using a UNIX command. The database needs to be shut down cleanly to prevent fractured blocks:

```
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
BACKUP DATAFILE '$ORACLE_HOME/dbs/tbs_01.f';
HOST 'cp $ORACLE_HOME/dbs/tbs_01.f $ORACLE_HOME/dbs/copy/tbs_01.f';
ALTER DATABASE OPEN;
```

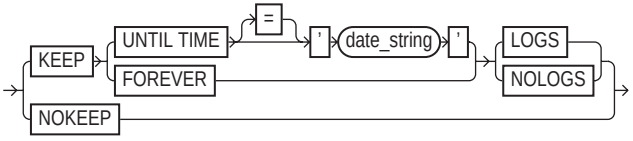
Hosting to the Operating System Within a Copy Job: Example This example makes an image copy of datafile 3, hosts out to the UNIX prompt to check that

the copy is in the directory (the UNIX session output is indented and displayed in bold), then resumes the RMAN session:

```
COPY DATAFILE 3 TO 'df.3';
HOST;
  % ls df.3
  df.3
  % exit
LIST COPY;
```

keepOption

Syntax



Purpose

A subclause specifying the status of a backup or copy in relation to a retention policy. The KEEP option marks the backup or copy as exempt from the retention policy (that is, not obsolete), and the NOKEEP option undoes any existing exemptions.

Keywords and Parameters

KEEP	Overrides any configured retention policy for this backup or copy so that the backup is not obsolete. The BACKUP . . . KEEP command or COPY . . . KEEP specifies a new retention time for this backup or copy. Use this option to create a **long-term backup**, that is, a backup that want you to archive.	
	UNTIL TIME = *'date_string'*	Specifies the date until which the backup or copy must be kept. You can either specify a specific time by using the current NLS_DATE_FORMAT, or a SQL date expression, such as 'SYSDATE+365'.
	FOREVER	Specifies that the backup or copy never expires. You must use a recovery catalog when FOREVER is specified, because the backup records eventually age out of the control file.
	LOGS	Specifies that all of the archived logs required to recover this backup or copy must remain available as long as this backup or copy is available.
	NOLOGS	Specifies that this backup or copy cannot be recovered because the archived logs needed to recover this backup will not be kept. The only use for this backup or copy is to restore the database to the point in time that the backup or copy was taken. This is the only valid recoverability option when the database operates in NOARCHIVELOG mode. This option is not valid if the backup or copy is inconsistent.

NOKEEP	Specifies that the backup or copy expires according to the user's retention policy. This is the default behavior if no KEEP option is specified.

Examples

Making a Long-Term Backup: Example This example makes a long-term backup of the database and specifies that it should never become obsolete and that the logs required to recover it should not be retained:

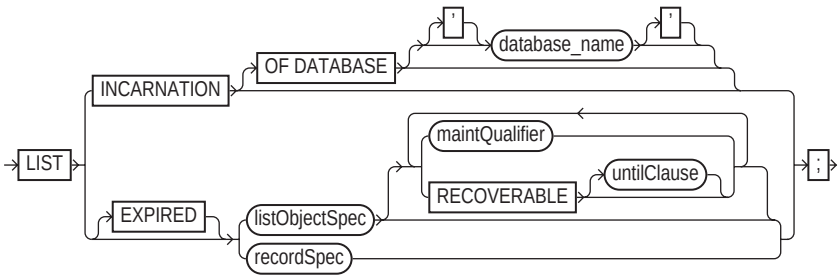
```
BACKUP DATABASE KEEP FOREVER NOLOGS;
```

Changing the Status of a Copy: Example This example specifies that any long-term copies of datafiles 1, 2, 3, 4, and 5 should lose their exempt status and so become eligible to be obsolete according to the existing retention policy:

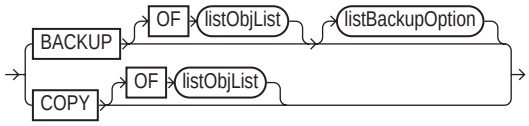
```
CHANGE COPY OF DATAFILE 1,2,3,4,5 NOKEEP;
```

LIST

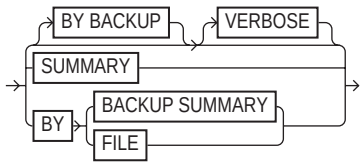
Syntax



listObjectSpec::=



listBackupOption::=



Purpose

To display information about backup sets, proxy copies, and image copies recorded in the repository. The `LIST` command displays the files against which you can run `CROSSCHECK` and `DELETE` commands.

Use this command to list:

- Backups and copies marked as `EXPIRED` in the RMAN repository

- Backups and copies of datafiles that are available and can possibly be used in a restore operation
- Specified archived logs, backup sets, backup pieces, control file copies, datafile copies, and proxy copies
- Backups and copies restricted by tag, completion time, recoverability, or device type
- Incarnations of a specified database or of all databases known to the catalog

RMAN records the output to either standard output or the message log, but not to both at the same time. You can control how the output is organized (BY BACKUP or BY FILE) as well as the level of detail in the output (VERBOSE or SUMMARY).

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to make lists and reports, and "cmdLine" on page 2-57

Restrictions and Usage Notes

- Execute LIST only at the RMAN prompt.
- The INCARNATION option requires the use of a recovery catalog.
- You must be connected to the target database. If you are connected in NOCATALOG mode, then the database must be mounted. If you connect to a recovery catalog, then the target instance must be started (but it does not need to be mounted).

Keywords and Parameters

INCARNATION	Displays information about the incarnations of a database. The LIST output includes the primary keys of all database incarnation records for the specified database name. Use the key in a RESET DATABASE command to change the incarnation that RMAN considers to be current to a previous incarnation. **See Also:** Table 2–15 on page 2-131 for an explanation of the column headings of the LIST INCARNATION output table OF DATABASE *'database_name'* — Specifies the name of the database. If you do not specify the OF DATABASE option, then the command lists all databases registered in the recovery catalog.

EXPIRED

Displays backup sets, proxy copies, and image copies marked in the repository as EXPIRED, that is, "not found."

To ensure that LIST EXPIRED shows up-to-date output, issue a CROSSCHECK command periodically. When you issue a CROSSCHECK command, RMAN searches on disk and tape for the backups and copies recorded in the repository. If it does not find them, then it updates their repository records to status EXPIRED.

listObjectSpec

Specifies the type of object or objects that you are listing.

See Also: "recordSpec" on page 2-144

BACKUP

Displays information about backups: backup sets, backup pieces, and proxy copies. The output displays a unique key for each. The LIST BACKUP command defaults to BY BACKUP.

Unless you specify the RECOVERABLE option, RMAN lists both usable and unusable backups, even those that cannot be restored, are expired or unavailable, or are incrementals that cannot be restored because their parent full backup or copy no longer exists.

See Also: "LIST Output" on page 2-121 for an explanation of the column headings of the LIST output tables. Use the KEY column of the output to obtain the primary key usable in the CHANGE and DELETE commands.

COPY

Displays information about datafile copies, archived redo logs, and image copies of archived redo logs. By default, LIST COPY displays copies of all database files and archived redo logs. Both usable and unusable image copies are included in the output, even those that cannot be restored or are expired or unavailable.

See Also: Table 2–12 on page 2-129 and Table 2–14 on page 2-130 for an explanation of the column headings of the LIST COPY output tables

OF *listObjList*

Restricts the list of objects operated on to the object type specified in the *listObjList* clause. If you do not specify an object, then LIST defaults to OF DATABASE CONTROLFILE ARCHIVELOG ALL.

Note: The LIST BACKUP . . . LIKE command is not valid. The only valid exception is LIST BACKUP OF ARCHIVELOG LIKE.

See Also: "listObjList" on page 2-135

listBackupOption

Specifies the type of object or objects that you are listing.

See Also: "recordSpec" on page 2-144

	BY BACKUP	Lists backup sets, then the contents of each backup set (pieces and files), and then proxy copies. This is the default option for LIST BACKUP.
	VERBOSE	Gives detailed description of contents of each backup set (default).
	SUMMARY	Gives a one-line summary for each datafile (when using BY FILE) or backup (when using BY BACKUP).
	BY BACKUP SUMMARY	Lists a summary of backup sets, then the contents of each backup set (pieces and files), and then proxy copies.
	BY FILE	Lists a datafile, then its backup sets (including recovery action info), and then proxy copies.
maintQualifier	Restricts the range of the listing. Refer to "maintQualifier" on page 2-137.	
RECOVERABLE	Specifies datafile backups or copies whose status in the repository is AVAILABLE and which can be used for restore and recovery in the target database's current incarnation. This list includes all backups and copies except the following: ■ Incremental backups that have no valid parent to which the incremental can be applied. ■ Full backups that were taken before the most recent RESETLOGS, and which have been in online read / write status sometime between the time the backup was taken and the RESETLOGS. In other words, a backup taken prior to the RESETLOGS can be used in the current incarnation only if the file was offline clean or read at the time of the backup, and was never made read / write again before the RESETLOGS.	
	untilClause	Specifies an end time, SCN, or log sequence number. See "untilClause" on page 2-210.
recordSpec	Specifies the object or objects that you are listing. Refer to "recordSpec" on page 2-144.	

LIST Output

The information that appears in the output is shown in the following tables:

- Table 2–2, "List of Backup Sets (when in verbose mode)"
- Table 2–3, "List of Backup Pieces (LIST BACKUP ... VERBOSE)"
- Table 2–4, "List of Datafiles in backup set ..."
- Table 2–5, "List of Archived Logs in backup set ..."
- Table 2–6, "List of Proxy Copies"
- Table 2–7, "List of Backup Sets (LIST BACKUP ... SUMMARY)"
- Table 2–8, "List of Backup Pieces (LIST BACKUPPIECE ...)"

- Table 2–9, "List of Datafile Backups (LIST BACKUP ... BY FILE)"
- Table 2–10, "List of Archived Log Backups (LIST BACKUP ... BY FILE)"
- Table 2–11, "List of Controlfile Backups (LIST BACKUP ... BY FILE)"
- Table 2–12, "List of Datafile Copies"
- Table 2–13, "List of Controlfile Copies"
- Table 2–14, "List of Archived Log Copies"
- Table 2–15, "List of Database Incarnations"

Table 2–2 List of Backup Sets (when in verbose mode)

Column	Indicates
BS Key	A unique key identifying this backup set. If you are connected to a recovery catalog, then BS Key is the primary key of the backup set in the catalog. It corresponds to BS_KEY in the RC_BACKUP_SET view. If you are connected in NOCATALOG mode, then BS Key displays the RECID from V$BACKUP_SET.
Type	The type of backup: Full or Incr (incremental).
LV	The level of the backup: NULL for nonincrementals, level 0-4 for incrementals.
Size	The size of the backup in bytes.
Device Type	The type of device on which the backup was made, for example, DISK or sbt.
Elapsed Time	The duration of the backup.
Completion Time	The date and time that the backup set completed. Note that the format of this field depends on the NLS_LANG and NLS_DATE_FORMAT environment settings.

Table 2–3 List of Backup Pieces (LIST BACKUP ... VERBOSE)

Column	Indicates
BP Key	A unique identifier for this backup piece in the recovery catalog or target database control file. If you are connected to a recovery catalog, then BP Key is the primary key of the backup piece in the catalog. It corresponds to BP_KEY in the RC_BACKUP_PIECE view. If you are connected in NOCATALOG mode, then BP Key displays the RECID from V$BACKUP_PIECE. **Note:** The values for KEY in the recovery catalog and the control file are different.
Status	The backup piece status: AVAILABLE, UNAVAILABLE, or EXPIRED (refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Tag	The tag applied to the backup set; NULL if none.
Piece Name	The filename or handle of the backup piece.
Controlfile Included	This row appears only if the current control file is included in the backup.
Ckp SCN	The SCN of the backup control file checkpoint. All database changes recorded in the redo records before the specified SCN are reflected in this control file.
Ckp time	The time of the backup control file checkpoint. All database changes recorded in the redo records before the specified time are reflected in this control file.

Table 2–4 List of Datafiles in backup set ... **(Page 1 of 2)**

Column	Indicates
File	The number of the file that was backed up.
LV	The level of the backup: NULL for nonincrementals, level 0-4 for incrementals.
Type	The type of backup: Full or Incr (incremental).
Ckp SCN	The checkpoint of the datafile at the time it was backed up. All database changes prior to the SCN have been written to the file; changes after the specified SCN have not been written to the file.

Table 2–4 List of Datafiles in backup set ... **(Page 2 of 2)**

Ckp Time	The checkpoint of the datafile at the time it was backed up. All database changes prior to the time have been written to the file; changes after the specified time have not been written to the file.
Name	The location where this file would be restored now if it were restored from this backup set and no SET NEWNAME command was entered. **See Also:** "SET" on page 2-189

Table 2–5 List of Archived Logs in backup set ...

Column	Indicates
Thrd	The thread number of the redo log.
Seq	The log sequence number of the archived log.
Low SCN	The lowest SCN in the archived log.
Low Time	The time when Oracle switched into the redo log having this sequence number.
Next SCN	The low SCN of the next archived log sequence.
Next Time	The low time of the next archived log sequence.

Table 2–6 List of Proxy Copies **(Page 1 of 2)**

Column	Indicates
PC Key	A unique key identifying this proxy copy. If you are connected to a catalog, then PC Key is the primary key of the proxy copy in the catalog. It corresponds to XDF_KEY in the RC_PROXY_DATAFILE view or XCF_KEY in the RC_PROXY_CONTROLFILE view. If you are connected in NOCATALOG mode, then PC Key displays the RECID from V$PROXY_DATAFILE.
File	The absolute datafile number of the file that was copied.
Status	The proxy copy status: AVAILABLE, UNAVAILABLE, or EXPIRED (see the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Completion Time	The date and time that the backup set completed. Note that the format of this field depends on the NLS_LANG and NLS_DATE_FORMAT environment settings.

Table 2–6 List of Proxy Copies **(Page 2 of 2)**

Ckp SCN	The SCN of the proxy copy control file checkpoint. All database changes recorded in the redo records before the specified SCN are reflected in this control file.
Ckp time	The time of the proxy copy control file checkpoint. All database changes recorded in the redo records before the specified time are reflected in this control file.
Datafile name	The location where this file would be restored now if it were restored from this backup set and no SET NEWNAME command was entered. **See Also:** "SET" on page 2-189
Handle	The media manager's handle for the proxy copy.
Tag	The tag applied to the proxy copy; NULL if none.

Table 2–7 List of Backup Sets (LIST BACKUP ... SUMMARY) **(Page 1 of 2)**

Column	Indicates
Key	A unique key identifying this backup set. If you are connected to a recovery catalog, then BS Key is the primary key of the backup set in the catalog. It corresponds to BS_KEY in the RC_BACKUP_SET view. If you are connected in NOCATALOG mode, then BS Key displays the RECID from V$BACKUP_SET.
TY	The type of backup: backup set (B) or proxy copy (P).
LV	The level of the backup: NULL for nonincrementals, level 0-4 for incrementals.
S	The backup set status: available (A), unavailable (U), or expired (X) (refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Device Type	The type of device on which the backup was made, for example, DISK or sbt.
Completion Time	The date and time that the backup set completed. Note that the format of this field depends on the NLS_LANG and NLS_DATE_FORMAT environment settings.
#Pieces	The number of backup pieces in the backup set.
#Copies	The number of copies made of each backup piece in the set. The number is 1 if no duplexing was performed. Otherwise, the value ranges from 2 to 4.

Table 2–7 List of Backup Sets (LIST BACKUP ... SUMMARY) **(Page 2 of 2)**

Tag	The tag applied to the backup set; NULL if none. An asterisk (*) indicates multiple copies with different tags.

Table 2–8 List of Backup Pieces (LIST BACKUPPIECE ...)

Column	Indicates
BP Key	A unique identifier for this backup piece in the recovery catalog or target database control file. If you are connected to a catalog, then BP Key is the primary key of the backup piece in the catalog. It corresponds to BP_KEY in the RC_BACKUP_PIECE view. If you are connected in NOCATALOG mode, then BP Key displays the RECID from V$BACKUP_PIECE. **Note:** The values for KEY in the recovery catalog and the control file are different.
BS Key	A unique key identifying this backup set. If you are connected to a recovery catalog, then BS Key is the primary key of the backup set in the catalog. It corresponds to BS_KEY in the RC_BACKUP_SET view. If you are connected in NOCATALOG mode, then BS Key displays the RECID from V$BACKUP_SET.
Pc#	The number of the backup piece in the backup set.
Cp#	The copy number of this backup piece in the backup set. The number is 1 if no duplexing was performed. Otherwise, the value ranges from 2 to 4.
Status	The backup piece status: AVAILABLE, UNAVAILABLE, or EXPIRED (see the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Device Type	The type of device on which the backup was made, for example, DISK or sbt.
Piece Name	The filename or handle of the backup piece.

Table 2–9 List of Datafile Backups (LIST BACKUP ... BY FILE)

Column	Indicates
File	The absolute datafile number.
Key	A unique key identifying this backup set. If you are connected to a recovery catalog, then Key is the primary key of the backup set in the catalog. It corresponds to BS_KEY in the RC_BACKUP_SET view. If you are connected in NOCATALOG mode, then Key displays the RECID from V$BACKUP_SET.
TY	The type of backup: backup set (B) or proxy copy (P).
LV	The backup level: F for nonincrementals, level 0-4 for incrementals.
S	The backup set status: available (A), unavailable (U), or expired (X) (refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Ckp SCN	The checkpoint of the datafile at the time it was backed up. All database changes prior to the SCN have been written to the file; changes after the specified SCN have not been written to the file.
Ckp Time	The checkpoint of the datafile at the time it was backed up. All database changes prior to the time have been written to the file; changes after the specified time have not been written to the file.
#Pieces	The number of backup pieces in the backup set.
#Copies	The number of copies made of each backup piece in the set. The number is 1 if no duplexing was performed. Otherwise, the value ranges from 2 to 4.
Tag	The tag applied to the backup set; NULL if none.

Table 2–10 List of Archived Log Backups (LIST BACKUP ... BY FILE)

Column	Indicates
Thrd	The thread number of the redo log.
Seq	The log sequence number of the archived log.
Low SCN	The lowest SCN in the archived log.
Low Time	The time when Oracle switched into the redo log having this sequence number.
BS Key	A unique key identifying this backup set. If you are connected to a recovery catalog, then BS Key is the primary key of the backup set in the catalog. It corresponds to BS_KEY in the RC_BACKUP_SET view. If you are connected in NOCATALOG mode, then BS Key displays the RECID from V$BACKUP_SET.
S	The backup set status: available (A), unavailable (U), or expired (X) (refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
#Pieces	The number of backup pieces in the backup set.
#Copies	The number of copies made of each backup piece in the set. The number is 1 if no duplexing was performed. Otherwise, the value ranges from 2 to 4.
Tag	The tag applied to the backup set; NULL if none.

Table 2–11 List of Controlfile Backups (LIST BACKUP ... BY FILE) **(Page 1 of 2)**

Column	Indicates
CF Ckp SCN	Checkpoint SCN of the control file.
Ckp Time	The log sequence number of the archived log.
BS Key	A unique key identifying this backup set. If you are connected to a recovery catalog, then BS Key is the primary key of the backup set in the catalog. It corresponds to BS_KEY in the RC_BACKUP_SET view. If you are connected in NOCATALOG mode, then BS Key displays the RECID from V$BACKUP_SET.
S	The backup set status: available (A), unavailable (U), or expired (X) ((refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).

Table 2–11 List of Controlfile Backups (LIST BACKUP ... BY FILE) **(Page 2 of 2)**

#Pieces	The number of backup pieces in the backup set.
#Copies	The number of copies made of each backup piece in the set. The number is 1 if no duplexing was performed. Otherwise, the value ranges from 2 to 4.
Tag	The tag applied to the backup set; NULL if none.

Table 2–12 List of Datafile Copies

Column	Indicates
Key	The unique identifier for the datafile copy. Use this value in a CHANGE command to alter the status of the datafile copy. If you are connected to a recovery catalog, then Key is the primary key of the datafile copy in the catalog. It corresponds to CDF_KEY in the RC_DATAFILE_COPY view. If you are connected in NOCATALOG mode, then Key displays the RECID from V$DATAFILE_COPY. **Note:** The values for KEY in the recovery catalog and the control file are different.
File	The file number of the datafile from which this copy was made.
S	The status of the datafile copy: available (A), unavailable (U), or expired (E). (Refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Completion Time	The date and time that the copy completed. Note that the value of this field is sensitive to the NLS_LANG and NLS_DATE_FORMAT environment variables.
Ckp SCN	The checkpoint of this datafile when it was copied. All database changes prior to this SCN have been written to this datafile.
Ckp TIME	The checkpoint of this datafile when it was copied. All database changes prior to this time have been written to this datafile.
Name	The filename of the datafile copy.

Table 2–13 List of Controlfile Copies

Column	Indicates
Key	The unique identifier for the control file copy. Use this value in a CHANGE command to alter the status of the copy. If you are connected to a recovery catalog, then Key is the primary key of the control file copy in the catalog. It corresponds to CCF_KEY in the RC_CONTROLFILE_COPY view. If you are connected in NOCATALOG mode, then Key displays the RECID from V$DATAFILE_COPY. **Note:** The values for Key in the recovery catalog and the control file are different.
S	The status of the control file copy: available (A), unavailable (U), or expired (E). (Refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).
Completion Time	The date and time that the copy completed. Note that the value of this field is sensitive to the NLS_LANG and NLS_DATE_FORMAT environment variables.
Ckp SCN	The checkpoint of this control file when it was copied.
Ckp TIME	The checkpoint of this control file when it was copied.
Name	The filename of the control file copy.

Table 2–14 List of Archived Log Copies **(Page 1 of 2)**

Column	Indicates
Key	The unique identifier for this archived redo log copy. Use this value in a CHANGE command to alter the status of the copy. If you are connected to a recovery catalog, then Key is the primary key of the backup set in the catalog. It corresponds to AL_KEY in the RC_ARCHIVED_LOG view. If you are connected in NOCATALOG mode, then Key displays the RECID from V$ARCHIVED_LOG.**Note:** The values for Key in the recovery catalog and the control file are different.
Thrd	The redo log thread number.
Seq	The log sequence number.
S	The status of the archived log: available (A), unavailable (U), or expired (E) (refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status).

Table 2–14 List of Archived Log Copies **(Page 2 of 2)**

Low Time	The time when Oracle switched into the redo log having this sequence number.
Name	The filename of the archived redo log copy.

Table 2–15 List of Database Incarnations

Column	Indicates
DB Key	When combined with the Inc Key, the unique key by which RMAN identifies the database incarnation in the recovery catalog. Use this key to unregister a database, that is, delete all the rows associated with that database from the recovery catalog.
Inc Key	When combined with DB Key, the unique key by which RMAN identifies the database incarnation in the recovery catalog. Use this key in RESET DATABASE . . . TO INCARNATION when recovering the database to a time before the most recent RESETLOGS.
DB Name	The database name as listed in the DB_NAME parameter.
DB ID	The database identification number, which Oracle generates automatically at database creation.
CUR	Whether the incarnation is the current incarnation of the database.
Reset SCN	The SCN at which the incarnation was created.
Reset Time	the time at which the incarnation was created.

Examples

Listing Backups: Example This example lists all backups in default verbose mode:

```
LIST BACKUP;

List of Backup Sets
===================

BS Key  Device Type Elapse Time Completion Time
------- ----------- ----------- ---------------
236     DISK        00:00:08    21-SEP-00
        BP Key: 237   Status: AVAILABLE   Tag:
        Piece Name: /oracle/dbs/09c5unih_1_1

  List of Archived Logs in backup set 236
  Thrd Seq     Low SCN    Low Time  Next SCN   Next Time
  ---- ------- ---------- --------- ---------- ---------
```

```
  1    141     49173      21-SEP-00 49784      21-SEP-00
  1    142     49784      21-SEP-00 50331      21-SEP-00

BS Key  Type LV Size       Device Type Elapse Time Completion Time
------- ---- -- ---------- ----------- ------------ ---------------
244     Full    61M        DISK        00:00:18    21-SEP-00
        BP Key: 245   Status: AVAILABLE   Tag:
        Piece Name: /oracle/dbs/0ac5unj5_1_1

  Controlfile Included: Ckp SCN: 51554        Ckp time: 21-SEP-00

  List of Datafiles in backup set 244
  File LV Type Ckp SCN    Ckp Time  Name
  ---- -- ---- ---------- --------- ----
  1       Full 51555      21-SEP-00 /oracle/dbs/tbs_01.f
  2       Full 51555      21-SEP-00 /oracle/dbs/tbs_02.f

List of Proxy Copies
====================

PC Key  File Status      Completion time     Ckp SCN    Ckp time
------- ---- ----------- ------------------- ---------- -------------------
552     1    AVAILABLE   10/07/2000 03:05:21 78022      10/07/2000 03:05:10
             Datafile name: /oracle/dbs/tbs_01.f
             Handle: 0jb8l876_1_0

561     1    AVAILABLE   10/07/2000 03:38:22 78025      10/07/2000 03:38:09
             Datafile name: /oracle/dbs/tbs_01.f
             Handle: 0lb8la51_1_0
             Tag: wklybkup
```

Listing a Summary of Backups: Example The following example lists a summarized version of all RMAN backups:

```
LIST BACKUP SUMMARY;

List of Backups
===============

Key     TY LV S Device Type Completion Time #Pieces #Copies Tag
------- -- -- - ----------- --------------- ------- ------- ---
164     B     A DISK        14-SEP-00       1       1
170     B     A DISK        14-SEP-00       1       1
```

Listing Backups by File: Example This example groups all backups by file:

```
LIST BACKUP BY FILE;

List of Datafile Backups
```

```
======================

File Key     TY LV S Ckp SCN    Ckp Time          #Pieces #Copies Tag
---- ------- -  -- - ---------- ----------------- ------- ------- ---
1    502     B  0  A 37973      09/28/99 19:28:36 1       2       *
     552     P  F  X 78022      10/07/99 03:05:10 1       1
     561     P  0  A 78025      10/07/99 03:38:09 1       1       DF_1_2
2    502     B  0  A 37973      09/28/99 19:28:36 1       2       *
     562     P  0  U 78027      10/07/99 03:38:22 1       1       DF_1_2

List of Archived Log Backups
============================

Thrd Seq     Low SCN    Low Time  BS Key  S #Pieces #Copies Tag
---- ------- ---------- --------- ------- - ------- ------- ---
1    141     49463      14-SEP-00 213     A 1       1

List of Controlfile Backups
===========================

CF Ckp SCN Ckp Time  BS Key  S #Pieces #Copies Tag
---------- --------- ------- - ------- ------- ---
51593      14-SEP-00 222     A 1       1
```

Listing Archived Redo Logs: Example The following example lists archived logs and copies of logs:

```
LIST COPY OF DATABASE ARCHIVELOG ALL;

List of Archived Log Copies
Key     Thrd Seq     S Low Time  Name
------- ---- ------- - --------- ----
153     1    141     A 14-SEP-00 /oracle/work/arc_dest/arcr_1_141.arc
154     1    142     A 14-SEP-00 /oracle/work/arc_dest/arcr_1_142.arc
```

Listing Backups of Specific Datafiles: Example The following example lists backups of datafile 11 in summary mode:

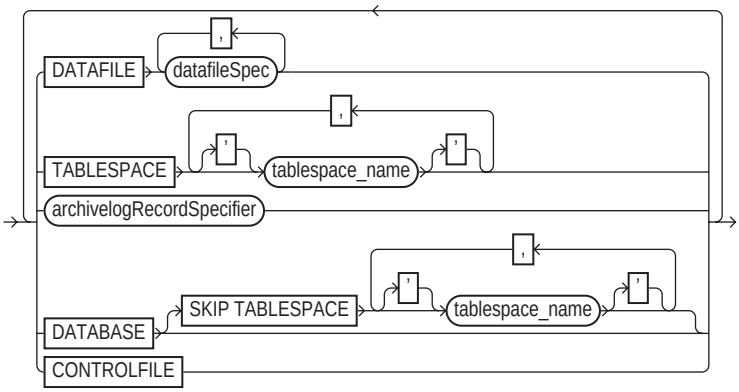
```
LIST BACKUP OF DATAFILE 11 SUMMARY;

List of Backups
===============

Key     TY LV S Device Type Completion Time #Pieces #Copies Tag
------- -- -- - ----------- --------------- ------- ------- ---
180     B  0  A DISK        14-SEP-00       1       2
```

Listing Database Incarnations: Example This example lists all database incarnations:

```
LIST INCARNATION;

List of Database Incarnations
DB Key  Inc Key DB Name  DB ID            CUR Reset SCN  Reset Time
------- ------- -------- ---------------- --- ---------- ----------
1       2       RDBMS    674879952        YES 1          14-SEP-00
```

listObjList

Syntax



Purpose

A subclause used to specify database files and archived redo logs.

Restrictions and Usage Notes

Use this clause in the following commands:

- LIST
- CROSSCHECK
- DELETE

Keywords and Parameters

DATAFILE *datafileSpec*	Specifies datafiles by filename or file number. The clause specifies datafile image copies or backup sets that contain at least one of the datafiles. **See Also:** "datafileSpec" on page 2-95
TABLESPACE *'tablespace_name'*	Specifies tablespace names. The clause specifies datafile image copies or backup sets that contain at least one of the datafile from the specified tablespace.

archivelogRecordSpecifier	Specifies a range of archived redo logs. **See Also:** "archivelogRecordSpecifier" on page 2-22
DATABASE	Specifies backup sets or image copies of all files in the current database. SKIP TABLESPACE *'tablespace_name'* omits the specified tablespaces from the DATABASE specification.
CONTROLFILE	Specifies the current control file.

Examples

Listing Datafile Copies: Example The following command lists image copies of all the files in the database, skipping the `temp` tablespace:

```
LIST COPY OF DATABASE SKIP TABLESPACE temp;
```

Crosschecking Archived Redo Logs: Example The following example queries the media manager for the status of archived redo log backup sets created in the last 90 days:

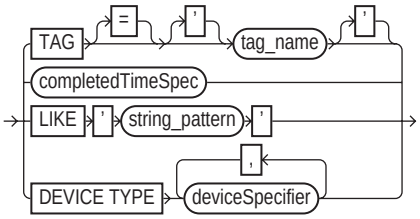
```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
CROSSCHECK BACKUP OF ARCHIVELOG FROM TIME 'SYSDATE-90';
```

Deleting Expired Control File Backup Sets: Example The following command deletes expired backups of the control file:

```
DELETE EXPIRED BACKUP OF CONTROLFILE;
```

maintQualifier

Syntax



Purpose

A subclause used to specify database files and archived redo logs.

Restrictions and Usage Notes

Use this clause in the following commands:

- LIST
- CROSSCHECK
- DELETE

Keywords and Parameters

TAG = *'tag_name'*	Specifies the datafile copies and backups by tag.
completedTimeSpec	Specifies a range of time for completion of the backup or copy. **See Also:** "completedTimeSpec" on page 2-61
LIKE *'string_pattern'*	Restricts datafile copies by specifying a filename pattern. The pattern can contain Oracle pattern matching characters % and _. RMAN only operates on those files whose name matches the pattern. **Note:** You cannot use the LIKE option with the LIST . . . ARCHIVELOG command.

DEVICE TYPE *deviceSpecifier*	Allocates automatic channels for the specified device type only. This option is valid only if you have configured automatic channels and have not manually allocated channels. For example, if you configure automatic disk and tape channels, and issue CHANGE . . . DEVICE TYPE DISK, then RMAN allocates only disk channels. **See Also:** "deviceSpecifier" on page 2-101

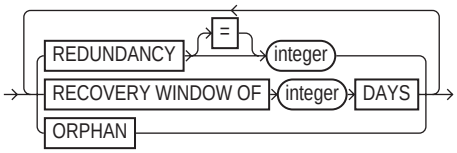
Example

Listing Backups on a Specific Device: Example The following command lists all backups located on tape:

```
LIST BACKUP DEVICE TYPE sbt;
```

obsOperandList

Syntax



Purpose

A subclause used to specify which criteria are used to mark backups and copies as obsolete.

Restrictions and Usage Notes

Use this clause in the following commands:

- DELETE
- REPORT

Keywords and Parameters

REDUNDANCY = *integer*	Specifies the minimum level of redundancy considered necessary for a backup or copy to be obsolete. A datafile copy is obsolete if there are at least *integer* more recent backups or image copies of this file; a datafile backup set is obsolete if there are at least *integer* more recent backups or image copies of each file contained in the backup set. For example, REDUNDANCY 2 means that there must be at least two more recent backups or copies of a datafile for any other backup or copy to be obsolete.
RECOVERY WINDOW OF *integer* DAYS	Specifies that RMAN should report as obsolete those backups and copies that are not needed to recover the database to any point within the last *integer* days. **See Also:** "CONFIGURE" on page 2-63 for an explanation of the recovery window
ORPHAN	Specifies as obsolete those backups and copies that are unusable because they belong to incarnations of the database that are not direct ancestors of the current incarnation. Note that RMAN displays orphaned backups *in addition to* the normal display of obsolete backups. **See Also:** *Oracle9i Recovery Manager User's Guide* for an explanation of orphaned backups

Example

Deleting Obsolete Backups: Example The following command deletes all backups and copies not needed to recover the database to a random point within the last 30 days:

```
DELETE OBSOLETE RECOVERY WINDOW OF 30 DAYS;
```

PRINT SCRIPT

Syntax

Purpose

To print a stored script to standard output or the RMAN message log. To print to a message log, specify the log filename with the LOG argument at the command line. If you do not specify this argument, Recovery Manager writes message output to standard output.

> **Note:** You can also display the individual lines of the stored scripts by querying the RC_STORED_SCRIPT_LINE recovery catalog view.

Restrictions and Usage Notes

- Use this command only at the RMAN prompt.
- You must be connected to a recovery catalog.

Keywords and Parameters

'script_name'

Prints a stored script with the specified name to standard output or a message log. To obtain a listing of all stored scripts, use SQL*Plus connect to the recovery catalog as the catalog owner and issue the following query:

```
SQL> SELECT * FROM RC_STORED_SCRIPT;
```

Note: To run the script, use EXECUTE SCRIPT within the braces of the RUN command.

See Also: "RC_STORED_SCRIPT" on page 3-27

Examples

Printing a Script to the Message Log: Example This example creates the backup_db script and prints it to rman_log. Finally, it executes the script:

```
% rman TARGET / CATALOG rman/rman@rcatdb LOG = rman_log

CREATE SCRIPT backup_db {
       ALLOCATE CHANNEL d1 DEVICE TYPE sbt;
       BACKUP DATABASE;
}
PRINT SCRIPT backup_db;

RUN
{
  EXECUTE SCRIPT backup_db;
};
```

Printing a Script to the Screen: Example This example prints a stored script to the screen:

```
PRINT SCRIPT tbs1_b;

printing stored script: tbs1_b
{
allocate channel ch1 type disk;
backup tablespace tbs1;
}
```

QUIT

Syntax

Purpose

To shut down the Recovery Manager utility.

Restrictions and Usage Notes

Execute only at the RMAN prompt.

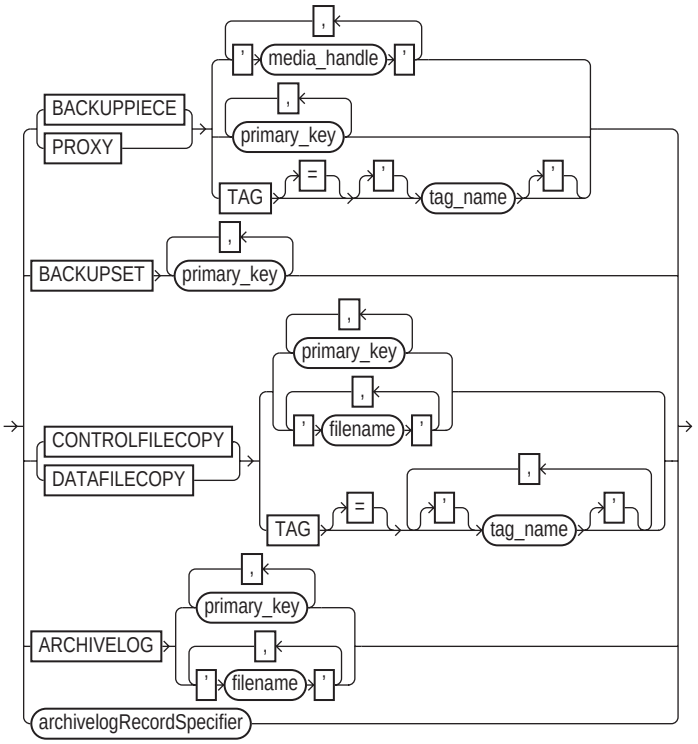
Example

Quitting RMAN: Example This example starts RMAN and then shuts it down:

```
% rman
RMAN> QUIT
```

recordSpec

Syntax



Purpose

A subclause that specifies which objects the `CHANGE`, `CROSSCHECK`, `DELETE`, and `LIST` commands should operate on. Most *recordSpec* options allow you to specify a primary key. Run the `LIST` command to obtain the key.

Keywords and Parameters

`BACKUPPIECE`	Specifies a backup piece by '*media_handle*', *primary_key*, or *tag_name*.
`PROXY`	Specifies a proxy copy by '*media_handle*', *primary_key*, or *tag_name*.

BACKUPSET *primary_key*	Specifies a backup set by *primary_key*.
CONTROLFILECOPY	Specifies a control file copy by *primary_key*, filename pattern (*'filename'*), or TAG = *tag_name*. If you crosscheck a control file copy, you must specify a filename rather than a primary key.
DATAFILECOPY	Specifies a datafile copy by either *primary_key*, filename pattern (*'filename'*), or TAG = tag_name.
ARCHIVELOG	Specifies an archived redo log by either *primary_key* or *'filename'*.
archivelogRecordSpecifier clause	Specifies a range of archived redo logs. **See Also:** "archivelogRecordSpecifier" on page 2-22

Examples

Crosschecking Backups: Example This example crosschecks a set of backup sets specified by primary key:

```
CROSSCHECK BACKUPPIECE 507, 508, 509;
```

Deleting Datafile Copies: Example This example deletes a specified datafile copy:

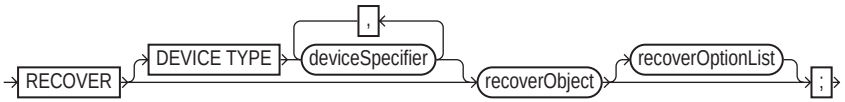
```
DELETE DATAFILECOPY "df1_copy.f";
```

Listing Expired Archived Logs: Example This example lists all expired archived redo logs:

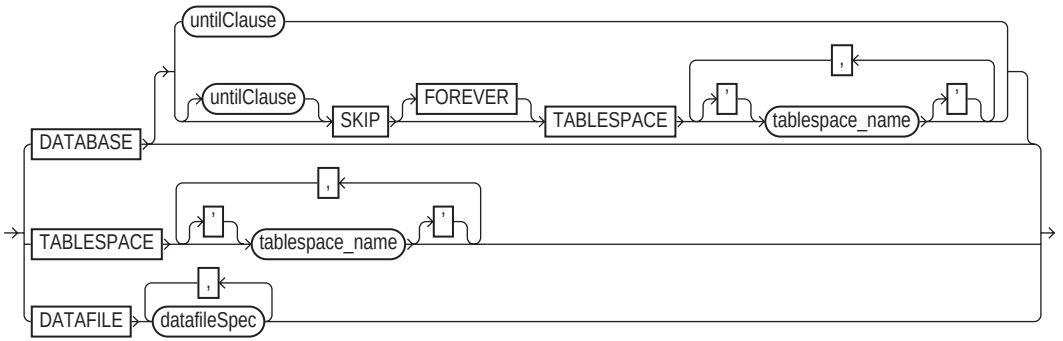
```
LIST EXPIRED ARCHIVELOG ALL;
```

RECOVER

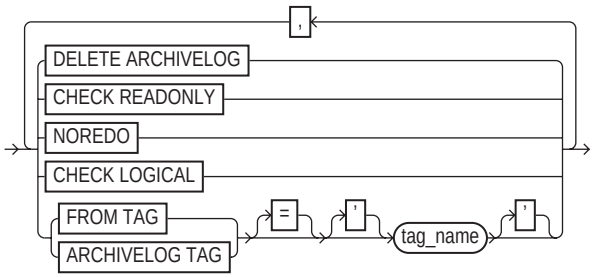
Syntax



recoverObject::=



recoverOptionList::=



Purpose

To apply redo logs or incremental backups to one or more restored datafiles in order to update them to a specified time.

RMAN uses online redo records and restores backup sets of archived redo logs as needed to perform the media recovery. RMAN first looks for the original archived logs or image copies, and if none are available, then it restores backups.

If RMAN has a choice between applying an incremental backup or applying redo, then it always chooses the incremental backup. If overlapping levels of incremental backup are available, then RMAN automatically chooses the one covering the longest period of time. Note that RMAN can apply incremental backups to restored files that were not created as part of an incremental backup.

Note: When RMAN applies incremental backups, it recovers changes to objects created with the `NOLOGGING` option. Applying archived redo logs to datafiles does not recover these changes.

See Also: *Oracle9i Recovery Manager User's Guide* to learn how to recover datafiles

Restrictions and Usage Notes

- Recovery is possible with a backup control file and no recovery catalog, but requires manual intervention if you added files to the database after the backup control file was created.
- If you have not configured channels, then at least one `ALLOCATE CHANNEL` command must precede `RECOVER` unless you do not need to restore archived redo log or incremental backups.
- You do not have to allocate a channel for archived log recovery because RMAN uses the preconfigured `DISK` channel. If incremental backups need to be restored during recovery, however, then you must either use configured channels or manually allocate channels of the same type that created these backups.
- For datafile and tablespace recovery, the target database must be mounted. If it is open, then the datafiles or tablespaces to be recovered must be offline. For database recovery, the database must be mounted but not open.
- Only the current datafiles may be recovered or have incremental backups applied to them.
- If you want to perform incomplete recovery, the best practice is to enter a `SET UNTIL` command before both the `RESTORE` and `RECOVER` command. If you specify a `SET UNTIL` command after a `RESTORE` and before a `RECOVER`, then

you may not be able to perform media recovery on the database to the time required because the restored files may have time stamps later than the specified time.

- The RECOVER DATABASE command does not recover any files that are offline normal or read-only at the point in time to which the files are being recovered. RMAN omits offline normal files with no further checking. If CHECK READONLY is specified, then RMAN checks each read-only file on disk to ensure that it is already current at the desired point in time. If CHECK READONLY is not specified, then RMAN omits read-only files.
- Open with the RESETLOGS option after incomplete recovery or recovery with a backup control file.
- You cannot recover temporary tablespaces. You can only re-create them.
- You must have already configured a device type with the CONFIGURE DEVICE TYPE command (except for DISK, which is preconfigured) before specifying the DEVICE TYPE option.
- You cannot manually allocate channels and then run RECOVER with the DEVICE TYPE option.

Keywords and Parameters

DEVICE TYPE *deviceSpecifier*

Allocates automatic channels for the specified device type only. For example, if you configure automatic disk and tape channels, and issue RECOVER . . . DEVICE TYPE DISK, then RMAN allocates only disk channels.

See Also: "deviceSpecifier" on page 2-101

DATABASE

Specifies that the entire database is to be recovered. Unless you specify an *untilClause*, RMAN performs complete recovery.

untilClause

Specifies a noncurrent time, SCN, or log sequence number for termination of the RECOVER command. You must open the database with the RESETLOGS option after incomplete recovery.

See Also: "untilClause" on page 2-210

	SKIP [FOREVER] TABLESPACE	Lists tablespaces that should not be recovered, which is useful for avoiding recovery of tablespaces containing only temporary data or for postponing recovery of some tablespaces. The SKIP clause takes the datafiles in the specified tablespaces offline before starting media recovery. These files are left offline after the media recovery is complete. If you perform incomplete recovery, then SKIP is not allowed. Instead, use SKIP FOREVER, with the intention of dropping the skipped tablespaces after opening the database with the RESETLOGS option. The SKIP FOREVER clause causes RMAN to take the datafiles offline with the DROP option. Only use SKIP FOREVER when the specified tablespaces will be dropped after opening the database.
TABLESPACE *'tablespace_name'*	Specifies tablespaces by tablespace name.	
DATAFILE *datafileSpec*	Specifies a list of one or more datafiles to recover. Specify datafiles by either filename (by using a quoted string) or absolute datafile number (by using an integer). If you are using the control file as the exclusive repository for RMAN metadata, then the filename must be the name of the datafile as known in the control file. If you are using a recovery catalog, then the filename of the datafile must be the most recent name recorded in the catalog. For example, assume that a datafile was renamed in the control file. The database then crashes before you can resynchronize the catalog. Specify the old name of the datafile in the RECOVER command, because this is the name recorded in the catalog. **See Also:** "datafileSpec" on page 2-95	
recoverOptionList	Specifies various recovery options.	
	DELETE ARCHIVELOG	Deletes archived logs restored from backups or copies that are no longer needed. RMAN does not delete archived logs that were already on disk before the RESTORE command started.
	CHECK READONLY	Checks the headers of read-only files to ensure that they are current before omitting them from the recovery.
	NOREDO	Suppresses the application of redo logs—only incremental backups are applied. This option is intended for recovery of NOARCHIVELOG databases by using incremental backups. If you do not specify NOREDO when recovering a NOARCHIVELOG database, then Oracle aborts a recovery and issues an error. **Note:** Incremental backups of NOARCHIVELOG databases must be taken after a consistent shutdown.

CHECK LOGICAL	Tests data and index blocks that pass physical corruption checks for logical corruption, for example, corruption of a row piece or index entry. If RMAN finds logical corruption, it logs the block in the `alert.log` and server session trace file. Provided the sum of physical and logical corruptions detected for a file remain below its MAXCORRUPT setting, the RMAN command completes and Oracle populates V$BACKUP_CORRUPTION and V$COPY_CORRUPTION with corrupt block ranges. If MAXCORRUPT is exceeded, then the command terminates without populating the views. **Note:** The MAXCORRUPT setting represents the total number of physical and logical corruptions permitted on a file.
FROM TAG = *tag_name*	Specifies the tag for an incremental backup to be used during recovery. If the tagged backup does not contain all the necessary incrementals for recovery, then RMAN uses logs or incremental backups as needed from whatever is available.
ARCHIVELOG TAG = *tag_name*	Specifies the tag for an archived log backup to be used during recovery. If the tagged backup does not contain all the necessary logs for recovery, RMAN uses logs or incremental backups as needed from whatever is available.

Examples

Recovering a Tablespace in an Open Database: Example The following example takes tablespace `tbs_1` offline, uses automatic channels to restore and recover it (deleting the logs that it restored from tape), then brings it back online:

```
SQL "ALTER TABLESPACE tbs_1 OFFLINE IMMEDIATE";
RESTORE TABLESPACE tbs_1;
RECOVER TABLESPACE tbs_1 DELETE ARCHIVELOG;
SQL "ALTER TABLESPACE tbs_1 ONLINE";
```

Recovering Datafiles Restored to New Locations: Example The following example uses the preconfigured disk channel and manually allocates one media management channel to use datafile copies on disk and backups on tape, and restores one of the datafiles in tablespace `tbs_1` to a different location:

```
RUN
{
  ALLOCATE CHANNEL dev2 DEVICE TYPE sbt;
  SQL "ALTER TABLESPACE tbs_1 OFFLINE IMMEDIATE";
  SET NEWNAME FOR DATAFILE 'disk7/oracle/tbs11.f'
    TO 'disk9/oracle/tbs11.f';
  RESTORE TABLESPACE tbs_1;
```

```
  SWITCH DATAFILE ALL;
  RECOVER TABLESPACE tbs_1;
  SQL "ALTER TABLESPACE tbs_1 ONLINE";
}
```

Performing Incomplete Recovery by Using a Backup Control File: Example

Assume that both the database and archived redo log 1234 were lost due to a disk crash. Because you do not have incremental backups, you need to recover the database by using available archived redo logs. You do not need to restore tablespace `readonly1` because it has not changed since log 1234.

```
RUN
{
  SET UNTIL SEQUENCE 1234 THREAD 1;      # Recover database until log sequence 1234
  RESTORE CONTROLFILE TO '/vobs/oracle/dbs/cf1.f' ;
  # Because you specified a restore destination, manually replicate the control file.
  # RMAN replicates automatically when no destination is specified.
  REPLICATE CONTROLFILE FROM '/vobs/oracle/dbs/cf1.f';
  ALTER DATABASE MOUNT;
  RESTORE DATABASE SKIP TABLESPACE temp1, readonly1;
  RECOVER DATABASE SKIP FOREVER TABLESPACE temp1;
  ALTER DATABASE OPEN RESETLOGS;
  SQL "DROP TABLESPACE temp1";
  SQL "CREATE TABLESPACE temp1 DATAFILE '/vobs/oracle/dbs/temp1.f' SIZE 10M TEMPORARY";
}
```

REGISTER

Syntax

Purpose

To register the target database in the recovery catalog so that RMAN can access it. RMAN obtains all information it needs to register the target database from the target database itself.

Note: If you perform a RESETLOGS operation on a database and later register it in the recovery catalog, the catalog records the DB_NAME for the old incarnations as UNKNOWN because the old incarnations were not previously registered. You should not try to remove these records.

See Also: *Oracle9i Recovery Manager User's Guide*, "CREATE CATALOG" on page 2-86

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- You must be connected to the target database and recovery catalog database.
- You can register multiple databases in the same recovery catalog, but the database identifiers of the databases must be unique.
- You can only register a database once in a given recovery catalog.
- The target database must be mounted or open.
- You should not register a standby database.
- The REGISTER DATABASE command fails when RMAN detects duplicate DBIDs. This situation can arise when databases are created by copying files from an existing database rather than by using the DUPLICATE command.

If this failure occurs, then you can create a second recovery catalog in the same database but in another user's schema by executing CREATE CATALOG and using a different user ID. Then, register the database with the duplicate database identifier into the newly created recovery catalog in the new schema.

Note: If you are using RMAN with different target databases that have the same database name and DBID, be careful to always specify the correct recovery catalog schema when invoking RMAN.

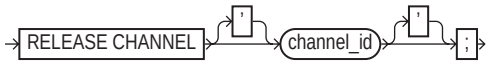
Example

Registering a Database: Example This example registers a new target database, catalogs an existing datafile copy, then opens the database for use:

```
% rman TARGET / CATALOG rman/rman@rcat
STARTUP MOUNT;
REGISTER DATABASE;
CATALOG DATAFILECOPY '/oracle/dbs/tbs_11.f';
ALTER DATABASE OPEN;
```

RELEASE CHANNEL

Syntax



Purpose

To release a channel while maintaining the connection to the target database instance. Specify the channel name with the same identifier used in the ALLOCATE CHANNEL command. This command is optional because RMAN automatically releases all channels allocated when the RUN command terminates.

Requirements

Execute this command only within a RUN command.

Keywords and Parameters

channel_id	specifies the case-sensitive channel ID used in the ALLOCATE CHANNEL command.

Examples

Releasing a Channel: Example This example makes three identical backup sets of datafiles 1 through 4 to tape with channel ch1, then releases it. RMAN then makes three identical backups of datafiles 5 and 6 to tape with channel ch2 and then releases it:

```
RUN {
     SET BACKUP COPIES = 3;
     ALLOCATE CHANNEL ch1 DEVICE TYPE sbt FILESPERSET = 2 RATE = 1000;
     ALLOCATE CHANNEL ch2 DEVICE TYPE sbt MAXPIECESIZE = 3000;
     BACKUP CHANNEL ch1 DATAFILE 1,2,3,4;
     RELEASE CHANNEL ch1;
     BACKUP DATAFILE 5,6;
}
```

releaseForMaint

Syntax

Purpose

To release a sequential I/O device specified in an ALLOCATE CHANNEL FOR MAINTENANCE command. Note that maintenance channels are unaffected by ALLOCATE CHANNEL and RELEASE CHANNEL command issued within a RUN command.

Requirements

- Execute this command only at the RMAN prompt.
- You must have a maintenance channel allocated in order to release it.

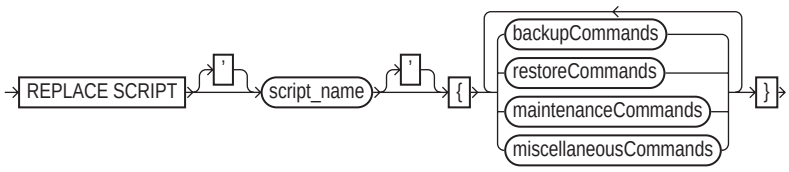
Examples

Releasing a Maintenance Channel After a Delete Operation: Example This example allocates and then releases a maintenance channel to the media manager:

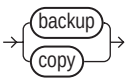
```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
DELETE BACKUPPIECE 100;
RUN
{
  ALLOCATE CHANNEL ch1 DEVICE TYPE DISK;
  BACKUP DATAFILE 1;
  RELEASE CHANNEL ch1; # releases RUN channel but not maintenance channel
}
RELEASE CHANNEL; # releases maintenance channel
```

REPLACE SCRIPT

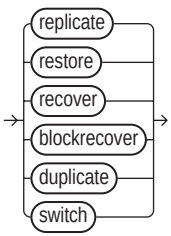
Syntax



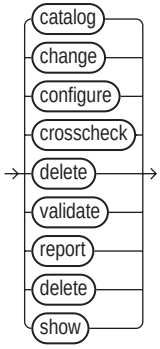
backupCommands::=



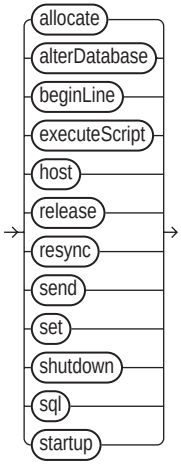
restoreCommands::=



maintenanceCommands::=



miscellaneousCommands::=



Purpose

To replace an existing script stored in the recovery catalog. If the script does not exist, then REPLACE SCRIPT creates it.

The stored script feature is provided primarily to provide a common repository for frequently executed collections of RMAN commands: use any command legal within a RUN command in the script. The script is not executed immediately; use the EXECUTE SCRIPT command to run it.

See Also:

- For descriptions of the individual commands that you can use in a stored script, see the appropriate entry, for example, "BACKUP" on page 2-26
- For information about the @ and @@ arguments, see "CREATE SCRIPT" on page 2-88
- For information about the EXECUTE SCRIPT command, see "EXECUTE SCRIPT" on page 2-112

Restrictions and Usage Notes

- Execute REPLACE SCRIPT only at the RMAN prompt.
- You must be connected to a recovery catalog.
- The @ and @@ commands do not work within REPLACE SCRIPT.

Keywords and Parameters

For descriptions of the individual commands that you can use in a stored script, refer to the appropriate entry, for example, "BACKUP" on page 2-26.

REPLACE SCRIPT *'script_name'*	Replaces the specified stored script with the new commands. The statements allowable within the parentheses of the REPLACE SCRIPT '*script_name*' (...) command are the same allowable within the RUN command. To obtain a listing of all stored scripts, use SQL*Plus to connect to the recovery catalog database as the catalog owner and issue the following query: `SQL> SELECT * FROM RC_STORED_SCRIPT;` **Note:** To run the script, issue EXECUTE SCRIPT within the braces of the RUN command. **See Also:** "RC_STORED_SCRIPT" on page 3-27 for more information about RC_STORED_SCRIPT

Example

Replacing an RMAN Script: Example This example creates a script called `backup_full`, replaces it with a different script, and then executes it:

```
CREATE SCRIPT backup_full {
   # manually allocates disk channels, specifying 3 different directories
   ALLOCATE CHANNEL ch1 DEVICE TYPE DISK FORMAT '/disk1/%U';
   ALLOCATE CHANNEL ch2 DEVICE TYPE DISK FORMAT '/disk2/%U';
   ALLOCATE CHANNEL ch3 DEVICE TYPE DISK FORMAT '/disk3/%U';
   BACKUP DATABASE;
}
REPLACE SCRIPT backup_full {
   # uses configured channel for default device type
   BACKUP DATABASE;
}
RUN { EXECUTE SCRIPT backup_full; }
```

REPLICATE

Syntax

Purpose

To copy a control file to the locations specified in the CONTROL_FILES initialization parameter of the target database.

After restoring the control file, you can use the REPLICATE CONTROLFILE statement to prepare the database for mounting. This operation is equivalent to executing multiple COPY CONTROLFILE statements.

> **Note:** The RESTORE command will automatically replicate the control file to all CONTROL_FILES locations if no restore destination is specified.

Restrictions and Usage Notes

- Execute REPLICATE CONTROLFILE only within the braces of a RUN command.
- The target instance must be started.

Keywords and Parameters

'filename'	Specifies the location of the control file to be replicated. For example, if you restore a control file backup to /oracle/temp/cf.bak, then you would also specify this filename in the REPLICATE command.

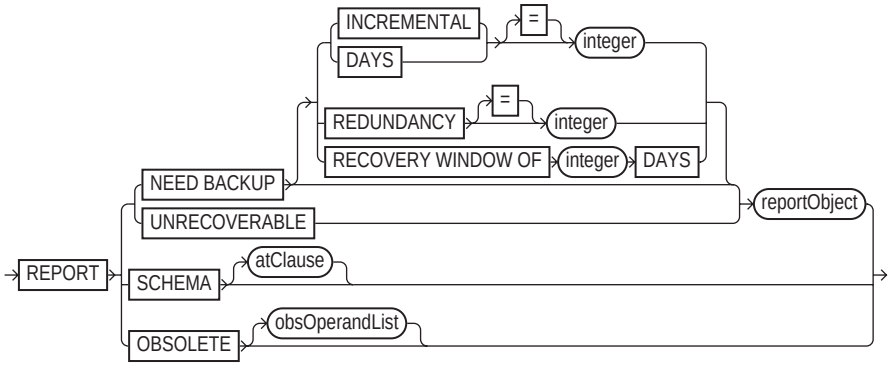
Example

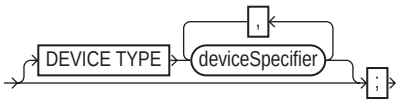
Replicating a Restored Control File: Example This example restores a control file to a temporary location and then replicates it manually:

```
STARTUP NOMOUNT;
RUN
{
  SET UNTIL TIME 'Jun 18 2000 16:32:36';
  # restore a backup controlfile to a temporary location.
  RESTORE CONTROLFILE TO '/tmp/cf.tmp';
  REPLICATE CONTROLFILE FROM '/tmp/cf.tmp';
  STARTUP FORCE MOUNT;
}
```

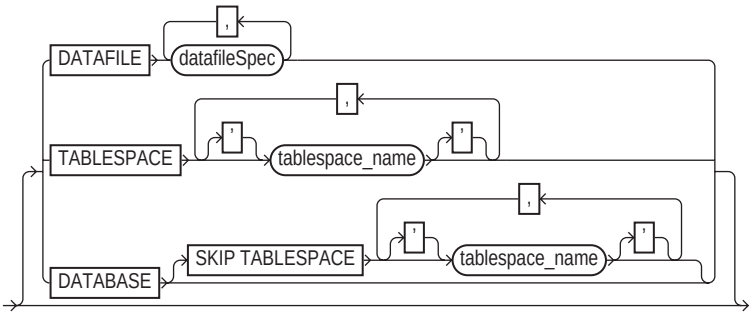
REPORT

Syntax

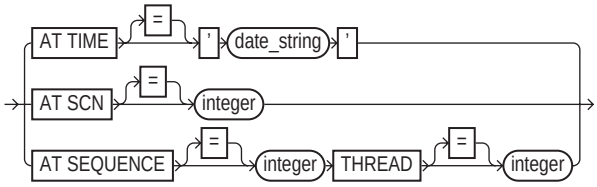




reportObject::=



atClause::=



Purpose

To perform detailed analyses of the RMAN repository. Oracle writes the output from the REPORT command to standard output or the message log file.

Use the REPORT command to answer questions such as the following:

- Which files need a backup?
- Which files have not had a backup for some time?
- Which files are not recoverable due to unrecoverable operations?
- Which backup files can be deleted?
- What was the physical schema of the database at a previous time?

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to use RMAN's reporting functionality

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- You must connect to a recovery catalog when issuing a REPORT SCHEMA command with the AT TIME, AT SCN, or AT SEQUENCE options. Otherwise, a recovery catalog is not required for the REPORT command.

Keywords and Parameters

NEED BACKUP

Lists all datafiles in need of a new backup. The report assumes that you will use the most recent backup for restore operations. If you do not specify any option, then RMAN uses the current retention policy configuration. If the retention policy is disabled (CONFIGURE RETENTION POLICY TO NONE), RMAN generates an error.

INCREMENTAL = *integer*

Specifies a threshold number of incremental backups required for recovery. If complete recovery of a datafile requires more than *integer* incremental backups, then the datafile requires a new full backup. The REPORT command, like the RECOVER command, uses the lowest level of incremental backup whenever there is a choice. This is the same strategy that RMAN would use if the file were actually being recovered by the RECOVER command.

Note: Files for which no backups exist will not appear in this list: issue the REPORT NEED BACKUP REDUNDANCY command to display them.

DAYS = *integer*

Specifies a threshold number of days worth of logs needed to recover the file. For example, REPORT NEED BACKUP DAYS 7 DATABASE shows the datafiles whose recovery requires more than one week's worth of archived redo logs.

If the target database control file is mounted and current, then RMAN makes the following optimizations to this report:

- Files that are offline and whose most recent backup contains all changes to the file are not included.
- Files that were offline and are now online, and whose most recent backup contains all changes up to the offline time, are only reported if they have been online for more than the specified number of days.

REDUNDANCY = *integer*

Specifies the minimum number of backups or copies that must exist for a datafile to be considered *not* in need of a backup. In other words, a datafile needs a backup if there are fewer than *integer* backups or copies of this file. For example, REDUNDANCY 2 means that if there are fewer than two copies or backups of a datafile, then it needs a new backup.

RECOVERY WINDOW OF *integer* DAYS

Specifies a time window in which RMAN should be able to recover the database. The window stretches from the current time (SYSDATE) to the **point of recoverability**, which is the earliest date to which you want to recover. The point of recoverability is *integer* days in the past, that is, SYSDATE - *integer*.

UNRECOVERABLE	Lists all unrecoverable datafiles. A datafile is considered unrecoverable if an unrecoverable operation has been performed against an object residing in the datafile since the last backup of the datafile. **Note:** The nonexistence of any backup of a datafile is not sufficient reason to consider it unrecoverable. Such datafiles can be recovered through the use of the CREATE DATAFILE command, if redo logs starting from when the file was created still exist.
reportObject	Specifies the datafiles to be included in the report. The report can include the entire database (optionally skipping certain tablespaces), a list of tablespaces, or a list of datafiles.
DATAFILE *datafileSpec*	Lists the specified datafiles. RMAN reports on backups or datafile copies that contain at least one of the specified datafiles.
TABLESPACE *'tablespace_name'*	Lists datafiles in the specified tablespace. RMAN reports on backups or datafile copies that include at least one datafile from a specified tablespace.
DATABASE	Lists backups or datafile copies of all files in the current database. Specify SKIP TABLESPACE *tablespace_name* to exclude the specified tablespace from the DATABASE specification.
SCHEMA	Lists the names of all datafiles and tablespaces at the specified point in time.
atClause	Specifies a point in time as a time, an SCN, or a log sequence number.
AT TIME = *'date_string'*	Specifies a date. The NLS_LANG and NLS_DATE_FORMAT environment variables specify the format for the time.
AT SCN = *integer*	Specifies an SCN.
AT SEQUENCE = *integer* THREAD = *integer*	Specifies a log sequence number for a specified redo THREAD number. The integer indicates the time when the specified log and thread were first opened.
OBSOLETE *obsOperandList*	Lists full backups and datafile copies recorded in the RMAN repository that can be deleted because they are no longer needed. The subclause *obsOperandList* describes the criteria that RMAN uses to determine what is obsolete. If you do not specify parameters in *obsOperandList*, then RMAN uses the options specified in CONFIGURE RETENTION POLICY. If you use this option in conjunction with DEVICE TYPE, then RMAN only considers backups and copies created on the specified device.
DEVICE TYPE *deviceSpecifier*	Specifies the type of storage device. RMAN only considers backups and copies available on the specified device for its report.

Report Output

The information that appears in the output is shown in the following tables:

- Table 2–16, "Report of Database Schema"
- Table 2–17, "Report of Obsolete Backups and Copies"
- Table 2–18, "Report of Files that Need Backup Due to Unrecoverable Operations"
- Table 2–19, "Report of Files with Less Than n Redundant Backups"
- Table 2–20, "Report of Files Whose Recovery Needs More Than n Days of Archived Logs"
- Table 2–21, "Report of Files That Need More than n Incrementals During Recovery"

Table 2–16 Report of Database Schema

Column	Indicates
`File`	The absolute datafile number.
`K-bytes`	The size of the file in kilobytes.
`Tablespace`	The tablespace name.
`RB segs`	`YES` if rollback segments exist in the tablespace and `NO` if they do not (only if connected to the recovery catalog). If RMAN is not connected to the catalog, then `***` is displayed.
`Datafile Name`	The filename of the datafile.

Table 2–17 Report of Obsolete Backups and Copies

Column	Indicates
`Type`	Whether the object is a backup set, backup piece, proxy copy, or datafile copy.
`Key`	A unique key that identifies this backup in the target database control file.
`Completion Time`	The time that the backup or copy completed.
`Filename/handle`	The filename or media handle of the backup or datafile copy.

Table 2–18 Report of Files that Need Backup Due to Unrecoverable Operations

Column	Indicates
`File`	The absolute number of the datafile that needs a new backup due to unrecoverable operations.
`Type Of Backup Required`	`FULL` or `INCREMENTAL`, depending on which type of backup is necessary to ensure the recoverability of all of the data in this file. If `FULL`, then create a full backup, level 0 backup, or a datafile copy. If `INCREMENTAL`, then a full or incremental backup will also suffice.
`Name`	The name of the datafile.

Table 2–19 Report of Files with Less Than n Redundant Backups

Column	Indicates
`File`	The absolute datafile number of a datafile with less than *n* redundant backups.
`#bkps`	The number of backups that exist for this file.
`Name`	The name of the file.

Table 2–20 Report of Files Whose Recovery Needs More Than n Days of Archived Logs

Column	Indicates
`File`	The absolute file number of a datafile that requires more than *n* days of archived redo logs for recovery.
`Days`	The number of days of archived redo data required for recovery.
`Name`	The name of the datafile.

Table 2–21 Report of Files That Need More than n Incrementals During Recovery

Column	Indicates
`File`	The absolute file number of a datafile that requires more than *n* incrementals for complete recovery.
`Incrementals`	The number of incremental backups required for complete recovery.
`Name`	The name of the datafile.

Examples

Reporting Database Schema: Example This example reports the names of all datafiles and tablespaces in the database one week ago:

```
REPORT SCHEMA AT TIME 'SYSDATE-7';

Report of database schema
File K-bytes    Tablespace           RB segs Name
---- ---------- -------------------- ------- ------------------
1         47104 SYSTEM               YES     /vobs/oracle/dbs/tbs_01.f
2           978 SYSTEM               YES     /vobs/oracle/dbs/tbs_02.f
3           978 TBS_1                NO      /vobs/oracle/dbs/tbs_11.f
4           978 TBS_1                NO      /vobs/oracle/dbs/tbs_12.f
5           978 TBS_2                NO      /vobs/oracle/dbs/tbs_21.f
6           978 TBS_2                NO      /vobs/oracle/dbs/tbs_22.f
7           500 TBS_3                NO      /vobs/oracle/dbs/tbs_31.f
8           500 TBS_3                NO      /vobs/oracle/dbs/tbs_32.f
9          5120 SYSTEM               YES     /vobs/oracle/dbs/tbs_03.f
```

Reporting Datafiles Needing Incremental Backups: Example This example reports all datafiles in the database that require the application of five or more incremental backups to be recovered to their current state:

```
REPORT NEED BACKUP INCREMENTAL 5 DATABASE;

Report of files that need more than 5 incrementals during recovery
File Incrementals Name
---- ------------ -----------------------------------------------
1    9            /vobs/oracle/dbs/tbs_01.f
2    9            /vobs/oracle/dbs/tbs_02.f
3    9            /vobs/oracle/dbs/tbs_11.f
4    9            /vobs/oracle/dbs/tbs_12.f
```

Reporting Datafiles Needing Backups: Example The following example reports all datafiles from tablespace SYSTEM that will need more than two days of archived redo logs to be applied during recovery after being restored from the most recent backup:

```
REPORT NEED BACKUP DAYS 2 TABLESPACE SYSTEM;

Report of files whose recovery needs more than 2 days of archived logs
File Days  Name
---- ----- -----------------------------------------------------
1    3     /vobs/oracle/dbs/tbs_01.f
2    3     /vobs/oracle/dbs/tbs_02.f
16   3     /vobs/oracle/dbs/tbs_03.f
```

Reporting Unrecoverable Datafiles: Example The following example reports all datafiles that cannot be recovered from existing backups because redo may be missing:

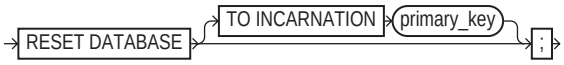
```
REPORT UNRECOVERABLE;

Report of files that need backup due to unrecoverable operations
File Type of Backup Required Name
---- ----------------------- -----------------------------------
4     FULL                   /vobs/oracle/dbs/tbs_12.f
```

Reporting Obsolete Backups and Copies: Example The following example reports obsolete backups and copies with a redundancy of 1:

```
REPORT OBSOLETE;

Report of obsolete backups and copies
Type                 Key    Completion Time    Filename/Handle
-------------------- ------ ------------------ --------------------
Backup Set           836    04-OCT-00
Backup Piece         839    04-OCT-00          /vobs/oracle/dbs/05aetj6b_1_1
Backup Set           807    04-OCT-00
Backup Piece         810    04-OCT-00          /vobs/oracle/dbs/03aetj1f_1_1
```

RESET DATABASE

Syntax



Purpose

To reset the target database in the RMAN repository, which means to do either of the following actions:

- Inform RMAN that the SQL statement ALTER DATABASE OPEN RESETLOGS has been executed and that a new incarnation of the target database has been created. Note that if you run the RMAN command ALTER DATABASE OPEN RESETLOGS (not the SQL statement with the same keywords), then RMAN resets the target database automatically so that you do not have to run RESET DATABASE. By resetting the database, RMAN considers the new incarnation as the current incarnation of the database.
- To reset the database to a previous incarnation. Typically, you would reset the incarnation when performing incomplete recovery to a point before a RESETLOGS operation, or when attempting to undo the affects of a RESETLOGS by restoring backups taken before a RESETLOGS.

Restrictions and Usage Notes

- Execute RESET DATABASE only at the RMAN prompt.
- You must be connected to the target database and a recovery catalog.
- You must issue a RESET DATABASE command before you can use RMAN with a target database that has been opened with the SQL statement ALTER DATABASE OPEN RESETLOGS option. If you do not, then RMAN refuses to access the recovery catalog because it cannot distinguish between a RESETLOGS operation and an accidental restore of an old control file. The RESET DATABASE command gives confirmation to RMAN that you issued a RESETLOGS command.
- You cannot specify TO INCARNATION unless the database is started but not mounted. If you mount a control file from an incarnation after the desired incarnation, then RESET DATABASE TO INCARNATION fails because of a control

file mismatch. If you mount the control file from the desired incarnation and then run RESET DATABASE TO INCARNATION, then the connection to the target database and recovery catalog fails due to an incarnation mismatch.

Keywords and Parameters

TO INCARNATION *primary_key*	Changes the incarnation that RMAN considers to be current to an older incarnation. Specify the primary key of the DBINC record for the database incarnation. Obtain the key value using the LIST INCARNATION OF DATABASE command. After you start the instance and issue the RESET DATABASE TO INCARNATION command, then you can mount or restore a control file from the desired incarnation and then run RMAN commands in this incarnation.

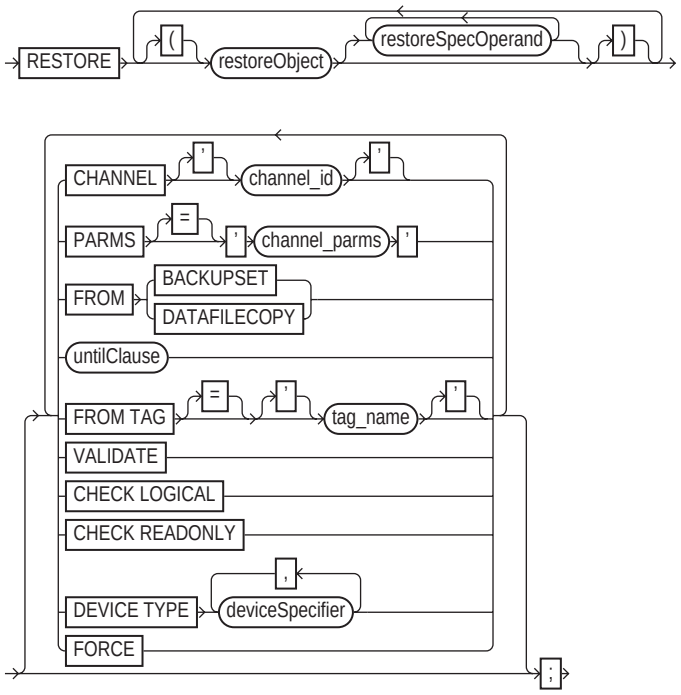
Examples

Resetting RMAN to a Previous Incarnation: Example The following scenario makes an old incarnation of database prod1 current again:

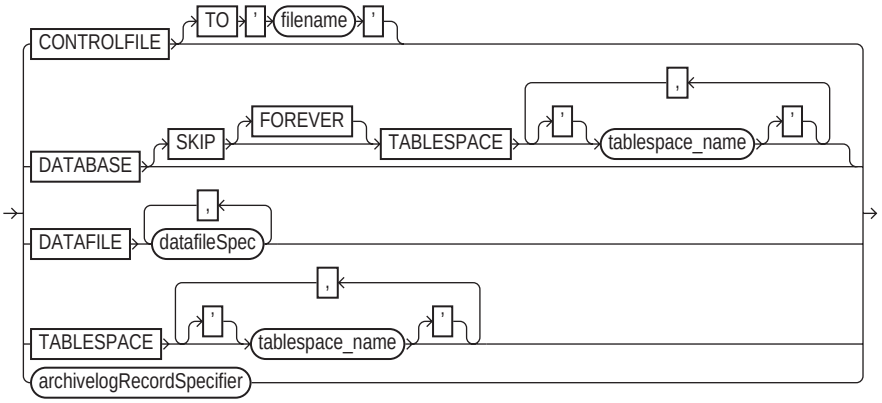
```
# step 1: obtain the primary key of old incarnation
LIST INCARNATION OF DATABASE PROD1;

List of Database Incarnations
DB Key  Inc Key   DB Name   DB ID       CUR    Reset SCN    Reset Time
------- -------   -------   ------      ---    ----------   ----------
1       2         PROD1     1224038686  NO     1            02-JUL-00
1       582       PROD1     1224038686  YES    59727        10-JUL-00

# step 2: start instance and reset database
SHUTDOWN IMMEDIATE;
STARTUP NOMOUNT;
RESET DATABASE TO INCARNATION 2;

# step 3: restore control file from previous incarnation:
RESTORE CONTROLFILE;

# step 4: shut down and then and mount the database
SHUTDOWN IMMEDIATE
STARTUP MOUNT

# step 5: restore and recover the database to a point before the RESETLOGS
RESTORE DATABASE UNTIL SEQUENCE 1001;
RECOVER DATABASE UNTIL SEQUENCE 1001;

# step 6: make this incarnation the current incarnation:
ALTER DATABASE OPEN RESETLOGS;
```

RESTORE

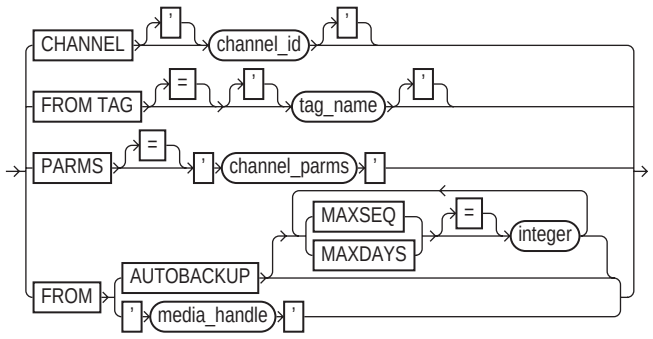
Syntax



restoreObject::=



restoreSpecOperand::=



Purpose

To restore files from backups or image copies. By default, RMAN restores files to their default location. You can use the SET NEWNAME command to restore files to nondefault locations. RMAN restores backups from disk or tape and restores images copies from disk only.

Typically, you restore when a media failure has damaged a current datafile, control file, or archived log or prior to performing a point-in-time recovery. The RESTORE command restores full backups, incremental backups (level 0 only), or copies of datafiles, control files, and archived redo logs. Because the RECOVER command automatically restores archived logs as needed, you should seldom need to restore

logs manually. Possible reasons for manually restoring archived logs are to speed up recovery or to stage the logs to multiple destinations.

> **Note:** In Oracle9*i*, unlike in previous RMAN releases, RMAN by default does not restore a datafile if the file is in the correct place and its header contains the expected data (RMAN does not scan the datafile body for corrupt blocks). The FORCE option overrides this behavior and restores the requested files unconditionally.

When you perform a restore operation by using a backup control file and use a recovery catalog, RMAN automatically adjusts the control file to reflect the structure of the restored database.

If you restore to the default location, then RMAN overwrites files with the same filenames. If you restore to a new location, then issue SET NEWNAME commands to rename the files and issue a SWITCH command to make the restored files current. If you do not issue SWITCH commands, then RMAN considers the restored files as valid copies for use in future restore operations.

If you do not manually allocate channels, then RMAN allocates all automatic channels possibly needed by the RESTORE command. For example, assume you configure 3 separate sbt channels (each with different PARMS) and then configure parallelism for DISK and sbt as follows:

```
CONFIGURE DEVICE TYPE DISK PARALLELISM 2;
CONFIGURE DEVICE TYPE sbt PARALLELISM 3;
CONFIGURE DEFAULT DEVICE TYPE TO sbt;
```

During a restore, RMAN allocates three sbt channels and the two preconfigured DISK channels. For a restore, RMAN allocates all configured channels unless the DEVICE TYPE option restricts the device type from which RMAN restores files.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to restore files

Restrictions and Usage Notes

- To restore datafiles to their current location, the database must be started, mounted, or open with the tablespaces or datafiles to be restored offline. If the database is only started, then it is recommended that you only restore the control file, if necessary. To restore other files, mount the database and then continue.

Note: When performing a database validation by using RESTORE . . . VALIDATE, the database can be open.

- To restore to a new location, use the SET NEWNAME commands to rename the datafiles and use SWITCH commands to make them the current database files. If you do not use SWITCH, then the repository lists the restored datafile as a datafile copy.
- If you use the FROM DATAFILECOPY option, then the allocated channels must be of DEVICE TYPE DISK.
- If you use the FROM BACKUPSET operand, then the appropriate type of storage devices must be allocated for the backup sets that need to be restored. If the appropriate device is not allocated, then you may not be able to find a candidate backup set or copy to restore, and the RESTORE command fails.
- RMAN only restores backups that were created on the same type of channels that are allocated for the RESTORE command.

  For example, if you made some backups of a datafile to DISK channels and others to sbt channels, and only a DISK channel is allocated for the RESTORE command, RMAN will not restore backups that were created on sbt channels.
- If datafile filenames are symbolic links, that is, files pointing to other files, then the control file contains the filenames of the link files but RMAN performs I/O on the datafiles pointed to by the link files. If a link file is lost and you RESTORE a datafile without first re-creating the symbolic link, then RMAN restores the datafile to the location of the link file rather than to the location pointed to by the link.
- Open the database RESETLOGS after restoring with a backup control file.
- You can only restore from a previous incarnation when restoring the whole database. For example, you cannot restore one datafile of a previous incarnation while the current database is in a different incarnation.
- Do not specify a datafile more than once in a restore job. For example, the following command is illegal because datafile 1 is both specified explicitly and implied by the SYSTEM tablespace:

  ```
  RESTORE TABLESPACE SYSTEM DATAFILE 1;
  ```
- If you restore a control file from a release earlier than release 8.1.6 on Windows NT that has not been normalized, then you must normalize it before mounting the database by following the procedure described in *Oracle9i Database*

Migration. A flawed mechanism in releases prior to release 8.1.6 on Windows NT could allow two different filenames to refer to the same physical file.

- If you restore the control file and do not specify `TO 'filename'`, then the database must be started but not mounted. RMAN restores the control file to the first location specified in the parameter file and then replicates it to all other locations. When the database is not mounted, you must set the DBID using the SET command or the restore fails. If you specify the `TO 'filename'` option, then RMAN only restores the control file to the specified location. In this case, you do not need to set the DBID because RMAN takes the value from the control file.
- You must have already configured a device type by using CONFIGURE (except for DISK, which is preconfigured) before specifying the DEVICE TYPE option.
- You cannot manually allocate channels and then run RECOVER with the DEVICE TYPE option.
- RMAN neither backs up nor restores temporary tablespaces.

Keywords and Parameters

restoreObject — Specifies the objects to be restored.

CONTROLFILE — Restores the current control file to the default location and automatically replicates it to all CONTROL_FILES locations in the initialization parameter file. The default location is the first filename specified in the CONTROL_FILES parameter.

If you specify a new path name with the `TO 'filename'` option, then RMAN restores the control file to the new location: you must replicate it manually with the REPLICATE command.

Note that you must always run the RECOVER command after restoring a control file, and must also always open the database with the RESETLOGS option.

	DATABASE	Restores all datafiles in the database except those that are offline or read-only. Unlike BACKUP DATABASE, RESTORE DATABASE does *not* automatically include the control file—you must issue an additional RESTORE command to perform this operation. If you specify the CHECK READONLY option, then RMAN examines the headers of all read-only files and restores any that need restoring. Use an optional SKIP TABLESPACE *'tablespace_name'* argument to avoid restoring specified tablespaces, which is useful when you want to avoid restoring tablespaces containing temporary data. If you specify SKIP FOREVER TABLESPACE, then RMAN specifies the DROP option of ALTER DATABASE DATAFILE ... OFFLINE when taking the datafiles that belong to the tablespace offline before the restore. The DROP option indicates that RMAN does not intend to recover these files and intends to drop their tablespaces from the database after the database is opened again. In other words, FOREVER indicates that RMAN never intends to do anything with the skipped tablespaces again.
	DATAFILE *datafileSpec*	Restores the datafiles specified by filename or absolute datafile number. **See Also:** "datafileSpec" on page 2-95
	TABLESPACE *'tablespace_name'*	Restores all datafiles in the specified tablespaces.
	archivelogRecordSpecifier	Restores the specified range of archived redo logs. **See Also:** "archivelogRecordSpecifier" on page 2-22 **Note:** The database can be started, mounted, or open for this operation.
restoreSpecOperand	specifies options for the *restoreObject* clause. **Note:** These parameters override the parameters with the same name at the RESTORE command level.	
	CHANNEL *'channel_id'*	Specifies the case-sensitive name of a channel to use for this restore operation. If you do not specify a channel, then RESTORE uses any available channel allocated with the correct device type.

	FROM TAG = *'tag_name'*	Overrides the default selection of the most recent backups or file copy available. The tag restricts the automatic selection to backup sets or file copies that were created with the specified tag. If multiple backup sets or file copies have a matching tag, then RMAN selects the most recent one.
	PARMS *'channel_parms'*	Specifies a quoted string containing operating system-specific information. The string is passed to the operating system dependent layer each time a backup piece is restored.
	FROM AUTOBACKUP	Restores a control file autobackup. You can only specify this option on the RESTORE CONTROLFILE command. RMAN begins the search on the current day or on the day specified with the SET UNTIL. If no autobackup is found in the current or SET UNTIL day, RMAN checks the previous day starting with sequence 256 (or the sequence specified by MAXSEQ) until it reaches 0. The search continues up to MAXDAYS days (default of 7, maximum of 366) from the current or SET UNTIL day. If no autobackup is found within MAXDAYS days, then RMAN signals an error and the command stops. Note these restrictions when restoring an autobackup: ■ You must run SET DBID when the target database is in NOMOUNT mode and you are not using a recovery catalog. ■ If you do not specify TO '*filename*', then the database must be started but not mounted. RMAN restores the control file to the first location specified in the parameter file and then replicates to all other locations. ■ If you specify TO '*filename*', then RMAN only restores the control file to the specified location. In this case, you do not need to run SET DBID because RMAN takes the value from the control file.
	FROM *'media_handle'*	Specifies the name of the backup piece containing a control file backup. The *media_handle* can be any backup piece that contains a backup of a control file: the control file backup does not need to be an autobackup. Refer to the FROM AUTOBACKUP description for restrictions involving the restore of a control file autobackup.
CHANNEL *'channel_id'*	Refer to the *restoreSpecOperand* clause.	
PARMS *'channel_parms'*	Refer to the *restoreSpecOperand* clause.	

FROM {BACKUPSET | DATAFILECOPY}	Specifies whether RMAN should restore from a DATAFILECOPY on disk or a BACKUPSET. By default RESTORE chooses the most recent backup set or file copy, that is, the file copy or backup set that needs the least media recovery.
untilClause	Limits the selection to those backup sets or file copies that would be suitable for performing an incomplete recovery to the specified time. In the absence of any other criteria, RMAN selects the most current file copy or backup set to restore. **See Also:** "untilClause" on page 2-210
FROM TAG = *'tag_name'*	Refer to the *restoreSpecOperand* clause.
VALIDATE	Causes RMAN to decide which backup sets, datafile copies, and archived logs need to be restored and then scans them to verify their contents. This operation creates no output files. Specify this option periodically to verify that the copies and backup sets required to restore the specified files are intact and usable.
CHECK LOGICAL	Tests data and index blocks that pass physical corruption checks for logical corruption, for example, corruption of a row piece or index entry. If RMAN finds logical corruption, it logs the block in the alert.log and server session trace file. If the sum of physical and logical corruptions for a file remain below its MAXCORRUPT setting, the RMAN command completes and Oracle populates the V$BACKUP_CORRUPTION and V$COPY_CORRUPTION views with corrupt block ranges. If MAXCORRUPT is exceeded, the command terminates without populating the views. **Note:** The MAXCORRUPT setting represents the total number of physical and logical corruptions permitted on a file.
CHECK READONLY	Checks the read-only datafiles to make sure they exist, are readable, and have the appropriate checkpoint. If any of these conditions is not met, then RMAN restores the files—whether or not they are read-only. By default, RMAN does not restore read-only files when you issue the RESTORE DATABASE command.
DEVICE TYPE *deviceSpecifier*	Allocates automatic channels for the specified device type only. For example, if you configure automatic disk and tape channels, and issue RESTORE ... DEVICE TYPE DISK, then RMAN allocates only disk channels. **See Also:** "deviceSpecifier" on page 2-101
FORCE	Overrides the restartable restore feature and restores all files regardless of whether they need to be restored. If you do not specify FORCE, then RMAN restores a file only if its header information does not match the information in the control file.

Examples

Restoring a Tablespace: Example This example takes a tablespace offline, restores it, then performs media recovery:

```
SQL "ALTER TABLESPACE TBS_1 OFFLINE IMMEDIATE";
```

```
RESTORE TABLESPACE tbs_1;
RECOVER TABLESPACE tbs_1;
SQL "ALTER TABLESPACE TBS_1 ONLINE";
```

Restoring the Control File: Example This example restores the control file to its default location, replicates it to all multiplexed locations, and mounts the database:

```
RUN
{
  STARTUP FORCE NOMOUNT;
  RESTORE CONTROLFILE;
  ALTER DATABASE MOUNT;
}
```

Restoring the Control File Using a Tag: Example This example restores the control file specified by a tag, replicates it, and then mounts the database:

```
STARTUP NOMOUNT;
RESTORE CONTROLFILE FROM TAG 'monday_cf_backup';
ALTER DATABASE MOUNT;
```

Restoring the Database Using a Backup Control File: Example This example restores the control file, replicates it to all control file locations specified in the parameter file, and then mounts the control file in order to restore the database:

```
STARTUP NOMOUNT;
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE sbt;
  RESTORE CONTROLFILE;
  ALTER DATABASE MOUNT;
  RESTORE DATABASE;
}
```

Restoring Archived Redo Logs to a New Location: Example This example restores all archived redo logs to the `/oracle/temp_restore` directory:

```
RUN
{
  SET ARCHIVELOG DESTINATION TO '/oracle/temp_restore';
  RESTORE ARCHIVELOG ALL;
}
```

Restoring a Control File Autobackup to a Nondefault Location: Example This example restores the latest control file autobackup made on or before June 23, 2000 with a nondefault format of `PROD_CF_AUTOBACKUP_%F`. It starts searching for backups with a sequence number of 20, and searches backwards for 5 months:

```
RUN
{
  SET UNTIL TIME '23-JUN-2000 00:00:00';
  SET CONTROLFILE AUTOBACKUP FORMAT TO 'PROD_CF_AUTOBACKUP_%F';
  ALLOCATE CHANNEL CHANNEL_1 DEVICE TYPE sbt;
  RESTORE CONTROLFILE TO '/tmp/autobackup_20001002.dbf' FROM AUTOBACKUP
    MAXSEQ 20 MAXDAYS 150;
}
```

RESYNC

Syntax

Purpose

To perform a full resynchronization of the recovery catalog.

Resynchronizations can be full or partial. When full, RMAN updates all changed records for the physical schema: datafiles, tablespaces, redo threads, and online redo logs. If the database is open, RMAN also obtains data about rollback segments. When partial, RMAN reads the current control file to update data, but does not resynchronize metadata about the physical schema or rollback segments.

When resynchronizing, RMAN creates a snapshot control file in order to obtain a read-consistent view of the control file, then updates the catalog with any new information from the snapshot. The RESYNC CATALOG command updates the classes or records described in the following table.

Record Type	Description
Log history	Records that are created whenever a log switch occurs. Note that log history records describe an online log switch, not a log archival.
Archived redo logs	Records associated with archived logs that were created by archiving an online redo log, copying an existing archived redo log, or restoring backups of archived redo logs.
Backups	Records associated with backup sets, backup pieces, backup set members, proxy copies, and image copies.
Physical schema	Records associated with datafiles and tablespaces. If the target database is open, then rollback segment information is also updated.

RMAN automatically executes a full or partial resynchronization as needed when you execute RMAN commands, so long as the control file is mounted and the recovery catalog database is available at command execution. RMAN reads the current control file and does not resynchronize metadata about the physical schema

unless it determines that this information has changed. If RMAN does detect a change, then it performs a full resynchronization.

Use RESYNC CATALOG to perform manual full resynchronizations when:

- The recovery catalog is unavailable when you issue any of the commands that automatically perform a resynchronization.
- You are running in ARCHIVELOG mode, since the catalog is *not* updated automatically when a log switch occurs or when an online redo log is archived.
- You have made changes to the physical structure of the target database such as adding or dropping a tablespace. As with archive operations, the recovery catalog is *not* updated automatically when the physical schema changes.

Restrictions and Usage Notes

- You must be connected to a recovery catalog.
- RMAN updates physical schema information in the recovery catalog only when the target database has the current control file mounted. If the target database has mounted a backup control file, a freshly created control file, or a control file that is less current than a control file that was used previously, then RMAN does not update physical schema information in the recovery catalog.

Keywords and Parameters

FROM CONTROLFILECOPY *'filename'*	Specifies the name of the control file copy to use for resynchronization. Physical schema information is not updated when you use this option.

Examples

Resynchronizing the Recovery Catalog After a Structural Change: Example This example adds a datafile to tablespace tbs_1 and then resynchronizes the catalog:

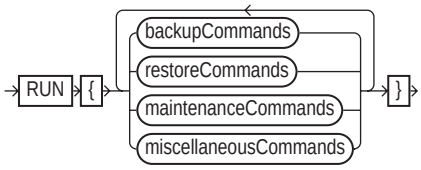
```
STARTUP MOUNT;
SQL "ALTER TABLESPACE tbs_1 ADD DATAFILE ''sales.f'' NEXT 10K MAXSIZE 100K";
RESYNC CATALOG;
```

Resynchronizing the Recovery Catalog in ARCHIVELOG Mode: Example This example performs a full resynchronization after archiving all unarchived redo logs:

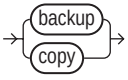
```
SQL "ALTER SYSTEM ARCHIVE LOG ALL";
RESYNC CATALOG;
```

RUN

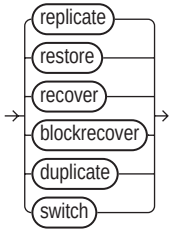
Syntax



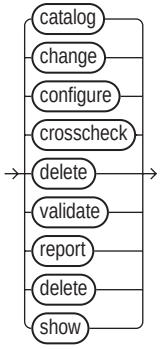
backupCommands::=



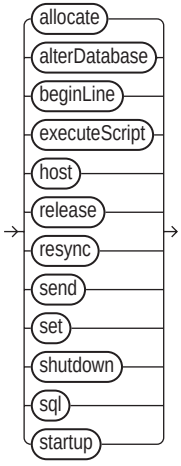
restoreCommands::=



maintenanceCommands::=



miscellaneousCommands::=



Purpose

To compile and execute job commands, which are one or more statements executed within the braces of RUN. The RUN command compiles the list of job commands into one or more job steps and then executes them immediately.

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- You must precede and follow the list of job commands with an opening and closing brace.

Keywords and Parameters

Refer to individual entries for information about commands that you can run from the RMAN prompt.

Examples

Making a Backup: Example This example backs up a database by using a single manually allocated channel to perform the backup:

```
RUN
{
  ALLOCATE CHANNEL c1 TYPE sbt;
  BACKUP DATABASE;
}
```

Restoring and Recovering a Tablespace: Example This example takes tablespace `tbs_1` offline, restores it, then performs complete media recovery:

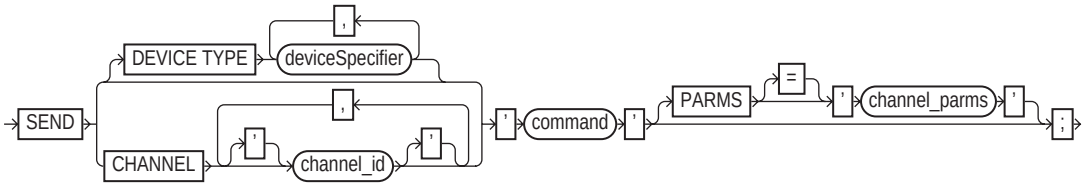
```
RUN
{
  SQL "ALTER TABLESPACE tbs_1 OFFLINE IMMEDIATE";
  RESTORE TABLESPACE tbs_1;
  RECOVER TABLESPACE tbs_1;
  SQL "ALTER TABLESPACE tbs_1 ONLINE";
}
```

Executing an RMAN Script: Example This example executes the stored script `backupdb`:

```
RUN { EXECUTE SCRIPT BACKUPDB; }
```

SEND

Syntax



Purpose

To send a vendor-specific string to one or more channels. Refer to your media management documentation to determine which commands are supported.

Restrictions and Usage Notes

- Execute SEND at the RMAN prompt or within the braces of a RUN command.
- You must use a media manager to use SEND and only with commands supported by the media manager. The contents of the string are not interpreted by Oracle, but are passed unaltered to the media management subsystem.

Keywords and Parameters

'command'	Specifies a vendor-specific media management command. **See Also:** Your media management documentation to determine which commands are supported
DEVICE TYPE *deviceSpecifier*	Specifies the type of storage device and sends the command to all channels of the specified type. **See Also:** "deviceSpecifier" on page 2-101
CHANNEL *'channel_id'*	Specifies which channel to use. If you do not specify DEVICE TYPE or CHANNEL, then RMAN uses all allocated channels. You must specify a case-sensitive channel ID, which is the name of the channel, after the CHANNEL keyword. Oracle uses the channel ID to report I/O errors.

PARMS *'channel_parms'*	Specifies parameters affecting the non-disk device you have allocated. The maximum length of the quoted string is 1000 bytes. **Note:** The only command from which the PARMS option will set environment variables in the server session is ALLOCATE CHANNEL or CONFIGURE CHANNEL.

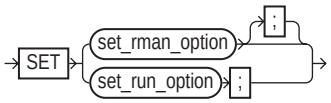
Example

Sending a String to the Media Manager: Example This example sends vendor-specific commands to a media manager:

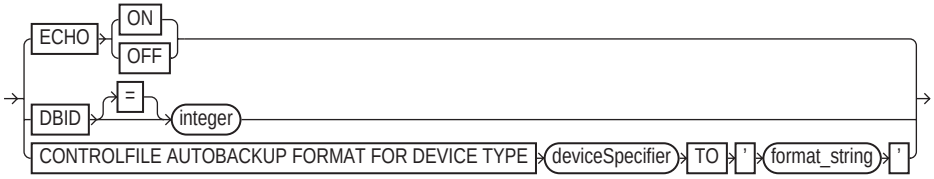
```
RMAN> SEND 'VAR=a82';
sent command to channel: ORA_SBT_TAPE_1

RMAN> BACKUP DATAFILE 2;
```

SET

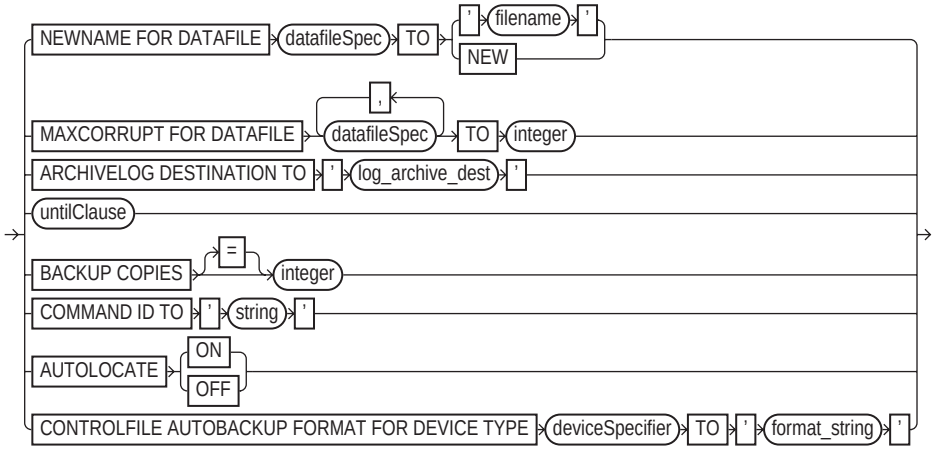
Syntax



set_rman_option::=



set_run_option::=



Purpose

To configure settings that apply *only* to the current RMAN session. The SET command contrasts with the CONFIGURE command, which configures persistent

settings that apply to all RMAN sessions.

You can specify the SET command either at the RMAN prompt or within a RUN block. When you issue SET within a RUN block, the command sets attributes for a RUN command that persist until the end of the job. The specified attributes affect all statements within RUN that follow the SET command.

Use the SET specified at the RMAN prompt to:

- Display executed RMAN commands in the message log.
- Specify a database's database identifier (DBID).

Use SET specified within a RUN block to:

- Specify the filenames for the auxiliary database during TSPITR or database duplication.
- Specify a limit for the number of permissible block corruptions.
- Override default archived redo log destinations.
- Set an end time, SCN, or log sequence number for recovery.
- Specify that backups should be duplexed, that is, multiple copies should be created of each backup piece in the backup set.
- Determine which server session corresponds to which channel.
- Turn RMAN's automatic location feature on or off.
- Override the default format for control file autobackups at the session level.

Restrictions and Usage Notes for SET Command Within RUN

The following restrictions apply to SET when issued within a RUN command:

- The SET BACKUP COPIES command affects all backups in the RUN block after issuing the command and is in effect until explicitly disabled or changed. The SET BACKUP COPIES command does not affect previous backups.
- Issue SET AUTOLOCATE ON only in an Oracle Real Application Clusters configuration and only when the media manager from one node cannot access or update data created on a different node.
- Issue SET AUTOLOCATE ON *before* RESTORE and RECOVER commands.
- Include the %F substitution variable in the autobackup format.
- You cannot use SET NEWNAME TO NEW when creating a duplicate or standby database or performing RMAN TSPITR.

Restrictions and Usage Notes for the SET DBID Command

You should only run the SET DBID command in specialized circumstances. Table 2–22 describes the general requirements for running the SET DBID command.

Table 2–22 SET DBID Requirements: General

Connected to Target?	Database Started NOMOUNT	Database Mounted or Open
Yes	SET DBID fails with RMAN-06188	SET DBID fails with RMAN-06188
No	You can run SET DBID	SET DBID value must match DBID of target database

Table 2–23 and Table 2–24 describe the requirements for running the SET DBID command when you are restoring a control file.

Table 2–23 SET DBID and RESTORE CONTROLFILE FROM AUTOBACKUP

Connected to Catalog?	Database Started NOMOUNT	Database Mounted or Open
Yes	Run SET DBID only if RMAN issues RMAN-20005	SET DBID not necessary
No	Run SET DBID	SET DBID not necessary

Table 2–24 SET DBID Requirements for RESTORE CONTROLFILE

Connected to Catalog?	Database Started NOMOUNT	Database Mounted or Open
Yes	Run SET DBID only if RMAN issues RMAN-20005	SET DBID not necessary
No	N/A	SET DBID not necessary

Keywords and Parameters

ECHO {ON | OFF}

Controls whether RMAN commands are displayed in the message log. When reading commands from a command file, RMAN automatically echoes those commands to the message log. When reading commands from standard input, RMAN does not echo those commands to the message log unless the SET ECHO ON command is used.

The command is useful only when stdin and stdout have been redirected. For example, in UNIX you can redirect RMAN's input and output in this manner:

```
% rman TARGET sys/sys_pwd@prod1 CATALOG rman/rman@rcat < input_file > output_file
```

By specifying SET ECHO ON, you enable the commands contained in input_file to be visible in output_file.

DBID *integer*

Specifies the DBID, which is a unique 32-bit identification number computed when the database is created. RMAN displays the DBID upon connection to the target database. You can obtain the DBID by querying the V$DATABASE view or the RC_DATABASE and RC_DATABASE_INCARNATION recovery catalog views.

See Also: "Restrictions and Usage Notes for the SET DBID Command" on page 2-191

CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE *deviceSpecifier* TO *'format_string'*

Overrides the default filename format for the control file autobackup on the specified device type. The override occurs at the session level only. You can run this command either in RUN or at the RMAN prompt. The order of precedence is as follows:

1. SET CONTROLFILE AUTOBACKUP executed within a RUN block
2. SET CONTROLFILE AUTOBACKUP executed at the RMAN prompt
3. CONFIGURE CONTROLFILE AUTOBACKUP FORMAT

See the CONFIGURE command for an explanation of the autobackup format.

NEWNAME FOR DATAFILE *datafileSpec* TO

Sets the default name for all subsequent RESTORE or SWITCH commands that affect the specified datafile. If you do not issue this command before the datafile restore operation, then RMAN restores the file to its default location.

After you restore a datafile to a new location, then you can run SWITCH to rename the file in the control file to the NEWNAME. If you do not run SWITCH, then the restored file functions as a datafile copy and is recorded as such in the repository.

See Also: "datafileSpec" on page 2-95

'*filename*'

Specifies a user-defined filename for the restored datafile.

NEW

Creates an Oracle-managed file in the directory specified in DB_CREATE_FILE_DEST. You cannot use this option when using the DUPLICATE command or performing RMAN TSPITR.

See Also: *Oracle9i Database Administrator's Guide* for information about Oracle Managed Files

MAXCORRUPT FOR DATAFILE *datafileSpec* TO *integer*	Sets a limit on the number of previously undetected physical block corruptions that Oracle will allow in a specified datafile or list of datafiles. If a BACKUP or COPY command detects more than the specified number of corruptions, the command aborts. The default limit is zero, meaning that RMAN tolerates no corrupt blocks. **Note:** If you specify CHECK LOGICAL, then the MAXCORRUPT limit applies to logical corruptions as well. **See Also:** "datafileSpec" on page 2-95
ARCHIVELOG DESTINATION TO '*log_archive_dest*'	Overrides the LOG_ARCHIVE_DEST_1 initialization parameter in the target database when forming names for restored archive logs during subsequent RESTORE and RECOVER commands. RMAN restores the logs to the destination specified in '*log_archive_dest*'. Use this parameter to restore archived redo logs that are not already on disk. Use this command to stage many archived logs to different locations while a database restore is occurring. RMAN knows where to find the newly restored archive logs; it does not require them to be in the destination specified by LOG_ARCHIVE_DEST_1. For example, if you specify a different destination from the one in the parameter file and restore archived redo log backups, subsequent restore and recovery operations will detect this new location. RMAN always looks for archived redo logs on disk first before restoring them from backup sets.
untilClause	Specifies an end time, SCN, or log sequence number for a subsequent RESTORE or RECOVER command. **See Also:** "untilClause" on page 2-210
BACKUP COPIES = *integer*	Specifies the number of copies of each backup piece that the channels should create: 1, 2, 3, or 4. The SET BACKUP COPIES command, which affects only the BACKUP command, affects all channels allocated in the session. The order of precedence is as follows, with settings higher on the list overriding settings lower on the list: ■ BACKUP COPIES ■ SET BACKUP COPIES ■ CONFIGURE . . . BACKUP COPIES The names of the backup pieces are dependent on the FORMAT clause in the BACKUP command. You can specify up to four FORMAT strings. RMAN uses the second, third, and fourth values only when BACKUP COPIES, SET BACKUP COPIES, or CONFIGURE . . . BACKUP COPIES is in effect. When choosing which format to use for each backup piece, RMAN uses the first format value for copy 1, the second format value for copy 2, and so on. If the number of format values exceeds the number of copies, then the extra formats are not used. If the number of format values is less than the number of copies, RMAN reuses the format values, starting with the first one. **Note:** Control file autobackups made within RUN are also duplexed.

COMMAND ID TO *'string'*	Enters the specified string into the V$SESSION.CLIENT_INFO column of all channels. Use this information to determine which Oracle server sessions correspond to which RMAN channels. The SET COMMAND ID command applies only to channels that are already allocated. The V$SESSION.CLIENT_INFO column contains information for each RMAN server session. The data appears in one of the following formats: ■ id=*string* ■ id=*string*, ch=*channel_id* The first form appears in the RMAN target database connection. The second form appears in all allocated channels. When the current job is complete, the V$SESSION.CLIENT_INFO column will be cleared. **See Also:** *Oracle9i Database Reference* for more information on V$SESSION.CLIENT_INFO
AUTOLOCATE	Forces RMAN to automatically discover which nodes of an Oracle Real Application Clusters configuration contain the backups that you want to restore. Set to ON or OFF (default). This option forces RMAN to hunt for backups on all allocated channels and to restore backups only from those channels that locate the backups on tape or on a file system. For example, assume that nodes A, B, and C are in an Oracle Real Application Clusters configuration. If node A backs up a datafile to a tape drive or local file system, you must tell RMAN not to attempt to restore from nodes B or C. The SET AUTOLOCATE command performs this function. Issue the SET AUTOLOCATE ON command only if: ■ The command precedes RESTORE or RECOVER commands. ■ Channels are allocated on different nodes of an Oracle Real Application Clusters configuration. ■ The media management servers do not already offer cluster-wide service. ■ It is necessary (the command incurs system overhead).

Restoring the Control File: Example This example uses the DBID to restore the control file because multiple target databases registered in the recovery catalog share the same DB_NAME. After you have restored the target control file, you can mount the database to restore the rest of the database. This example assumes that the database is started but not mounted.

```
% rman CATALOG cat_owner/pwd@rcatdb
RMAN> SET DBID = 862893450;
RMAN> CONNECT TARGET / # uses operating system authentication
RMAN> RESTORE CONTROLFILE; # assuming you have enabled automatic channel allocation
RMAN> ALTER DATABASE MOUNT;
```

Setting the Command ID: Example This example sets the command ID, backs up the `data_1` tablespace by using manually allocated disk channels, hosts out to the operating system, then archives the online redo logs:

```
RUN
{
  ALLOCATE CHANNEL t1 DEVICE TYPE DISK FORMAT '/disk1/%U';
  ALLOCATE CHANNEL t2 DEVICE TYPE DISK FORMAT '/disk2/%U';
  SET COMMAND ID TO 'rman';
  BACKUP INCREMENTAL LEVEL 0 FILESPERSET 5 TABLESPACE data_1;
  HOST;
  SQL 'ALTER SYSTEM ARCHIVE LOG ALL';
}
```

Duplexing a Backup Set: Example This example makes a nonduplexed backup of datafiles 1-5, then duplexes all archived logs and the current control file:

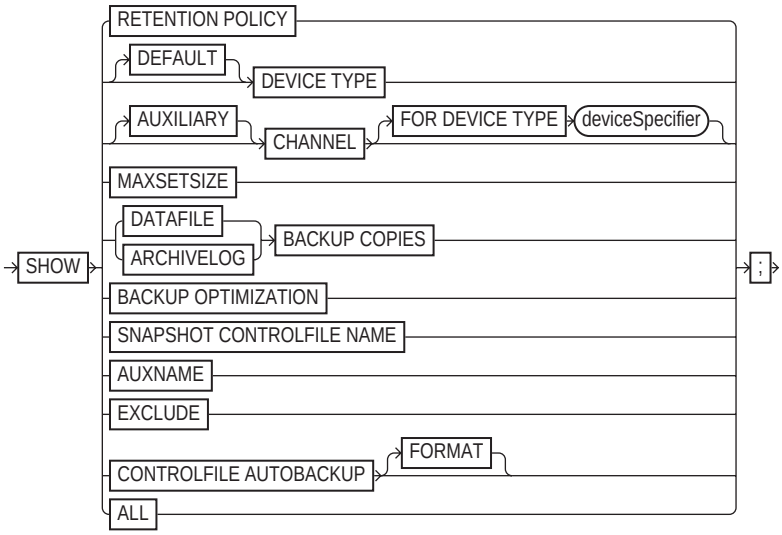
```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE sbt;
  BACKUP FILESPERSET 1 DATAFILE 1,2,3,4,5;
  SET BACKUP COPIES = 2;
  BACKUP FILESPERSET 10 ARCHIVELOG ALL;
  BACKUP CURRENT CONTROLFILE;
}
```

Overriding the Autobackup Format During a Restore: Example This example sets the DBID, sets a boundary time for the restore, then restores a control file autobackup by using a nondefault format:

```
% sqlplus SYS/sys_pwd@prod1
SQL> STARTUP NOMOUNT
SQL> EXIT

% rman
SET DBID 676549873;
CONNECT TARGET /
RUN
{
  SET UNTIL TIME '10/10/1999 13:45:00';
  SET CONTROLFILE AUTOBACKUP FORMAT TO '/oracle/backups/%F.bck';
  ALLOCATE CHANNEL channel_1 DEVICE TYPE DISK;
  RESTORE CONTROLFILE FROM AUTOBACKUP MAXSEQ 100;
}
```

SHOW

Syntax



Purpose

To display the current `CONFIGURE` command settings. The output of `SHOW` consists of the `CONFIGURE` commands used to set the configuration. RMAN default configurations are suffixed with `#default`.

Restrictions and Usage Notes

- Execute this command at the RMAN prompt.

Keywords and Parameters

`RETENTION POLICY`	Displays the settings for `CONFIGURE RETENTION POLICY` for the current target database.
`DEVICE TYPE`	Displays the configured device types and parallelism settings. If `DEFAULT` is specified, then `SHOW` displays the default device type and settings.

CHANNEL	Displays the CONFIGURE CHANNEL settings. You can specify a normal channel or an AUXILIARY channel.	
	FOR DEVICE TYPE *deviceSpecifier*	Specifies the device type of the channel. For example, SHOW CHANNEL FOR DEVICE TYPE DISK displays only channel settings for disk channels.
MAXSETSIZE	Displays the CONFIGURE MAXSETSIZE settings.	
{DATAFILE | ARCHIVELOG} BACKUP COPIES	Displays the CONFIGURE . . . BACKUP COPIES setting for datafiles and archived redo logs: 1, 2, 3, or 4.	
BACKUP OPTIMIZATION	Displays the CONFIGURE BACKUP OPTIMIZATION settings: ON or OFF (default).	
SNAPSHOT CONTROLFILE NAME	Displays the CONFIGURE SNAPSHOT CONTROLFILE settings.	
AUXNAME	Displays the CONFIGURE AUXNAME settings.	
EXCLUDE	Displays only the tablespaces that you have specified should be excluded.	
CONTROLFILE AUTOBACKUP	Displays the CONFIGURE CONTROLFILE AUTOBACKUP settings: ON or OFF.	
	FORMAT	Displays the format for the controlfile autobackup file for all configured devices.
ALL	Displays all user-entered CONFIGURE commands as well as default configurations.	

Examples

Showing Channel Configurations: Example This example shows commands relevant for displaying automatic channel configurations:

```
SHOW CHANNEL;
SHOW DEVICE TYPE;
SHOW DEFAULT DEVICE TYPE;
SHOW MAXSETSIZE;
```

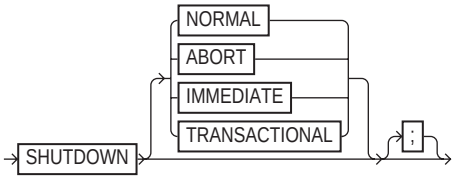
Showing All Configurations: Example This example shows all persistent configurations for the target database (and includes sample output):

```
SHOW ALL;

RMAN configuration parameters are:
CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default
CONFIGURE BACKUP OPTIMIZATION ON;
CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default
```

```
CONFIGURE DEVICE TYPE 'SBT' PARALLELISM 1;
CONFIGURE DEVICE TYPE DISK PARALLELISM 1; # default
CONFIGURE DATAFILE BACKUP COPIES FOR DISK TO 2;
CONFIGURE DATAFILE BACKUP COPIES FOR SBT TO 1; #default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR SBT TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DISK TO 1; # default
CONFIGURE MAXSETSIZE TO 2097152K;
CONFIGURE SNAPSHOT CONTROLFILE NAME TO '/oracle/dbs/cf_snap.f';
```

SHUTDOWN

Syntax



Purpose

To shut down the target database without exiting RMAN. This command is equivalent to using the SQL*Plus `SHUTDOWN` statement.

> **See Also:** *Oracle9i Database Administrator's Guide* for information on how to start up and shut down a database, and *SQL*Plus User's Guide and Reference* for `SHUTDOWN` syntax

Restrictions and Usage Notes

- Execute this command at the RMAN prompt or within the braces of a `RUN` command.
- You cannot use the RMAN `SHUTDOWN` command to shut down the recovery catalog database. To shut down this database, start a SQL*Plus session and issue a `SHUTDOWN` statement.
- The `NORMAL`, `TRANSACTIONAL`, and `IMMEDIATE` options all perform a clean close of the database. The `ABORT` option does not cleanly close the database; Oracle will perform instance recovery at startup.
- If the database operates in `NOARCHIVELOG` mode, then you must shut down the database cleanly and then issue a `STARTUP MOUNT` before a making a backup.

Keywords and Parameters

NORMAL	Shuts down the database with normal priority (default option), which means: ■ No new connections are allowed after the statement is issued. ■ Before the database shuts down, Oracle waits for currently connected users to disconnect ■ The next startup of the database will not require instance recovery.
ABORT	Aborts the target instance, with the following consequences: ■ All current client SQL statements are immediately terminated. ■ Uncommitted transactions are not rolled back until next startup. ■ Oracle disconnects all connected users. ■ Oracle will perform crash recovery on the database at next startup.
IMMEDIATE	Shuts down the target database immediately, with the following consequences: ■ Current client SQL statements being processed by Oracle are allowed to complete. ■ Uncommitted transactions are rolled back. ■ All connected users are disconnected.
TRANSACTIONAL	Shuts down the target database while minimizing interruption to clients, with the following consequences: ■ Clients currently conducting transactions are allowed to complete, that is, either commit or abort before shutdown. ■ No client can start a new transaction on this instance; any client attempting to start a new transaction is disconnected. ■ After all transactions have either committed or aborted, any client still connected is disconnected.

Examples

Shutting Down a Database by Using the Immediate Option: Example This example waits for current SQL transactions to be processed before shutting down, then mounts the database:

```
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
```

Shutting Down a Database in NOARCHIVELOG Mode: Example This example backs up a database running in NOARCHIVELOG mode:

```
STARTUP FORCE DBA;
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
# executing the above commands ensures that database is in proper state for NOARCHIVELOG
# backup
BACKUP COPIES 2 DATABASE;
ALTER DATABASE OPEN;
```

SPOOL

Syntax

Purpose

To write RMAN output to a log file.

If the file does not already exist, then RMAN creates it. If the file does exist, then RMAN overwrites the file, unless APPEND is specified, in which case RMAN appends its output to the end of the file. The SPOOL command does not abort if the specified file cannot be opened for writing. Instead, RMAN turns SPOOL to OFF.

See Also: "cmdLine" on page 2-57 for a description of LOG files

Restrictions and Usage Notes

Execute the SQL command at the RMAN prompt or within the braces of a RUN command.

Keywords and Parameters

OFF	Turns off spooling.
TO *filename*	Specifies the name of the log file to which RMAN directs its output. RMAN creates the file if it does not exist, or overwrites the file if it does exist.
APPEND	Specifies that RMAN should append its output to the end of the existing log file.

Examples

Spooling RMAN Output to a File: Example This example directs RMAN output to standard output for the backup of datafile 1, then directs output to a log file for the backup of datafile 2, then directs output to a different log file for the whole database backup:

```
% rman target / nocatalog
```

```
BACKUP DATAFILE 1;
SPOOL LOG TO '/oracle/log/df2log.f';
BACKUP DATAFILE 2;
SPOOL LOG OFF:
SPOOL LOG TO '/oracle/log/dblog.f';
BACKUP DATABASE;
SPOOL LOG OFF;
```

SQL

Syntax

Purpose

To execute a SQL statement or a PL/SQL stored procedure from within Recovery Manager.

Restrictions and Usage Notes

- Execute the SQL command at the RMAN prompt or within the braces of a RUN command.
- If the string that RMAN passes to PL/SQL contains a filename, then the filename must be enclosed in duplicate *single* quotes and the entire string following the SQL keyword must be enclosed in *double* quotes. For example, use the following syntax:

  ```
  SQL "CREATE TABLESPACE temp1 DATAFILE ' '/oracle/dbs/temp1.f' ' SIZE 10M TEMPORARY"
  ```

  If you attempt to use single quotes for the string following the SQL keyword or use only one set of single quotes for the filename, then the command fails.
- You cannot execute SELECT statements.

See Also: For valid SQL syntax, see the *Oracle9i SQL Reference*

Keywords and Parameters

'command'	Specifies a SQL statement for execution. For example, issue the following at the RMAN prompt to archive the online redo logs:
	`SQL 'ALTER SYSTEM ARCHIVE LOG ALL';`
	Because EXECUTE is a SQL*Plus command, you cannot execute a PL/SQL command by specifying EXECUTE within the RMAN SQL command. Instead, you must use the BEGIN and END keywords. For example, to execute a PL/SQL procedure named rman.rman_purge through the RMAN SQL command, issue the following:
	`SQL 'BEGIN rman.rman_purge; END;';`

Examples

Archiving the Unarchived Online Logs: Example This example backs up a tablespace and then archives all unarchived online logs:

```
BACKUP TABLESPACE users;
SQL "ALTER SYSTEM ARCHIVE LOG CURRENT";
```

Specifying a Filename within a Quoted String: Example This example specifies a filename by using duplicate single quotes within the context of a double-quoted string:

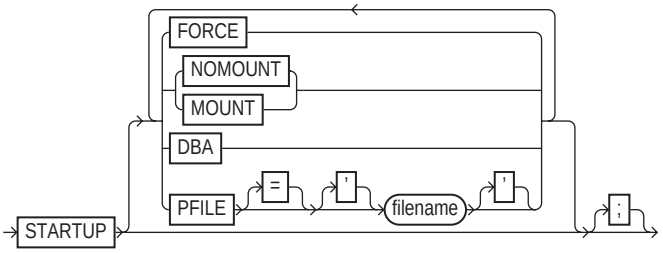
```
SQL "ALTER TABLESPACE tbs_1 ADD DATAFILE ''/oracle/dbs/tbs_7.f'' NEXT 10K MAXSIZE 100k;"
```

Executing a PL/SQL Stored Procedure Within RMAN: Example This example issues a PL/SQL stored procedure called `scott.update_log`:

```
RUN
{
  SQL ' BEGIN scott.update_log; END; ';
}
```

STARTUP

Syntax



Purpose

To start the target database from within the RMAN environment. This command is equivalent to using the SQL*Plus STARTUP command. You can:

- Start the instance without mounting a database.
- Start the instance and mount the database, but leave it closed.
- Start the instance, and mount and open the database in:
  - unrestricted mode (accessible to all users)
  - restricted mode (accessible to DBAs only)

See Also: *Oracle9i Database Administrator's Guide* to learn how to start up and shut down a database, and *SQL*Plus User's Guide and Reference* for SQL*Plus STARTUP syntax

Restrictions and Usage Notes

- Execute this command either at the RMAN prompt or within the braces of a RUN command.
- You cannot use the RMAN STARTUP command to open the recovery catalog database. To start this database, start a SQL*Plus session and execute a STARTUP statement.

Keywords and Parameters

If you do not specify any options, then RMAN mounts and opens the database with the default server parameter file.

STARTUP	If you specify only STARTUP with no other options, then Oracle starts the instance, then mounts and open the database.
FORCE	Executes either of these operations: ■ If the database is open, then this option first shuts down the database with a SHUTDOWN ABORT statement before re-opening it. ■ If the database is closed, then this option opens the database.
NOMOUNT	Starts the instance without mounting the database.
MOUNT	Starts the instance, then mounts the database without opening it
DBA	Restricts access to the database to users with the RESTRICTED SESSION privilege.
PFILE = *'filename'*	Specifies the filename of the init.ora file for the target database. If this parameter is not specified, then the default init.ora filename is used.

Examples

Opening the Database by Using the Default Parameter File: Example This example starts and opens the database:

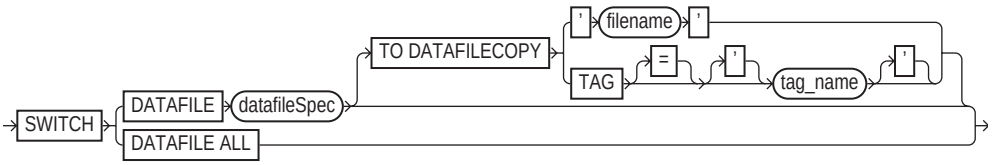
```
STARTUP;
```

Mounting the Database While Specifying the Parameter File: Example This example forces a SHUTDOWN ABORT and then mounts the database with restricted access, specifying a nondefault parameter file location:

```
STARTUP FORCE MOUNT DBA PFILE=t_init1.ora;
```

SWITCH

Syntax



Purpose

To specify that a datafile copy is now the **current datafile**, that is, the datafile pointed to by the control file. A switch is equivalent to using the ALTER DATABASE RENAME FILE statement: Oracle renames the files in the control file but does not actually rename them on the operating system. Note that this command deletes the records for the datafile copy from the recovery catalog and updates the control file records to status DELETED.

Restrictions and Usage Notes

- Execute SWITCH within the braces of a RUN command.
- If the control file is a restored backup control file, then SWITCH adds the datafile to the control file if it is not there already. You can only add datafiles through SWITCH that were created *after* the backup control file was created.

Keywords and Parameters

DATAFILE *datafileSpec*

Specifies the datafile that you wish to rename. After the switch, the control file no longer views the specified file as current. For example, this command points the control file from tbs_1.f to cp1.f:

```
SWITCH DATAFILE '/oracle/dbs/tbs_1.f' TO DATAFILECOPY '/oracle/dbs/copies/cp1.f';
```

If you do not specify a TO option, then RMAN uses the filename specified on a prior SET NEWNAME command for this file number as the switch target.

	TO DATAFILECOPY {*'filename'* | TAG = *'tag_name'*}	Specifies the input copy file for the switch, that is, the datafile copy that you wish to rename. Specify the file by filename or tag. For example, the following command sets `df2.copy` as the filename for datafile 2:
		`SWITCH DATAFILE 2 TO DATAFILECOPY '/oracle/dbs/df2.copy';`
		Note that if you specify a tag and the tag is ambiguous, then RMAN uses the most current copy, that is, the one that requires the least recovery.
		The following command switches datafile 3 to the most recently created Monday evening copy.:
		`SWITCH DATAFILE 3 TO DATAFILECOPY TAG mondayPMcopy;`

DATAFILE ALL	Specifies that all datafiles for which a SET NEWNAME FOR DATAFILE command has been issued in this job are switched to their new name.	

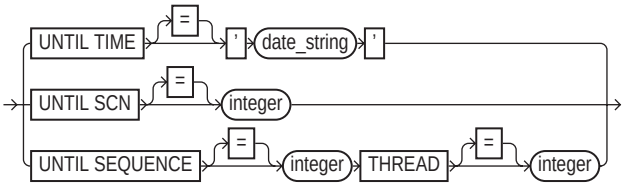
Example

Switching Datafile Filenames After a Restore: Example This example allocates one disk device and one tape device to allow RMAN to restore both from disk and tape.

```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE DISK RATE 1000;
  ALLOCATE CHANNEL dev2 DEVICE TYPE sbt;
  SQL "ALTER TABLESPACE tbs_1 OFFLINE IMMEDIATE";
  SET NEWNAME FOR DATAFILE '/disk7/oracle/tbs11.f'
    TO '/disk9/oracle/tbs11.f';
  RESTORE TABLESPACE tbs_1;
  SWITCH DATAFILE ALL;
  RECOVER TABLESPACE tbs_1;
  SQL "ALTER TABLESPACE tbs_1 ONLINE";
}
```

untilClause

Syntax



Purpose

A subclause that specifies an upper limit by time, SCN, or log sequence number for various RMAN operations.

> **See Also:** *Oracle9i Recovery Manager User's Guide* to learn how to set the Globalization Support date format used by RMAN

Restrictions and Usage Notes

When specifying dates in RMAN commands, the date string must be either:

- A literal string whose format matches the NLS_DATE_FORMAT setting.
- A SQL expression of type DATE, for example, 'SYSDATE-10' or "TO_DATE('01/30/1997', 'MM/DD/YYYY')". Note that the second example includes its own date format mask and so is independent of the current NLS_DATE_FORMAT setting.

Following are examples of typical date settings in RMAN commands:

```
BACKUP ARCHIVELOG FROM TIME 'SYSDATE-31' UNTIL TIME 'SYSDATE-14';
RESTORE DATABASE UNTIL TIME "TO_DATE('09/20/00','MM/DD/YY')";
```

Keywords and Parameters

UNTIL TIME = *'date_string'*	Specifies a time as an upper limit. RMAN performs the operation on files up to but not including the specified time.
UNTIL SCN = *integer*	Specifies an SCN as an upper limit. RMAN performs the operation on files up to but not including the specified SCN.

UNTIL SEQUENCE = *integer* THREAD = *integer*	Specifies a redo log sequence number and thread as an upper limit. RMAN performs the operation on files up to but not including the specified log sequence number.

Examples

Performing Incomplete Recovery Until a Log Sequence Number: Example This example assumes that log sequence 1234 was lost due to a disk crash and the database needs to be recovered by using available archived redo logs.

```
RUN
{
  SET UNTIL SEQUENCE 1234 THREAD 1;
  RESTORE CONTROLFILE TO '$ORACLE_HOME/dbs/cf1.f' ;
  REPLICATE CONTROLFILE FROM '$ORACLE_HOME/dbs/cf1.f';
  ALTER DATABASE MOUNT;
  RESTORE DATABASE;
  RECOVER DATABASE;  # recovers through log 1233
  SQL "ALTER DATABASE OPEN RESESTLOGS";
}
```

Performing Incomplete Recovery to a Specified SCN: Example This example recovers the database until a specified SCN:

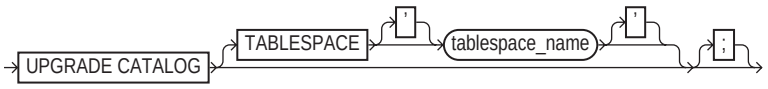
```
STARTUP MOUNT;
RUN
{
  ALLOCATE CHANNEL ch1 TYPE sbt;
  RESTORE DATABASE;
  RECOVER DATABASE UNTIL SCN 1000;  # recovers through SCN 999
  SQL "ALTER DATABASE OPEN RESESTLOGS";
}
```

Reporting Obsolete Backups: Example This example assumes that you want to be able to recover to any point within the last week. It considers backups made more than a week ago as obsolete:

```
REPORT OBSOLETE UNTIL TIME 'SYSDATE-7';
```

UPGRADE CATALOG

Syntax



Purpose

To upgrade the recovery catalog schema from an older version to the version required by the RMAN executable. For example, if you use a release 8.0 recovery catalog with a release 8.1 version of RMAN, then you must upgrade the catalog.

Note that UPGRADE CATALOG does not run scripts to perform the upgrade. Instead, RMAN sends various SQL DDL statements to the recovery catalog to update the recovery catalog schema with new tables, views, columns, and so forth.

Restrictions and Usage Notes

- You must be connected to the catalog database, and the catalog database must be open. You do not have to be connected to the target database.
- You must enter the UPGRADE command twice in a row to confirm the upgrade.
- You will receive an error if the recovery catalog is already at a version greater than needed by the RMAN executable. RMAN permits the command to be run if the recovery catalog is already current, however, so that the packages can be re-created if necessary. RMAN displays all error messages generated during the upgrade in the message log.

Keywords and Parameters

TABLESPACE *'tablespace_name'*	Specifies the tablespace in which to store the recovery catalog. If not specified, then no TABLESPACE parameter will be used for the new tables that may be created as part of the upgrade, which means that these new tables will be stored in the default tablespace for the catalog owner.

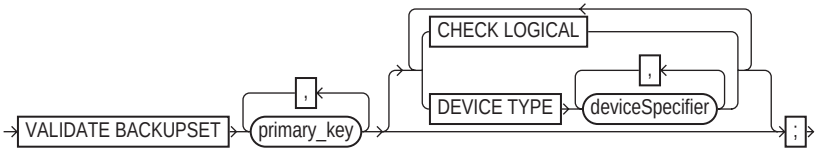
Example

Upgrading a Recovery Catalog: Example This example connects to recovery catalog database `recdb` at the operating system command line and then upgrades it to a more current version:

```
% rman CATALOG rcat/rcat@recdb

connected to recovery catalog database
PL/SQL package rcat.DBMS_RCVCAT version 08.00.04 in RCVCAT database is too old

RMAN> UPGRADE CATALOG

recovery catalog owner is rcat
enter UPGRADE CATALOG command again to confirm catalog upgrade

RMAN> UPGRADE CATALOG

recovery catalog upgraded to version 09.00.01
DBMS_RCVMAN package upgraded to version 09.00.01
DBMS_RCVCAT package upgraded to version 09.00.01
```

VALIDATE

Syntax



Purpose

To examine a backup set and report whether it can be restored. RMAN scans all of the backup pieces in the specified backup sets and looks at the checksums to verify that the contents are intact so that the backup can be successfully restored if necessary.

> **Note:** The VALIDATE BACKUPSET command tests whether the backup sets can be restored, whereas CROSSCHECK merely examines the headers of the specified files if they are on disk or queries the media management catalog if they are on tape.

Use this command when you suspect that one or more backup pieces in a backup set are missing or have been damaged. Use VALIDATE BACKUPSET to specify which backups to test; use the VALIDATE option of the RESTORE command to let RMAN choose which backups to validate.

Restrictions and Usage Notes

- Execute this command within the braces of a RUN command or at the RMAN prompt.
- If you do not have automatic channels configured, manually allocate at least one channel before executing a VALIDATE BACKUPSET statement.
- The target instance must be started.

Keywords and Parameters

primary_key

Specifies the backup sets to be validated by *primary_key*. Obtain the primary keys of backup sets by executing a LIST statement or, if you use a recovery catalog, by querying the RC_BACKUP_SET recovery catalog view.

CHECK LOGICAL

Tests data and index blocks that pass physical corruption checks for logical corruption, for example, corruption of a row piece or index entry. If RMAN finds logical corruption, then it logs the block in the alert.log and server session trace file. The RMAN command completes and Oracle populates the V$BACKUP_CORRUPTION and V$COPY_CORRUPTION views with corrupt block ranges.

Note: VALIDATE does not use MAXCORRUPT.

DEVICE TYPE *deviceSpecifier*

Allocates automatic channels for the specified device type only. This option is valid only if you have configured automatic channels and have not manually allocated channels. For example, if you configure automatic disk and tape channels, and run VALIDATE ...DEVICE TYPE DISK, RMAN allocates only disk channels.

See Also: "deviceSpecifier" on page 2-101

Example

Validating a Backup Set: Example This example validates the status of the backup set whose primary key is 218:

```
VALIDATE BACKUPSET 218;
# As the output indicates, RMAN determines whether it is possible to restore the
# specified backup set.

allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=8 devtype=DISK
channel ORA_DISK_1: starting validation of datafile backupset
channel ORA_DISK_1: restored backup piece 1
piece handle=/oracle/dbs/c-3939560491-20010419-00 tag=null params=NULL
channel ORA_DISK_1: validation complete
```

3

Recovery Catalog Views

This chapter contains descriptions of recovery catalog views. You can only access these views if you have created a recovery catalog. For a summary of the recovery catalog views, refer to "Summary of RMAN Recovery Catalog Views" on page 3-2.

Note: These views are not normalized, but are optimized for RMAN usage. Hence, most catalog views have redundant values that result from joining of several underlying tables.

Summary of RMAN Recovery Catalog Views

The following table provides a functional summary of RMAN recovery catalog views.

Table 3–1 Recovery Catalog Views

Recovery Catalog View	Corresponding V$ View	Description of Recovery Catalog View
RC_ARCHIVED_LOG	V$ARCHIVED_LOG	Contains historical information about archived and unarchived redo logs.
RC_BACKUP_CONTROLFILE	V$BACKUP_DATAFILE	Lists information about control files in backup sets.
RC_BACKUP_CORRUPTION	V$BACKUP_CORRUPTION	Lists corrupt block ranges in datafile backups.
RC_BACKUP_DATAFILE	V$BACKUP_DATAFILE	Lists information about datafiles in backup sets.
RC_BACKUP_PIECE	V$BACKUP_PIECE	Lists information about backup pieces.
RC_BACKUP_REDOLOG	V$BACKUP_REDOLOG	Lists information about archived redo logs in backup sets.
RC_BACKUP_SET	V$BACKUP_SET	Lists information about backup sets for all incarnations of the database.
RC_CHECKPOINT		Deprecated in favor of RC_RESYNC.
RC_CONTROLFILE_COPY	V$DATAFILE_COPY	Lists information about control file copies on disk.
RC_COPY_CORRUPTION	V$COPY_CORRUPTION	Lists information about control file copies on disk.
RC_DATABASE	V$DATABASE	Lists information about the databases registered in the recovery catalog.
RC_DATABASE_INCARNATION	V$DATABASE (contains only current incarnation and one previous incarnation)	Lists information about all database incarnations registered in the recovery catalog.
RC_DATAFILE	V$DATAFILE	Lists information about all datafiles registered in the recovery catalog.
RC_DATAFILE_COPY	V$DATAFILE_COPY	Lists information about datafile copies on disk.
RC_LOG_HISTORY	V$LOG_HISTORY	Lists historical information about the online redo logs.
RC_OFFLINE_RANGE	V$OFFLINE_RANGE	Lists the offline ranges for datafiles.

Table 3–1 Recovery Catalog Views

Recovery Catalog View	Corresponding V$ View	Description of Recovery Catalog View
RC_PROXY_CONTROLFILE	V$PROXY_DATAFILE	Lists control file backups that were taken using the proxy copy functionality.
RC_PROXY_DATAFILE	V$PROXY_DATAFILE	Lists datafile backups that were taken using the proxy copy functionality.
RC_REDO_LOG	V$LOG and V$LOGFILE	Lists the online redo logs for all incarnations of the database since the last catalog resynchronization.
RC_REDO_THREAD	V$THREAD	Lists all redo threads for all incarnations of the database since the last catalog resynchronization.
RC_RESYNC	n/a	Lists information about recovery catalog resynchronizations.
RC_RMAN_CONFIGURATION	V$RMAN_CONFIGURATION	Lists information about RMAN persistent configuration settings.
RC_STORED_SCRIPT	n/a	Lists information about RMAN persistent configuration settings.
RC_STORED_SCRIPT_LINE	n/a	Lists information about lines of the scripts stored in the recovery catalog.
RC_TABLESPACE	V$TABLESPACE	Lists all tablespaces registered in the recovery catalog, all dropped tablespaces, and tablespaces that belong to old incarnations.

RC_ARCHIVED_LOG

This view contains historical information about archived and unarchived redo logs. It corresponds to the V$ARCHIVED_LOG view in the target database control file.

Oracle inserts an archived redo log record after the online redo log is successfully archived or cleared (NAME column is NULL if the log was cleared). If the log is archived multiple times, then the view will contain multiple archived log records with the same THREAD#, SEQUENCE#, and RESETLOGS_CHANGE#, but with a different name. An archived log record is also inserted when an archived log is restored from a backup set or a copy. Note that an archived log can have no record if the record ages out of the control file.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database to which this record belongs. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
AL_KEY	NUMBER	The primary key of the archived redo log in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The archived redo log RECID from V$ARCHIVED_LOG. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The archived redo log stamp from V$ARCHIVED_LOG. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
NAME	VARCHAR2(1024)	The filename of the archived redo log.
THREAD#	NUMBER	The number of the redo thread.
SEQUENCE#	NUMBER	The log sequence number.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS when the record was created.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS when the record was created.
FIRST_CHANGE#	NUMBER	The first SCN of this redo log.
FIRST_TIME	DATE	The time when Oracle switched into the redo log.
NEXT_CHANGE#	NUMBER	The first SCN of the next redo log in the thread.
NEXT_TIME	DATE	The first time stamp of the next redo log in the thread.
BLOCKS	NUMBER	The size of this archived log in operating system blocks.

Column	Datatype	Description
BLOCK_SIZE	NUMBER	The size of the block in bytes.
COMPLETION_TIME	DATE	The time when the redo log was archived or copied.
ARCHIVED	VARCHAR2(3)	Indicates whether the log was archived: YES (archived redo log) or NO (inspected file header of online redo log and added record to V$ARCHIVED_LOG). Inspecting the online logs creates archived log records for them, which allows them to be applied during RMAN recovery. Oracle sets ARCHIVED to NO to prevent online logs from being backed up.
STATUS	VARCHAR2(1)	The status of the archived redo log: A (available), U (unavailable), D (deleted), or X (expired).
IS_STANDBY	VARCHAR2(3)	The database that archived this log: Y (belongs to a standby database) or N (belongs to the primary database).
DICTIONARY_BEGIN	VARCHAR2(3)	Indicates whether this archived log contains the start of a LogMiner dictionary: YES or NO. If both DICTIONARY_BEGIN and DICTIONARY_END are YES, this log contains a complete LogMiner dictionary. If DICTIONARY_BEGIN is YES but DICTIONARY_END is NO, this log contains the start of the dictionary, and it continues through each subsequent log of this thread and ends in the log where DICTIONARY_END is YES.
DICTIONARY_END	VARCHAR2(3)	Indicates whether this archived log contains the end of a LogMiner dictionary: YES or NO. See the description of DICTIONARY_BEGIN for an explanation of how to interpret this value.

RC_BACKUP_CONTROLFILE

This view lists information about control files in backup sets. Note that the V$BACKUP_DATAFILE view contains both datafile and control file records: a backup datafile record with file number 0 represents the backup control file. In the recovery catalog, the RC_BACKUP_CONTROLFILE view contains only control file records, while the RC_BACKUP_DATAFILE view contains only datafile records.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
BCF_KEY	NUMBER	The primary key of the control file backup in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.

Column	Datatype	Description
RECID	NUMBER	The RECID value from V$BACKUP_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The STAMP value from V$BACKUP_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
BS_KEY	NUMBER	The primary key of the backup set to which this record belongs in the recovery catalog. Use this column to form a join with RC_BACKUP_SET.
SET_STAMP	NUMBER	The SET_STAMP value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
SET_COUNT	NUMBER	The SET_COUNT value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS when the record was created.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS when the record was created.
CHECKPOINT_CHANGE#	NUMBER	The control file checkpoint SCN.
CHECKPOINT_TIME	DATE	The control file checkpoint time.
CREATION_TIME#	DATE	The control file creation time.
BLOCK_SIZE	NUMBER	The size of the blocks in bytes.
OLDEST_OFFLINE_RANGE	NUMBER	Internal use only.
STATUS	VARCHAR2(1)	The status of the backup set: A (available), U (unavailable), or D (deleted).
BS_RECID	NUMBER	The control file RECID of the backup set that contains this backup control file.
BS_STAMP	NUMBER	The control file stamp of the backup set that contains this backup control file.
BS_LEVEL	NUMBER	The incremental level (NULL, 0, 1, 2) of the backup set that contains this backup control file. Although an incremental backup set can contain the control file, it is always contains a complete copy of the control file. There is no such thing as an incremental control file backup.
COMPLETION_TIME	DATE	The date that the control file backup completed.
CONTROLFILE_TYPE	VARCHAR2(1)	The type of control file backup: B (normal backup) or S (standby backup).
AUTOBACKUP_DATE	DATE	The date of the control file autobackup.
AUTOBACKUP_SEQ	NUMBER	The sequence of the control file autobackup: 1 - 255.

RC_BACKUP_CORRUPTION

This view lists corrupt block ranges in datafile backups. It corresponds to the V$BACKUP_CORRUPTION view in the control file. Note that corruptions are not tolerated in control file and archived redo log backups.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
RECID	NUMBER	The record identifier from V$BACKUP_CORRUPTION. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The stamp propagated from V$BACKUP_CORRUPTION. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
BS_KEY	NUMBER	The primary key of the backup set to which this record belongs in the recovery catalog. Use this column to form a join with RC_BACKUP_SET.
SET_STAMP	NUMBER	The SET_STAMP value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
SET_COUNT	NUMBER	The SET_COUNT value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
PIECE#	NUMBER	The backup piece that contains this corrupt block.
BDF_KEY	NUMBER	The primary key for the datafile backup or copy in the recovery catalog. Use this key to join with RC_BACKUP_DATAFILE. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
BDF_RECID	NUMBER	The RECID value from V$BACKUP_DATAFILE.
BDF_STAMP	NUMBER	The STAMP value from V$BACKUP_DATAFILE.
FILE#	NUMBER	The absolute file number for the datafile that contains the corrupt blocks.
CREATION_CHANGE#	NUMBER	The creation SCN of the datafile containing the corrupt blocks.
BLOCK#	NUMBER	The block number of the first corrupted block in this range of corrupted blocks.
BLOCKS	NUMBER	The number of corrupted blocks found beginning with BLOCK#.
CORRUPTION_CHANGE#	NUMBER	For media corrupt blocks, this value is zero. For logically corrupt blocks, this value is the lowest SCN in the blocks in this corrupt range.

Column	Datatype	Description
MARKED_CORRUPT	VARCHAR2(3)	YES if this corruption was not previously detected by Oracle, or NO if Oracle had already discovered this corrupt block and marked it as corrupt in the database. Note that when a corrupt block is encountered in a backup, and was not already marked corrupt by Oracle, then the backup process does not mark the block as corrupt in the production datafile. Thus, this field may be YES for the same block in more than one backup set.
AUX_NAME	VARCHAR2(513)	The auxiliary name configured for this datafile using CONFIGURE AUXNAME.

RC_BACKUP_DATAFILE

This view lists information about datafiles in backup sets. It corresponds to the V$BACKUP_DATAFILE view. A backup datafile is uniquely identified by BDF_KEY.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
BDF_KEY	NUMBER	The primary key of the datafile backup in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The backup datafile RECID from V$BACKUP_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The backup datafile stamp from V$BACKUP_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
BS_KEY	NUMBER	The primary key of the backup set to which this record belongs in the recovery catalog. Use this column to form a join with RC_BACKUP_SET.
SET_STAMP	NUMBER	The SET_STAMP value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
SET_COUNT	NUMBER	The SET_COUNT value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
BS_RECID	NUMBER	The RECID from V$BACKUP_SET.
BS_STAMP	NUMBER	The STAMP from V$BACKUP_SET.

Column	Datatype	Description
BACKUP_TYPE	VARCHAR2(1)	The type of the backup: D (full or level 0 incremental) or I (incremental level 1 or higher).
INCREMENTAL_LEVEL	NUMBER	The level of the incremental backup: NULL or 0 - 4.
COMPLETION_TIME	DATE	The completion time of the backup.
FILE#	NUMBER	The absolute file number of the datafile.
CREATION_CHANGE#	NUMBER	The creation SCN of the datafile.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS in the datafile header.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS in the datafile header.
INCREMENTAL_CHANGE#	NUMBER	The SCN that determines whether a block will be included in the incremental backup. A block is only included if the SCN in the block header is greater than or equal to INCREMENTAL_CHANGE#. The range of redo covered by the incremental backup begins with INCREMENTAL_CHANGE# and ends with CHECKPOINT_CHANGE#.
CHECKPOINT_CHANGE#	NUMBER	The checkpoint SCN of this datafile in this backup set.
CHECKPOINT_TIME	DATE	The time associated with CHECKPOINT_CHANGE#.
ABSOLUTE_FUZZY_CHANGE#	NUMBER	The absolute fuzzy SCN.
DATAFILE_BLOCKS	NUMBER	The number of data blocks in the datafile.
BLOCKS	NUMBER	The number of data blocks written to the backup. This value is often less than DATAFILE_BLOCKS because for full backups, blocks that have never been used are not included in the backup, and for incremental backups, blocks that have not changed are not included in the backup. This value is never greater than DATAFILE_BLOCKS.
BLOCK_SIZE	NUMBER	The size of the data blocks in bytes.
STATUS	VARCHAR2(1)	The status of the backup set: A (all pieces available), D (all pieces deleted), O (some pieces are available but others are not, so the backup set is unusable).
BS_LEVEL	NUMBER	The incremental level (NULL or 0-4) specified when this backup was created. This value can be different from the INCREMENTAL_LEVEL column because if you run, for example, a level 2 incremental backup, but no previous level 0 backup exists for some files, a level 0 backup is automatically taken for these files. In this case, BS_LEVEL is 2 and INCREMENTAL_LEVEL is 0.
PIECES	NUMBER	The number of backup pieces in the backup set that contains this backup datafile.

RC_BACKUP_PIECE

This view lists information about backup pieces. This view corresponds to the V$BACKUP_PIECE view. Each backup set contains one or more backup pieces.

Multiple copies of the same backup piece can exist, but each copy has its own record in the control file and its own row in the view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DB_ID	NUMBER	The database identifier.
BP_KEY	NUMBER	The primary key for the backup piece in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The backup piece RECID from V$BACKUP_PIECE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The backup piece stamp propagated from V$BACKUP_PIECE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
BS_KEY	NUMBER	The primary key of the backup set to which this record belongs in the recovery catalog. Use this column to form a join with RC_BACKUP_SET.
SET_STAMP	NUMBER	The SET_STAMP value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
SET_COUNT	NUMBER	The SET_COUNT value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
BACKUP_TYPE	VARCHAR2(1)	The type of the backup: D (full or level 0 incremental), I (incremental level 1 or higher), L (archived redo log).
INCREMENTAL_LEVEL	NUMBER	The level of the incremental backup: NULL or 0 - 4.
PIECE#	NUMBER	The number of the backup piece. The first piece has the value of 1.
COPY#	NUMBER	The copy number of the backup piece.
DEVICE_TYPE	VARCHAR2(255)	The type of backup device, for example, DISK.
HANDLE	VARCHAR2(1024)	The filename of the backup piece.
COMMENTS	VARCHAR2(255)	Comments about the backup piece.
MEDIA	VARCHAR2(80)	A comment that contains further information about the media manager that created this backup.
MEDIA_POOL	NUMBER	The number of the media pool in which the backup is stored.

Column	Datatype	Description
CONCUR	VARCHAR2(3)	Specifies whether backup media supports concurrent access: YES or NO.
TAG	VARCHAR2(32)	The user-specified tag for the backup piece.
START_TIME	DATE	The time when RMAN started to write the backup piece.
COMPLETION_TIME	DATE	The time when the backup piece was completed.
ELAPSED_SECONDS	NUMBER	The duration of the creation of the backup piece.
STATUS	VARCHAR2(1)	The status of the backup piece: A (available), U (unavailable), D (deleted), or X (expired). Note that status D will not appear in Oracle9*i* unless an older recovery catalog is upgraded.

RC_BACKUP_REDOLOG

This view lists information about archived redo logs in backup sets. It corresponds to the V$BACKUP_REDOLOG view.

You cannot back up online logs directly: you must first archive them to disk and then back them up. An archived log backup set contains one or more archived logs.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
BRL_KEY	NUMBER	The primary key of the archived redo log in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The record identifier propagated from V$BACKUP_REDOLOG. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The stamp from V$BACKUP_REDOLOG. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
BS_KEY	NUMBER	The primary key of the backup set to which this record belongs in the recovery catalog. Use this column to form a join with RC_BACKUP_SET.
SET_STAMP	NUMBER	The SET_STAMP value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.

Column	Datatype	Description
SET_COUNT	NUMBER	The SET_COUNT value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
BACKUP_TYPE	VARCHAR2(1)	The type of the backup: L (archived redo log).
COMPLETION_TIME	DATE	The time when the backup completed.
THREAD#	NUMBER	The thread number of the redo log.
SEQUENCE#	NUMBER	The log sequence number.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS when the record was created.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS when the record was created.
FIRST_CHANGE#	NUMBER	The SCN generated when Oracle switched into the redo log.
FIRST_TIME	DATE	The time when Oracle switched into the redo log.
NEXT_CHANGE#	NUMBER	The first SCN of the next redo log in the thread.
NEXT_TIME	DATE	The first time stamp of the next redo log in the thread.
BLOCKS	NUMBER	The number of operating system blocks written to the backup.
BLOCK_SIZE	NUMBER	The number of bytes in each block of this redo log.
STATUS	VARCHAR2(1)	The status of the backup set: A (all pieces available), D (all pieces deleted), O (some pieces are available but others are not, so the backup set is unusable).
BS_RECID	NUMBER	The RECID value from V$BACKUP_SET.
BS_STAMP	NUMBER	The STAMP value from V$BACKUP_SET. Note that BS_STAMP is different from SET_STAMP. BS_STAMP is the stamp of the backup set record when created in the control file, whereas SET_STAMP joins with SET_COUNT to make a unique identifier.
PIECES	NUMBER	The number of pieces in the backup set.

RC_BACKUP_SET

This view lists information about backup sets for all incarnations of the database. It corresponds to the V$BACKUP_SET view. A backup set record is inserted after the backup has successfully completed.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DB_ID	NUMBER	The unique database identifier.

Column	Datatype	Description
BS_KEY	NUMBER	The primary key of the backup set in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The backup set RECID from V$BACKUP_SET. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file. Use either RECID and STAMP or SET_STAMP and SET_COUNT to access V$BACKUP_SET.
STAMP	NUMBER	The backup set STAMP from V$BACKUP_SET. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file. Use either RECID and STAMP or SET_STAMP and SET_COUNT to access V$BACKUP_SET.
SET_STAMP	NUMBER	The SET_STAMP value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies this record in the target database control file. Use either RECID and STAMP or SET_STAMP and SET_COUNT to access V$BACKUP_SET.
SET_COUNT	NUMBER	The SET_COUNT value from V$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies this record in the target database control file. Use either RECID and STAMP or SET_STAMP and SET_COUNT to access V$BACKUP_SET.
BACKUP_TYPE	VARCHAR2(1)	The type of the backup: D (full backup or level 0 incremental), I (incremental of level 1 or higher), L (archived redo log).
INCREMENTAL_LEVEL	NUMBER	The level of the incremental backup: NULL or 0 - 4.
PIECES	NUMBER	The number of backup pieces in the backup set.
START_TIME	DATE	The time when the backup began.
COMPLETION_TIME	DATE	The time when the backup completed.
ELAPSED_SECONDS	NUMBER	The duration of the backup in seconds.
STATUS	VARCHAR2(1)	The status of the backup set: A (all backup pieces available), D (all backup pieces deleted), O (some backup pieces are available but others are not, so the backup set is unusable).
CONTROLFILE_INCLUDED	VARCHAR2(1)	Possible values are NONE (backup set does not include a backup control file), BACKUP (backup set includes a normal backup control file), and STANDBY (backup set includes a standby control file).
INPUT_FILE_SCAN_ONLY	VARCHAR2(3)	This backup set record was created by the BACKUP VALIDATE command. No real backup set exists. This record is only a placeholder used to keep track of which datafiles were scanned and which corrupt blocks (if any) were found in those files.
KEEP	VARCHAR2(3)	Indicates whether this backup set has a retention policy different from the value for CONFIGURE RETENTION POLICY. Possible values are YES and NO.

Column	Datatype	Description
KEEP_OPTIONS	VARCHAR2(10)	The KEEP options specified for this backup set. Options can be LOGS (RMAN keeps the logs needed to recover this backup), NOLOGS (RMAN does not keep the logs needed to recover this backup), or NULL (the backup has no KEEP options and will be made obsolete based on the retention policy).
KEEP_UNTIL	DATE	If the KEEP UNTIL TIME clause of the BACKUP command was specified, then this column shows the date after which this backup becomes obsolete. If the column is NULL and KEEP OPTIONS is not NULL, the backup never becomes obsolete.

RC_CHECKPOINT

This view is deprecated. See RC_RESYNC on page 3-26 instead.

RC_CONTROLFILE_COPY

This view lists information about control file copies on disk. A datafile copy record with a file number of 0 represents the control file copy in V$DATAFILE_COPY.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
CCF_KEY	NUMBER	The primary key of the control file copy in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The record identifier from V$DATAFILE_COPY. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The stamp from V$DATAFILE_COPY. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
NAME	VARCHAR2(1024)	The control file copy filename.
TAG	VARCHAR2(32)	The tag of the control file copy. NULL if no tag used.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS when the record was created.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS when the record was created.

Column	Datatype	Description
CHECKPOINT_CHANGE#	NUMBER	The control file checkpoint SCN.
CHECKPOINT_TIME	DATE	The control file checkpoint time.
CREATION_TIME	DATE	The control file creation time.
BLOCK_SIZE	NUMBER	The block size in bytes.
MIN_OFFR_RECID	NUMBER	Internal use only.
OLDEST_OFFLINE_RANGE	NUMBER	Internal use only.
COMPLETION_TIME	DATE	The time when the copy was generated.
STATUS	VARCHAR2(1)	The status of the copy: A (available), U (unavailable), X (expired), or D (deleted).
KEEP	VARCHAR2(3)	Indicates whether this copy has a retention policy different from the value for CONFIGURE RETENTION POLICY. Possible values are YES and NO.
KEEP_OPTIONS	VARCHAR2(10)	The KEEP options specified for this control file copy. Options can be LOGS (RMAN keeps the logs needed to recover this backup), NOLOGS (RMAN does not keep the logs needed to recover this backup), or NULL (the backup has no KEEP options and will be made obsolete based on the retention policy).
KEEP_UNTIL	DATE	If the KEEP UNTIL TIME clause of the COPY command was specified, then this column shows the date after which this file becomes obsolete. If the column is NULL and KEEP OPTIONS is not NULL, the file never becomes obsolete.
CONTROLFILE_TYPE	VARCHAR2(1)	The type of control file copy: B (normal copy) or S (standby copy).

RC_COPY_CORRUPTION

This view lists corrupt block ranges in datafile copies. It corresponds to the V$COPY_CORRUPTION view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
RECID	NUMBER	The record identifier from V$COPY_CORRUPTION. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.

Column	Datatype	Description
STAMP	NUMBER	The stamp from V$COPY_CORRUPTION. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
CDF_KEY	NUMBER	The primary key of the datafile copy in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output. Use this column to form a join with RC_DATAFILE_COPY.
COPY_RECID	NUMBER	The RECID from RC_DATAFILE_COPY. This value is propagated from the control file.
COPY_STAMP	NUMBER	The STAMP from RC_DATAFILE_COPY. This value is propagated from the control file.
FILE#	NUMBER	The absolute file number of the datafile.
CREATION_CHANGE#	NUMBER	The creation SCN of this data file. Because file numbers can be reused, FILE# and CREATION_CHANGE# are both required to uniquely identify a specified file over the life of the database.
BLOCK#	NUMBER	The block number of the first corrupted block in the file.
BLOCKS	NUMBER	The number of corrupted blocks found beginning with BLOCK#.
CORRUPTION_CHANGE#	NUMBER	For media corrupt blocks, this value is zero. For logically corrupt blocks, this value is the lowest SCN in the blocks in this corrupt range.
MARKED_CORRUPT	VARCHAR2(3)	YES if this corruption was not previously detected by the database server or NO if it was already known by the database server.

RC_DATABASE

This view gives information about the databases registered in the recovery catalog. It corresponds to the V$DATABASE view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the current incarnation. Use this column to form a join with RC_DATABASE_INCARNATION.
DBID	NUMBER	Unique identifier for the database obtained from V$DATABASE.
NAME	VARCHAR2(8)	The DB_NAME of the database for the current incarnation.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS operation when the record was created.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS operation when the record was created.

RC_DATABASE_INCARNATION

This view lists information about all database incarnations registered in the recovery catalog. Oracle creates a new incarnation whenever you open a database with the RESETLOGS option. Records about the current and immediately previous incarnation are also contained in the V$DATABASE view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the database. Use this column to form a join with almost any other catalog view.
DBID	NUMBER	Unique identifier for the database.
DBINC_KEY	NUMBER	The primary key for the incarnation.
NAME	VARCHAR2(8)	The DB_NAME for the database at the time of the RESETLOGS. The value is UNKNOWN if you have done at least one RESETLOGS before registering the target database with RMAN, because RMAN does not know the DB_NAME prior to the RESETLOGS.
RESETLOGS_CHANGE#	NUMBER	The SCN of the RESETLOGS operation that created this incarnation.
RESETLOGS_TIME	DATE	The time stamp of the RESETLOGS operation that created this incarnation.
CURRENT_INCARNATION	VARCHAR2(3)	YES if it is the current incarnation; NO if it is not.
PARENT_DBINC_KEY	NUMBER	The DBINC_KEY of the previous incarnation for this database. The value is NULL if it is the first incarnation recorded for the database.

RC_DATAFILE

This view lists information about all datafiles registered in the recovery catalog. It corresponds to the V$DATAFILE view. A datafile is shown as dropped if its tablespace was dropped.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
TS#	NUMBER	The number of the tablespace to which the datafile belongs. The TS# may exist multiple times in the same incarnation if the tablespace is dropped and re-created.
TABLESPACE_NAME	VARCHAR2(30)	The tablespace name. The name may exist multiple times in the same incarnation if the tablespace is dropped and re-created.

Column	Datatype	Description
FILE#	NUMBER	The absolute file number of the datafile. The same datafile number may exist multiple times in the same incarnation if the datafile is dropped and re-created.
CREATION_CHANGE#	NUMBER	The SCN at datafile creation.
CREATION_TIME	DATE	The time of datafile creation.
DROP_CHANGE#	NUMBER	The SCN recorded when the datafile was dropped. If a new datafile with the same file number is discovered then the DROP_CHANGE# is set to CREATION_CHANGE# for the datafile; otherwise the value is set to RC_CHECKPOINT.CKP_SCN.
DROP_TIME	DATE	The time when the datafile was dropped. If a new datafile with the same file number is discovered then the DROP_TIME is set to CREATION_TIME for the datafile; otherwise the value is set to RC_CHECKPOINT.CKP_TIME.
BYTES	NUMBER	The size of the datafile in bytes.
BLOCKS	NUMBER	The size of the datafile in blocks.
BLOCK_SIZE	NUMBER	The size of the data blocks in btyes.
NAME	VARCHAR2(1024)	The datafile filename.
STOP_CHANGE#	NUMBER	For offline or read-only datafiles, the SCN value such that no changes in the redo stream at an equal or greater SCN apply to this file.
STOP_TIME	DATE	For offline normal or read-only datafiles, the time beyond which there are no changes in the redo stream that apply to this datafile.
READ_ONLY	NUMBER	1 if the file is read-only; otherwise 0.
RFILE#	NUMBER	The relative file number of this datafile within its tablespace.
INCLUDED_IN_DATABASE_BACKUP	VARCHAR2(3)	Indicates whether this tablespace is included in whole database backups: YES or NO. The NO value occurs only if CONFIGURE EXCLUDE was run on the tablespace that owns this datafile.

RC_DATAFILE_COPY

This view lists information about datafile copies on disk. It corresponds to the V$DATAFILE_COPY view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.

Column	Datatype	Description
CDF_KEY	NUMBER	The primary key of the datafile copy in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The datafile copy record from V$DATAFILE_COPY. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The datafile copy stamp from V$DATAFILE_COPY. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
NAME	VARCHAR2(1024)	The filename of the datafile copy.
TAG	VARCHAR2(32)	The tag for the datafile copy.
FILE#	NUMBER	The absolute file number for the datafile.
CREATION_CHANGE#	NUMBER	The creation SCN of the datafile.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS when the datafile was created.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS in the datafile header.
INCREMENTAL_LEVEL	NUMBER	The incremental level of the copy: 0 or NULL.
CHECKPOINT_CHANGE#	NUMBER	The SCN of the most recent datafile checkpoint.
CHECKPOINT_TIME	DATE	The time of the most recent datafile checkpoint.
ABSOLUTE_FUZZY_ CHANGE#	NUMBER	The highest SCN in any block of the file, if known. Recovery must proceed to at least this SCN for the file to become not fuzzy.
RECOVERY_FUZZY_ CHANGE#	NUMBER	The SCN to which recovery must proceed for the file to become not fuzzy. If not NULL, this file must be recovered at least to the specified SCN before the database can be opened with this file.
RECOVERY_FUZZY_TIME	DATE	The time that is associated with the RECOVERY_FUZZY_CHANGE#.
ONLINE_FUZZY	VARCHAR2(3)	YES / NO. If set to YES, this copy was made after a crash or OFFLINE IMMEDATE (or is a copy that was taken improperly while the database was open). Recovery will need to apply all redo up to the next crash recovery marker to make the file consistent.
BACKUP_FUZZY	VARCHAR2(3)	YES / NO. If set to YES, this is a copy taken using the BEGIN BACKUP / END BACKUP technique. To make this copy consistent, Recovery needs to apply all redo up to the marker that is placed in the redo stream when the ALTER TABLESPACE END BACKUP command is used.
BLOCKS	NUMBER	The number of blocks in the datafile copy (also the size of the datafile when the copy was made).
BLOCK_SIZE	NUMBER	The size of the blocks in bytes.
COMPLETION_TIME		The time when the copy completed.
STATUS	VARCHAR2(1)	The status of the copy: A (available), U (unavailable), X (expired), or D (deleted).

Column	Datatype	Description
KEEP	VARCHAR2(3)	Indicates whether this copy has a retention policy different from the value for CONFIGURE RETENTION POLICY. Possible values are YES and NO.
KEEP_OPTIONS	VARCHAR2(10)	The KEEP options specified for this datafile copy. Options can be LOGS (RMAN keeps the logs needed to recover this backup), NOLOGS (RMAN does not keep the logs needed to recover this backup), or NULL (the backup has no KEEP options and will be made obsolete based on the retention policy).
KEEP_UNTIL	DATE	If the KEEP UNTIL TIME clause of the COPY command was specified, then this column shows the date after which this datafile copy becomes obsolete. If the column is NULL and KEEP OPTIONS is not NULL, the copy never becomes obsolete.

RC_LOG_HISTORY

This view lists historical information about the online redo logs. RMAN adds a new row during a catalog resynchronization whenever Oracle has switched out of the online redo log. This catalog view corresponds to the V$LOG_HISTORY view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
RECID	NUMBER	The redo log history RECID from V$LOG_HISTORY. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The redo log history stamp from V$LOG_HISTORY. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
THREAD#	NUMBER	The thread number of the online redo log.
SEQUENCE#	NUMBER	The log sequence number of the redo log.
FIRST_CHANGE#	NUMBER	The SCN generated when switching into the redo log.
FIRST_TIME	DATE	The time stamp when switching into the redo log.
NEXT_CHANGE#	NUMBER	The first SCN of the next redo log in the thread.
CLEARED	VARCHAR2(3)	YES if the redo log was cleared with the ALTER DATABASE CLEAR LOGFILE statement; otherwise, NULL. This statement allows a log to be dropped without archiving it first.

RC_OFFLINE_RANGE

This view lists the offline ranges for datafiles. It corresponds to the V$OFFLINE_RANGE view.

An offline range is created for a datafile when its tablespace is first altered to be offline normal or read-only, and then subsequently altered to be online or read/write. Note that no offline range is created if the datafile itself is altered to be offline or if the tablespace is altered to be offline immediate.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
RECID	NUMBER	The record identifier for the offline range from V$OFFLINE_RANGE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The stamp for the offline range from V$OFFLINE_RANGE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
FILE#	NUMBER	The absolute file number of the datafile.
CREATION_CHANGE#	NUMBER	The SCN at datafile creation.
OFFLINE_CHANGE#	NUMBER	The SCN taken when the datafile was taken offline.
ONLINE_CHANGE#	NUMBER	The online checkpoint SCN.
ONLINE_TIME	DATE	The online checkpoint time.
CF_CREATE_TIME	DATE	The time of control file creation.

RC_PROXY_CONTROLFILE

This view contains descriptions of control file backups that were taken using the proxy copy functionality. It corresponds to the V$PROXY_DATAFILE view.

In a proxy copy, the media manager takes over the operations of backing up and restoring data. Each row represents a backup of one control file.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.

Column	Datatype	Description
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
XCF_KEY	NUMBER	The proxy copy primary key in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The proxy copy record identifier from V$PROXY_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The proxy copy stamp from V$PROXY_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
TAG	VARCHAR2(32)	The tag for the proxy copy.
RESETLOGS_CHANGE#	NUMBER	The RESETLOGS SCN of the database incarnation to which this datafile belongs.
RESETLOGS_TIME	DATE	The RESETLOGS time stamp of the database incarnation to which this datafile belongs.
CHECKPOINT_CHANGE#	NUMBER	Datafile checkpoint SCN when this copy was made.
CHECKPOINT_TIME	DATE	Datafile checkpoint time when this copy was made.
CREATION_TIME	DATE	The control file creation time.
BLOCK_SIZE	NUMBER	The block size for the copy in bytes.
MIN_OFFR_RECID	NUMBER	Internal use only.
OLDEST_OFFLINE_RANGE	NUMBER	Internal use only.
DEVICE_TYPE	VARCHAR2(255)	The type of sequential media device.
HANDLE	VARCHAR2(1024)	The name or "handle" for the proxy copy. RMAN passes this value to the operating system-dependent layer that identifies the file.
COMMENTS	VARCHAR2(255)	Comments about the proxy copy.
MEDIA	VARCHAR2(80)	A comment that contains further information about the media manager that created this backup.
MEDIA_POOL	NUMBER	The number of the media pool in which the proxy copy is stored.
START_TIME	DATE	The time when proxy copy was initiated.
COMPLETION_TIME	DATE	The time when the proxy copy was completed.
ELAPSED_SECONDS	NUMBER	The duration of the proxy copy.
STATUS	VARCHAR2(1)	The status of the backup set: A (available), U (unavailable), X (expired), or D (deleted).

Column	Datatype	Description
KEEP	VARCHAR2(3)	Indicates whether this proxy copy has a retention policy different from the value for CONFIGURE RETENTION POLICY. Possible values are YES and NO.
KEEP_OPTIONS	VARCHAR2(10)	The KEEP options specified for this control file backup. Options can be LOGS (RMAN keeps the logs needed to recover this backup), NOLOGS (RMAN does not keep the logs needed to recover this backup), or NULL (the backup has no KEEP options and will be made obsolete based on the retention policy).
KEEP_UNTIL	DATE	If the KEEP UNTIL TIME clause of the BACKUP command was specified, then this column shows the date after which this control file backup becomes obsolete. If the column is NULL and KEEP OPTIONS is not NULL, the backup never becomes obsolete.
CONTROLFILE_TYPE	VARCHAR2(1)	The type of control file copy: B (normal copy) or S (standby copy).

RC_PROXY_DATAFILE

This view contains descriptions of datafile backups that were taken using the proxy copy functionality. It corresponds to the V$PROXY_DATAFILE view.

In a proxy copy, the media manager takes over the operations of backing up and restoring data. Each row represents a backup of one database file.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
XDF_KEY	NUMBER	The proxy copy primary key in the recovery catalog. If you issue the LIST command while connected to the recovery catalog, this value appears in the KEY column of the output.
RECID	NUMBER	The proxy copy record identifier from V$PROXY_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The proxy copy stamp from V$PROXY_DATAFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
TAG	VARCHAR2(32)	The tag for the proxy copy.
FILE#	NUMBER	The absolute file number of the datafile that is proxy copied.
CREATION_CHANGE#	NUMBER	The datafile creation SCN.

Column	Datatype	Description
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS in the datafile header.
RESETLOGS_TIME	DATE	The time stamp of the most recent RESETLOGS in the datafile header.
INCREMENTAL_LEVEL	NUMBER	0 if this copy is part of an incremental backup strategy, otherwise NULL.
CHECKPOINT_CHANGE#	NUMBER	Checkpoint SCN when the copy was made.
CHECKPOINT_TIME	DATE	Checkpoint time when the copy was made.
ABSOLUTE_FUZZY_ CHANGE#	NUMBER	The highest SCN in any block of the file, if known. Recovery must proceed to at least this SCN for the file to become not fuzzy.
RECOVERY_FUZZY_ CHANGE#	NUMBER	The SCN to which recovery must proceed for the file to become not fuzzy. If not NULL, this file must be recovered at least to the specified SCN before the database can be opened with this file.
RECOVERY_FUZZY_TIME	DATE	The time that is associated with the RECOVERY_FUZZY_CHANGE#.
ONLINE_FUZZY	VARCHAR2(3)	YES / NO. If set to YES, this copy was made after a crash or offline immediate (or is a copy of a copy which was taken improperly while the database was open). Recovery will need to apply all redo up to the next crash recovery marker to make the file consistent.
BACKUP_FUZZY	VARCHAR2(3)	YES / NO. If set to YES, this is a copy taken using the BEGIN BACKUP / END BACKUP backup method. To make this copy consistent, recovery must apply all redo up to the marker that is placed in the redo stream when the ALTER TABLESPACE END BACKUP statement is issued.
BLOCKS	NUMBER	Size of the datafile copy in blocks (also the size of the datafile when the copy was made).
BLOCK_SIZE	NUMBER	The block size for the copy in bytes.
DEVICE_TYPE	VARCHAR2(255)	The type of sequential media device.
HANDLE	VARCHAR2(1024)	The name or "handle" for the proxy copy. RMAN passes this value to the operating system-dependent layer that identifies the file.
COMMENTS	VARCHAR2(255)	Comments about the proxy copy.
MEDIA	VARCHAR2(80)	A comment that contains further information about the media manager that created this backup.
MEDIA_POOL	NUMBER	The number of the media pool in which the proxy copy is stored.
START_TIME	DATE	The time when proxy copy was initiated.
COMPLETION_TIME	DATE	The time when the proxy copy was completed.
ELAPSED_SECONDS	NUMBER	The duration of the proxy copy.
STATUS	VARCHAR2(1)	The status of the backup set: A (available), U (unavailable), X (expired), or D (deleted).

Column	Datatype	Description
KEEP_OPTIONS	VARCHAR2(10)	The KEEP options specified for this datafile backup. Options can be LOGS (RMAN keeps the logs needed to recover this backup), NOLOGS (RMAN does not keep the logs needed to recover this backup), or NULL (the backup has no KEEP options and will be made obsolete based on the retention policy).
KEEP_UNTIL	DATE	If the KEEP UNTIL TIME clause of the BACKUP command was specified, then this column shows the date after which this datafile backup becomes obsolete. If the column is NULL and KEEP OPTIONS is not NULL, the backup never becomes obsolete.

RC_REDO_LOG

This view lists information about the online redo logs for all incarnations of the database since the last catalog resynchronization. This view corresponds to a combination of the V$LOG and V$LOGFILE views.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
THREAD#	NUMBER	The number of the redo thread.
GROUP#	NUMBER	The number of the online redo log group.
NAME	VARCHAR2(1024)	The name of the online redo log file.

RC_REDO_THREAD

This view lists data about all redo threads for all incarnations of the database since the last catalog resynchronization. This view corresponds to V$THREAD.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
THREAD#	NUMBER	The redo thread number for the database incarnation.

Column	Datatype	Description
STATUS	VARCHAR2(1)	The status of the redo thread: D (disabled), E (enabled), or O (open).
SEQUENCE#	NUMBER	The last allocated log sequence number.
ENABLE_CHANGE#	NUMBER	The SCN at which this thread was enabled.
ENABLE_TIME	DATE	The time at which this thread was enabled.
DISABLE_CHANGE#	NUMBER	The most recent SCN at which this thread was disabled. If the thread is still disabled, then no redo at or beyond this SCN exists for this thread. If the thread is now enabled, then no redo exists between the DISABLE_CHANGE# and the ENABLE_CHANGE# for this thread.
DISABLE_TIME	DATE	The most recent time at which this thread was disabled.

RC_RESYNC

This view lists information about recovery catalog resynchronizations. Every full resynchronization takes a snapshot of the target database control file and resynchronizes the recovery catalog from the snapshot.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
RESYNC_KEY	NUMBER	The primary key for the resynchronization.
CONTROLFILE_CHANGE#	NUMBER	The control file checkpoint SCN from which the catalog was resynchronized.
CONTROLFILE_TIME	DATE	The control file checkpoint time stamp from which the catalog was resynchronized.
CONTROLFILE_SEQUENCE#	NUMBER	The control file sequence number.
CONTROLFILE_VERSION	DATE	The creation time for the version of the control file from which the catalog was resynchronized.
RESYNC_TYPE	VARCHAR2(7)	The type of resynchronization: FULL or PARTIAL.
DB_STATUS	VARCHAR2(7)	The status of the target database: OPEN or MOUNTED.
RESYNC_TIME	DATE	The time of the resynchronization.

RC_RMAN_CONFIGURATION

This view lists information about RMAN persistent configuration settings. It corresponds to the V$RMAN_CONFIGURATION view.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database corresponding to this configuration. Use this column to form a join with almost any other catalog view.
CONF#	NUMBER	A unique key identifying this configuration record within the target database that owns it.
NAME	VARCHAR2(65)	The type of configuration. All options of CONFIGURE command are valid types except: CONFIGURE EXCLUDE, (described in RC_TABLESPACE), CONFIGURE AUXNAME (described in RC_DATAFILE), and CONFIGURE SNAPSHOT CONTROLFILE (stored only in control file).
VALUE	VARCHAR2(1025)	The CONFIGURE command setting. For example: RETENTION POLICY TO RECOVERY WINDOW OF 1 DAYS.

RC_STORED_SCRIPT

This view lists information about scripts stored in the recovery catalog. The view contains one row for each stored script.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the database that owns this script. Use this column to form a join with almost any other catalog view.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
SCRIPT_NAME	VARCHAR2(100)	The name of the script.

RC_STORED_SCRIPT_LINE

This view lists information about lines of the scripts stored in the recovery catalog. The view contains one row for each line of each stored script.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the database that owns this script. Use this column to form a join with almost any other catalog view.
SCRIPT_NAME	VARCHAR2(100)	The name of the stored script.
LINE	NUMBER	The number of the line in the script. The line of a script is uniquely identified by SCRIPT_NAME and LINE.

Column	Datatype	Description
TEXT	VARCHAR2(1024)	The text of the line of the script.

RC_TABLESPACE

This view lists all tablespaces registered in the recovery catalog, all dropped tablespaces, and tablespaces that belong to old incarnations. It corresponds to the V$TABLESPACE view. The current value is shown for tablespace attributes.

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the target database. Use this column to form a join with almost any other catalog view.
DBINC_KEY	NUMBER	The primary key for the incarnation of the target database. Use this column to form a join with RC_DATABASE_INCARNATION.
DB_NAME	VARCHAR2(8)	The DB_NAME of the database incarnation to which this record belongs.
TS#	NUMBER	The tablespace identifier in the target database. The TS# may exist multiple times in the same incarnation if the tablespace is dropped and re-created.
NAME	VARCHAR2(30)	The tablespace name. The name may exist multiple times in the same incarnation if the tablespace is dropped and re-created.
CREATION_CHANGE#	NUMBER	The creation SCN (from the first datafile).
CREATION_TIME	DATE	The creation time of the tablespace. NULL for offline tablespaces after creating the control file.
DROP_CHANGE#	NUMBER	The SCN recorded when the tablespace was dropped. If a new tablespace with the same TS# is discovered then the DROP_CHANGE# is set to CREATION_CHANGE# for the tablespace; otherwise, the value is set to RC_CHECKPOINT.CKP_SCN.
DROP_TIME	DATE	The date when the tablespace was dropped.
INCLUDED_IN_DATABASE_BACKUP	VARCHAR2(3)	Indicates whether this tablespace is included in whole database backups: YES or NO. The YES value occurs only if CONFIGURE EXCLUDE was run on the tablespace that owns this datafile.

A

Deprecated RMAN Commands

This appendix describes Recovery Manager syntax that is deprecated and describes preferred syntax if any exists.

Deprecated RMAN syntax continues to be supported in subsequent releases for backward compatibility. For example, the SET AUXNAME command replaced the SET CLONENAME command in release 8.1.5, and the CONFIGURE AUXNAME command replaced the SET AUXNAME command in Oracle9*i*, but you can continue to run both SET CLONENAME and SET AUXNAME in all subsequent RMAN releases.

Table 3–2 Deprecated RMAN Syntax

Deprecated Syntax	Deprecated in Release	Preferred Current Syntax
ALLOCATE CHANNEL FOR DELETE	9.0.1	n/a
ALLOCATE CHANNEL CLONE	8.1.5	CONFIGURE AUXILIARY CHANNEL
ALLOCATE CHANNEL ... TYPE	9.0.1	CONFIGURE CHANNEL ... DEVICE TYPE
ALLOCATE CHANNEL ... KBYTES	9.0.1	CONFIGURE CHANNEL ... MAXPIECESIZE
ALLOCATE CHANNEL ... READRATE	9.0.1	CONFIGURE CHANNEL ... RATE
... ARCHIVELOG ... LOGSEQ	9.0.1	... ARCHIVELOG ... SEQUENCE
BACKUP ... SETSIZE	9.0.1	BACKUP ... MAXSETSIZE
CHANGE ... CROSSCHECK	9.0.1	CROSSCHECK
CHANGE ... DELETE	9.0.1	DELETE
CHANGE ... VALIDATE	8.1.5	CROSSCHECK
CLONE (see "cmdLine")	8.1.5	AUXILIARY (see "cmdLine")
CONFIGURE COMPATIBLE	8.1.7	n/a

Table 3–2 Deprecated RMAN Syntax

Deprecated Syntax	Deprecated in Release	Preferred Current Syntax
CONNECT CLONE	8.1.5	CONNECT AUXILIARY
MSGLOG (see "cmdLine")	8.1.5	LOG (see "cmdLine")
RCVCAT (see "cmdLine")	8.1.5	CATALOG (see "cmdLine")
REPORT ... AT LOGSEQ	9.0.1	REPORT ... AT SEQUENCE
SET AUXNAME	9.0.1	CONFIGURE AUXNAME
SET DUPLEX	9.0.1	SET BACKUP COPIES CONFIGURE BACKUP COPIES
SET LIMIT CHANNEL ...	9.0.1	ALLOCATE CHANNEL ... CONFIGURE CHANNEL ...
SET SNAPSHOT	9.0.1	CONFIGURE SNAPSHOT
UNTIL LOGSEQ (see "untilClause")	9.0.1	UNTIL SEQUENCE (see "untilClause")

B

RMAN Compatibility

This section contains these topics:

- About RMAN Compatibility
- RMAN Compatibility Matrix
- RMAN Compatibility: Scenario

About RMAN Compatibility

The RMAN environment can contain the following components:

- RMAN executable
- Recovery catalog database
- Recovery catalog schema in the recovery catalog database
- Target database
- Auxiliary database (that is, a duplicate or standby database)

Each component has a release number. For example, you can use a release 9.0.1 RMAN executable with:

- A release 9.0.1 target database
- A release 9.0.1 duplicate database
- A release 8.1.5 recovery catalog database whose catalog tables were created with RMAN release 9.0.1

RMAN Compatibility Matrix

In general, the rules of RMAN compatibility are as follows:

- The RMAN catalog schema version should be greater than or equal to the catalog database version (refer to "Note 1: 8.1 or Later Catalog Schemas in 8.0 Catalog Databases" on page B-3).
- The RMAN catalog is backwards compatible with target databases from earlier releases (refer to "Note 2: 8.1 or Later Catalog Schemas and 8.0 Target Databases" on page B-3).
- The versions of the RMAN executable and the target database should be the same (refer to Table B–1 for other legal combinations).

Table B–1 shows version requirements for RMAN components.

Table B–1 RMAN Compatibility Table

Target/Auxiliary Database	RMAN Executable	Catalog Database	Catalog Schema
8.0.3	8.0.3	>=8.x	8.0.3
8.0.4	8.0.4	>=8.x	>= 8.0.4, see "Note 2: 8.1 or Later Catalog Schemas and 8.0 Target Databases"
8.0.5	8.0.5	>=8.x	>= 8.0.5, see "Note 2: 8.1 or Later Catalog Schemas and 8.0 Target Databases"
8.0.6	8.0.6	>=8.x	8.0.6
8.0.6	8.0.6	>=8.1.x	>= 8.1.x
8.1.5	8.1.5	>=8.1.x	>= 8.1.5
8.1.6	8.0.6.1	>=8.x	8.0.6
8.1.6	8.0.6.1	>=8.1.x	>= 8.1.x
8.1.6	8.1.5	>=8.1.x	>= RMAN executable
8.1.6	8.1.6	>=8.1.x	>= RMAN executable
8.1.7	8.0.6.1	>=8.x	8.0.6
8.1.7	8.0.6.1	>=8.1.x	>=8.1.x
8.1.7	8.1.x	>=8.1.x	>= RMAN executable
9.0.1	>= 9.0.1	>=8.1.x	>= RMAN executable

Note 1: 8.1 or Later Catalog Schemas in 8.0 Catalog Databases

RMAN cannot create release 8.1 or later catalog schemas in 8.0 catalog databases.

Note 2: 8.1 or Later Catalog Schemas and 8.0 Target Databases

Restore operations for an 8.0.4 or 8.0.5 target with an 8.1 or later catalog schema do not work when both these conditions are met:

- The target database is mounted or open
- You are connected to a recovery catalog

If any of these conditions is not met, then you can use an 8.1 or later catalog schema with an 8.0.4 or 8.0.5 target database.

Note 3: 8.1.6 Catalog Schema and Pre-8.1.6 RMAN Executable

Using a pre-8.1.6 release of the RMAN executable with recovery catalog schema of release 8.1.6 (newly created by 8.1.6 RMAN executable with the CREATE CATALOG command) requires the following update at the catalog database:

```
SQL> UPDATE CONFIG SET VALUE='080004' WHERE NAME='COMPATIBLE';
```

RMAN Compatibility: Scenario

Assume that you maintain a production databases of the following releases:

- 8.0.3
- 8.0.4
- 8.0.5
- 8.0.6
- 8.1.6
- 8.1.7
- 9.0.1

You want to record metadata about these databases in a single recovery catalog database. According to Table B–1, you can use a single 9.0.1 recovery catalog database with a 9.0.1 catalog schema for all but the 8.0.3, 8.0.4, and 8.0.5 target databases. The 8.0.3 target database requires an 8.0.3 catalog schema. "Note 2: 8.1 or Later Catalog Schemas and 8.0 Target Databases" on page B-3 indicates that in general 8.0.4 and 8.0.5 target databases should not use the 9.0.1 catalog schema.

RMAN permits you to create multiple catalog schemas in a single catalog database. Hence, the solution illustrated in Table B–2 is to do the following:

- Use a single release 9.0.1 catalog database to store all metadata, but create three separate catalog schemas of the following releases: 8.0.3, 8.0.5, and 9.0.1
- Ensure that the RMAN executable version matches the release of the target database that it is backing up

Table B–2 RMAN Compatibility Scenario with Release 9.0.1 Catalog Database

Target Database	Catalog Schema
8.0.3	8.0.3
8.0.4	8.0.5
8.0.5	8.0.5
8.0.6	9.0.1
8.1.5	9.0.1
8.1.6	9.0.1
8.1.7	9.0.1
9.0.1	9.0.1

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