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Recovery Manager Reference

10*g* Release 1 (10.1)

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Oracle Database Recovery Manager Reference 10*g* Release 1 (10.1)

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Primary Author: Antonio Romero

Contributing Author: Lance Ashdown

Contributors: Anand Beldalker, Tammy Bednar, Senad Dizdar, Muthu Olagappan, Francisco Sanchez, Steve Wertheimer

Graphic Designer: Valarie Moore

Contents

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Part No. B10770-02

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Preface

This preface contains these topics:

- Audience
- Organization
- Related Documentation
- Conventions
- Documentation Accessibility

Audience

Recovery Manager Reference 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 *Oracle Database Concepts* and the *Oracle Database Administrator's Guide*
- Basic RMAN concepts and tasks as described in *Oracle Database Backup and Recovery Basics*
- 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 client, target database, recovery catalog database, and recovery catalog schema.

Related Documentation

For more information, see these Oracle resources:

- *Oracle Database Backup and Recovery Basics*
- *Oracle Database Utilities*
- `http://otn.oracle.com/deploy/availability/index.html`

Many of the examples in this book use the sample schemas of the seed database, which is installed by default when you install Oracle. Refer to *Oracle Database Sample Schemas* for information on how these schemas were created and how you can use them yourself.

Printed documentation is available for sale in the Oracle Store at

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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.	*Oracle 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 italic monospace (fixed-width) font`	Lowercase italic monospace 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
	■ That you can repeat a portion of the code
		CREATE TABLE ... AS *subquery*;
		
		SELECT *col1*, *col2*, ... , *coln* FROM employees;

. . .	Vertical ellipsis points indicate that we have omitted several lines of code not directly related to the example.	SQL> SELECT NAME FROM V$DATAFILE; NAME ------------------------------------ /fsl/dbs/tbs_01.dbf /fs1/dbs/tbs_02.dbf . . . /fsl/dbs/tbs_09.dbf 9 rows selected.

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/`

Accessibility of Code Examples in Documentation 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.

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1 About RMAN Commands

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

- Conventions Used in this Reference
- RMAN Command Entries

Conventions Used in this Reference

This section explains the conventions used in this chapter including:

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

RMAN Text Conventions

The text in this reference adheres to the following conventions:

- `UPPERCASE monospace` : Calls attention to RMAN keywords, SQL keywords, column headings in tables and views, and initialization parameters.
- `lowercase monospace` : Calls attention to variable text in RMAN examples.
- *`italics`* : 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.

RMAN Syntax Diagrams and Notation

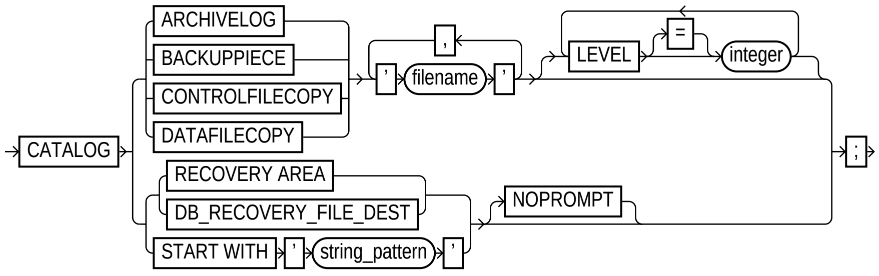
This section describes the conventions for RMAN command syntax.

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

`catalog::=`



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 only system-independent, legal environment variables in RMAN quoted strings are `?` for the Oracle home and `@` for the SID. However, you can use operating system specific environment variables on the target system within quoted strings. The environment variables are interpreted by the database server and not the RMAN client.

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`

RMAN Reserved Words

This section describes the 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
```

Reserved Word	Reserved Word	Reserved Word	Reserved Word	Reserved Word	Reserved Word
ABORT	CONSISTENT	FORMAT	MAXPIECESIZE	PLSQL	SETLIMIT
AFFINITY	CONTROLFILE	FROM	MAXSEQ	PLUS	SETSIZE
AFTER	CONTROLFILECOPY	FULL	MAXSETSIZE	POLICY	SHOW
ALL	COPIES	G	MAXSIZE	POOL	SHUTDOWN
ALLOCATE	COPY	GET	MISC	PRINT	SINCE
ALTER	CORRUPTION	GROUP	MOUNT	PROXY	SIZE
AND	CREATE	HIGH	MSGLOG	PUT	SKIP
APPEND	CROSSCHECK	HOST	MSGNO	QUIT	SLAXDEBUG
ARCHIVELOG	CUMULATIVE	ID	NAME	RATE	SNAPSHOT
AT	CURRENT	IDENTIFIER	NEED	RCVCAT	SPFILE
ATALL	DATABASE	IMMEDIATE	NEW	RCVMAN	SPOOL
AUTOBACKUP	DATAFILE	INACCESSIBLE	NEW-LINE	READONLY	SQL
AUTOLOCATE	DATAFILECOPY	INCARNATION	NEWNAME	READRATE	STANDBY
AUXILIARY	DAYS	INCLUDE	NOCATALOG	RECOVER	STARTUP
AUXNAME	DBA	INCREMENTAL	NOCFAU	RECOVERABLE	STEP
AVAILABLE	DBID	INPUT	NOCHECKSUM	RECOVERY	SUMMARY
BACKED	DEBUG	IO	NOEXCLUDE	REDUNDANCY	SWITCH
BACKUP	DEFAULT	JOB	NOFILENAMECHECK	REGISTER	TABLESPACE
BACKUPPIECE	DEFINE	K	NOFILEUPDATE	RELEASE	TAG
BACKUPSET	DELETE	KBYTES	NOKEEP	RELOAD	TARGET
BEFORE	DESTINATION	KEEP	NOLOGS	REMOVE	TEST
BETWEEN	DEVICE	LEVEL	NOMOUNT	RENORMALIZE	THREAD
BLOCK	DISK	LIBNAME	NONE	REPLACE	TIME
BLOCKRECOVER	DISKRATIO	LIBPARM	NOPROMPT	REPLICATE	TIMEOUT

Reserved Word	Reserved Word	Reserved Word	Reserved Word	Reserved Word	Reserved Word
BLOCKS	DISPLAY	LIBRARY	NOREDO	REPORT	TIMES
BY	DORECOVER	LIBTEXT	NORMAL	RESET	TO
CANCEL	DROP	LIKE	NOT	RESETLOGS	TRACE
CATALOG	DUMP	LIMIT	NULL	RESTART	TRANSACTIONAL
CHANGE	DUPLEX	LIST	OBSOLETE	RESTORE	TXT
CHANNEL	DUPLICATE	LOG	OF	RESYNC	TYPE
CHARSET	ECHO	LOGFILE	OFF	RETENTION	UNAVAILABLE
CHECK	EXCLUDE	LOGICAL	OFFLINE	REUSE	UNCATALOG
CLEAR	EXECUTE	LOGS	ON	RPC	UNLIMITED
CLONE	EXIT	LOGSCN	ONLY	RPCTEST	UNRECOVERABLE
CLONENAME	EXPIRED	LOGSEQ	OPEN	RUN	UNTIL
CLONE_CF	FILE	LOW	OPTIMIZATION	SAVE	UNUSED
CMDFILE	FILES	M	ORPHAN	SCHEMA	UP
COMMAND	FILESPERSET	MAINTENANCE	PACKAGES	SCN	UPGRADE
COMPATIBLE	FINAL	MASK	PARALLELISM		VALIDATE
COMPLETED	FOR	MAXCORRUPT	PARMS	SEND	VERBOSE
CONFIGURE	FORCE	MAXDAYS	PFILE	SEQUENCE	WINDOW
CONNECT	FOREVER	MAXOPENFILES	PIPE	SET	

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:

```
BACKUP DATABASE;
```

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

RMAN Command Entries

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

Table 1–1

Section	Content
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 can 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 command line options for the RMAN client, refer to "cmdLine" on page 2-75.

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 2-8	Establish a channel, which is a connection between RMAN and a database instance.
"ALLOCATE CHANNEL FOR MAINTENANCE" on page 2-12	Allocate a channel in preparation for issuing maintenance commands such as DELETE.
"allocOperandList" on page 2-15	A subclause that specifies channel control options such as PARMS and FORMAT.
"ALTER DATABASE" on page 2-19	Mount or open a database.
"archivelogRecordSpecifier" on page 2-22	Specify a range of archived redo logs files.
"BACKUP" on page 2-28	Back up database files, copies of database files, archived logs, or backup sets.
"BLOCKRECOVER" on page 2-62	Recover an individual data block or set of data blocks within one or more datafiles.
"CATALOG" on page 2-67	Add information about a datafile copy, archived redo log, or control file copy to the repository.
"CHANGE" on page 2-71	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 2-80	Specify a time range during which the backup or copy completed.
"CONFIGURE" on page 2-82	Configure persistent RMAN settings. These settings apply to all RMAN sessions until explicitly changed or disabled.
"CONNECT" on page 2-100	Establish a connection between RMAN and a target, auxiliary, or recovery catalog database.

Table 2–1 Recovery Manager Commands

Command	Purpose
"connectStringSpec" on page 2-103	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.
"CONVERT" on page 2-105	Converts datafile formats for transporting tablespaces across platforms.
"CREATE CATALOG" on page 2-113	Create the schema for the recovery catalog.
"CREATE SCRIPT" on page 2-115	Create a stored script and store it in the recovery catalog.
"CROSSCHECK" on page 2-118	Determine whether files managed by RMAN, such as archived logs, datafile copies, and backup pieces, still exist on disk or tape.
"datafileSpec" on page 2-121	Specify a datafile by filename or absolute file number.
"DELETE" on page 2-123	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 2-127	Delete a stored script from the recovery catalog.
"deviceSpecifier" on page 2-129	Specify the type of storage device for a backup or copy.
"DROP CATALOG" on page 2-131	Remove the schema from the recovery catalog.
"DROP DATABASE" on page 2-133	Deletes the target database from disk and unregisters it.
"DUPLICATE" on page 2-135	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 2-145	Run an RMAN stored script.
"EXIT" on page 2-147	Quit the RMAN executable.
"fileNameConversionSpec" on page 2-148	Specify patterns to transform source to target filenames during BACKUP AS COPY, CONVERT and DUPLICATE.
"FLASHBACK" on page 2-151	Returns the database to its state at a previous time or SCN.
"formatSpec" on page 2-156	Specify a filename format for a backup or copy.
"HOST" on page 2-160	Invoke an operating system command-line subshell from within RMAN or run a specific operating system command.
"keepOption" on page 2-162	Specify that a backup or copy should or should not be exempt from the current retention policy.
"LIST" on page 2-164	Produce a detailed listing of backup sets or copies.

Table 2–1 Recovery Manager Commands

Command	Purpose
"listObjList" on page 2-185	A subclause used to specify which items will be displayed by the `LIST` command.
"maintQualifier" on page 2-188	A subclause used to specify additional options for maintenance commands such as `DELETE` and `CHANGE`.
"maintSpec" on page 2-190	A subclause used to specify the files operated on by maintenance commands such as `CHANGE`, `CROSSCHECK`, and `DELETE`.
"obsOperandList" on page 2-193	A subclause used to determine which backups and copies are obsolete.
"PRINT SCRIPT" on page 2-195	Display a stored script.
"QUIT" on page 2-197	Exit the RMAN executable.
"recordSpec" on page 2-198	A subclause used to specify which objects the maintenance commands should operate on.
"RECOVER" on page 2-200	Apply redo logs and incremental backups to datafiles restored from backup or datafile copies, in order to update them to a specified time.
"REGISTER" on page 2-212	Register the target database in the recovery catalog.
"RELEASE CHANNEL" on page 2-214	Release a channel that was allocated with an `ALLOCATE CHANNEL` command.
"releaseForMaint" on page 2-216	Release a channel allocated with an `ALLOCATE CHANNEL FOR MAINTENANCE` command.
"REPLACE SCRIPT" on page 2-217	Replace an existing script stored in the recovery catalog. If the script does not exist, then `REPLACE SCRIPT` creates it.
"REPORT" on page 2-220	Perform detailed analyses of the content of the recovery catalog.
"RESET DATABASE" on page 2-228	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 2-231	Restore files from backup sets or from disk copies to the default or a new location.
"RESYNC" on page 2-246	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 2-249	Execute a sequence of one or more RMAN commands, which are one or more statements executed within the braces of `RUN`.
"SEND" on page 2-252	Send a vendor-specific quoted string to one or more specific channels.

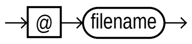
Table 2–1 Recovery Manager Commands

Command	Purpose
"SET" on page 2-254	Sets the value of various attributes that affect RMAN behavior for the duration of a RUN block or a session.
"SHOW" on page 2-263	Displays the current `CONFIGURE` settings.
"SHUTDOWN" on page 2-266	Shut down the target database. This command is equivalent to the SQL*Plus `SHUTDOWN` command.
"SPOOL" on page 2-269	Write RMAN output to a log file.
"SQL" on page 2-271	Execute a SQL statement from within Recovery Manager.
"STARTUP" on page 2-273	Start up the target database. This command is equivalent to the SQL*Plus `STARTUP` command.
"SWITCH" on page 2-276	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.
"UNREGISTER DATABASE" on page 2-280	Unregisters a database from the recovery catalog.
"untilClause" on page 2-282	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 2-285	Upgrade the recovery catalog schema from an older version to the version required by the RMAN executable.
"VALIDATE" on page 2-287	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

at::=



Purpose

To execute a series of RMAN commands stored in an operating system file with the specified full path name, for example, `@/oracle/dbs/cmd/cmd1.rman`. If you do not specify the full path name, then 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

None.

Example

Running a Command File from the Command Line: Example This example creates a command file and then runs it from the operating system command line:

```
echo "BACKUP DATABASE;" > backup_db.rman
rman TARGET / @backup_db.rman
```

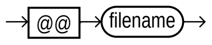
Running a Command File Within RMAN: Example This example runs a command file from the RMAN prompt and from within a RUN command:

```
@backup_db.rman
RUN { @backup_db.rman }
```

@@

Syntax

atat::=



Purpose

To execute a series of RMAN commands stored in an operating system file with the specified filename, for example, `@@cmd2.rman`. If `@@` is contained in a command file, then `@@`*`filename`* directs RMAN to look for the specified filename in the same directory as the command file from which it was called. If not used within a command file, the `@@` command is identical to the `@` command. For example, assume that 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 that the file must contain complete RMAN commands.

Restrictions and Usage Notes

None.

Example

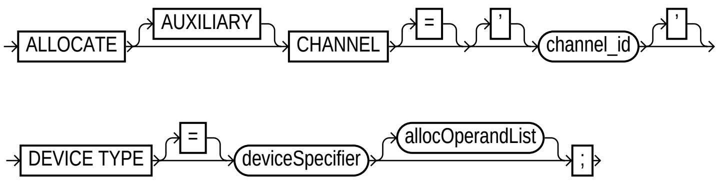
Calling a Command File Within Another Command File: Example Assume that you create command files called `backup_logs.rman` and `backup_db.rman` as in the following example. Then, you execute `bkup_db.rman` from the command line, which specifies that RMAN should look for the `bkup_logs.rman` script in the Oracle home directory:

```
echo "BACKUP ARCHIVELOG ALL;" > $ORACLE_HOME/bkup_logs.rman
echo "BACKUP DATABASE;" > $ORACLE_HOME/bkup_db.rman
echo "@@bkup_logs.rman" >> $ORACLE_HOME/bkup_db.rman
rman TARGET / @$ORACLE_HOME/bkup_db.rman
```

ALLOCATE CHANNEL

Syntax

allocate::=



Purpose

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

Manually allocated channels (allocated by using `ALLOCATE`) should be distinguished from 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 or image copy at a time. RMAN automatically releases the channel at the end of the job.

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

Whether `ALLOCATE CHANNEL` causes operating system resources to be allocated immediately 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 CHANNEL 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 either allocate a channel manually or configure a channel for automatic allocation before executing a BACKUP, DUPLICATE, CREATE CATALOG, RESTORE, RECOVER, or VALIDATE command.
- You cannot use BACKUP DEVICE TYPE or RESTORE DEVICE TYPE to use automatic channels after specifying manual channels with 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

Syntax Element	Description
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 2-135 to learn how to duplicate a database, and "CONNECT" on page 2-100 to learn how to connect to a duplicate database

Syntax Element	Description
CHANNEL *'channel_id'*	Specifies a connection between RMAN and the target database instance. Each connection initiates a 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. The database uses the *channel_id* to report I/O errors.
DEVICE TYPE = *deviceSpecifier*	Specifies the type of storage device. **See Also:** "deviceSpecifier" on page 2-129 **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 2-15

Examples

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

```
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE sbt;
  BACKUP DATABASE PLUS ARCHIVELOG;
}
```

Spreading a Backup 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/backups/%U';
  ALLOCATE CHANNEL disk2 DEVICE TYPE DISK FORMAT '/disk2/backups/%U';
  BACKUP DATABASE PLUS ARCHIVELOG; # AS COPY is default when backing up to disk
}
```

Creating Multiple Copies of a Backup: Example When creating multiple copies of a backup, you can specify the SET BACKUP COPIES command. The following example generates a single backup of the database to disk, and then creates two identical backups of datafile `1` to two different file systems:

```
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE DISK MAXPIECESIZE 5M;
  BACKUP DATABASE PLUS ARCHIVELOG;  # AS COPY is the default, so RMAN creates image copies
  SET BACKUP COPIES = 2;
  BACKUP DATAFILE 1 FORMAT '/disk1/backups/%U', '/disk2/backups/%U';
}
```

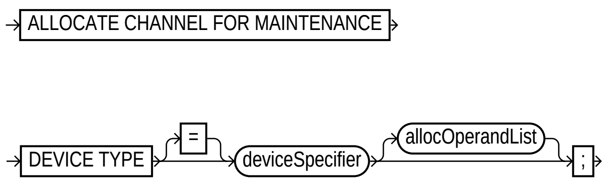
Allocating an Auxiliary Channel for Database Duplication: Example When creating a duplicate database, allocate a channel by using the `AUXILIARY` option:

```
RUN
{
  ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE sbt;
  ALLOCATE AUXILIARY CHANNEL c2 DEVICE TYPE sbt;
  DUPLICATE TARGET DATABASE TO ndbnewh
    LOGFILE
      '?/oradata/aux1/redo01.log' SIZE 200K,
      '?/oradata/aux1/redo02.log' SIZE 200K
      '?/oradata/aux1/redo03.log' SIZE 200K
  SKIP READONLY
  NOFILENAMECHECK;
}
```

ALLOCATE CHANNEL FOR MAINTENANCE

Syntax

allocateForMaint::=



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 automatic maintenance channel for you, then it uses the same naming convention as any other automatically allocated channel. If you explicitly invoke `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: *Oracle Database Backup and Recovery Advanced 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. This command cannot be used within a RUN block.
- 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.
- Manually allocated and automatic channels are never mixed. To perform maintenance on both disk and SBT simultaneously using manually allocated maintenance channels, you must allocate both channels explicitly.

Keywords and Parameters

Syntax Element	Description
`DEVICE TYPE =` *`deviceSpecifier`*	Specifies the type of storage device. **See Also:** "deviceSpecifier" on page 2-129 **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 2-15

Examples

Deleting a Backup Set: Example This example deletes backup sets from tape created more than a week ago:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
DELETE NOPROMPT BACKUP OF DATABASE COMPLETED BEFORE 'SYSDATE-7';
```

Crosschecking Archived Logs: Example This example crosschecks all archived logs on disk (by using the preconfigured disk channel) and tape. If the logs are not found, then RMAN marks them as `EXPIRED` in the repository:

```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
CROSSCHECK ARCHIVELOG ALL;
```

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:

```
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 a backup from both disk and tape:

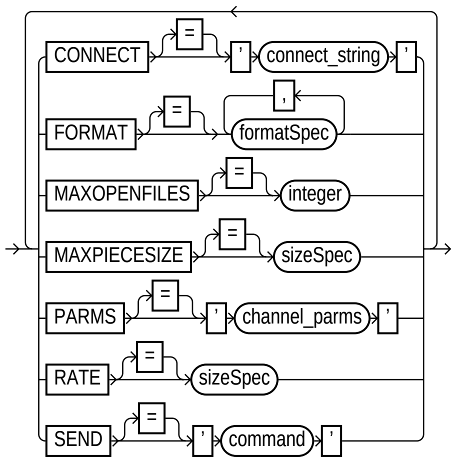
```
# back up datafile to disk and tape
BACKUP DEVICE TYPE DISK DATAFILE 1 TAG "weekly_bkup";
BACKUP DEVICE TYPE sbt DATAFILE 1 TAG "weekly_bkup";

# manually allocate sbt channel and disk channel
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE DISK;
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
DELETE BACKUPSET TAG "weekly_bkup";
```

allocOperandList

Syntax

allocOperandList::=



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

Syntax Element	Description
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 CONNECT 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 2-103 and "cmdLine" on page 2-75
FORMAT = *formatSpec*	Specifies the format to use for the names of backup pieces that are created on this channel. If you do not specify FORMAT, RMAN uses %U by default, which guarantees a unique identifier. If the flash recovery area is configured, then the files are created in the default disk location. Otherwise, the default disk location is operating system specific (for example, ?/dbs on Solaris). 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**: "formatSpec" on page 2-156 for available FORMAT parameters
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.

Syntax Element	Description
`MAXPIECESIZE =` *`integer`*	Specifies the maximum size of each backup piece created on this channel. Specify the size in bytes, kilobytes (`K`), megabytes (`M`), or gigabytes (`G`). The default setting is in bytes and is rounded down into kilobytes. 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.
`PARMS = '`*`channel_parms`*`'`	Specifies parameters for the device to allocate. Do not use this port-specific string if you have specified `DEVICE TYPE DISK`. **See Also:** *Oracle Database Backup and Recovery Advanced User's Guide* to learn how to integrate media management libraries
`'ENV=(`*`var1`*`=`*`val1`*`, `*`var2`*`=`*`val2`*`,...)'`	Specifies one or more environment variables required by the media management vendor in the 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=(TAPE_SERVER=srv1)"`
`'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` in the Solaris Operating Environment and `ORASBT.DLL` on Windows NT). For example: `PARMS="SBT_LIBRARY=/oracle/lib/mmv.so"`
`RATE =` *`integer`*	Sets the maximum number of bytes (default), kilobytes (`K`), megabytes (`M`), or gigabytes (`G`) that RMAN reads each second 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.
`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 and when it should be used.

Examples

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

```
CONFIGURE CHANNEL DEVICE TYPE DISK FORMAT = '?/oradata/bkup_%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 MAXPIECESIZE 800M;
  BACKUP DATABASE;
}
```

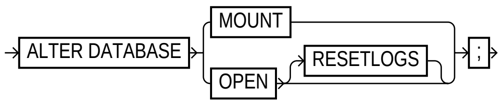
Allocating a Channel for a Backup: Example This example configures a default media management library, then makes a database backup by using this library. Then, the example backs up the database again using a different library, then finally makes a third backup using the default library:

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

ALTER DATABASE

Syntax

alterDatabase::=



Purpose

To mount or open a database.

See Also: *Oracle Database 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

Syntax Element	Description
MOUNT	Mounts the database without opening it. This option is equivalent to the SQL statement ALTER DATABASE MOUNT.
OPEN	Opens the database.

Syntax Element	Description
RESETLOGS	Archives the current online redo logs (or up to the last redo record before redo corruption if corruption is found), clears the contents of the online redo logs, and 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 when connected to a recovery catalog, enter the following:

```
STARTUP NOMOUNT;
RESTORE CONTROLFILE;
ALTER DATABASE MOUNT;
# you must run the RECOVER command after restoring a control file even if no datafiles
# require recovery
RECOVER DATABASE;
ALTER DATABASE OPEN RESETLOGS;
# if the database uses locally-managed temporary tablespaces, then you must add tempfiles
# to these tablespaces after restoring a backup control file
SQL " ALTER TABLESPACE temp ADD TEMPFILE ''?/oradata/trgt/temp01.dbf'' REUSE";
```

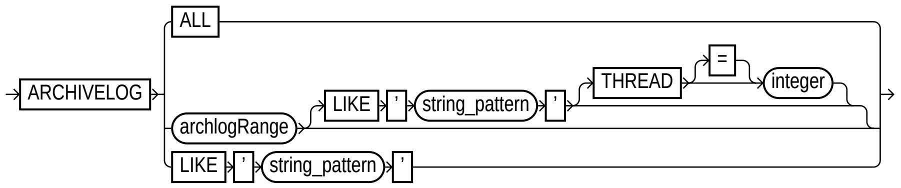
Performing RESETLOGS After Incomplete Recovery: Example This example uses a manually allocated channel to perform incomplete recovery and then resets the online redo logs:

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

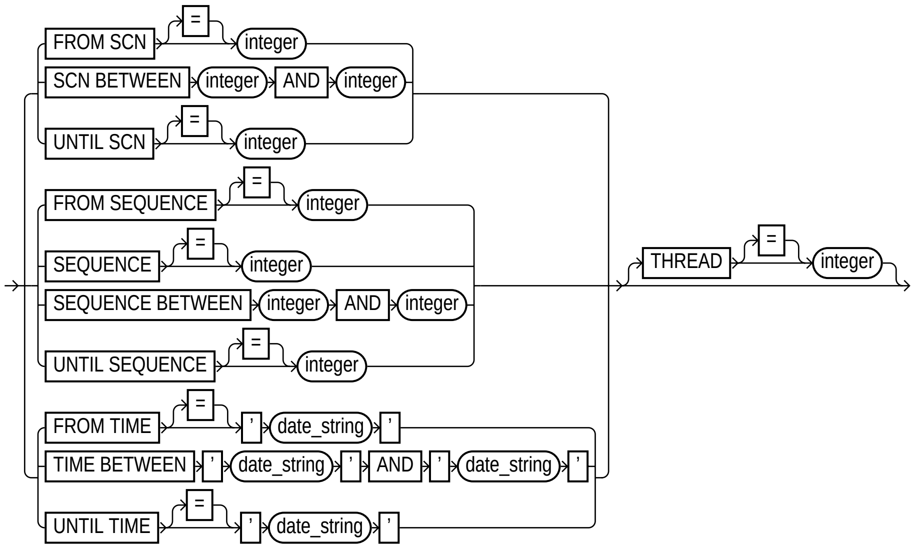
archivelogRecordSpecifier

Syntax

`archivelogRecordSpecifier::=`



`archlogRange::=`



Purpose

A subclause used to specify an archived log or range of archived redo logs files for use in backup, restore, recovery, 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 *Oracle Database Reference*.

Keywords and Parameters

`archivelogRecordSpecifier`

Syntax Element	Description
`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:** *Oracle Real Application Clusters Administrator's Guide* to learn about using RMAN in a RAC configuration

archlogRange

Syntax Element	Description
`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.
`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`*.
`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. If the database is open when you run `BACKUP ARCHIVELOG`, and if the `UNTIL` clause is specified, then RMAN does not run `ALTER SYSTEM ARCHIVE LOG CURRENT`.
`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. If the database is open when you run `BACKUP ARCHIVELOG`, and if the `SEQUENCE` keyword is specified, then RMAN does not run `ALTER SYSTEM ARCHIVE LOG CURRENT`.
`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`*.
`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. If the database is open when you run `BACKUP ARCHIVELOG`, and if the `UNTIL` clause is specified, then RMAN does not run `ALTER SYSTEM ARCHIVE LOG CURRENT`.

Syntax Element	Description
FROM TIME = '*date_string*'	Specifies the beginning date for a sequence of archived redo log files. The clause specifies those logs that could be used in a recovery starting at the indicated time. 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 DATE 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. **Note:** The FROM TIME clause is not the same as the COMPLETED AFTER clause. FROM TIME specifies logs that could be used to *recover* starting at the indicated time, whereas COMPLETED AFTER specifies logs that were *created* after the indicated time (refer to "completedTimeSpec" on page 2-80). **See Also:** *Oracle 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 TIME = '*date_string*'	Specifies the end date for a sequence of archived redo log files. The clause specifies those logs that could be used to recover to the indicated time. 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 DATE 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. If the database is open when you run BACKUP ARCHIVELOG, and if the UNTIL clause is specified, then RMAN does not run ALTER SYSTEM ARCHIVE LOG CURRENT. **Note:** The UNTIL TIME clause is not the same as the COMPLETED BEFORE clause. UNTIL TIME specifies logs that could be used to *recover* to the indicated time, whereas COMPLETED BEFORE specifies logs that were *created* before the indicated time (refer to "completedTimeSpec" on page 2-80). **See Also:** *Oracle Database Reference* for information on how to use the NLS_LANG and NLS_DATE_FORMAT environment variables to specify the format for the time

Syntax Element	Description
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 (RAC) configuration. THREAD is only valid when SEQUENCE is also specified. 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 a log.

Examples

Specifying Records by Time: Example This example backs up all logs that could be used to recover to a point one week ago, and then deletes all archived redo logs that were created more than two weeks ago:

```
BACKUP ARCHIVELOG UNTIL TIME 'SYSDATE-7';
DELETE ARCHIVELOG ALL COMPLETED BEFORE '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 94097 AND 106245;
```

Specifying a Single Log Sequence Number: Example This example backs up only archived log 30 of thread 1 and then deletes it.

```
BACKUP ARCHIVELOG SEQUENCE 30 DELETE INPUT;
```

Specifying a Range of Records by Log Sequence Number: Example This example backs up all archived logs from sequence 431 to sequence 440 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 31 AND 40 THREAD 1
    # delete original archived redo logs after backup completes
    DELETE INPUT;
}
```

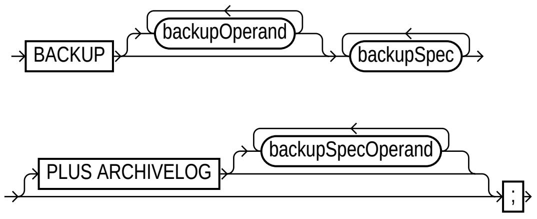
Specifying All Log Sequence Numbers in a Thread This example crosschecks all archived redo logs in thread `1`:

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

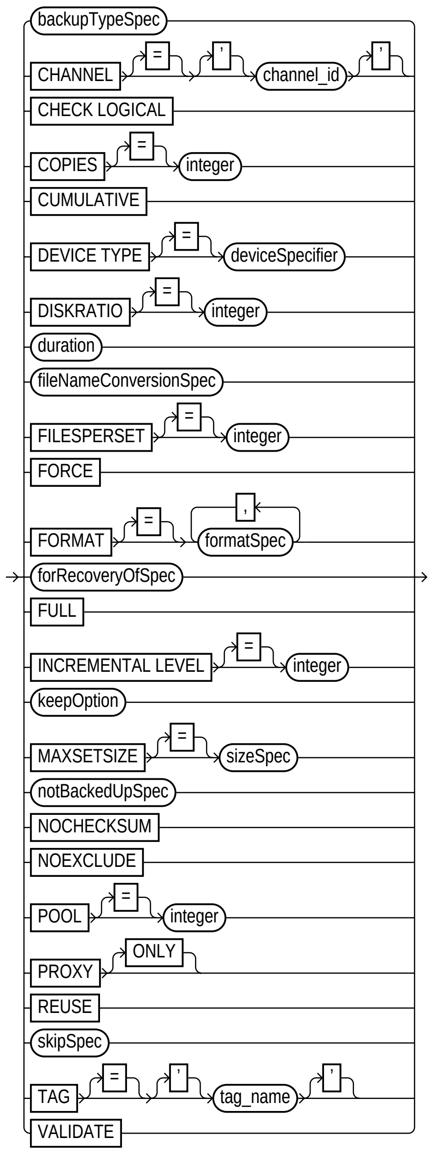
BACKUP

Syntax

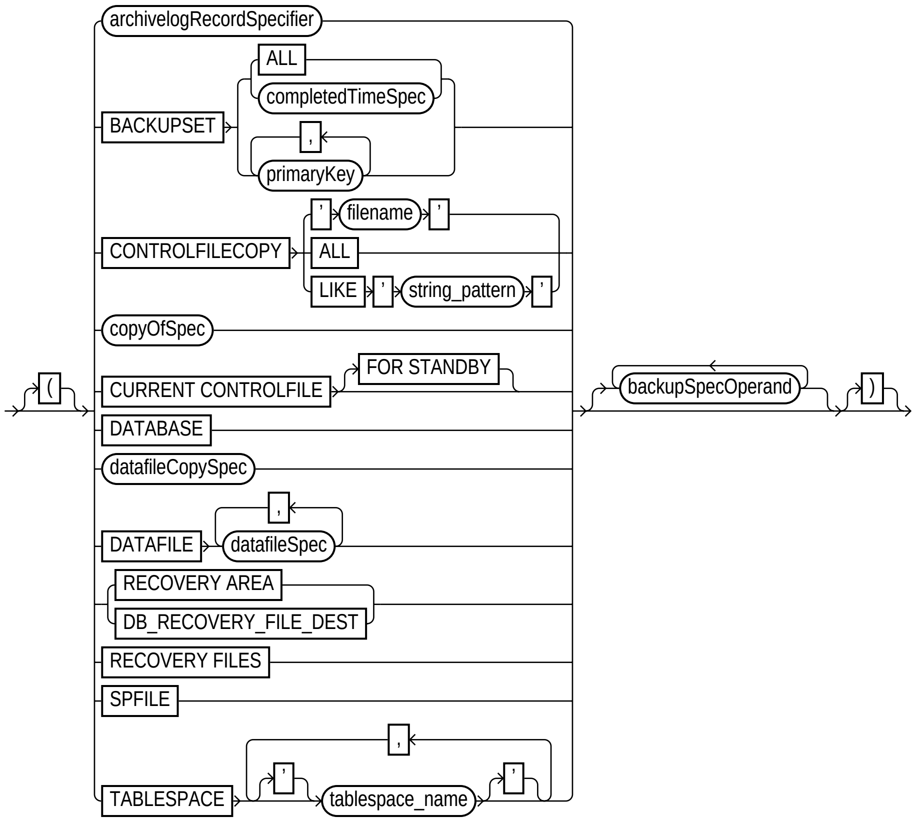
backup::=



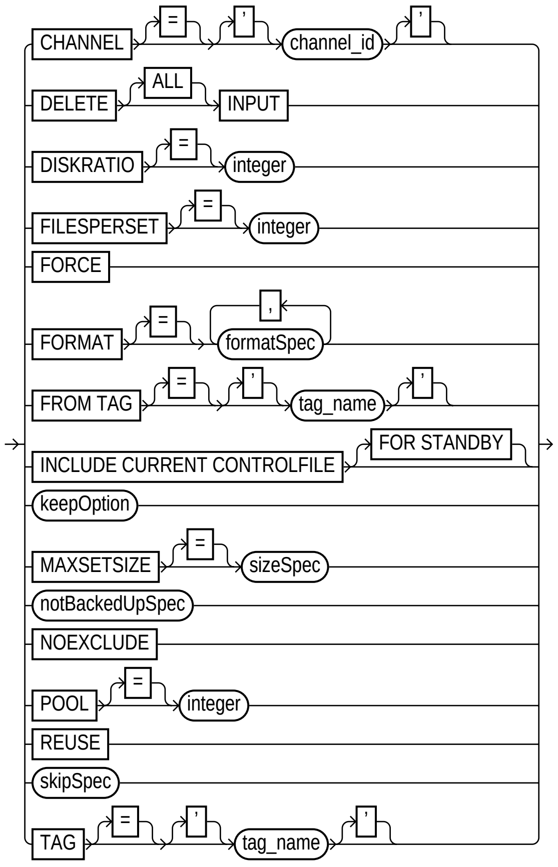
backupOperand::=



backupSpec::=


archivelogRecordSpecifier
BACKUPSET
ALL
completedTimeSpec
,
primaryKey
CONTROLFILECOPY
'
filename
'
ALL
LIKE
'
string_pattern
'
copyOfSpec
(
CURRENT CONTROLFILE
FOR STANDBY
DATABASE
datafileCopySpec
DATAFILE
,
datafileSpec
RECOVERY AREA
DB_RECOVERY_FILE_DEST
RECOVERY FILES
SPFILE
TABLESPACE
,
'
tablespace_name
'
backupSpecOperand
)

backupSpecOperand::=



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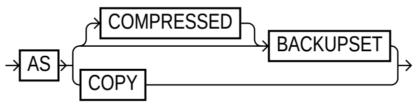

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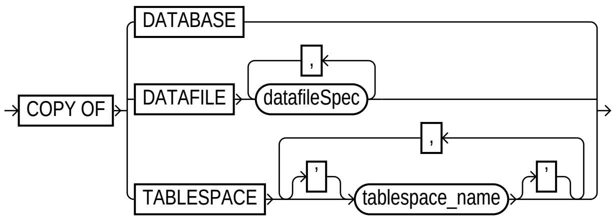

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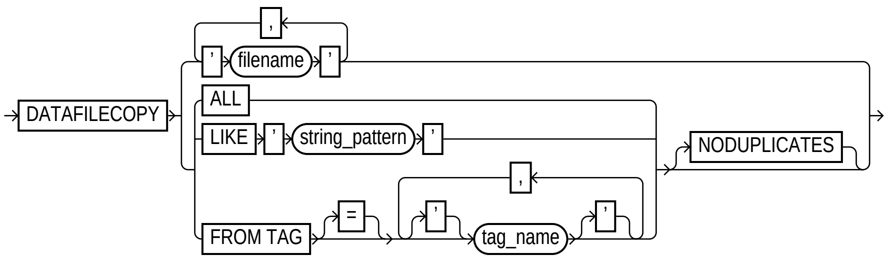
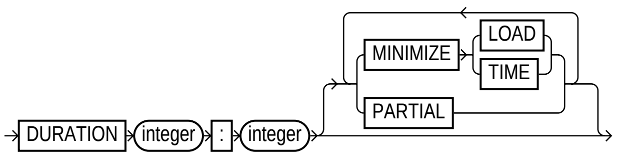
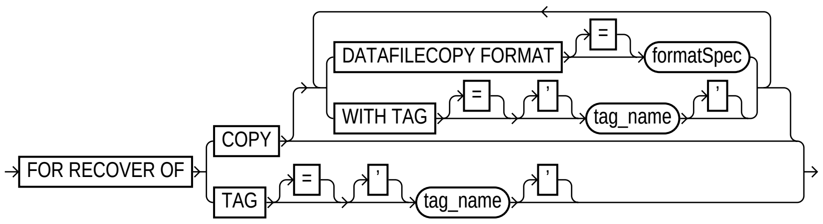


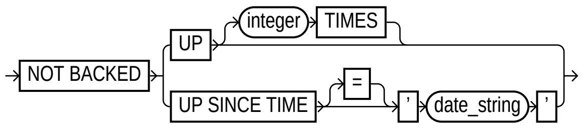
duration::=



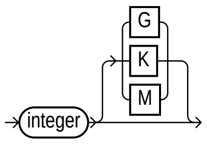
forRecoveryOfSpec::=



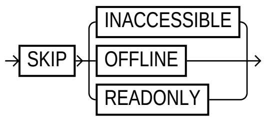
notBackedUpSpec::=



sizeSpec::=



skipSpec::=



Purpose

To back up a database, tablespace, datafile (current or copy), control file (current or copy), SPFILE, archived log, or backup set. (These are the only file types that can be backed up by RMAN.) can back up a target or standby database. The term **backup** refers to the files created by an RMAN BACKUP command.

Control File Autobackups

If CONFIGURE CONTROLFILE AUTOBACKUP is set to ON, then RMAN automatically backs up the control file after BACKUP commands. "CONFIGURE" on page 2-82 describes the complete set of circumstances in which autobackups occur.

Backup Sets, Backup Pieces, Image Copies, and Proxy Copies

When the AS BACKUPSET option is used, RMAN generates one or more **backup sets**, which are RMAN-specific logical structures. The backup set is the smallest unit of a backup. By default, each backup set contains 4 or fewer datafiles or 16 or fewer archived logs.

Note: RMAN only records complete backup sets in the RMAN repository. There are no partial backup sets. When a BACKUP command creates backup pieces but does not produce a complete backup set for any reason, the backup pieces are discarded.

Each backup set contains at least one **backup piece**, which is an RMAN-specific 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.

Backup sets can be created on disk, or on media manager devices such as tape drives.

When the AS COPY option is used, RMAN generates **image copies** of the input files. An image copy is a byte-for-byte identical copy of the original file. You can create image copy backups of datafiles, datafile copies, and archived redo log files. Image copy files can only exist on disk.

You can create and restore image copy backups with RMAN, or with a native operating system command for copying files. However, when you use RMAN to create image copies, they are recorded in the RMAN repository, and are more easily available for use in restore and recovery operations. Otherwise, you must use the `CATALOG` command to add the image copies to the RMAN repository before RMAN can use them.

By default, RMAN creates all backups as backup sets, on tape or on disk. You can change the default backup type for disk backups to be image copies using the `CONFIGURE` command. Backups to tape can only be backup sets.

Incremental Backups

Incremental backups copy only those blocks that have changed since a previous backup. A level 0 incremental backup captures all data blocks in a datafile. Level 1 incremental backups capture changes since a previous backup. Level 1 backups can be cumulative, in which case they capture changes since the last level 0 incremental backup, or differential, in which case they capture changes since the last level 0 or level 1 incremental backup.

Block Change Tracking for Incremental Backups

You can improve incremental backup performance by enabling **block change tracking**, in which case RMAN keeps a record of which blocks have changed, and uses this record whenever possible to avoid scanning entire datafiles.

For details on block change tracking, including how to enable and disable it, see *Oracle Database Backup and Recovery Basics*.

Incrementally Updated Backups: Rolling Forward Datafile Image Copies

By using the `BACKUP INCREMENTAL... FOR RECOVER OF COPY WITH TAG...` syntax you can create level 1 incremental backups suitable for rolling forward a level 0 incremetal image copy backup of your database. `RECOVER COPY OF... WITH TAG...` is used to perform incremental update of a backup. This technique is used in Enterprise Manager's Oracle-suggested Strategy for backups to disk.

For more details on incrementally updated backups, see *Oracle Database Backup and Recovery Basics*.

Backup Optimization

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.

Channel Failover
A BACKUP command is decomposed into multiple independent backup steps by RMAN. Each independent step can be executed on any channel allocated for a specific device. If you have multiple channels allocated, and one channel fails or encounters a problem during a backup step, then RMAN attempts to complete the work on another channel. RMAN reports a message in V$RMAN_OUTPUT and in the output to the interactive session or log file when channel failover occurs.

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. If no manual channel is allocated, then RMAN uses the default channels (refer to description of CONFIGURE command). RMAN comes with a preconfigured DISK channel.

> **Note:** Backups that use the disk test API are not supported for production backups. 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 a 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 manager.

When using the RMAN BACKUP command, you *cannot* perform any of the following actions:

- Make a backup (either normal or incremental) in NOARCHIVELOG mode when the database is open or is closed after an instance failure or SHUTDOWN ABORT. You can only backup a database running in NOARCHIVELOG mode 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 set.
- Specify multiple, identical FORMAT strings within a single *backupSpec* (for example, BACKUP DATAFILE 3 TO '/tmp/foo', DATAFILE 4 TO '/tmp/foo'). However, RMAN permits a single FORMAT string to exist in multiple *backupSpec* clauses.
- 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 locally-managed temporary tablespaces (although you can back up dictionary-managed 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.
- Create image copies (BACKUP AS COPY) on a nondisk media device.
- Create incremental level 1 backups as image copies.
- Back up a backup set on tape to disk or on tape to tape.
- Make an image copy of a backup set, although you can make an image copy of an image copy.
- Specify the PLUS ARCHIVELOG clause on the BACKUP ARCHIVELOG command.
- 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 platform-specific length limit. If you use a media manager, then the length is also limited by the limit in the supported version of the media management API. Vendors supporting SBT 1.1 must support filenames up to 14 characters, and may support longer filenames. Vendors supporting SBT 2.0 must support filenames up to 512 characters, but may support longer filenames.
- Specify the `DEVICE TYPE` option for a device other than `DISK` if you have not already run `CONFIGURE DEVICE TYPE` for this device.
- Manually allocate channels and run `BACKUP` with the `DEVICE TYPE` option.
- Validate the backup of backup sets.
- Specify `DEVICE TYPE DISK` when running the `BACKUP RECOVERY AREA` command.
- Back up the change-tracking file with RMAN.

Keywords and Parameters

backup

Syntax Element	Description
backupOperand	Specifies various options for the BACKUP command.
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 (AS BACKUPSET) or image copies (AS COPY). For AS BACKUPSET, the *backupSpec* clause generates multiple backup sets if the number of datafiles specified in or implied by its list of objects exceeds the default limit of 4 datafiles or 16 archived logs in each backup set.
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.
backupSpecOperand	Specifies a variety of options and parameters that affect the *backupSpec* clause.

backupOperand

Syntax Element	Description
backupOperand	Specifies various options for the BACKUP command.
backupTypeSpec	Specifies the type of backup being created, either backup sets or image copies. See "backupTypeSpec" on page 2-52 for details.
CHANNEL *channel_id*	Specifies the case-sensitive name of a channel to use when creating backups. Use any name that is meaningful, for example *ch1* or *dev1*. The database uses the channel ID to report I/O errors. If you do not set this parameter, then RMAN dynamically assigns the backup sets to any available channels during execution. **Note:** You can also specify this parameter in the *backupSpec* clause.

Syntax Element	Description
`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 is no more than its `MAXCORRUPT` setting, then the command completes, and `V$DATABASE_BLOCK_CORRUPTION` is populated with any corrupt block ranges. If `MAXCORRUPT` is exceeded, then the command terminates without updating the view. If the initialization parameter `DB_BLOCK_CHECKSUM=TRUE`, and if `MAXCORRUPT` and `NOCHECKSUM` are not set, then specifying `CHECK LOGICAL` detects all types of corruption that are possible to detect. **Note:** The `MAXCORRUPT` setting specifies the total number of physical and logical corruptions permitted on a file.
`COPIES` = *`integer`*	Sets the number of identical backups (`1` - `4`) that RMAN should create. 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 lower settings: 1. `BACKUP COPIES` 2. `SET BACKUP COPIES` 3. `CONFIGURE ... BACKUP COPIES` **Note:** This option does not apply with `AS COPY` and results in an error message. **Note:** Duplexing cannot be used when creating files in the flash recovery area.
`CUMULATIVE`	Copies the data blocks used since the most recent backup at level 0 or lower, where *n* is 1. For example, in a cumulative level 1 backup RMAN backs up all blocks used since the most recent level 0 backup. **Note:** This option does not apply with `AS COPY` and results in an error message.
`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 2-129

Syntax Element	Description
`DISKRATIO [=]` *`integer`*	Directs RMAN to populate each backup set with datafiles from at least integer disks. This parameter is only enabled when you are backing up datafiles or control files, and when the operating system can give RMAN disk contention and node affinity information. To manually disable this feature, set `DISKRATIO = 0`. For example, assume that datafiles are distributed across 10 disks. If the disks supply data at 10 bytes/second, and if the tape drive requires 50 bytes/second to keep streaming, then set `DISKRATIO = 5` to direct RMAN to include datafiles from at least 5 disks in each backup set. If you set `FILESPERSET` but not `DISKRATIO`, then `DISKRATIO` defaults to the same value as `FILESPERSET`. If you specify neither parameter, then `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` is 4 and the datafiles are located on three disks, then RMAN attempts to include datafiles from three disks in each backup set. 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 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.
`duration`	Specifies options related to the maximum time for a backup command to run. **See Also:** "duration" on page 2-54
`filenameConversionSpec`	This option is valid only when `BACKUP` is creating image copies. Files being copied are renamed according to the specified patterns. If a file being backed up has a name that does not match any of the specified rename patterns, then RMAN uses `FORMAT` to name the output image copies. If no `FORMAT` was specified, then RMAN uses the default format `%U`. See "fileNameConversionSpec" on page 2-148 for details about file renaming patterns.
`FILESPERSET [=]` *`integer`*	When used with commands that create backupsets, specifies the maximum number of files to include in each backupset created. By default, RMAN divides files among backupsets in order to make optimal use of channel resources. The number of files to be backed up is divided by the number of channels. If the result is less than 64, then it is the number of files placed in each backupset. Otherwise, 64 files will be placed in each backupset..

Syntax Element	Description
`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.
`FORMAT =` *`formatSpec`*	Specifies a pattern to use in creating a filename for the backup pieces or image copies created by this command. For `AS COPY`, if one or more of the directories mentioned in the specified format do not exist, then RMAN signals an error. **See Also:** "formatSpec" on page 2-156 for legal substitution variables
`forRecoveryOfSpec`	Identifies the backup being created as an incremental backup to be used in rolling forward an image copy. See "forRecoveryOfSpec" on page 2-55 for details.
`FULL`	Copies all blocks into the backup set or image copy, skipping only datafile blocks that have never been used. `FULL` is the opposite of `INCREMENTAL`. RMAN makes full backups by default if neither `FULL` nor `INCREMENTAL` is specified. Unused block compression causes never-written blocks to be skipped when backing up datafiles to backupsets, even for full backups. A full backup has no effect on subsequent incremental backups, and is not considered a part of any incremental backup strategy (though a full image copy backup can be incrementally updated by applying incremental backups with the RECOVER command).

Syntax Element	Description
INCREMENTAL LEVEL [=] *integer*	Copies only those data blocks that have changed since the last incremental *integer* backup, where *integer* is 0 or 1. An incremental backup at level 0 backs up all data blocks in datafiles being backed up. An incremental backup at level 1 backs up only changed blocks. An incremental backup can be either differential or cumulative.In a cumulative level 1 incremental backup, RMAN backs up all blocks changed since the most recent level 0 backup. In a differential level 1 incremental backup, RMAN backs up blocks updated since the last level 0 or level 1 incremental backup. Incremental backups at level 0 can be either backup sets or image copies. Incremental backups at level 1 can only be backup sets. 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 backup, then RMAN makes a level 0 backup automatically. The database performs checks when attempting to create a level 1 incremental backup, to ensure that the incremental backup is usable by a subsequent RECOVER command. Among the checks performed are: ■ A level 0 backup must exist for each datafile in the BACKUP command. These backups must not have status UNAVAILABLE. If no level 0 backup exists, then RMAN 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:** 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. **Note:** When creating an incremental backup, RMAN considers backups from parent incarnations as valid. For example, assume you make a level 0 backup and then OPEN RESETLOGS. If you make a level 1 incremental backup, then RMAN backs up all blocks changed since the pre-RESETLOGS level 0 backup. **See Also:** "CHANGE" on page 2-71
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 2-162

Syntax Element	Description
MAXSETSIZE = integer [K | M | G]	Specifies a maximum size for a backup set.RMAN limits all backup sets to this size. Use MAXSETSIZE to configure backup sets so that each fits on one tape rather than spanning 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. Specify size in bytes (default), kilobytes (K), megabytes (M), or gigabytes (G). Thus, to limit a backup set to 3 MB, specify MAXSETSIZE = 3M. The default size is in bytes, rounded down from kilobytes. For example, MAXSETSIZE = 3000 is rounded down to 2 KB (2048 bytes). The minimum value must be greater than or equal to the database block size. The default number of files in each backup set is 4 for datafiles and 16 for archived logs. When you specify MAsXSETSIZE, RMAN attempts to limit the size in bytes of the backup sets according to the MAXSETSIZE parameter. The limit on the number of files in a backup set will apply even if the total size of the resulting backup set is less than MAXSETSIZEs. **Note:** This option cannot be used with BACKUP AS COPY and results in an error message. If you run BACKUP AS COPY on a channel that has MAXSETSIZE set, then MAXSETSIZE is silently ignored.
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 the database computes a checksum for each block during normal operations and stores it in the block before writing the block to disk. When the database reads the block from disk later, it recomputes the checksum and compares it to the stored value. If they do not match, then the block is damaged. By default, the database also 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. If you wish to prevent the use of block checksums in your backup, use the NOCHECKSUM option. **See Also:** *Oracle Database Reference* for more information about the DB_ BLOCK_CHECKSUM initialization parameter
notBackedUpSpec	Limits the set of files to be backed up according to whether a specified number of backups are already present (and not obsolete), or whether the files have been backed up since a specified date. See "notBackedUpSpec" on page 2-55 for details.
NOEXCLUDE	When specified on BACKUP DATABASE or BACKUP COPY OF 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.

Syntax Element	Description
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. **Note:** This option does not apply with AS COPY and results in an error message.
PROXY	Backs up the specified files by means of the proxy copy functionality, which gives the media management software control over the data transfer between storage devices and the 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 a warning and attempts a a conventional (that is, non-proxy) backup of the specified files. **2.** If RMAN locates a proxy-capable channel, it calls the media manager to check if it can proxy copy the files. If the media manager cannot proxy copy, then RMAN uses conventional backup sets to back up the files. If you do not want RMAN to try a conventional copy when a proxy copy fails, use the ONLY option. **Note:** If you specify PROXY, then the %p variable must be included in the FORMAT string either explicitly or implicitly within %U. **Note:** This option cannot be used with BACKUP AS COPY and results in an error message.
ONLY	Causes the database to issue an error message when it cannot proxy copy rather than creating conventional backup sets.
REUSE	Enables RMAN to overwrite an already existing backup or copy with the same filename as the file that BACKUP is currently creating.
skipSpec	Excludes datafiles or archived redo logs from the backup if they are inaccessible, offline or read-only. See "*skipSpec*" on page 2-57 for details.

Syntax Element	Description
`TAG` *`tag_name`*	Creates a user-specified tag name for a backup. The tag is not case sensitive. If you do not specify a tag name, then by default RMAN creates a tag for backups (except for control file autobackups) in the format `TAG`*`YYYYMMDD`*`T`*`HHMMSS`*, where *`YYYY`* is the year, *`MM`* is the month, *`DD`* is the day, *`HH`* is the hour (in 24-hour format), *`MM`* is the minutes, and *`SS`* is the seconds. For example, a backup of datafile `1` can receive the tag `TAG20020208T133437`. The date and time refer to when RMAN started the backup. If multiple backup sets are created by one `BACKUP AS BACKUPSET` command, then each backup piece is assigned the same default tag. A tag applies to each backup piece in a given copy of a backup set (for `AS BACKUPSET`) or each image copy (for `AS COPY`). For example, if you run `BACKUP AS BACKUPSET COPIES 1 DATABASE TAG TUE_PM`, then only one copy of the backup set exists and each piece in the backup set has tag `TUE_PM`. Assume that this backup set has primary key `1234`. If you then run `BACKUP BACKUPSET 1234 TAG WED_PM`, then the first copy of the backup set has tag `TUE_PM` and the second copy of the backup set has tag `WED_PM`. Typically, a tag is a meaningful name such as `MONDAY_EVENING_BACKUP` or `WEEKLY_FULL_BACKUP`. Tags must be 30 characters or less. 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 the command have the 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.
`VALIDATE`	Causes RMAN to scan the specified files and verify their contents, testing whether this file can be backed up. 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.

backupSpec

Syntax Element	Description
backupSpec	A BACKUP specification list contains a list of one or more *backupSpec* clauses. A *backupSpec* clause contains, at a minimum, a list of one or more objects to be backed up. Each *backupSpec* clause generates one or more backup sets (AS BACKUPSET) or image copies (AS COPY). For AS BACKUPSET, the *backupSpec* clause generates multiple backup sets if the number of datafiles specified in or implied by its list of objects exceeds the default limit of 4 datafiles or 16 archived logs in each backup set.
archivelogRecordSpecifier	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 to multiple destinations, RMAN backs up *one* copy of each log sequence number—not each copy of each log sequence number. For other commands, such as DELETE, ALL does refer to every log, even duplicate log sequences. If the database is open when you run BACKUP ARCHIVELOG, and if the UNTIL clause or SEQUENCE parameter is not specified, then RMAN runs ALTER SYSTEM ARCHIVE LOG CURRENT. **Note:** If you run BACKUP ARCHIVELOG ALL, or if the specified log range includes logs from prior incarnations, then RMAN backs up logs from prior incarnations to ensure availability of all logs that may be required for recovery through an OPEN RESETLOGS. **See Also:** "archivelogRecordSpecifier" on page 2-22 for syntax, and *Oracle Database Backup and Recovery Advanced User's Guide* explanations of backup failover for logs and automatic log switching

Syntax Element	Description
`BACKUPSET { ALL | completedTimeSpec | primaryKey [, primaryKey ] }`	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 2-80
`CONTROLFILECOPY { '`*`filename`*`' | ALL | LIKE '`*`string_pattern`*`' }`	Specifies a control file copy in one of the following ways: ■ *`'filename'`* specifies a control file copy by filename ■ `ALL` specifies that all control file copies should be backed up ■ `LIKE` *`'pattern'`* specifies a filename pattern. The percent sign (%) as a wildcard meaning 0 o r more characters; an underscore (_) is a wildcard meaning 1 character. The control file copy can be: ■ A copy of a normal control file (that is, not a standby control file) created with the `BACKUP AS COPY CURRENT CONTROLFILE` command or the SQL statement `ALTER DATABASE BACKUP CONTROLFILE TO '...'` ■ A standby control file copy created with the `BACKUP AS 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.
`copyOfSpec`	Makes a backup of previous image copies of datafiles and possibly control files. See "copyOfSpec" on page 2-53 for details.
`CURRENT CONTROLFILE [FOR STANDBY]`	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 backup of the current control file.

Syntax Element	Description
DATABASE	Creates a backup set (AS BACKUPSET) or group of image copies (AS COPY) for all datafiles in the database. If generating a backup set, then RMAN can include only datafiles and control files: it cannot include archived redo logs. If the *backupSpec* includes datafile 1, and if CONFIGURE CONTROLFILE AUTOBACKUP is OFF, then RMAN automatically includes the control file in the backup. If the instance is started with a server parameter file, then RMAN also includes this parameter file in the backup. If the *backupSpec* includes datafile 1, and if CONTROLFILE AUTOBACKUP is ON, then RMAN does *not* automatically include the control file in the output. Instead, RMAN generates a separate control file autobackup piece. If the instance is started with a server parameter file, then RMAN includes this parameter file in the autobackup piece. **Note:** To force RMAN to include the current control file in the backup when CONTROLFILE AUTOBACKUP is ON, specify the INCLUDE CURRENT CONTROLFILE clause.
datafileCopySpec	Specifies the filenames of one or more datafile image copies. See "datafileCopySpec" on page 2-54 for details.
DATAFILE *datafileSpec*	Specifies a list of one or more datafiles. Refer to description of BACKUP DATABASE for RMAN behavior when datafile 1 is backed up. **See Also:** "datafileSpec" on page 2-121
RECOVERY AREA | DB_RECOVERY_FILE_DEST	Backs up recovery files created in the current and all previous flash recovery area destinations. Recovery files are full and incremental backup sets, control file autobackups, archived logs, and datafile copies. Flashback logs, the current control file, and online redo logs are *not* backed up. RECOVERY AREA and DB_RECOVERY_FILE_DEST are synonyms. Backup optimization is always ON for this option. The backup must go to sbt, so RMAN issues an error if no sbt channels are allocated or configured. **Note:** If the flash recovery area is not enabled but has been enabled in the past, then files that were created in the previous flash recovery area location are backed up.
RECOVERY FILES	Backs up *all* recovery files on disk, whether they are stored in the flash recovery area or another locations on disk. Recovery files include full and incremental backup sets, control file autobackups, archived logs, and datafile copies. Backup optimization is always ON for this option. The backup must go to sbt, so RMAN issues an error if no sbt channels are allocated or configured.
SPFILE	Backs up the server parameter file currently used by the database. RMAN cannot back up other copies of the server parameter file, and cannot back up the server parameter file when the instance was started with an initialization parameter file. RMAN cannot make incremental backups of the SPFILE.

Syntax Element	Description
TABLESPACE *tablespace_name* [, *tablespace_name*]	Specifies the names of one or more tablespaces. RMAN backs up all datafiles that are currently part of the tablespaces. If the SYSTEM tablespace (and thus datafile 1) is included in the backup, and if CONTROLFILE AUTOBACKUP is not configured, then RMAN creates a copy of the control file. The TABLESPACE keyword is merely a convenience; tablespace names are translated internally into a list of datafiles. If you rename a tablespace (for example, from users to customers), then RMAN detects that the tablespace has changed its name and updates the recovery catalog on the next resynchronization.
backupSpecOperand	The *backupSpecOperand* that follows a *backupSpec* specifies options that apply to the backupSpec.

backupSpecOperand

Syntax Element	Description
backupSpecOperand	Specifies a variety of options and parameters that affect the *backupSpec* clause. Many subclauses of *backupSpecOperand* are also used with *backupOperand*. For those, see the description of *"backupOperand"* on page 2-39. Those which are not shared in common with backupOperand are listed here.
DELETE [ALL] INPUT	Deletes the input files upon successful creation of the backup. Specify this option only when backing up archived logs, datafile copies (COPY OF or DATAFILECOPY), 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 used *without* the ALL keyword, RMAN only deletes the copy of the file that it backs up. **See Also:** "CONNECT" on page 2-100 for information on the effect of recovery catalog compatibility on this command
FROM TAG = 'tag_name'	Allows specifying a backup by tag. Defined in context with several other commands.
INCLUDE CURRENT CONTROLFILE [FOR STANDBY]	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. **Note:** This option does not apply with AS COPY and results in an error message.

backupTypeSpec

Syntax Element	Description
`AS [ COMPRESSED ] BACKUPSET`	Creates backup sets (rather than image copies) on the specified device type. AS BACKUPSET is the only possibility when backing up to tape, and for creating level 1 incremental backups to any destination. With the COMPRESSED option, binary compression is used. The data written into the backup set is compressed to reduce the overall size of the backup set. All backups that create backup sets can create compressed backup sets. Restoring compressed backup sets is no different from restoring uncompressed backup sets. **Note:** ■ There is some CPU overhead associated with compressing backup sets. If the database being backed up is running at or near its maximum load, you may find the overhead from using AS COMPRESSED BACKUPSET unacceptable. In most other circumstances, compressing backupsets saves enough disk space to be worth the CPU overhead. ■ When backing up to a *locally attached* tape device, compression provided by the media management vendor is usually preferable to the binary compression integraed into the database, so use uncompressed backup sets and turn on the compression provided by the media management vendor. In any case, you should not use both forms of compression together. ■ When using incrementally updated backups, the level 0 incremental must be an image copy backup. ■ Full database backups should usually be either image copies or compressed backupsets. Image copies are more flexible than backup sets for some purposes (such as use in an incrementally updated backups strategy), and compressed backupsets make more efficient use of storage space, if you can tolerate the CPU overhead.
`AS COPY`	Creates image copies (rather than backup sets). Can only be used with backups created on disk.

copyOfSpec

Syntax Element	Description
COPY OF DATABASE	Makes a backup of previous image copies of all datafiles and control files in the database. All datafiles that would normally be included by BACKUP DATABASE are expected to have copies: if not, then RMAN signals an error. It is not necessary for all copies to have been produced by a single BACKUP command. If multiple copies exist of datafile, then RMAN backs up the latest. Optionally, specify the copies by tag name (for example, FULL_COLD_COPY). **Note**: The output of this command can be image copies or backup sets.
COPY OF TABLESPACE *tablespace_name*	Makes a backup of previous image copies of the datafiles in one or more specified tablespaces. All datafiles that would normally be included by BACKUP TABLESPACE should have copies: if not, then RMAN signals an error. It is not necessary for all copies to have been produced by a single BACKUP command. If multiple copies exist of datafile, then RMAN backs up the latest. Specify the tablespaces in the list by tablespace name (for example, users) or specify a particular copy by tag name (for example, 0403_CPY_OF_USERS). If you do not specify TAG, then RMAN backs up the most recent datafile copy for each datafile in the tablespace. **Note**: The output of this command can be image copies or backup sets.
COPY OF DATAFILE *datafileSpec*	Makes a backup of a previous image copy of one or more datafiles. Specify the datafile by file number (DATAFILE 3) or filename (DATAFILE '?/oradata/trgt/users01.dbf'). You specify the datafile filename and *not* the filename of the copy of the datafile. If more than one copy exists of a given datafile, then RMAN backs up the most recent copy. **Note:** It is not necessary for the image copies that you are backing up to have been created by a single BACKUP command. **Note**: The output of this command can be image copies or backup sets. **See Also:** "datafileSpec" on page 2-121

datafileCopySpec

Syntax Element	Description
`DATAFILECOPY { filename [,filename...] |{ ALL | LIKE 'string_pattern' | FROM TAG 'tag_name' } }`	Specifies the filenames of one or more datafile image copies. You can use the following parameters: ■ *'filename'* specifies an image copy by filename ■ `ALL` specifies that all datafile image copies should be backed up ■ `LIKE` *'pattern'* specifies a filename pattern. The percent sign (%) is a wildcard that means zero or more characters; an underscore (_) is a wildcard that means one character. ■ `FROM TAG` *'tag_name'* specifies a list of one or more datafile copies, identified by the tag *tag_name*. If multiple datafile copies with this tag exist, then RMAN backs up only the most current datafile copy of any particular datafile. Tags are not case sensitive.
`NODUPLICATES`	Prevents the inclusion of identical datafile copies in a backup operation. For each set of duplicate datafile copies, the file with the most recent timestamp will be selected.

duration

Syntax Element	Description
`DURATION` *hh:mm* `[PARTIAL] [MINIMIZE (TIME|LOAD)]`	Specifies a maximum time for a backup command to run. If a backup command does not complete in the specified duration, the backup being taken stops. With the `PARTIAL` option, the command is considered to have completed successfully and no error is reported by RMAN even if the whole backup is not completed in the specified duration. Without the `PARTIAL` option, the backup command is considered to have failed if it does not complete in the specified duration, and RMAN reports an error. If the backup command is part of a RUN block, subsequent commands in the RUN block do not execute. Whether `PARTIAL` is used or not, all backupsets completed before the backup is interrupted are retained and can be used in restore and recover operations. With disk backups, you can use `MINIMIZE TIME` run the backup at maximum speed (default) , or `MINIMIZE LOAD` to slow the rate of backup to lessen the load on the system. With `MINIMIZE LOAD` the backup will take the full specified duration. When `DURATION` is used with `MINIMIZE TIME`, the file most recently backed up is given the lowest priority to back up. This scheduling mechanism provides for the eventual complete backup of the database during successive backup windows, as different datafiles are backed up in round-robin fashion.

forRecoveryOfSpec

Syntax Element	Description
`FOR RECOVER OF TAG [=] 'tag_name'`	Lets you identify any tagged level 0 incremental to serve as the basis for this level 1 incremental. Useful in strategies other than the incrementally updated backups strategy.
`FOR RECOVER OF COPY`	Lets you specify that this incremental should contain all changes since the SCN of a datafile copy (level 0 incremental backup) of your database. The datafile copies should be identified with either a `DATAFILE COPY` or `WITH TAG` clause, to keep the incremental backup strategy for which this backup will be used separate from the rest of your backup strategies. Otherwise, the most recent copy of each datafile will be used as the basis for the incremetal.
`WITH TAG [=] 'tag_name'`	Used with `FOR RECOVER OF COPY`, specifies a tag to identify the level 0 incremental backup to serve as the basis of the incremental. If no level 0 with the tag specified in `WITH TAG` option is found, then `FOR RECOVER OF COPY` option will create a level 0 datafile copy tagged with the value specified in the `WITH TAG` option. `BACKUP... FOR RECOVER OF COPY WITH TAG`... is key to backup strategies based on incrementally updated backups, as described in *Oracle Database Backup and Recovery Basics* and used in some Enterprise Manager backup strategies.
`DATAFILE COPY [=] formatSpec`	Used with `FOR RECOVER OF COPY`, identifies the datafile copies to use as the basis for this incremental.

notBackedUpSpec

Syntax Element	Description
`NOT BACKED UP`	Backs up only those files (of the files specified on the command) that RMAN has never backed up. This option is a convenient way to back up new files after adding them to the database.

Syntax Element	Description
`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 calculating the number of backups for a file, RMAN only considers backups created on the same device type as the current backup. This option is a convenient way to back up files that were not backed up during a previous failed backup. For example, you back up the database, but the instance fails halfway through. You can restart the backup with the `NOT BACKED UP SINCE TIME` clause and avoid backing up those files that you already backed up. If `AS BACKUPSET` is set, then this feature is only useful if RMAN generates multiple backup sets during the backup. When determining whether a file has been backed up, the `SINCE` date is compared with the completion time of the most recent backup. For `BACKUP AS BACKUPSET`, 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.
`integer` `TIMES`	Backs up only those archived logs that have not been backed up at least *`integer`* times. To determine the number of backups for a file, RMAN only considers backups created on the same device type as the current backup. This option is a convenient way to back up archived logs on a specified media (for example, you want to keep at least three copies of each log on tape).

sizeSpec

Syntax Element	Description
integer [K|M|G]	Specifies the size of data, such as a file, in kilobytes (K), megabytes (M) or gigabytes (G).

skipSpec

Syntax Element	Description
SKIP	Excludes datafiles or archived redo logs from the backup according to the criteria specified by the following keywords. **Note:** You can also specify this option in the *backupSpec* clause.
INACCESSIBLE	Specifies that datafiles or archived redo logs that cannot be read due to I/O errors should be excluded from the backup. 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.
OFFLINE	Specifies that offline datafiles should be excluded from the backup.
READONLY	Specifies that read-only datafiles should be excluded from the backup.

Examples

Backing Up a Database: Example This example assumes that CONFIGURE CONTROLFILE AUTOBACKUP is OFF. The command backs up all datafiles to tape, as well as the current control file, the server parameter file, and archived logs:

```
BACKUP DATABASE PLUS ARCHIVELOG;
```

Scripting Incremental Backups: Example This example shows a series of scripts that you can run to make regular incremental backups of the database:

```
# Run once a week to back up database to disk as level 0:
BACKUP INCREMENTAL LEVEL 0 DATABASE;

# Run every day to back up blocks that have changed since most recent level 0 or 1:
BACKUP INCREMENTAL LEVEL 1 CUMULATIVE DATABASE;
BACKUP INCREMENTAL LEVEL 1 DIFFERENTIAL TABLESPACE users;
```

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

```
BACKUP INCREMENTAL LEVEL 1 CUMULATIVE SKIP INACCESSIBLE DATABASE;
```

Backing Up Tablespaces and Datafiles to Disk: 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 '/disk1/%U';
  ALLOCATE CHANNEL dev2 DEVICE TYPE DISK FORMAT '/disk2/%U';
  BACKUP
    (TABLESPACE SYSTEM, tools, users, undotbs MAXSETSIZE 5M)
    (DATAFILE 2,4,5);
}
```

Backing Up Tablespaces and Datafiles to Disk: 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 '/disk1/%U';
  ALLOCATE CHANNEL dev2 DEVICE TYPE DISK FORMAT '/disk2/%U';
  BACKUP AS COPY
    (TABLESPACE SYSTEM, tools, users, undotbs MAXSETSIZE 5M)
    (DATAFILE 2,4,5);
}
```

Backing Up Datafile Copies: Example This example finds three datafile copies with the tag LATESTCOPY, copies them to directory `/copies` and names the copies by means of subsitution variables:

```
BACKUP AS COPY
   FROM TAG 'LATESTCOPY'
  COPY OF DATAFILE 4, 6, 14
  FORMAT '/copies/Datafile%f_Database%d';
```

Backing Up Archived Logs and Deleting the Input: Example This example assumes that you have two archive destinations set: `/arch1` and `/arch2`. The command backs up one log for each unique sequence number and then deletes all logs from both archiving directories.

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

Backing Up Backup Sets to Tape: Example In this example, the goal is to keep recent backup sets on disk and older backup sets on tape, and to avoid keeping copies of the same backup set on disk and tape simultaneously. This command backs up backup sets created more than two weeks ago to tape and then deletes the backed-up backup pieces from disk:

```
BACKUP DEVICE TYPE sbt BACKUPSET COMPLETED 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 the server parameter file and all archived logs to tape:

```
# when disk is the default device and you do not specify a FORMAT parameter, then the
# default backup location is the flash recovery area (if configured) or
# a platform-specific default location (if not configured)
CONFIGURE DEFAULT DEVICE TYPE TO DISK;
BACKUP DEVICE TYPE sbt SPFILE ARCHIVELOG ALL;
```

Duplexing a Backup Set: Example This example duplexes a backup of datafile `1` (which includes the current control file and server parameter file) to separate disks:

```
BACKUP DEVICE TYPE DISK
  COPIES 2 DATAFILE 1
  FORMAT '/disk1/df1_%U', '/disk2/df1_%U';
```

Specifying How Channels Divide 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;
  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
}
```

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 CURRENT CONTROLFILE FOR STANDBY;
```

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;
}
```

Making an Image Copy of a Database Copy: Example This example makes an image copy of the database copy with tag TEST to the default destination, gives the output copy the tag DUPTEST, and performs logical checking:

```
BACKUP AS COPY COPY OF DATABASE FROM TAG 'TEST' CHECK LOGICAL TAG 'DUPTEST';
```

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

```
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
BACKUP DATABASE
  KEEP UNTIL TIME 'SYSDATE+365'
  NOLOGS;
ALTER DATABASE OPEN;
```

Exempting Copies from the Retention Policy: Example The following example copies the control file and two datafiles and exempts them from the retention policy forever. (Note that KEEP FOREVER requires a recovery catalog.)

```
rman TARGET / CATALOG rman/rman@rcat
RMAN> SHUTDOWN IMMEDIATE;
RMAN> STARTUP MOUNT;
RMAN> BACKUP AS COPY
  KEEP FOREVER NOLOGS
  CURRENT CONTROLFILE FORMAT '?/oradata/cf_longterm.cpy',
  DATAFILE 1 FORMAT '?/oradata/df1_longterm.cpy',
  DATAFILE 2 FORMAT '?/oradata/df2_longterm.cpy';
ALTER DATABASE OPEN;
```

Backing Up Files That Need Backups: Example This example backs up all datafiles that have not been backed up to tape in the last month, and then backs up all archived logs that do not have at least two backups on tape:

```
BACKUP DEVICE TYPE sbt DATABASE NOT BACKED UP SINCE TIME 'SYSDATE-31';
BACKUP DEVICE TYPE sbt ARCHIVELOG ALL NOT BACKED UP 2 TIMES;
```

Using NODUPLICATES To Back Up Datafile Copies: Example This example creates several duplicate datafiles, and then backs up only the most recent of the duplicates:

```
RMAN> backup as copy datafile 10 format 'foo' tag my_tag;
RMAN> backup as copy datafilecopy 'foo' format 'bar';
RMAN> backup as copy datafilecopy 'bar' format 'foobar';
RMAN> backup as backupset datafilecopy all noduplicates; # backs up only ’foobar’
RMAN> backup as backupset datafilecopy all; # backs up all files
```

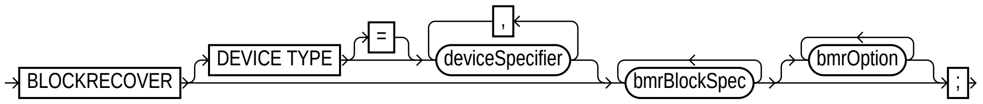
Backing Up a Noncurrent Server Parameter File: Example The following UNIX example backs up an older version of the server parameter file. RMAN can only back up the copy of the server parameter file currently in use by the target database:

```
# create temporary initialization parameter file that points to old SPFILE
echo "SPFILE=/tmp/old_spfile.ora" > /tmp/initTEMP.ora
rman TARGET /
# start database with old SPFILE
STARTUP FORCE PFILE=/tmp/initTEMP.ora
# backup old SPFILE
BACKUP SPFILE TAG "old_spfile.bak";
# restart database with current SPFILE
STARTUP FORCE;
EXIT
```

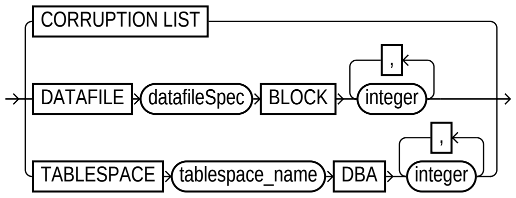
BLOCKRECOVER

Syntax

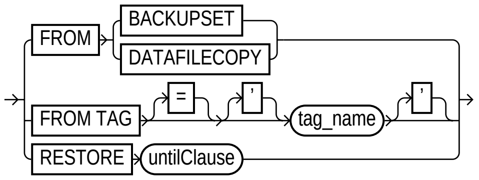
blockrecover::=



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 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$DATABASE_BLOCK_CORRUPTION` view.

Restrictions and Usage Notes

- This command is available only in the Enterprise Edition.
- The target database must be mounted or open. You do *not* have to take a datafile offline if you are performing block media recovery on it.
- You can only perform complete media 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 when using a backup control file.
- You cannot use proxy backups to perform block media recovery. If the only backups that you have are proxy backups, then you can restore them to a nondefault location on disk, which causes RMAN to view the restored files as datafile copies. You can then use the datafile copies for block media recovery.
- You must have a full backup of the file containing the corrupt blocks: block media recovery cannot use incremental backups.
- If RMAN fails to access a specific archived redo log file needed for block media recovery, it performs restore failover, trying all other backups listed in the RMAN repository that are suitable for use in this operation, and only fails if no suitable backup is available. See *Oracle Database Backup and Recovery Advanced User's Guide* for details on restore failover.

- Block media recovery cannot survive a missing or inaccessible archived log, although it can sometimes survive missing or inaccessible records (*Oracle Database Backup and Recovery Advanced User's Guide*).
- The datafile header block (block 1) cannot be recovered.
- You cannot perform block media recovery in NOARCHIVELOG mode.

Keywords and Parameters

blockrecover

Syntax Element	Description
DEVICE TYPE *deviceSpecifier*	Specifies the device type for the backup used in the block recovery. **See Also:** "deviceSpecifier" on page 2-129

bmrBlockSpec

Syntax Element	Description
bmrBlockSpec	Specifies the data blocks that require recovery.
CORRUPTION LIST	Recovers all blocks listed in the V$DATABASE_BLOCK_CORRUPTION view. This view displays blocks marked corrupt by the most recent BACKUP (with or without the VALIDATE option), VALIDATE, or CREATE CATALOG command. The following types of corruption result in rows added to this view: ■ Physical corruption (sometimes called media corruption). The database 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.
DATAFILE *datafileSpec*	Specifies a list of one or more datafiles that contain blocks requiring recovery. **See Also:** "datafileSpec" on page 2-121
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.

Syntax Element	Description
DBA *integer*	Specifies the data block address (DBA) of the corrupt block.

bmrOption

Syntax Element	Description
bmrOption	Specifies various restore options relating to the block recovery.
FROM BACKUPSET	Indicates that only backup sets should be restored.
FROM DATAFILECOPY	Indicates that only datafile image copies should be restored.
FROM TAG= '*tag_name*'	Indicates that only the copy of the backup with the specified tag should be restored. Tag names are not case sensitive. **See Also:** "BACKUP" on page 2-28 to learn how a tag is applied to a copy of a backup.
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 2-282

Examples

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

```
BLOCKRECOVER DATAFILE 2 BLOCK 12, 13 DATAFILE 3 BLOCK 5, 98, 99 DATAFILE 4 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 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. It restores only from backups that could be used to recover the database to a point two days ago:

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

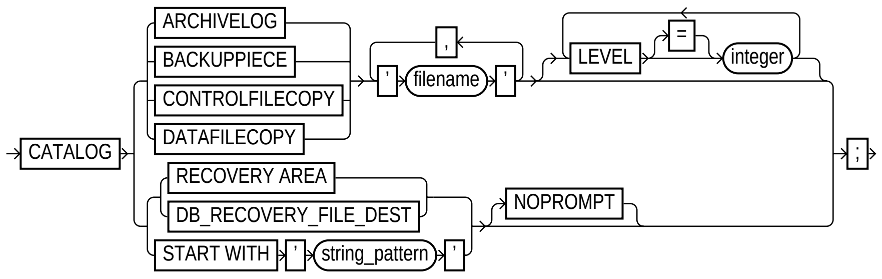
Repairing All Block Corruption in the Database: Example The following example runs a backup validation to populate V$DATABASE_BLOCK_CORRUPTION, then repairs any corrupt blocks recorded in the view:

```
BACKUP VALIDATE DATABASE;
BLOCKRECOVER CORRUPTION LIST;
```

CATALOG

Syntax

catalog::=



Purpose

Use the CATALOG command to do the following:

- Add metadata about a user-managed datafile copy, control file copy, archived log or backup piece to the RMAN repository.
- Record a datafile copy as a level 0 incremental backup in the RMAN repository, which enables you to use it as part of an incremental backup strategy.
- Record the existence of the last user-managed datafile copies made after the final shutdown in Oracle7, before migrating the database to Oracle8.

> **See Also:** *Oracle Database Backup and Recovery Basics* to learn how to manage target database records stored in the catalog

Restrictions and Usage Notes

- You must be connected to the target database, which must be mounted or open.
- If RMAN is connected to a recovery catalog, then the catalog database must be open.
- For a user-managed copy to be cataloged, it must be:
  - Accessible on disk.

  – A datafile copy, control file copy, archived log, or backup piece.

  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 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 archived logs must need to be applied to the backups to roll them forward.
- You cannot use `CATALOG` to catalog a file that belongs to a different database.
- You cannot use `CATALOG` to catalog a backup piece that exists on an `sbt` device.

Keywords and Parameters

Syntax Element	Description
`ARCHIVELOG '`*`filename`*`'`	Specifies the filename of an archived log to be added to or updated in the RMAN repository.
`BACKUPPIECE`	Specifies the name of a backup piece to be added to the RMAN repository. The backup piece must be on disk. RMAN verifies the backup piece header before cataloging it. RMAN can catalog a backup piece from a prior incarnation. Typically, you would catalog a backup piece in the following situations: ■ You have copied a backup piece with an operating system utility. In this case, the original backup piece is cataloged but the piece copy is not. ■ You want to move a backup piece from one disk to another under a different absolute filename. ■ You run in `NOCATALOG` mode and must re-create the control file, thereby losing all RMAN metadata. If you specify a list of backup pieces, RMAN catalogs all pieces in the given list even if one of them fails. Cataloging a backup piece creates a new row in `V$BACKUP_PIECE`. A backup set is only usable when *all* backup pieces are cataloged. Otherwise it would be in partially available state. **Note:** When cataloging backup pieces from releases prior to Oracle9i, performance improves when you catalog higher copy numbers first. For example, if you need to catalog copies 1, 2, and 3 of a backup piece, then specify copy 3 as the first item in the `CATALOG` list.

Syntax Element	Description
CONTROLFILECOPY '*filename*'	Specifies the filename of a control file copy to be added to or updated in the RMAN repository. 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 BACKUP AS COPY CURRENT CONTROLFILE command or the SQL statement ALTER DATABASE BACKUP CONTROLFILE ▪ A standby control file copy created with the RMAN command BACKUP AS 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 RMAN repository.
LEVEL = 0	For datafile copies only, indicates that the copy should be recorded as a level 0 incremental backup. You can perform incremental backups by using this datafile copy as the base level 0 backup.
(RECOVERY AREA | DB_RECOVERY_FILE_DEST) [NOPROMPT]	Catalogs all valid backup sets, datafile copies, and archived redo logs in the flash recovery area. RMAN must be connected to the target database and the target database must be mounted or open. Specify NOPROMPT if you do not want to be prompted after every match. The keywords RECOVERY AREA and DB_RECOVERY_FILE_DEST are exact synonyms.
START WITH *'string_pattern'* [NOPROMPT]	Catalogs all valid backups in the specified location, which can be an Automatic Storage Management disk group, Oracle Managed Files directory, or part of a filename. RMAN will report any files in the disk location that cannot be cataloged. RMAN must be connected to the target database and the target database must be mounted. Specify NOPROMPT if you do not want to be prompted after every match. If the string pattern specifies a filename, then it matches the left part of the filename pattern. For example, /tmp/arc matches everything in directory /tmp/arc_dest and /tmp/archive/january as well as a file /tmp/arc.cpy. **Note:** You cannot use wildcard characters.

Examples

Cataloging an Archived Redo Log: Example This example assumes that you made operating system copies of archived logs or transferred them from another location, and then added them to the RMAN repository:

```
CATALOG ARCHIVELOG '?/oradata/archive1_30.dbf', '?/oradata/archive1_31.dbf',
                   '?/oradata/archive1_32.dbf';
```

Cataloging a File Copy as an Incremental Backup: Example The following example catalogs datafile copy `users01.bak` as an incremental level 0 backup:

```
CATALOG DATAFILECOPY '?/oradata/users01.bak' LEVEL 0;
```

Note that you can create datafile copies both with the RMAN `BACKUP AS COPY` command and by using operating system utilities in conjunction with `ALTER TABLESPACE BEGIN/END BACKUP`.

Cataloging Multiple Copies in a Directory: Example The following example catalogs a directory full of archived logs that were copied into the `/tmp/arch_logs directory` with an operating system utility:

```
CATALOG START WITH '/tmp/arch_logs';
```

Cataloging File in the Flash Recovery Area: Example The following example catalogs all files in the currently enabled flash recovery area without prompting the user for each one:

```
CATALOG RECOVERY AREA NOPROMPT;
```

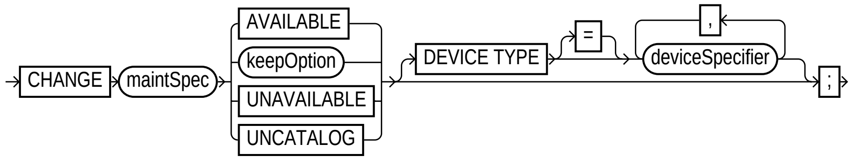
Cataloging Backup Pieces: Example The following example catalogs a backup piece that was copied with an operating system utility:

```
CATALOG BACKUPPIECE '?/oradata/01dmsbj4_1_1.bcp';
```

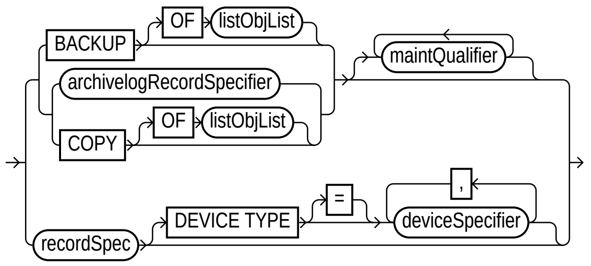
CHANGE

Syntax

change::=



maintSpec::=



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.
- The `CHANGE` command can alter the repository status of usable backups and copies from prior incarnations.

- 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: *Oracle Database Backup and Recovery Basics* to change the availability status of a backup or copy

Restrictions and Usage Notes

- The target instance must be started.
- The KEEP FOREVER clause requires use of a recovery catalog.
- You cannot use CHANGE... UNAVAILABLE or KEEP attributes for files stored in the flash recovery area.
- 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.

Syntax Element	Description
maintSpec	Specifies which files you want to CHANGE. Refer to "maintSpec" on page 2-190 for descriptions of the options in this caluse.
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.

Syntax Element	Description
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. You can also specify KEEP in the *backupSpec* clause. **Note:** You cannot use this option with flash recovery area files. **See Also:** "keepOption" on page 2-162
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 use the AVAILABLE option to update its status.
UNCATALOG	Removes references to a datafile copy, backup piece, or archived redo log 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 2-129). 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.

Examples

Updating Backups to Status UNAVAILABLE: Example This example changes the status of backup set 100 as well as all backups of server parameter files created more than a day ago to UNAVAILABLE:

```
CHANGE BACKUPSET 100 UNAVAILABLE;
CHANGE BACKUP OF SPFILE COMPLETED BEFORE 'SYSDATE-1' UNAVAILABLE;
```

You do not need to allocate a maintenance channel.

Uncataloging and Cataloging Archived Logs: Example In this example, you move all archived logs to a new directory, uncatalog them, and then recatalog them in the new location:

```
HOST 'mv $ORACLE_HOME/oradata/trgt/arch/* /fs2/arch';
CHANGE ARCHIVELOG ALL UNCATALOG;
CATALOG START WITH ’/fs2/arch’;
```

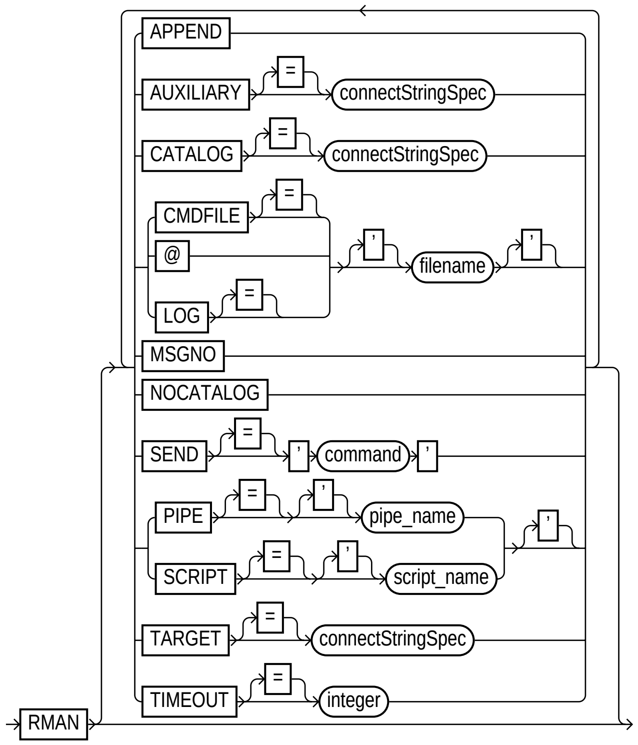
Changing the Retention Status of a Backupset: Example This example, which requires a recovery catalog, changes an ordinary backup into a long-term backup:

```
CHANGE BACKUP TAG 'consistent_db_bkup'
  KEEP FOREVER NOLOGS;
```

cmdLine

Syntax

cmdLine::=



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 whether you are using RMAN without a recovery catalog.
- Run a command file (text file containing commands) or stored script (from the recovery catalog) on startup, and exit on completion, instead of starting an interactive session.
- 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: *Oracle Database Backup and Recovery Basics* to learn how to connect RMAN to database instances

Restrictions and Usage Notes

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

Keywords and Parameters

Syntax Element	Description
`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.
`AUXILIARY =` *`connectStringSpec`*	Specifies a connect string to an auxiliary database, for example, `AUXILIARY SYS/change_on_install@dupdb`. **See Also:** "connectStringSpec" on page 2-103

Syntax Element	Description
`CATALOG =` *`connectStringSpec`*	Specifies a connect string to the database containing the recovery catalog, for example, `CATALOG rman/rman@inst2`. **See Also:** "connectStringSpec" on page 2-103
`CMDFILE =` *`'filename'`*	Parses and compiles all RMAN commands in a file and then sequentially executes each command in the file. RMAN exits if it encounters a syntax error during the parse phase or if it encounters a runtime error during the execution phase. If no errors are found, then RMAN exits after the job completes. 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. **Note:** If you run a command file at the RMAN prompt rather than as an option on the operating system command line, then RMAN does *not* run the file as a single job. RMAN reads each line sequentially and executes it, only exiting when it reaches the last line of the script.
`@filename`	Equivalent to `CMDFILE`.
`LOG =` *`'filename'`*	Specifies the file where RMAN records its 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 RMAN output is also stored in the `V$RMAN_OUTPUT` view (a memory-only view for jobs in progress) and in `V$RMAN_STATUS` (a control file view for completed jobs and jobs in progress). The `LOG` parameter does not cause RMAN to terminate if the specified file cannot be opened. Instead, RMAN writes to standard output.
`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.
`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`).
`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 2-252

Syntax Element	Description
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:** *Oracle Database Backup and Recovery Advanced User's Guide* to learn how to pass commands to RMAN through a pipe
SCRIPT = *'script_name'*	Once connected to the target database and recovery catalog (which must be specified using the TARGET and CATALOG options), RMAN will run the named stored script from the recovery catalog against the target database. If there are both a global script.and a local stored script on the target database with the name *script_name*, RMAN will run the local script. The single-quotes around the stored script name are required when the script name either begins with a number or is an RMAN reserved word. You should avoid creating script names that begin with a number or that match RMAN reserved words. See "CREATE SCRIPT" on page 2-115 for more details about stored scripts.
TARGET = *connectStringSpec*	Specifies a connect string to the target database, for example, TARGET SYS/mypassword@inst1. **See Also:** "connectStringSpec" on page 2-103
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:** *Oracle Database Backup and Recovery Advanced 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/oracle@inst1 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 target database prod1, recovery catalog database rcat, and 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 Stored Script: Example This example connects to the target database prod1 and the recovery catalog database rcat, and then runs the stored script full_backup:

```
% rman TARGET SYS/sys_pwd@prod1 CATALOG rman/rman@rcat SCRIPT full_backup
```

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
```

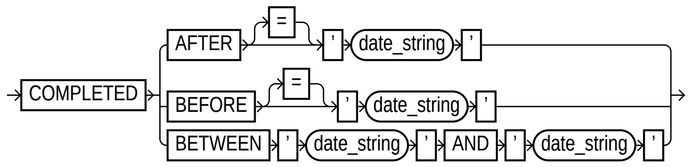
Invoking the RMAN Pipe Interface: Example This example invokes the RMAN pipe newpipe with a 90 second timeout option:

```
% rman PIPE newpipe TARGET SYS/oracle@inst1 TIMEOUT = 90
```

completedTimeSpec

Syntax

completedTimeSpec::=



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

Syntax Element	Description
`AFTER '`*`date_string`*`'`	Specifies the time after which the backup was completed.
`BEFORE '`*`date_string`*`'`	Specifies the time before 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`*`'`.

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';
```

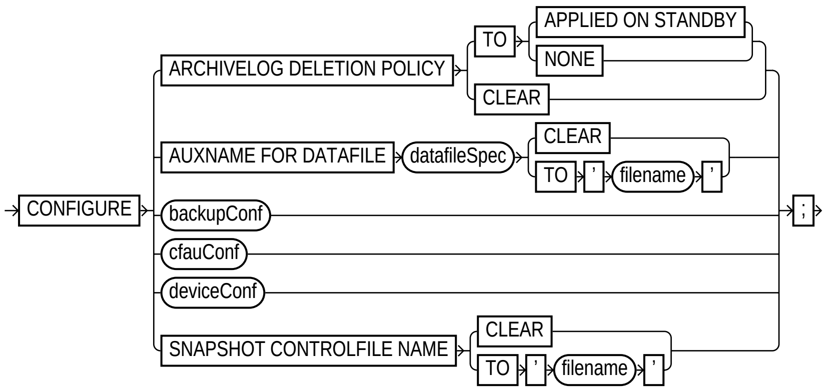
Listing Copies: Example This example lists image copies of datafile `?/oradata/trgt/users01.dbf` made before September 27, 2001:

```
LIST COPY OF DATAFILE '?/oradata/trgt/users01.dbf'
  COMPLETED BEFORE '27-SEP-01';
```

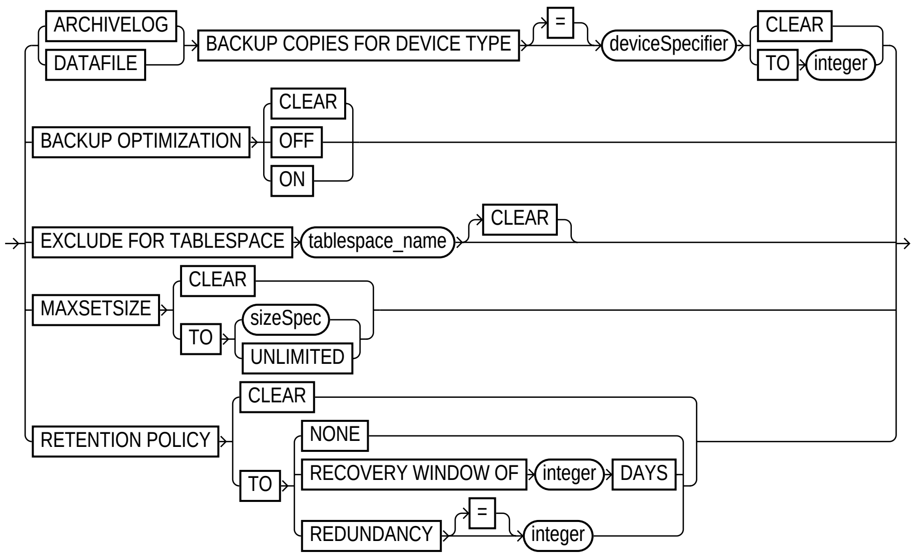
CONFIGURE

Syntax

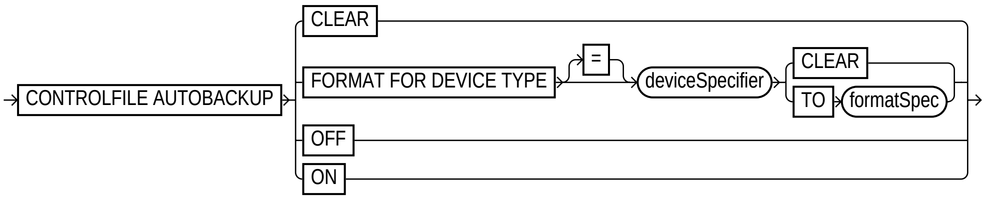
configure::=



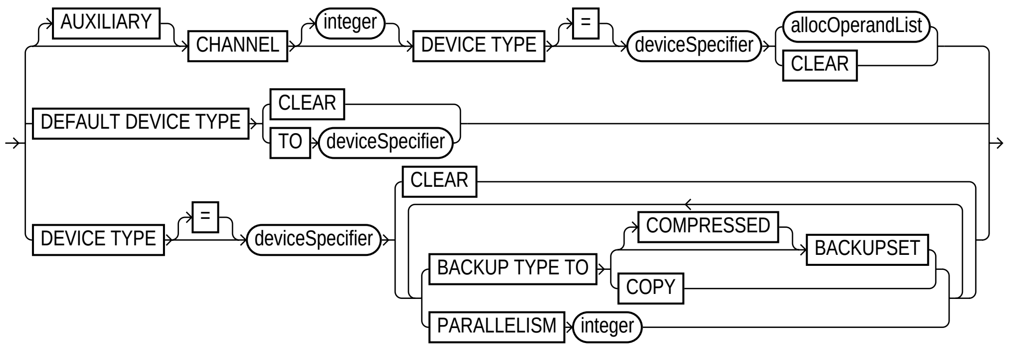
backupConf::=



cfauConf::=



deviceConf::=



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:** *Oracle Database Backup and Recovery Basics* to learn how to configure the RMAN environment

Restrictions and Usage Notes

- Execute this command at the RMAN prompt. CONFIGURE cannot be used within a RUN block.
- 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 command.
- 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 MAXPIECESIZE 5M 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. It cannot contain any other substitution variable.

- With Oracle Database Release 10*g* in a Data Guard environment, configurations can be set for standby databases as well as primary databases. All configurations except for retention policy, tablespace exclude and auxiliary names can be set to node-specific values. This means that the primary and standby databases can have different channel configurations, autobackup locations, and so on.

Keywords and Parameters

configure

Syntax Element	Description
`ARCHIVELOG DELETION POLICY TO [ APPLIED ON STANDBY | NONE | CLEAR ]`	Governs archived redo log deletion policy for the flash recovery area. Possible settings are: ■ `APPLIED ON STANDBY` - enables flash recovery area to delete archivelogs that are applied on mandatory standby. See *Oracle Data Guard Concepts and Administration* for details. ■ `NONE` - enables flash recovery area to delete archivelogs that are backed up to tertiary device and that are obsolete based on the configured backup retention policy. This is the default configuration. ■ `CLEAR` - clears the deletion policy and returns the specified configuration to default value. The default value is `NONE`.
`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 CLEAR`. 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:** *Oracle Database Backup and Recovery Advanced User's Guide* to learn how to perform RMAN TSPITR, and *Oracle Database Backup and Recovery Advanced User's Guide* to learn how to duplicate a database with RMAN
`backupConf`	Configures default backup options such as duplexing, optimization, excluding tablespaces, backup set sizes, and retention policies.
`cfauConf`	Configures control file autobackup settings

Syntax Element	Description
`deviceConf`	Configures default backup settings for devices, such as the default backup device, channel configurations for devices, default backup types for each device, and parallelism.
`SNAPSHOT CONTROLFILE NAME [ TO 'filename' | CLEAR ]`	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 `?/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:** *Oracle Database Backup and Recovery Advanced User's Guide* for more information about snapshot control files

backupConf

Syntax Element	Description

`{ARCHIVELOG	DATAFILE}`
	`BACKUP COPIES`
	`FOR DEVICE TYPE [=]`
	`deviceSpecifier`
	`[CLEAR
		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.
			
			Note: Control file autobackups on disk are a special case and are never duplexed. RMAN always writes one and only copy.
			
			Note: RMAN raises an error if you try to duplex backups to the flash recovery area. You cannot duplex backups to the flash recovery area.

`BACKUP OPTIMIZATION` `[CLEAR	OFF	ON]`	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 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 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`. ■ 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:** *Oracle Database Backup and Recovery Advanced User's Guide* for a description of how RMAN determines that it can skip the backup of a file

`EXCLUDE FOR TABLESPACE`
`tablespace_name`
`[ CLEAR ]`
	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.

Syntax Element	Description
`MAXSETSIZE [ CLEAR | TO [ sizeSpec | UNLIMITED ]`	Specifies the maximum size of each backup set created on a channel. By default `MAXSETSIZE` is set to `UNLIMITED`, meaning that it is disabled. **Note:** This option is ignored by `BACKUP AS COPY`.
`RETENTION POLICY`	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) or image copy. For example, `BACKUP AS BACKUPSET 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.
`CLEAR`	Resets the retention policy to its default (`REDUNDANCY = 1`).
`TO 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 `SYSDATE` - *`integer`* days in the past.
`TO 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.
`TO NONE`	Disables the retention policy feature. RMAN does not consider any backups or copies as obsolete.

cfauConf

Syntax Element	Description
`CONTROLFILE AUTOBACKUP`	Controls the control file autobackup feature. By default, this feature is not enabled.
`CLEAR`	Returns the feature to its default setting of `OFF`.
`FORMAT FOR DEVICE TYPE` *`deviceSpecifier`* `[ CLEAR | TO` *`formatSpec`* `]`	Configures the default filename format for the control file autobackup on the specified device type. If a flash recovery area is enabled, then RMAN creates the disk autobackup in the flash recovery area. Otherwise, RMAN creates it in an operating system specific location (`?/dbs` on Unix and Windows). By default, the initial format is `%F` for all devices. Any default format string specified with `CONFIGURE` must include the `%F` substitution variable. `%F` is the only legal substitution variable for use in a control file autobackup format. Use of any other substitution variable is an error. Specify `CLEAR` to return the format to the default `%F`. The *`formatSpec`* can specify an Automatic Storage Management disk group. The following example configures a channel for an ASM disk group: `CONFIGURE CONTROLFILE AUTOBACKUP FOR DEVICE TYPE DISK TO '+dgroup1';` **See Also:** "formatSpec" on page 2-156, for the semantics of the `%F` substitution variable.
`OFF`	Disables the autobackup feature. (`OFF` is the default value.) When this command is `OFF`, any `BACKUP` command that includes datafile `1` (including `BACKUP DATABASE`) automatically includes the current control file and server parameter file in the backup set. Otherwise, RMAN does not include these files.

Syntax Element	Description
ON	If CONFIGURE CONTROLFILE AUTOBACKUP is ON (by default it is OFF), then RMAN performs a control file autobackup in the following circumstances: ■ After every BACKUP or CREATE CATALOG command issued at the RMAN prompt. ■ Whenever a BACKUP command within a RUN block is followed by a command that is not BACKUP. ■ At the end of every RUN block if the last command in the block was BACKUP. ■ After database structural changes such as adding a new tablespace, altering the state of a tablespace or datafile (for example, bringing it online), adding a new online redo log, renaming a file, adding a new redo thread, and so forth. This type of autobackup, unlike autobackups that occur in the preceding circumstances, goes only to disk. You can run CONFIGURE CONTROLFILE AUTOBACKUP FOR DEVICE TYPE DISK to set a nondefault disk location. The first channel allocated during the backup or copy job creates the autobackup and places it into its own backup set; for post-structural autobackups, the default disk channel makes the backup. RMAN writes the control file and the server parameter file to the same backup piece. After the control file autobackup completes, the database writes a message containing the complete path of the backup piece and the device type to the alert log. The default location for the autobackup on disk is the flash recovery area (if configured) or a platform-specific location (if not configured). RMAN automatically backs up the current control file using the default format of %F (refer to entry for CONFIGURE CONTROLFILE AUTOBACKUP FORMAT for an explanation of this substitution variable). You can change the location and filename format with the CONFIGURE CONTROLFILE AUTOBACKUP FORMAT and SET CONTROLFILE AUTOBACKUP FORMAT commands.

deviceConf

Syntax Element	Description

[AUXILIARY] 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. Either configure a generic channel or specify a channel 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. A generic channel setting specifies options for all channels not configured explicitly.
	
	For generic channels of a specified device type, a new command erases previous settings for this device type. Assume that you run these commands:
	
	`CONFIGURE CHANNEL DEVICE TYPE sbt MAXPIECESIZE 1G;`
	`CONFIGURE CHANNEL DEVICE TYPE sbt FORMAT 'bkup_%U';`
	
	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. Specify configuration information for auxiliary channels if they require different parameters from the channels allocated at the target instance. If no auxiliary device configuration is specified, then RMAN configures any auxiliary channels using the target database device configuration.
	
	See Also: *Oracle Database Backup and Recovery Advanced User's Guide* to learn how configure automatic channels specified by channel number

allocOperandList	Specifies control options for the allocated channel. Note that the FORMAT parameter can specify an Automatic Storage Management disk group. The following example configures a channel for an ASM disk group: `CONFIGURE CHANNEL DEVICE TYPE DISK FORMAT '+dgroup1';` **See Also:** "allocOperandList" on page 2-15
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.

Syntax Element	Description
`DEFAULT DEVICE TYPE [ TO` *`deviceSpecifier`* `| CLEAR ]`	Specifies the default device type for automatic channels. By default, DISK is the default device type. CLEAR returns the default device type to DISK. By default, the BACKUP command only allocates channels of the default device type. For example, if you configure automatic channels for 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 DEVICE TYPE 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`*	Specifies the device type (disk or sbt) to which to apply the settings specified in this CONFIGURE command.
`CLEAR`	Resets backup type and parallelism settings for this device to their defaults..
`BACKUP TYPE TO [ COPY | [ COMPRESSED ] BACKUPSET]`	Configures the default backup type for disk or tape backups to either BACKUPSET, COMPRESSED BACKUPSET or COPY. For sbt devices the COPY option is not supported. The default for DISK is BACKUPSET. If the backup type is set to BACKUPSET, the BACKUP command always produces backup sets regardless of which media the backup is produced on. With the COMPRESSED option, the backupsets produced will use binary compression. The default location for disk backups is the flash recovery area, if one is configured; otherwise, backups are stored in a platform-specific location (for Unix and Windows, this is $ORACLE_HOME/dbs). The default format for backup filenames is %U.

Syntax Element	Description

PARALLELISM *integer*	Configures the device types that are eligible for use in jobs that use automatic channels and sets the degree of channel parallelism (DISK is the default).
	
	The PARALLELISM parameter sets the number of automatic channels of the specified device type allocated for RMAN jobs. RMAN always allocates the number of channels set by PARALLELISM, although it may use only a subset of these channels.
	
	By default, PARALLELISM = 1. Specifying CLEAR for a device type resets its settings to the default. 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 10 automatic channels and configure PARALLELISM to 2 or 12.

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 its default value of 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 FORMAT '/?/%U';
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 DEVICE TYPE DISK PARALLELISM 3;
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';
BACKUP DEVICE TYPE DISK DATABASE PLUS ARCHIVELOG;
```

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 (control file autobackups on disk are a special case and are never duplexed) and then runs a database backup, specifying three different file systems for the copies:

```
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 3;
BACKUP DEVICE TYPE DISK DATABASE
  FORMAT '/disk1/backup/%U', '/disk2/backup/%U', '/disk3/backup/%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 '?/oradata/snap.cf';
```

Excluding a Tablespace from a Whole Database Backup: Example This example excludes the `example` tablespace from whole database backups, then returns the tablespace to its default value of "not excluded":

```
CONFIGURE EXCLUDE FOR TABLESPACE example;
CONFIGURE EXCLUDE 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 ('?/dbs/dupdb_log_1_1.f',
             '?/dbs/dupdb_log_1_2.f') SIZE 200K,
    GROUP 2 ('?/dbs/dupdb_log_2_1.f',
             '?/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;
```

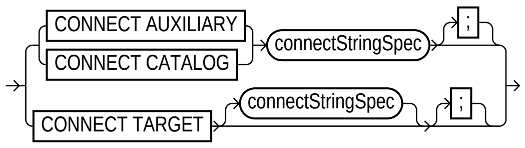
Specifying the Default Format for the Control File Autobackup: Example This example turns on the autobackup feature, then changes the default format for the `DISK` and `sbt` devices, then clears the autobackup setting:

```
CONFIGURE CONTROLFILE AUTOBACKUP ON;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '?/oradata/%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

connect::=



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 2-75 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.
- If you need to connect to a different target, catalog, or auxiliary database, then you must start a new RMAN session.
- You cannot use the CONNECT CATALOG command when RMAN is in the default NOCATALOG mode, that is, when these conditions are met:
  – You started RMAN without specifying either CATALOG or NOCATALOG.

– You have already run a command such as BACKUP that requires a repository connection.

Keywords and Parameters

Syntax Element	Description
CONNECT AUXILIARY *connectStringSpec*	Establishes a connection between RMAN and an auxiliary instance. You can use an auxiliary instance with the DUPLICATE command or during TSPITR.
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 TARGET *connectStringSpec*	Establishes a connection between RMAN and the target database.

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 through Oracle Net. 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
```

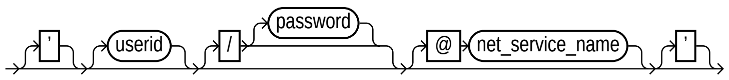
Connecting to Target, Recovery Catalog, and Duplicate Databases: Example This example connects to three databases specifying a username and password for each:

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

connectStringSpec

Syntax

connectStringSpec::=



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

Syntax Element	Description
/	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 (@).

Syntax Element	Description
/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 10.1.0.2.0 - Production

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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
```

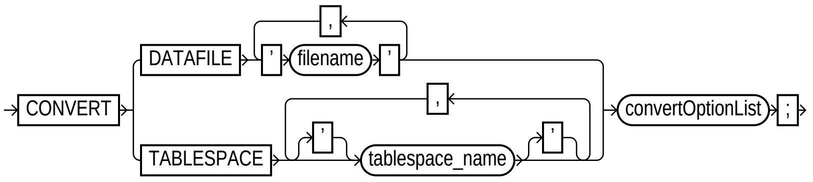
Connecting to a Target Database, Recovery Catalog, and Auxiliary Instance: Example This example connects to three different databases from the command line, specifying a username, password, and net service name for each:

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

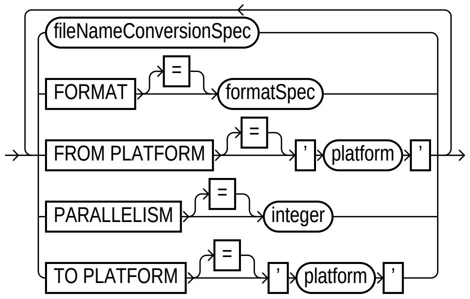
CONVERT

Syntax

convert::=



convertOptionList::=



Purpose

To quickly transport a tablespace across different platforms. Important uses of the command include:

- Content providers can publish structured data as transportable tablespaces and distribute it to customers who can easily and efficiently integrate this data into their Oracle databases, regardless of their chosen platform.
- Data from a large data warehouse server can be distributed to data marts on smaller computers (for example, Windows NT workstations).

- Read-only tablespaces can be shared across a heterogeneous cluster.

> **Note:** The CONVERT command is only one part of a multiple-step process for transporting tablespaces across platforms. The full process is described in *Oracle Database Administrator's Guide*. You should refer to that document before attempting to transport a tablespace across platforms.

Restrictions and Usage Notes

- Both source and destination databases must be running with initialization parameter COMPATIBLE set to 10.0 or higher.
- A tablespace must have been made read-write at least once in Release 10*g* before it can be transported to another platform. Hence, any read-only tablespaces (or currently existing transported tablespaces) that exist from an earlier release must be first made read-write before they can be transported to a different platform.
- RMAN does not process user datatypes that require endian conversions. If you need to transport objects built on underlying types that store data in a platform-specific format, then use the Data Pump Import and Export utilities.
- Query V$TRANSPORTABLE_PLATFORM to determine the platforms supported by the CONVERT command. Cross-platform tablespace transport is only supported when both the source and destination platforms are contained in this view.

  In Release 10*g*, the CONVERT command is required when transporting between platforms for which the value in V$TRANSPORTABLE_PLATFORM.ENDIAN_FORMAT is different. When transporting between platforms for which the ENDIAN_FORMAT column is the same, you can either use the CONVERT command to move the file, or copy the file from the source to the destination with operating system utilities. If the destination host uses ASM storage, you must use CONVERT to move the data into ASM. Operating system utilities cannot be used to move data into ASM.
- The CONVERT command can be run either on the source host or the destination host. When converting on the source host, CONVERT... TO is used to identify the destination platform (and the source platform is, implicitly, the platform of the source host). When converting on the destination host, use CONVERT... FROM to identify the source platform (and the destination platform is, implicitly, the platform of the destination host).

- `CONVERT` does not do in-place conversion of datafiles. It creates an output file that is readable on the specified platform.
- Prior to Release 10*g*, CLOBs were created in a variable width character set and stored in an endian-dependent format. The `CONVERT` command does not perform conversions on these CLOBs. Instead, RMAN captures the endian format of each LOB column and propagates it to the target database. Subsequent reads of this data by the SQL layer will interpret the data correctly based on either endian format and write it out in an endian- independent way if the tablespace is writeable.

  CLOBs created in Oracle Database Release 10*g*are stored in character set `AL16UTF16`, which is platform independent.

Keywords and Parameters

Syntax Element	Description
`DATAFILE` *`datafile_name`*	Specifies the name of a datafile that you want to transport into the destination database. At the destination, you must use `CONVERT DATAFILE` instead of `CONVERT TABLESPACE`, and name each datafile that is being converted. Because those files have not yet been imported into the destination database, RMAN cannot determine which files belong to the tablespace being converted.
`convertOptionList`	Options for this `CONVERT` command.
`fileNameConversionSpec`	A set of string pairs. Whenever any of the input filenames contains one of the first halves of a pair, anywhere in the filename, it will be replaced with the second half of the same pair.You can use as many pairs of replacement strings as required. You can use single or double quotation marks.
`FORMAT` *`formatSpec`*	Specifies the name template for the output file(s). See the `BACKUP AS COPY` command for the format values that are valid here.
`FROM PLATFORM =` *`platform_name`*	Specifies the name of the source platform. This must be one of the platforms listed in the `PLATFORM_NAME` column of the `V$TRANSPORTABLE_PLATFORM` view.
`PARALLELISM [=]` *`integer`*	Specifies the degree of parallelism to use while performing the operation.
`TO PLATFORM =` *`platform_name`*	Specifies the name of the destination platform as displayed in the `V$TRANSPORTABLE_PLATFORM.PLATFORM_NAME` output.

Syntax Element	Description
`TABLESPACE` *`tablespace_name`*	Specifies the name of a tablespace in the source database that you want to transport into the destination database on a different platform. `CONVERT TABLESPACE` can only be used when connected to the source database, not the destination database. (Until the tablespace transport has been completed, the destination database has no way of recognizing the tablespace name for use with `CONVERT TABLESPACE`.)

Examples

The procedure for transporting tablespaces is documented at length in *Oracle Database Administrator's Guide.* RMAN's `CONVERT` command is only required in cases where you are transporting between platforms with different byte ordering. If your platforms have the same byte ordering, then you can either use `CONVERT` or copy the files directly.

The basic outline of the process is as follows:

1. Identify the tablespaces that will be transported. Depending on relations between objects in the tablespaces you want to transport and objects in other tablespaces, this may require careful planning.
2. Make the tablespaces to be moved read-only.
3. Use the Original Export utility to generate a file containing structural information from the data dictionary for the tablespaces to be transported. This file will be used when plugging the tablespaces into the destination database.
4. If you need to convert your datafiles for transport and you wish to use the source system's resources for the conversion, then use the RMAN `CONVERT` command at this point on the source platform to convert the tablespaces for the target platform. See the first example following this outline. (If you prefer to use the destination system's resources for the conversion, do nothing in this step.)
5. Copy the datafiles (converted, if necessary) and the structural information file to the target database. You may move these by any means that is convenient: an operating system copy, ftp, or even distribution on removable media like CDs or tapes.
6. If you are transporting across platforms where endian conversion is required, and you did not perform the conversion on the source platform, then perform the conversion on the destination platform. See the second example following this outline.

7. Invoke the Original Import utility to plug the set of tablespaces into the target database.

For more details on this process, see *Oracle Database Administrator's Guide*. Read that discussion **in its entirety** before attempting any part of the tablespace transport process. The discussion in this document will focus on the specifics of using the CONVERT command, as you would use it on the source and destination platforms.

Converting Tablespaces on the Source Platform: Example In this scenario you need to transport the following tablespaces from a source database running on a Sun Solaris host to a destination database running on a Linux PC:

- `finance` (datafiles '`/orahome/fin/fin01.dbf`' and '`/orahome/fin/fin02.dbf`')
- `hr` (datafiles '`/orahome/fin/hr01.dbf`' and '`/orahome/fin/hr02.dbf`')

You plan to store the converted datafiles in the temporary directory `/tmp/transport_linux/` on the source host.

The example assumes that you have carried out the following steps in preparation for the tablespace transport:

- You have set the tablespaces to be transported to be read-only.
- You have looked up the name for the destination platform in `V$TRANSPORTABLE_PLATFORM`.

  The database has a list of its own internal names for each platform it runs on. You may need the exact name of the source or target platform as a parameter to the `CONVERT` command. Query `V$TRANSPORTABLE_PLATFORM` to get the platform name from SQL*Plus as follows:

  ```
  SQL> SELECT PLATFORM_ID, PLATFORM_NAME, ENDIAN_FORMAT
     FROM V$TRANSPORTABLE_PLATFORM
     WHERE UPPER(PLATFORM_NAME) LIKE 'LINUX';
  ```

  The `PLATFORM_NAME` for Linux on a PC is '`Linux IA (32-bit)`'.

Now use RMAN to convert the datafiles to be transported to the destination host's format on the source host. The `FORMAT` argument controls the name and location of the converted datafiles.

```
% rman TARGET /
RMAN> CONVERT TABLESPACE finance,hr
   TO PLATFORM 'Linux IA (32-bit)'
```

```
FORMAT='/tmp/transport_linux/%U';
```

The result is a set of converted datafiles in the `/tmp/transport_linux/` directory, with data in the right endian-order for the Linux IA (32-bit) platform.

From this point, you follow the rest of the general outline for tablespace transport. Use the export utility to create the file of structural information, if you have not already, move the structural information file and the converted datafiles from `/tmp/transport_linux/` to the desired directories on the destination host, and plug the tablespace into the new database with the Import utility.

Converting Tablespaces on the Target Platform: Example In this scenario you need to transport the following tablespaces from a source database running on a Sun Solaris host to a destination database running on a Linux PC:

- `finance` (datafiles '`/orahome/fin/fin01.dbf`' and '`/orahome/fin/fin02.dbf`')
- `hr` (datafiles '`/orahome/fin/hr01.dbf`' and '`/orahome/fin/hr02.dbf`')

You plan to perform conversion on the target host. You will temporarily store the unconverted datafiles in the directory `/tmp/transport_solaris/` on the target host. When the datafiles are plugged into the destination database, they will be stored in `/orahome/dbs`.

The example assumes that you have carried out the following steps in preparation for the tablespace transport:

- Set the source tablespaces to be transported to be read-only
- Used the Original Export utility to create the structural information file (named, in this scenario, `expdat.dmp`)
- Copied `expdat.dmp` and the unconverted tablespace datafiles to be transported to the destination host, in the `/tmp/transport_solaris/` directory, preserving the subdirectory structure from the files' original location, so that the datafiles are stored as:
  - `/tmp/transport_solaris/fin/fin01.dbf`
  - `/tmp/transport_solaris/fin/fin02.dbf`
  - `/tmp/transport_solaris/hr/hr01.dbf`
  - `/tmp/transport_solaris/hr/hr02.dbf`

You can now use RMAN’s `CONVERT` command to convert the datafiles to be transported to the destination host’s format and deposit the results in `/orahome/dbs`.

Note the following:

- You have to identify the datafiles by filename, not by tablespace name. Until the datafiles are plugged in, the local instance cannot recognize the desired tablespace names.
- The `DB_FILE_NAME_CONVERT` argument controls the name and location of the converted datafiles.
- You must specify the source platform. Otherwise, RMAN will assume that the source platform is the platform on which the conversion process is run. Query `V$TRANSPORTABLE_PLATFORM` to get the platform name from SQL*Plus as follows:

  ```
  SQL> SELECT PLATFORM_ID, PLATFORM_NAME, ENDIAN_FORMAT
     FROM V$TRANSPORTABLE_PLATFORM
     WHERE UPPER(PLATFORM_NAME) LIKE 'SOLARIS';
  ```

  The `PLATFORM_NAME` for the source platform in this example is `'Solaris[tm] OE (32-bit)'`.
- You do not need to specify the target platform. The target platform defaults to the platform of the host running the conversion.

```
% rman TARGET /
RMAN> CONVERT DATAFILE=
   ’/tmp/transport_solaris/fin/fin01.dbf’,
   ’/tmp/transport_solaris/fin/fin02.dbf’,
   ’/tmp/transport_solaris/hr/hr01.dbf’,
   ’/tmp/transport_solaris/hr/hr02.dbf’
   FROM PLATFORM 'Solaris[tm] OE (32-bit)'
   DB_FILE_NAME_CONVERT
        ’/tmp/transport_solaris/fin’,’/orahome/dbs/fin’,
        ’/tmp/transport_solaris/hr’,’/orahome/dbs/hr’
```

The result is a set of converted datafiles in the `/orahome/dbs/` directory, named as follows:

- `/orahome/dbs/fin/fin01.dbf`
- `/orahome/dbs/fin/fin02.dbf`
- `/orahome/dbs/hr/hr01.dbf`

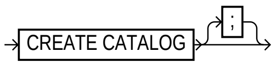
- `/orahome/dbs/hr/hr02.dbf`

From this point, follow the rest of the general outline for tablespace transport. Use Import to plug the converted tablespaces into the new database with the import utility, and make the tablespaces read-write if applicable.

CREATE CATALOG

Syntax

createCatalog::=



Purpose

To create a schema for the recovery catalog. Typically, you create this schema in a separate recovery catalog database. The catalog is created in the default tablespace of the recovery catalog owner.

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: *Oracle Database Backup and Recovery Advanced 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.
- If you specify the tablespace name in the `CREATE CATALOG` command, *and* if the tablespace name is an RMAN reserved word (as listed in "RMAN Reserved Words" on page 1-4), then it *must* be uppercase and enclosed in quotes.
- Do not create the recovery catalog in the `SYS` schema.

See Also:

- *Oracle Database Administrator's Guide* for more information about the RECOVERY_CATALOG_OWNER role
- "cmdLine" on page 2-75 for information about RMAN command-line options

Keywords and Parameters

None

Example

Creating a Catalog Schema: Example

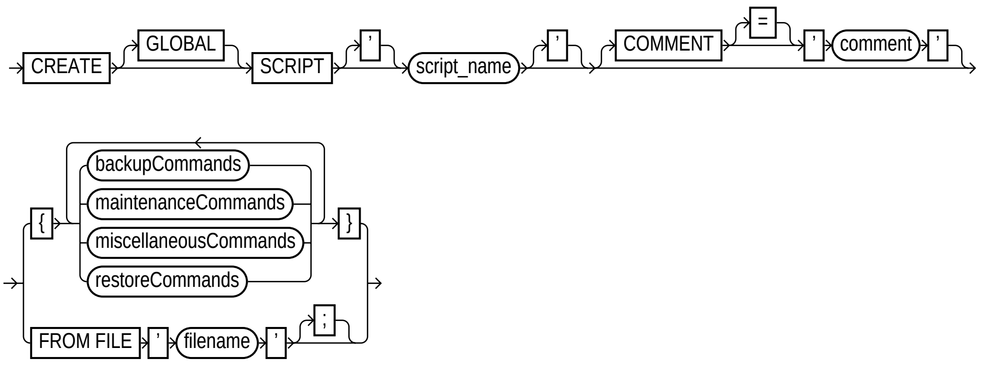
The following example creates a user rman, grants rman the RECOVERY_CATALOG_OWNER role, then creates the recovery catalog in the schema rman.cattbs of the database rcat:

```
#!/usr/bin/tcsh
# create user rman in recovery catalog database as catalog owner
% sqlplus 'SYS/change_on_install@rcat AS SYSDBA'
SQL> CREATE USER rman IDENTIFIED BY rman
  DEFAULT TABLESPACE cattbs
  QUOTA UNLIMITED ON cattbs;
SQL> GRANT recovery_catalog_owner TO rman;
SQL> EXIT

# connect to database as catalog owner and create catalog
% rman CATALOG rman/rman@rcat
RMAN> CREATE CATALOG;
```

CREATE SCRIPT

Syntax

createScript::=



Purpose

To create a stored script in the recovery catalog.

A stored script is a sequence of RMAN commands, given a name and stored in the recovery catalog for later execution. A stored script may be local (that is, associated with one target database) or global (available for use with any database registered in the recovery catalog).

Any command that is legal within a `RUN` command is permitted in the stored script.

Several other commands are used with stored scripts:

- The `PRINT SCRIPT` command is used to view the contents of a stored script.
- The `REPLACE SCRIPT` command is used to update the contents of a stored script.
- The `EXECUTE SCRIPT` command is used to execute the commands in the stored script.

- The `SCRIPT` command line arguments for RMAN (described in `"cmdLine"` on page 2-75) runs a stored script automatically when starting RMAN.
- The `LIST SCRIPT NAMES` command is used to find out what stored scripts are defined for the current target database and recovery catalog.
- The `DELETE SCRIPT` command is used to delete a stored script from the recovery catalog.

See Also: *Oracle Database Backup and Recovery Advanced User's Guide* to learn how to use stored scripts

Restrictions and Usage Notes

Note the following restrictions:

- Execute `CREATE SCRIPT` only at the RMAN prompt, not within a RUN block.
- When creating a script, RMAN must be connected to a target database and a recovery catalog, and the catalog database must be open.
- You cannot run `CREATE SCRIPT` once to create a local script, and then use this same script on multiple target databases. If you want to create a global script, you must connect to some target database (as well as a recovery catalog) and then use `CREATE GLOBAL SCRIPT` instead of `CREATE SCRIPT`.
- 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.
- RMAN returns an error `RMAN-20401: script already exists` if you try to create a local script when another local script already exists for the same target database with the same name. The same error is returned if you try to create a global script and a global script already exists with the same name in the recovery catalog. If the script already exists, you must use `REPLACE SCRIPT` to update its contents.

Keywords and Parameters

Syntax Element	Description
GLOBAL	Identifies the script being created as global. If omitted, RMAN creates a local stored script *script_name* defined on the current target database. If no such script is defined on the target database, RMAN creates for a global stored script *script_name*.
'script_name'	The name of the script to create.
COMMENT [=] *'comment'*	Associates an explanatory comment with the stored script in the catalog.
FROM FILE *'filename'*	Reads the sequence of commands to define the script from the specified file. The file should look like the body of a valid stored script. The first line of the file must be a '{' and the last line must contain a '}'. The RMAN commands in the file must be valid in a stored script.
backupCommands *maintenanceCommands* *miscellaneousCommands* *restoreCommands*	Commands valid in a stored script. The statements allowable within the brackets of the CREATE SCRIPT *'script_name'* { ... } command are the same commands supported within a RUN block. See "RUN" on page 2-249 for more details.

Example

Creating a Local Stored Script: Example This example creates a stored script called backup_whole that backs up the database and archived redo logs:

```
# creates recovery catalog script to back up database and archived logs
CREATE SCRIPT backup_whole
COMMENT "backup whole database and logs"
{
    BACKUP INCREMENTAL LEVEL 0 TAG b_whole_l0
    DATABASE PLUS ARCHIVELOG;
}
```

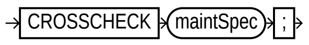
Creating a Global Stored Script: Example This example creates a stored script called backup_whole that backs up the database and archived redo logs:

```
# creates recovery catalog script to back up database and archived logs
CREATE GLOBAL SCRIPT global_backup_db
COMMENT "backup any database from the recovery catalog, with logs"
{
    BACKUP DATABASE PLUS ARCHIVELOG;
}
```

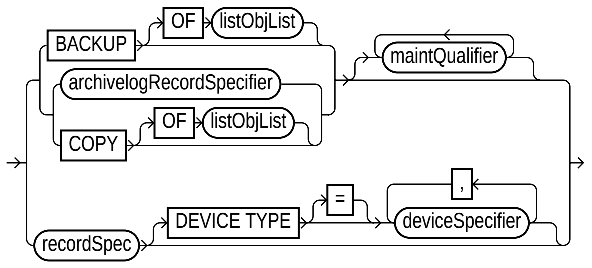
CROSSCHECK

Syntax

crosscheck::=



maintSpec::=



Purpose

To verify the status of backups and copies recorded in the RMAN repository against media such as disk or tape. The `CROSSCHECK` command only processes files created on the same device type as the channels running the crosscheck.

Status of RMAN Backups

The `CROSSCHECK` command checks only objects marked `AVAILABLE` or `EXPIRED` by examining the files on disk for `DISK` channels or by querying the media manager for `sbt` channels. Table 2–2 describes the meaning of each status.

Table 2–2 Meaning of Crosscheck Status

Status	Description
EXPIRED	Object is not found either in file system (for DISK) or in the media manager (for sbt). Note that for a backup set to be EXPIRED, all backup pieces in the set must be EXPIRED. **Note**: EXPIRED does not mean the same as OBSOLETE.
AVAILABLE	Object is available for use by RMAN. For a backup set to be AVAILABLE, all backup pieces in the set must have the status AVAILABLE.
UNAVAILABLE	Object is not available for use by RMAN. For a backup set to be UNAVAILABLE, all backup pieces in the set must have the status UNAVAILABLE.

The CROSSCHECK command does not delete any files that it is unable to find, but updates their repository records to EXPIRED. Then, you can run DELETE EXPIRED to remove the repository records for all expired files as well as any existing physical files whose records show the status EXPIRED.

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.

See Also: *Oracle Database Backup and Recovery Basics* 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. However, if you run CROSSCHECK on files stored on a media manager, and you have not configured automatic channels for the media manager, then you must manually allocate maintenance channels for these objects. For example, if you created a backup on an sbt channel, but have not configured automatic channels for your sbt device, then you must manually allocate an sbt channel before the CROSSCHECK command can check the backup.
- Crosscheck validates all specified backups and copies, even if they were created in prior incarnations (that is, before the most recent OPEN RESETLOGS).

Keywords and Parameters

Syntax Element	Description
maintSpec	Crosschecks files output by the BACKUP command. For *maintSpec* options, refer to the parameter descriptions in "maintSpec" on page 2-190.

Examples

Crosschecking All Backups and Copies: Example The following example, which assumes that the default configured channel is DEVICE TYPE sbt, queries the status of all backups and copies on tape and disk. Because RMAN preconfigures a disk channel, you do not need to manually allocate a disk channel:

```
CROSSCHECK BACKUP; # crosschecks backup sets and image copies
```

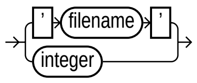
Crosschecking Within a Range of Dates: Example The following example queries the media manager for the status of the backup sets in a given six month range. Note that RMAN uses the date format specified in the NLS_DATE_FORMAT parameter, which is 'DD-MON-YY' in this example:

```
# if you manually allocate an sbt channel, then RMAN does not crosscheck disk
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
CROSSCHECK BACKUP
  COMPLETED BETWEEN '01-JAN-01' AND '01-SEP-01';
RELEASE CHANNEL;

# to crosscheck only disk, specify CROSSCHECK DEVICE TYPE DISK
CROSSCHECK BACKUP DEVICE TYPE DISK
  COMPLETED BETWEEN '01-JAN-01' AND '01-SEP-01';

# assuming that the default channel is sbt, you can crosscheck on both disk
# and sbt backups by simply running CROSSCHECK with the default channels
CROSSCHECK BACKUP COMPLETED BETWEEN '01-JAN-01' AND '01-SEP-01';
```

datafileSpec

Syntax

datafileSpec::=



Purpose

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

Restrictions and Usage Notes

- You can specify the relative or absolute path name.
- Double and single quotes are both legal (although only single quotes are shown in the diagram). Double quotes are recommended in the SQL command.
- Use ? to represent the Oracle home and @ for the Oracle SID.

See Also: "Placeholders" on page 1-3 to learn about the difference between single and double quotes, as well as the behavior of environment variables in RMAN quoted strings

Keywords and Parameters

Syntax Element	Description
'*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 `?/oradata/trgt/users01.dbf` to disk, specifying it by filename:

```
BACKUP AS COPY
  DATAFILE '?/oradata/trgt/users01.dbf'
  FORMAT '?/oradata/users01.cpy';
```

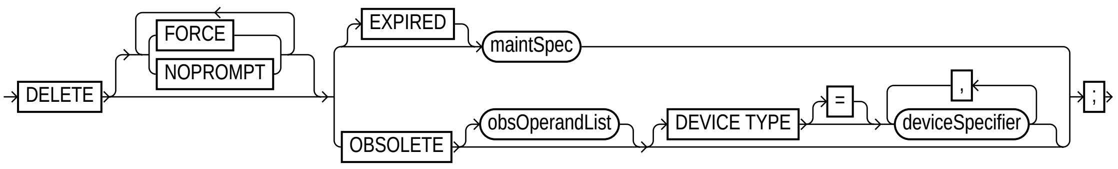
Specifying a Datafile by Absolute File Number: Example This example copies datafiles `3` and `4` to disk, specifying them by file number:

```
BACKUP AS COPY
  DATAFILE 3 FORMAT '?/oradata/df3.cpy',
  DATAFILE 4 FORMAT ’?/oradata/df4.cpy’;
```

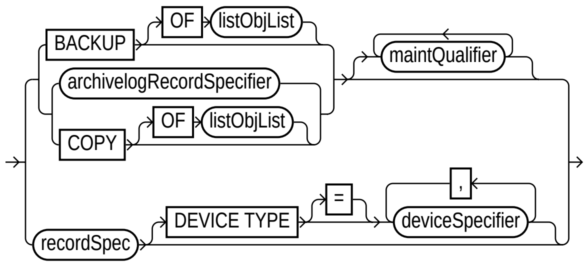
DELETE

Syntax

delete::=



maintSpec::=



Purpose

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

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

When running RMAN interactively, `DELETE` displays a list of the files and prompts you for confirmation before deleting any file in the list. When reading commands from a command file, RMAN will not prompt for confirmation.

Relationship Between Repository and Media

The repository record for a backup can sometimes fail to reflect the physical status of the backup. For example, you back up a log to disk and then use an operating system utility to delete the file. If you do not run the CROSSCHECK command to update the repository, and if you then run DELETE against the backup, then the repository shows that the object is AVAILABLE while the object is in fact missing. The following table indicates the behavior of DELETE in such situations.

Repository Status	Physical Status	Behavior of DELETE Command
AVAILABLE	Not found on media	Does not delete the object and reports the list of mismatched objects at the end of the job. RMAN does not update the repository status.
EXPIRED	Found on media	Does not delete the object and reports the list of mismatched objects at the end of the job. RMAN does not update the repository status.
UNAVAILABLE	Any	Removes repository record and deletes object if it exists. All I/O errors are ignored.
FORCE	Any	Removes repository record and deletes object if it exists. All I/O errors are ignored. RMAN displays the number of objects deleted at the end of the job.

See Also: "BACKUP" on page 2-28 to learn about the BACKUP ... DELETE INPUT command

Restrictions and Usage Notes

- The target instance must be started.
- The DELETE command can delete usable backups and copies from prior incarnations.
- 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

Syntax Element	Description
`FORCE`	Deletes specified files (whether or not they exist on the media) and removes repository records. RMAN ignores any I/O errors for the deleted objects. RMAN displays the number of deleted objects at the end of the job.
`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 a list of files to be deleted and 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. If for some reason a backup or copy marked `EXPIRED` exists when you run the `DELETE EXPIRED` command, then RMAN deletes the physical files.
`maintSpec`	Deletes files output by the `BACKUP` command. For maintSpec options, refer to the parameter descriptions in "maintSpec" on page 2-190.
`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 2-193
`DEVICE TYPE` *`deviceSpecifier`*	Restricts the deletion to obsolete backups and copies created on the specified device type only. **See Also:** "deviceSpecifier" on page 2-129

Examples

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

```
CROSSCHECK BACKUPSET OF TABLESPACE users
  DEVICE TYPE sbt COMPLETED BEFORE 'SYSDATE-31';
DELETE NOPROMPT EXPIRED BACKUPSET OF TABLESPACE users
  DEVICE TYPE sbt 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 Files That Have Already Been Backed Up: Example The following example deletes backups and copies (including archived redo logs) that have already been backed up at least twice to tape:

```
DELETE NOPROMPT BACKUP BACKED UP 2 TIMES TO DEVICE TYPE sbt;
DELETE NOPROMPT COPY BACKED UP 2 TIMES TO DEVICE TYPE sbt;
```

Forcing the Deletion of a Backup Set: Example The following example attempts to delete the backup set copy with tag `weekly_bkup`:

```
DELETE NOPROMPT BACKUPSET TAG weekly_bkup;
```

However, RMAN displays a warning because the repository shows the backup set as available, but the object is not actually available on the media:

```
RMAN-06207: WARNING: 1 objects could not be deleted for SBT_TAPE channel(s) due
RMAN-06208:          to mismatched status.  Use CROSSCHECK command to fix status
List of Mismatched objects
==========================
  Object Type   Filename/Handle
--------------- ---------------------------------------------------
Backup Piece    0id270ud_1_1
```

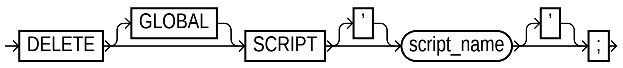
The following command forces RMAN to delete the backup set:

```
DELETE FORCE NOPROMPT BACKUPSET TAG weekly_bkup;
```

DELETE SCRIPT

Syntax

deleteScript::=



Purpose

To delete a local or global stored script from the recovery catalog.

Restrictions and Usage Notes

- Execute `DELETE SCRIPT` only at the RMAN prompt.
- RMAN must be connected to a recovery catalog and target database, and the catalog database must be open.
- To delete a local script, you must be connected to the target database on which the local script is defined.
- Quotes must be used around the script name when the name contains either spaces or reserved words.

Keywords and Parameters

Syntax Element	Description
`GLOBAL`	Specifies that the script to delete is a global stored script. Otherwise, RMAN will look for a local stored script called *`script_name`* defined on the current target database. (If no such script is defined on the target database, RMAN will check for a global stored script named *`script_name`* and delete that script if it exists.)
`'script_name'`	The name of the script to delete. **See Also:** "CREATE SCRIPT" on page 2-115, "EXECUTE SCRIPT" on page 2-145, "REPLACE SCRIPT" on page 2-217, and "LIST" on page 2-115 for LIST SCRIPT NAMES.

Example

Deleting a Script: Example The following example deletes a stored script `b_whole_10` from the recovery catalog:

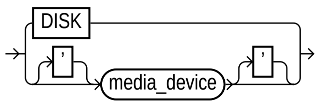
```
rman TARGET / CATALOG rman/cat@catdb
RMAN> DELETE SCRIPT b_whole_10;
```

If a local stored script `b_whole_10` is defined, it is deleted. If no local stored script `b_whole_10` is defined but a global stored script `b_whole_10` is defined, the global script is deleted.

deviceSpecifier

Syntax

deviceSpecifier::=



Purpose

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

Keywords and Parameters

Syntax Element	Description
`DISK`	Specifies disk storage device.
`'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 manager. Media device names are case insensitive. 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 backward 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;
```

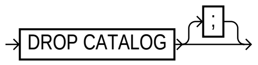
Restoring from Tape: Example This example restores archived logs from tape:

```
RESTORE DEVICE TYPE sbt ARCHIVELOG ALL;
```

DROP CATALOG

Syntax

dropCatalog::=



Purpose

To remove the schema from the recovery catalog.

Caution: This command deletes all RMAN repository data 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: *Oracle Database Backup and Recovery Advanced 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):

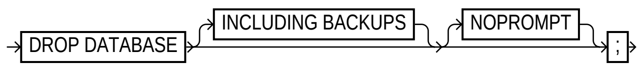
```
RMAN> DROP CATALOG

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

```
RMAN> DROP CATALOG
```

DROP DATABASE

Syntax

dropDatabase::=



Purpose

Deletes the target database and, if RMAN is connected to a recovery catalog, unregisters it. RMAN removes all datafiles, online logs, and control files belonging to the target database.

Restrictions and Usage Notes

- Execute this command only at the RMAN prompt.
- You must be connected to the target database, which must either mounted exclusive and not open.
- If you want RMAN to delete archived logs, copies, and backups belonging to the database, then you must use the `DROP DATABASE INCLUDING BACKUPS` form of the command.

Keywords and Parameters

Syntax Element	Description
`INCLUDING BACKUPS`	Deletes backup sets, proxy copies, image copies, and archived logs associated with the target database from all configured device types. **Note:** If you have been using a recovery catalog but run RMAN in `NOCATALOG` mode when you drop the database, then RMAN will not delete any backups which are known to the recovery catalog but no longer exist in the target database control file.
`NOPROMPT`	Specifies that you do not want RMAN to prompt you for confirmation before deleting the database. By default, RMAN prompts for confirmation.

Example

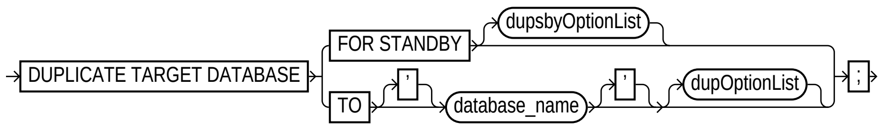
Deleting a Database: Example In this example, you maintain a test database called `test1` that is registered in the recovery catalog. You connect to `test1` and delete the database files as well as all backups, copies, and archived logs associated with the database:

```
% rman TARGET SYS/oracle@test1 CATALOG test1/test1@catdb
RMAN> DROP DATABASE INCLUDING BACKUPS NOPROMPT;
```

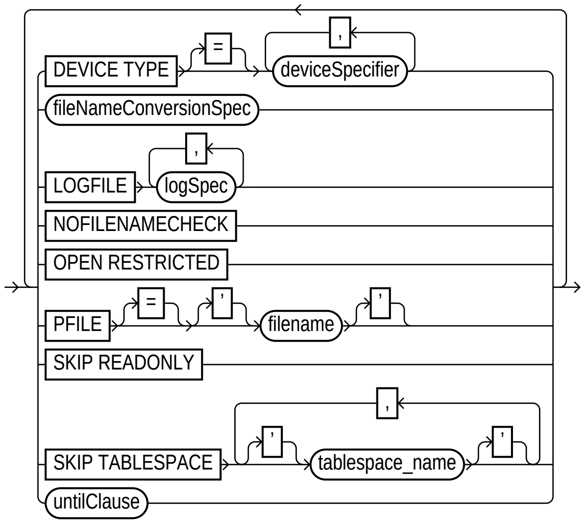
DUPLICATE

Syntax

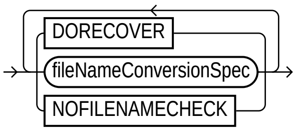
duplicate::=



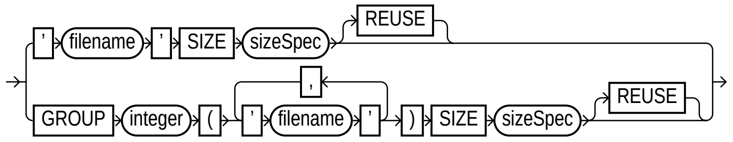
dupOptionList::=



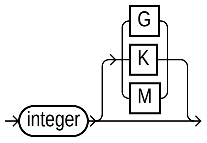
dupsbyOptionList::=



logSpec::=



sizeSpec::=



Purpose

To use backups (backup sets or image copies) of the target database to create either of the following:

- A **duplicate database**, which is a copy of the target database (or a subset 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, or until a time specified with a SET UNTIL clause.

See Also:

Oracle Database Backup and Recovery Advanced User's Guide to learn how to create a duplicate database with the DUPLICATE command

Oracle Data Guard Concepts and Administration to learn how to create, manage, and back up a 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.

  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. The target database cannot be a standby database.

- If you need to duplicate a database when some backups of the target database do not exist then you must specify SKIP TABLESPACE. If you do not specify SKIP TABLESPACE, then 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.
- You can skip all tablespaces in the target database except the SYSTEM tablespace, undo tablespaces, and tablespaces containing rollback segments. RMAN does not check for completeness. For example, you can duplicate a data tablespace but not the tablespace containing the index for the data, or duplicate a tablespace that contains only one partition of a partitioned table.
- 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 tasks for duplication to be successful:
  - Move backups and disk copies from the target host to the duplicate host to the same location as the target host so that the path names are identical
  - Move backups and disk copies from the target host to the duplicate host to a new location (so that the path names are different), and then CATALOG them.

  - 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.

- Duplication must be done to the same platform as the source datababse.
- 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 log: it cannot recover into the online redo logs.
- 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. In this case, you must recover the standby database up to at least log sequence 100, or the database 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

duplicate

Syntax Element	Description
`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`*
`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 the database signals an error when creating the control file.

dupOptionList

Syntax Element	Description
dupOptionList	Specifies options that apply when creating a duplicate database not intended for use as a standby database.
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 2-129
fileNameConversionSpec	Specifies one or more patterns to map original to duplicate filenames. Note that this parameter overrides the initialization parameter DB_FILE_NAME_CONVERT (if it is set). If a file in the specification list is not affected by the conversion parameter in DUPLICATE, then you must rename it by other means, such as SET NEWNAME. **See Also:** "fileNameConversionSpec" on page 2-148
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.

Syntax Element	Description
`OPEN RESTRICTED`	Enables a restricted session in the duplicate database by issuing the following SQL statement: `ALTER SYSTEM ENABLE RESTRICTED SESSION`. RMAN issues this statement immediately before the duplicate database is opened.
`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`.
`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.
`SKIP TABLESPACE 'tablespace_name'`	Excludes the specified tablespace from the duplicate database. Note that you cannot exclude the `SYSTEM` tablespace, undo tablespaces, and tablespaces with rollback segments.
untilClause	Sets the end point for incomplete recovery of the duplicate database. You can achieve the same result by running `SET UNTIL` before the `DUPLICATE` command. **See Also:** "untilClause" on page 2-282

logSpec

Syntax Element	Description
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:** *Oracle Database SQL Reference* for `CREATE DATABASE` syntax
'*filename*' `SIZE` *integer*	Specifies the filename of the online redo log member and the size of the file in kilobytes (`K`) or megabytes (`M`). The default is in bytes.
`REUSE`	Allows the database to reuse an existing file. If the file already exists, then the database verifies that its size matches the value of the `SIZE` parameter. If the file does not exist, then it is created.
`GROUP` *integer*	Specifies the group containing the online redo log members.

dupsbyOptionList

Syntax Element	Description
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.
fileNameConversion Spec	Specifies how to convert original datafile names to new datafile names in the standby database. **See Also:**"fileNameConversionSpec" on page 2-148
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"* on page 2-141

Examples

Setting New Filenames Manually: Example This example assumes that the target datafiles are on host1 in directory /h1/oracle/dbs/trgt. You wish to duplicate the database to newdb on host2 in the directory /h2/oracle/oradata/newdb. The DUPLICATE command uses backup sets stored on tape to duplicate the target database to database newdb, and recovers it to a point 24 hours ago:

```
RUN
{
  ALLOCATE AUXILIARY CHANNEL newdb1 DEVICE TYPE sbt;
  DUPLICATE TARGET DATABASE TO newdb
    DB_FILE_NAME_CONVERT=('/h1/oracle/dbs/trgt/','/h2/oracle/oradata/newdb/')
    UNTIL TIME ’SYSDATE-1’  # specifies incomplete recovery
    SKIP TABLESPACE cmwlite, drsys, example   # skip desired tablespaces
    PFILE = ?/dbs/initNEWDB.ora
    lOGFILE
      GROUP 1 ('?/oradata/newdb/redo01_1.f',
               '?/oradata/newdb/redo01_2.f') SIZE 200K,
      GROUP 2 ('?/oradata/newdb/redo02_1.f',
               '?/oradata/newdb/redo02_2.f') SIZE 200K
      GROUP 3 ('?/oradata/newdb/redo03_1.f',
               '?/oradata/newdb/redo03_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
    '?/dbs/log_1.f' SIZE 200K,
    '?/dbs/log_2.f' SIZE 200K
  SKIP READONLY
  NOFILENAMECHECK;
```

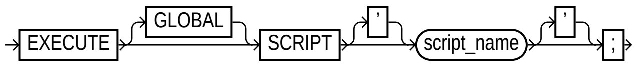
Creating a Standby Database: Example This example creates a standby database on a remote host with the same directory structure as the primary host. In this example, the `NOFILENAMECHECK` option is specified because the standby and primary datafiles and logs have the same names. Note that an automatic auxiliary channel is already configured, so you do not need to manually allocate a channel:

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

EXECUTE SCRIPT

Syntax

executeScript::=



Purpose

To run a local or global RMAN script stored in the recovery catalog.

> **See Also:** "CREATE SCRIPT" on page 2-115 and *Oracle Database Backup and Recovery Advanced User's Guide* for more details about stored scripts

Restrictions and Usage Notes

- Use `EXECUTE SCRIPT` only within the braces of a `RUN` command.
- RMAN must be connected to the catalog with the `CATALOG` command-line option or the `CONNECT CATALOG` command, and the catalog must be open.
- For a local script, RMAN must be connected to the target database for which the local script is created.
- When you run an `EXECUTE SCRIPT` command within a `RUN` block, RMAN places the contents of the script in the context of that RUN block. For this reason, you should not allocate a channel within the RUN block if you also allocate it in the script.

Keywords and Parameters

Syntax Element	Description
`GLOBAL`	Specifies the execution of a global stored script instead of a local one.

Syntax Element	Description
'script_name'	The name of the stored script to execute. If no local stored script defined for the current target database is found with the name specified, RMAN searches for a global script by the same name and executes it if one is found. **See Also:** "LIST" on page 2-164 for more information about listing the scripts stored in the recovery catalog, and "CREATE SCRIPT" on page 2-115 for information about creating scripts

Example

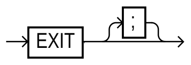
Executing a Script: Example This example runs a stored script called `backup_whole_10`:

```
RUN { EXECUTE script backup_whole_10; }
```

EXIT

Syntax

exit::=



Purpose

To shut down the Recovery Manager utility.

Restrictions and Usage Notes

Execute only at the RMAN prompt.

Example

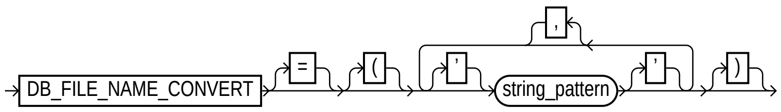
Exiting RMAN: Example This example starts RMAN and then shuts it down:

```
% rman
RMAN> EXIT
```

fileNameConversionSpec

Syntax

fileNameConversionSpec::=



Purpose

A subclause that specifies one or more patterns to be used in generating new database file names based on old ones. Used with BACKUP , CONVERT and DUPLICATE as one way of generating output file names.

Restrictions and Usage Notes

The rules for these patterns and how they affect file naming are the same as those for the initialization parameter DB_FILE_NAME_CONVERT. In parentheses, provide an even number of string patterns.

When a new filename is generated based on an old one, the original filename is compared to the first member of each pair of string patterns. The first time a pattern is found which is a substring of the original filename, the new filename is generated by substituting the second member of the pair for the substring that matched.

Set the `string_pattern` to a value such as:

```
DB_FILE_NAME_CONVERT = ('string1' , 'string2' , 'string3' , 'string4' ...)
```

Where:

- *string1* is a pattern matching the orignal filename
- *string2* is the pattern replacing *string1* in the generated filename
- *string3* is a pattern matching the orignal filename
- *string4* is the pattern replacing *string3* in the generated filename

You can use as many pairs of primary and standby replacement strings as required.

For example, when making image copy backups of tablespaces `users` (with datafiles in directory `/disk1/dbs/users`) and `tools` (with datafiles in `/disk1/dbs/tools/`), to direct the converted datafiles to `/newdisk/users` and `/newdisk/tools` respectively, use the `DB_FILE_NAME_CONVERT` pattern shown here:

```
BACKUP AS COPY TABLESPACE users, tools
    DB_FILE_NAME_CONVERT = ('disk1/dbs','newdisk');
```

For each datafile to be converted where '`disk1/dbs`' is a substring of the filename, the new filename is created by replacing '`disk1/dbs`' with '`newdisk`'. For example, the converted datafile corresponding to `/disk1/dbs/users/users01.dbf` is stored in `/newdisk/users/users01.dbf`, the converted datafile corresponding to `/disk1/dbs/tools/tools01.dbf` is stored in `/newdisk/tools/tools.dbf`, and so on.

Be aware of the following details:

- The pattern does not have to match at the beginning of the filename. In the previous example, the match of the pattern to the original filename began at the second character. The command

  ```
  BACKUP AS COPY TABLESPACE users
      DB_FILE_NAME_CONVERT = ('dbs','newdbs');
  ```

  would direct the image copies to `/disk1/newdbs/users` and `/disk1/newdbs/tools`.

- When there are multiple possible matches for a given filename being converted, the first match in the list of patterns is used to generate the new filename. The command

  ```
  BACKUP AS COPY TABLESPACE users
      DB_FILE_NAME_CONVERT = ('dbs','newdbs','/disk1','/newdisk');
  ```

  would have the same effect as the previous example, because the pattern '`dbs`' matches the filename and there is no reason to compare it to the second pattern '`/disk1`'.

Keywords and Parameters

Syntax Element	Description
'string_pattern'	Specifies the pattern, consisting of the pairs of strings used to convert the filenames..

Examples

Using DB_FILE_NAME_CONVERT with Multiple String Patterns: Example This example shows the use of `DB_FILE_NAME_CONVERT` with `BACKUP AS COPY` to create image copies of the `users` and `tools` tablespaces from the above discussion, directing `users` to `/newdisk1` and `tools` to `/newdisk2`:

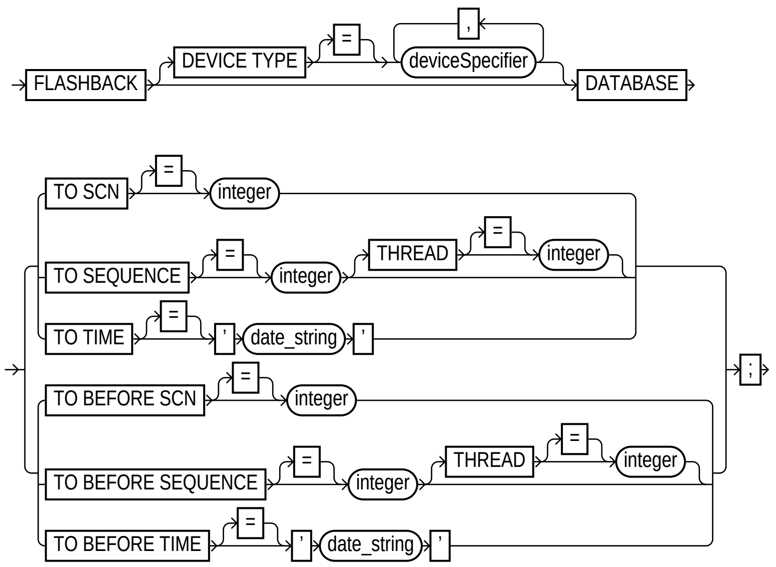
```
BACKUP AS COPY DEVICE TYPE DISK
    TABLESPACE tools, users
    DB_FILE_NAME_CONVERT=('/disk1/dbs/users','/newdisk1',
                          '/disk1/dbs/tools','/newdisk2');
```

See Also: "BACKUP" on page 2-28, "CONVERT" on page 2-105, and "DUPLICATE" on page 2-135 for commands that use fileNameConversionSpec

FLASHBACK

Syntax

flashback::=



Purpose

Performs a Flashback Database operation, returning the database to (or to just before) target time, as specified by time, SCN or log sequence number.

The result of using flashback database is generally similar to a database point-in-time recovery performed with RECOVER, except for the following principal differences:

- You do not need to restore a backup.
- RMAN uses **flashback logs** to undo changes to a point before the target time or SCN, and then uses archived redo logs to recover the database forward to make it consistent. RMAN automatically restores from backup any archived logs that

are needed. (Flashback logs are stored as Oracle-managed files in the flash recovery area, and cannot be created if no flash recovery area is configured.)

- The `FLASHBACK` command does not start modifying the database until it has made sure that it has all the files and resources that it needs.
- Some `NOLOGGING` changes will be reflected in the flashback which would not be reflected in the results of a point-in-time recovery, because flashback database uses backed-up block images as the basis for undoing changes to your current datafiles.

Because `FLASHBACK DATABASE` does not require you to restore a backup, it is usually much faster than incomplete recovery.

Restrictions and Usage Notes

- You can run this command from the RMAN prompt or from within a `RUN` command.
- The target database must be in `ARCHIVELOG` mode.
- The target database must be a Release 10*g* database.
- You must be connected to the target database.
- You must have enabled the flashback functionality before the target time for flashback, using the SQL statement `ALTER DATABASE ... FLASHBACK ON`. You can query this status in `V$DATABASE.FLASHBACK_ON`.
- The target database must be mounted with a current control file, that is, the control file cannot be a backup or have been re-created.
- The flash recovery area must be enabled (that is, `DB_RECOVERY_FILE_DEST` must be set). Flashback logs can only be stored in the flash recovery area.
- RMAN performs restore failover when unable to restore an archvied redo log file for use in a Flashback Database operation. See *Oracle Database Backup and Recovery Advanced User's Guide* for details on restore failover.
- The point to which RMAN can flash back the database depends on the setting of the `DB_FLASHBACK_RETENTION_TARGET` initialization parameter, and upon the actual retention of flashback logs permitted by available disk space. If there is not enough space in the flash recovery area for the retention of other required files, flashback logs may be deleted to make room. If the `FLASHBACK` command does not have enough flashback data to return the database to the requested SCN or time, then RMAN issues an error and does not modify the database.

- If insufficient flashback data is available for a subset of your datafiles, then you can take these datafiles offline and then run FLASHBACK on those for which there is sufficient flashback log data. Afterwards, you can perform point-in-time recovery on those files where there was not sufficient flashback log data.
- RMAN issues an error if you attempt to perform Flashback Database on online tablespaces on which flashback was disabled using the SQL statement ALTER TABLESPACE ... FLASHBACK OFF.
- You must OPEN RESETLOGS after running FLASHBACK DATABASE. If datafiles are not flashed back because they are offline, then the RESETLOGS may fail with an error. In that case you must do one of the following:
  - Flash back the affected datafiles to the same time or SCN as the other datafiles.
  - Run RESTORE and then RECOVER to bring the affected datafiles to the same time or SCN as the rest of the database.
  - Take the datafiles offline and then drop them.
- RMAN never flashes back data for temporary tablespaces.
- You cannot run FLASHBACK DATABASE to a time before an OPEN RESETLOGS.
- If a datafile has changed status between the current SCN and the SCN to which you are flashing back, then the FLASHBACK command behaves differently depending on the nature of the status change. Refer to Table 2–3.
- If the FLASHBACK command fails or is interrupted, then the database is left mounted. You can issue another FLASHBACK command or run RECOVER to return the database to its original state.
- When you have completed a flashback operation, you may wish to open the database read-only and run some queries to see if you have achieved the desired result. If you are not satisfied with your flashback operation, you can perform RECOVER DATABASE to re-apply all changes and bring the database back to its state when you started the flashback operation. You can then attempt flashb ack again. If you are satisfied, you can either perform an OPEN RESETLOGS to abandon all changes after the target time for the flashback, or you can export lost data, use RECOVER DATABASE to return your database to its state before the flashback database operation, and then re-import the lost data.
- When performing a FLASHBACK DATABASE operation, your database may not be left at the SCN most immediately before the target time you specify. There are events other than transactions which cause the SCN for your database to be

updated. If you use the FLASHBACK DATABASE TO form of the command and there is a transaction associated with your specified SCN, the database after the flashback operation will include all changes up to and including that transaction. Otherwise, all changes up to but not including that transaction will be included in your datafiles, whether you use the FLASHBACK DATBASE TO or FLASHBACK DATABASE TO BEFORE form of the command. Changes after the specified target time or SCN are never applied.

Table 2–3 How FLASHBACK Responds to Datafile Operations

If this datafile operation occurred during the flashback window ...	Then the FLASHBACK command ...
Added	Removes the datafile record from the control file.
Dropped	Adds the datafile to the control file, but marks it as offline and does not flash it back. You can then restore and recover the datafile to the same time or SCN.
Renamed	Ignores the renaming. The datafile retains its current name.
Resized	May fail. You can take the datafile offline and then rerun the FLASHBACK command. The datafile will not be flashed back. You can then restore and recover the datafile to the same time or SCN.
Taken offline	Ignores the operation. The datafile retains its current online status.
Brought online	Ignores the operation. The datafile retains its current offline status.
Made read-only or read-write	Changes the status of the datafile in the control file.

Keywords and Parameters

Syntax Element	Description
DEVICE TYPE *deviceSpecifier*	Allocates automatic channels for the specified device type only. For example, if you configure automatic disk and tape channels, and issue FLASHBACK ... DEVICE TYPE DISK, then RMAN allocates only disk channels. RMAN may need to restore redo logs from backup during the flashback database process. Changes between the last flashback log and the target time must be re-created based on the archived redo log. If no automatic channels are allocated for tape and a needed redo log is on tape, the FLASHBACK operation will fail. **See Also:** "deviceSpecifier" on page 2-129

Syntax Element	Description
DATABASE	Returns the database to the specified point. Query OLDEST_FLASHBACK_SCN and OLDEST_FLASHBACK_TIME in V$FLASHBACK_DATABASE_LOG to display the approximate lowest SCN and time to which you can flash back. View the current database SCN in V$DATABASE.CURRENT_SCN.
TO SCN = *integer*	Returns the database to the point up to (and including) the specified SCN.
TO BEFORE SCN = *integer*	Returns the database to its state just before the specified SCN. Any changes at an SCN lower than that specified are applied, but if there is a change associated with the specified SCN it is not applied.
TO SEQUENCE = *integer* THREAD = *integer*	Specifies a redo log sequence number and thread as an upper limit. RMAN applies changes up to (and including) the last change in the log with the specified sequence and thread number.
TO BEFORE SEQUENCE = *integer* [THREAD = *integer*]	Specifies a redo log sequence number and thread as an upper limit. RMAN applies changes up to (but not including) the last change in the log with the specified sequence and thread number.
TO TIME = '*date_ string*'	Returns the database to its state at the specified time. You can use any SQL DATE expressions to convert the time to the current format, for example, FLASHBACK DATABASE UNTIL TIME 'SYSDATE-7'.
TO BEFORE TIME = '*date_string*'	Similar to the TO TIME clause, but returns the database to its state including all changes up to but not including changes at the specified time.

Examples

FLASHBACK DATABASE to a Specific SCN: Example The following command flash back the database to a particular SCN:

```
RMAN> FLASHBACK DATABASE TO SCN 46963;
```

FLASHBACK DATABASE to One Hour Ago: Example The following command flashes the database by 1/24 of a day, or one hour:

```
RMAN> FLASHBACK DATABASE TO TIMESTAMP (SYSDATE-1/24);
```

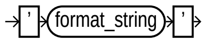
FLASHBACK DATABASE to a Specific Time: Example The following command uses SQL date conversion functions to specify the target time:

```
RMAN> FLASHBACK DATABASE TO TIMESTAMP
   TO_TIMESTAMP('2002-03-11 16:00:00', 'YYYY-MM-DD HH24:MI:SS');
```

formatSpec

Syntax

formatSpec::=



Purpose

To specify a filename format or an Automatic Storage Management disk group for a backup piece or image copy. If you do not specify a value for the FORMAT parameter, then RMAN either creates the backup in the flash recovery area if it is enabled, or in a port-specific directory (for example, ?/dbs on UNIX) if a flash recovery area is not enabled. In either case, RMAN uses the variable %U to name the backup.

The entire *format_string* is processed in a port-specific manner by the target instance to derive the final backup piece name. The substitution variables listed in "Keywords and Parameters" are available in FORMAT strings to aid in generating unique filenames. The formatting of this information varies by platform.

Order of Precedence for Multiple Format Strings

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_string* 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.

Restrictions and Usage Notes

Any name that is legal as a sequential filename on the platform is allowed, so long as each backup piece or copy has a unique name. If backing up to disk, then any legal disk filename is allowed, provided it is unique.

Keywords and Parameters

Syntax Element	Description
`%a`	Specifies the activation ID of the database.
`%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`.
`%e`	Specifies the archived log sequence number.
`%f`	Specifies the absolute file number.
`%F`	Combines the DBID, day, month, year, and sequence into a unique and repeatable generated name. This variable translates into *`c-IIIIIIIIII-YYYYMMDD-QQ`*, where: ■ *`IIIIIIIIII`* 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)
`%h`	Specifies the archived redo log thread number.
`%I`	Specifies the DBID.
`%M`	Specifies the month in the Gregorian calendar in format `MM`.
`%N`	Specifies the tablespace name.

Syntax Element	Description
`%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 the Gregorian calendar in this format: `YYYYMMDD`.
`%u`	Specifies an 8-character name constituted by compressed representations of the backup set or image copy number and the time the backup set or image copy was created.

`%U`	Specifies a system-generated unique filename (default). The meaning of `%U` is different for image copies and backup pieces.
	
	For a backup piece, `%U` specifies a convenient shorthand for `%u_%p_%c` that guarantees uniqueness in generated backup filenames. If you do not specify a format when making a backup, then RMAN uses `%U` by default.
	
	For an image copy of a datafile, `%U` means the following:
	
	`data-D-%d_id-%I_TS-%N_FNO-%f_%u`
	
	For an image copy of an archived redo velog, %U means the following:
	
	`arch-D_%d-id-%I_S-%e_T-%h_A-%a_%u`
	
	For an image copy of a control file, %U means the following:
	
	`cf-D_%d-id-%I_%u`

`%Y`	Specifies the year in this format: YYYY.
`%%`	Specifies the `'%'` character. For example, %%Y translates to the string %Y.

Example

Specifying an ASM Disk Group: Example This example copies the database to ASM disk group `disk1` and uses a tempfile creation template:

```
BACKUP AS COPY DATABASE FORMAT ’+disk1(tempfile)’; # use tempfile creation template
```

Specifying a Format for Datafile Copies: Example This example creates copies of three datafiles with tag '`LATESTCOPY`' to directory `/copies`:

```
# Create copies of 3 datafiles with tag 'LATESTCOPY' to directory /copies
BACKUP AS COPY
  FROM TAG 'LATESCOPY'
  COPY OF DATAFILE 4, 6, 14
  FORMAT '/copies/Datafile%f_Database%d';
```

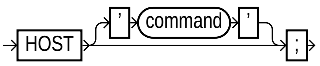
Creating a Database Copy for Use as a Standby Database: Example This example creates an image copy of the database to instantiate a physical standby in /stby:

```
# Create an image copy of the database to instantiate physical standby in /stby
BACKUP AS COPY
  DATABASE
  FORMAT '/stby/standby_file_%f_of_db_%I';
```

HOST

Syntax

host::=



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

Syntax Element	Description
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 `system01.dbf`, then executes the UNIX `ls` command to display all backed up datafiles:

```
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
BACKUP DATAFILE '?/oradata/trgt/system01.dbf'  FORMAT '/tmp/system01.dbf';
HOST 'ls -l /tmp/*dbf';
ALTER DATABASE OPEN;
```

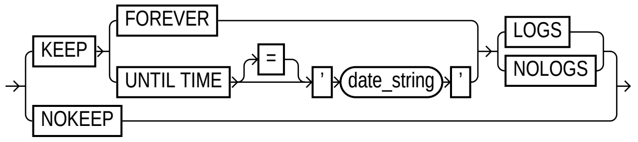
Hosting to the Operating System Within a Backup: Example This example makes an image copy of `datafile 3`, hosts out to the UNIX prompt to check that the copy is in the directory (the UNIX session output is indented and displayed in bold), then resumes the RMAN session:

```
RMAN> BACKUP DATAFILE 3 FORMAT '?/oradata/df3.cpy';
RMAN> HOST;
  % ls $ORACLE_HOME/oradata/df3.cpy
  /net/oracle/oradata/df3.cpy
  % exit
RMAN> LIST COPY;
```

keepOption

Syntax

keepOption::=



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.

Limitations and Restrictions

This option cannot be used with files stored in the flash recovery area.

Keywords and Parameters

Syntax Element	Description
KEEP	Overrides any configured retention policy for this backup or copy so that the backup is not obsolete. The BACKUP ... KEEP command specifies a new retention time for this backup. Use this option to create a **long-term backup**, that is, a backup that want you to archive.
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.
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'.
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.

Syntax Element	Description
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:

```
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
BACKUP DATABASE
  KEEP FOREVER NOLOGS;
ALTER DATABASE OPEN;
```

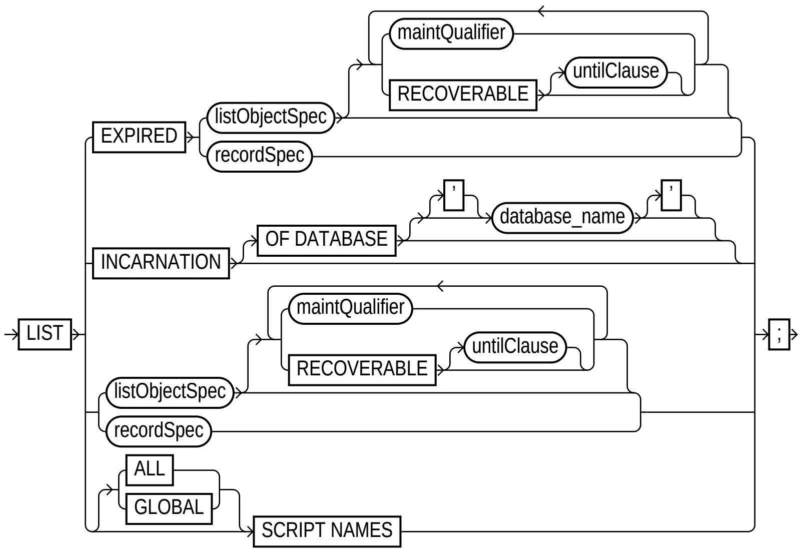
Changing the Status of a Copy: Example This example specifies that any long-term image copies of datafiles and control files should lose their exempt status and so become eligible to be obsolete according to the existing retention policy:

```
CHANGE COPY OF DATABASE CONTROLFILE NOKEEP;
```

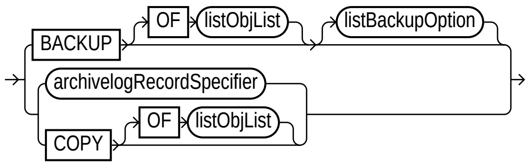
LIST

Syntax

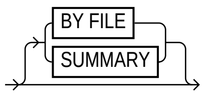
list::=



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 that do not have the status `AVAILABLE` 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
- Incarnations of a specified database or of all databases known to the repository
- Stored scripts in the recovery 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:** *Oracle Database Backup and Recovery Basics* to learn how to make lists and reports, and "cmdLine" on page 2-75

Restrictions and Usage Notes

- Execute `LIST` only at the RMAN prompt.
- RMAN must be connected to the target database. If RMAN is connected in `NOCATALOG` mode, then the database must be mounted. If RMAN is connected to a recovery catalog, then the target instance must be started but the target database does not need to be mounted.

Keywords and Parameters

list

Syntax Element	Description
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.
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 incremental backups that have no valid parent to which the incremental can be applied.
untilClause	Specifies an end time, SCN, or log sequence number. See "untilClause" on page 2-282.
recordSpec	Specifies the object or objects that you are listing. Refer to "recordSpec" on page 2-198.
INCARNATION	Displays information about the incarnations of a database. Whenever you open a database with the RESETLOGS option, then you create a new incarnation of the database. So, if LIST INCARNATION displays *n* incarnations of a database, then you have reset the online logs for this database *n*-1 times. The LIST output includes the primary keys of all database incarnation records for the specified database name (in the column "Inc Key," short for "incarnation key"). 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 2–19 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.
maintQualifier	Restricts the range of the listing. Refer to "maintQualifier" on page 2-188.

Syntax Element	Description
`SCRIPT NAMES`	Lists names of RMAN stored scripts in the currently connected recovery catalog, along with any descriptive comments. Without `ALL` or `GLOBAL` options, lists local and global scripts that can be executed on the current target database. You must be connected to a target database and a recovery catalog to use this form of the command. You must connect to a target database and a recovery catalog to list names for scripts defined for that target database.
`ALL`	RMAN lists all global and local scripts defined for all databases in the connected recovery catalog. You must be connected to a recovery catalog to use `LIST ALL SCRIPT NAMES`, but you do not need to be connected to a target database.
`GLOBAL`	RMAN lists only global scripts defined in the connected recovery catalog. You must be connected to a recovery catalog to use `LIST GLOBAL SCRIPT NAMES`, but you do not need to be connected to a target database.

listObjectSpec

Syntax Element	Description
`listObjectSpec`	Specifies the type of object or objects that you are listing. **See Also:** "recordSpec" on page 2-198
`BACKUP`	Displays information about `BACKUP` output: backup sets (including detail on backup pieces), proxy copies, and image copies.
`BACKUPSET`	Displays only information about backup sets, backup pieces, and proxy copies. The output displays a unique key for each. The `LIST BACKUPSET` command defaults to `BY BACKUP`. By default, 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. To see only backups that can be used for recovery, use the `RECOVERABLE` option. **See Also:** "LIST Output" on page 2-168 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.

Syntax Element	Description
`COPY`	Displays only 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 2–16 and Table 2–18 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 2-185
`archivelogRecordSpecifier`	Displays information about a range of archived redo logs.

listBackupOption

Syntax Element	Description
`listBackupOption`	Specifies how you want the list backup sets. **See Also:** "recordSpec" on page 2-198
`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`. If you specify the `SUMMARY` option, then this command is equivalent to `LIST BACKUP SUMMARY`.
`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 FILE`	Lists a datafile, then its backup sets, and then proxy copies.

LIST Output

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

- Table 2–4, "List of Backup Sets (for datafile backup sets)"
- Table 2–5, "List of Backup Pieces (for sets with only one piece)"

- Table 2–6, "List of Datafiles in backup set ..."
- Table 2–7, "List of Archived Logs in backup set ..."
- Table 2–8, "Backup Set Copy ... of backup set ... (only if multiple pieces)"
- Table 2–9, "List of Backup Pieces for backup set ... Copy ... (if multiple pieces)"
- Table 2–10, "List of Proxy Copies"
- Table 2–11, "List of Backup Sets (LIST BACKUP ... SUMMARY)"
- Table 2–12, "List of Backup Pieces (LIST BACKUPPIECE ...)"
- Table 2–13, "List of Datafile Backups (LIST BACKUP ... BY FILE)"
- Table 2–14, "List of Archived Log Backups (LIST BACKUP ... BY FILE)"
- Table 2–15, "List of Controlfile Backups (LIST BACKUP ... BY FILE)"
- Table 2–16, "List of Datafile Copies"
- Table 2–17, "List of Controlfile Copies"
- Table 2–18, "List of Archived Log Copies"
- Table 2–19, "List of Database Incarnations"
- Table 2–20, "List Script Names Output"

Table 2–4 List of Backup Sets (for datafile backup sets)

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 the default `NOCATALOG` mode, then `BS Key` displays the `RECID` from `V$BACKUP_SET`.
`Type`	The type of backup: `Full` or `Incr` (incremental). **Note:** Column only included in datafile backup sets.
`LV`	The level of the backup: `NULL` for nonincrementals, level `0` or level 1 for incrementals. **Note:** Column only included in datafile backup sets.
`Size`	The size of the backup in bytes. **Note:** Column only included in datafile backup sets.

Table 2–4 List of Backup Sets (for datafile backup sets) (Cont.)

Column	Indicates
`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 2–5 List of Backup Pieces (for sets with only one piece)

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. Note that tag names are not case sensitive and display in all uppercase.
`Piece Name`	The filename or handle of the backup piece. If the backup piece is on sbt, the Media ID is displayed with the name.
`Controlfile Included`	A control file is included in the backup. **Note:** This row appears only if the current control file is included in the backup.

Table 2–5 List of Backup Pieces (for sets with only one piece) (Cont.)

Column	Indicates
`SPFILE Included`	A server parameter 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. **Note:** This row appears only if the current control file is included in the backup.
`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. **Note:** This row appears only if the current control file is included in the backup.

Table 2–6 List of Datafiles in backup set ...

Column	Indicates
`File`	The number of the file that was backed up.
`LV`	The level of the backup: `NULL` for nonincrementals, level 0 or 1 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.
`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 2-254

Table 2–7 List of Archived Logs in backup set ...

Column	Indicates
`Thrd`	The thread number of the redo log.

Table 2–7 List of Archived Logs in backup set ... (Cont.)

Column	Indicates
`Seq`	The log sequence number of the archived log.
`Low SCN`	The lowest SCN in the archived log.
`Low Time`	The time when the database 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 2–8 Backup Set Copy ... of backup set ... (only if multiple pieces)

Column	Indicates
`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.
`Tag`	The tag applied to the backup set; `NULL` if none. Note that tag names are not case sensitive and display in all uppercase.

Table 2–9 List of Backup Pieces for backup set ... Copy ... (if multiple pieces)

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.
`Pc#`	The number of the backup piece in the backup set.
`Status`	The backup piece status: `AVAILABLE`, `UNAVAILABLE`, or `EXPIRED` (refer to the `CHANGE`, `CROSSCHECK`, and `DELETE` commands for an explanation of each status).

Table 2–9 List of Backup Pieces for backup set ... Copy ... (if multiple pieces) (Cont.)

Column	Indicates
`Piece Name`	The filename or handle of the backup piece. If the backup piece is stored on sbt, the media ID is also displayed.

Table 2–10 List of Proxy Copies

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.
`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 2-254
`Handle`	The media manager's handle for the proxy copy. If the object is on sbt, then the media ID is also displayed.
`Tag`	The tag applied to the proxy copy; `NULL` if none. Note that tag names are not case sensitive and display in all uppercase.

Table 2–11 List of Backup Sets (LIST BACKUP ... SUMMARY)

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 or 1 for incrementals.
S	The status of the backup: A (available), U (unavailable), or X (all backup pieces in set expired). 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.
Tag	The tag applied to the backup set; NULL if none. An asterisk (*) indicates multiple copies with different tags. Note that tag names are not case sensitive and display in all uppercase.

Table 2–12 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. If the piece is stored on SBT then the Handle and media ID are displayed.

Table 2–13 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 or 1 for incrementals.
S	The status of the backup: A (available), U (unavailable), or X (all backup pieces in set expired). 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. Note that tag names are not case sensitive and display in all uppercase.

Table 2–14 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 the database 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 status of the backup: A (available), U (unavailable), or X (all backup pieces in set expired). 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. Note that tag names are not case sensitive and display in all uppercase.

Table 2–15 List of Controlfile Backups (LIST BACKUP ... BY FILE)

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.

Table 2–15 List of Controlfile Backups (LIST BACKUP ... BY FILE) (Cont.)

Column	Indicates
S	The status of the backup: A (available), U (unavailable), or X (all backup pieces in set expired). 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. Note that tag names are not case sensitive and display in all uppercase.

Table 2–16 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 copy: A (available), U (unavailable), or X (expired). 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.

Table 2–16 List of Datafile Copies (Cont.)

Column	Indicates
`Name`	The filename of the datafile copy.

Table 2–17 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 copy: `A` (available), `U` (unavailable), or `X` (expired). 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 2–18 List of Archived Log Copies

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 copy: A (available), U (unavailable), or X (expired). Refer to the CHANGE, CROSSCHECK, and DELETE commands for an explanation of each status.
Low Time	The time when the database switched into the redo log having this sequence number.
Name	The filename of the archived redo log copy.

Table 2–19 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 from a recovery catalog, 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 the database generates automatically at database creation.

Table 2–19 List of Database Incarnations (Cont.)

Column	Indicates
`STATUS`	`CURRENT` for the current incarnation, `PARENT` for the parent incarnations of the current incarnation, and `ORPHAN` for orphaned incarnations.
`Reset SCN`	The SCN at which the incarnation was created.
`Reset Time`	The time at which the incarnation was created.

Table 2–20 List Script Names Output

Column	Indicates
`Script Name`	The name of the stored script.
`Description`	The comment provided when the script 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: TAG20011121T053733
        Piece Name: /oracle/oradata/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-01 49784      21-SEP-01
  1    142     49784      21-SEP-01 50331      21-SEP-01

BS Key  Type LV Size       Device Type Elapse Time Completion Time
------- ---- -- ---------- ----------- ----------- ---------------
244     Full    61M        DISK        00:00:18    21-SEP-01
        BP Key: 245   Status: AVAILABLE   Tag: TAG20011121T053816
        Piece Name: /oracle/oradata/0ac5unj5_1_1
  Controlfile Included: Ckp SCN: 51554        Ckp time: 21-SEP-01
  SPFILE Included: Modification time: 21-SEP-01
  List of Datafiles in backup set 244
  File LV Type Ckp SCN    Ckp Time  Name
  ---- -- ---- ---------- --------- ----
  1       Full 51555      21-SEP-01 /oracle/oradata/trgt/system01.dbf
  2       Full 51555      21-SEP-01 /oracle/oradata/trgt/undotbs_01.dbf

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

PC Key  File Status      Completion time     Ckp SCN    Ckp time
------- ---- ----------- ------------------- ---------- -------------------
552     1    AVAILABLE   10/07/2001 03:05:21 78022      10/07/2001 03:05:10
             Datafile name: /oracle/oradata/trgt/system01.dbf
             Handle: 0jb8l876_1_0

561     1    AVAILABLE   10/07/2001 03:38:22 78025      10/07/2001 03:38:09
             Datafile name: /oracle/oradata/trgt/system01.dbf
             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
------- -- -- - ----------- -------------------- ------- ------- ---
35      B  A  A SBT_TAPE    FEB 08 2002 05:37:37 1       1       TAG20020208T053733
42      B  F  A SBT_TAPE    FEB 08 2002 05:38:21 1       1       TAG20020208T053744
```

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      09/28/01 19:28:36 1       3       *
     552     P  F  X 78022      10/07/01 03:05:10 1       1       DF_1
     561     P  0  U 78025      10/07/01 03:38:09 2       1       DF_1
2    502     B  0  A 37973      09/28/01 19:28:36 1       2       *
     562     P  0  U 78027      10/07/01 03:38:22 1       1       DF_2

List of Archived Log Backups
============================
Thrd Seq     Low SCN    Low Time  BS Key  S #Pieces #Copies Tag
---- ------- ---------- --------- ------- - ------- ------- ---
1    141     49463      14-SEP-01 213     A 1       1       TAG20011114T125431

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

CF Ckp SCN Ckp Time  BS Key  S #Pieces #Copies Tag
---------- --------- ------- - ------- ------- ---
51593      14-SEP-01 222     A 1       1

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

Modification Time    BS Key  S #Pieces #Copies Tag
-------------------- ------- - ------- ------- ---
OCT 08 2001 05:38:55 251     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    30      A 14-SEP-01 /oracle/oradata/trgt/arch/archive1_30.dbf
154     1    31      A 14-SEP-01 /oracle/oradata/trgt/arch/archive1_31.dbf
```

Listing Backups of Specific Datafiles: Example The following example lists backups of datafile 3 in summary mode:

```
LIST BACKUP OF DATAFILE 3 SUMMARY;

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

Key     TY LV S Device Type Completion Time #Pieces #Copies Tag
------- -- -- - ----------- --------------- ------- ------- ---
180     B  0  A DISK        14-SEP-01       1       2       TAG20011114T125431
```

Listing Database Incarnations: Example This example lists all database incarnations recorded in the recovery catalog:

```
LIST INCARNATION;

List of Database Incarnations
DB Key  Inc Key DB Name  DB ID           STATUS  Reset SCN  Reset Time
------- ------- -------- --------------- ------  ---------- ----------
```

```
1       1       RDBMS    774627068        PARENT  1          21-OCT-03
2       2       RDBMS    774627068        CURRENT 173832     21-OCT-03
```

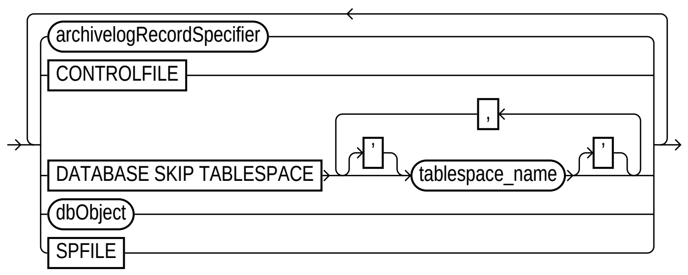
Listing Stored Scripts: Example This example shows the output of running `LIST ALL SCRIPT NAMES`:

```
RMAN> LIST ALL SCRIPT NAMES;

List of Stored Scripts in Recovery Catalog


    Scripts of Target Database TEST

       Script Name
       Description
       -----------------------------------------------------------------------
       configure_Rman
       Script to configure retention policy and device parameters.

       backup_schema_dfs
       Backups only tablespaces that are being currently used.


    Scripts of Target Database PROD

       Script Name
       Description
       -----------------------------------------------------------------------
       nightly_backup
       Script used to backup PROD database every weekday.


    Global Scripts


       Script Name
       Description
       -----------------------------------------------------------------------
       purge_backups
       General script to enforce retention policy

       validate_archived_logs
       General script to synchronize archived logs on disk with RMAN.
```

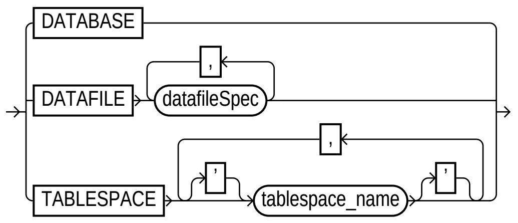
listObjList

Syntax

listObjList::=



dbObject::=



Purpose

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

Restrictions and Usage Notes

Use this clause in the following commands:

- `CHANGE`
- `CROSSCHECK`
- `DELETE`

- `LIST`

Keywords and Parameters

listObjList

Syntax Element	Description
`archivelogRecordSpecifier`	Specifies a range of archived redo logs. **See Also:** "archivelogRecordSpecifier" on page 2-22
`CONTROLFILE`	Specifies the current control file.
`DATABASE SKIP TABLESPACE` *`'tablespace_name'`* `[,` *`'tablespace_name'`* `]`	Omits the specified tablespaces from the DATABASE specification.
`SPFILE`	Specifies the current server parameter file.

dbObject

Syntax Element	Description
`DATABASE`	Specifies backup sets or image copies of all files in the current database.
`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 2-121
`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.

Examples

Listing Datafile Copies: Example The following command lists image copies of all the files in the database, skipping the `temp` tablespace, which is a dictionary-managed temporary tablespace:

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

Crosschecking Archived Redo Logs: Example The following example queries the media manager for the status of server parameter file and archived redo log backups (either backup sets or image copies) created in the last three months:

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

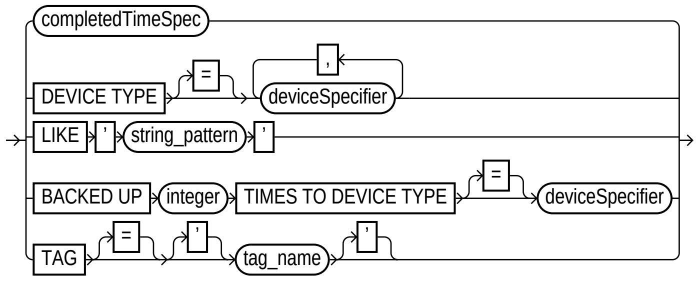
Deleting Expired Control File Backup Sets: Example The following command deletes expired backups (either backup sets or image copies) of the control file:

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

maintQualifier

Syntax

maintQualifier::=



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
  - SWITCH
- The BACKED UP *integer* TIMES clause applies only to archived redo logs.
- You cannot use LIKE with backup pieces.

Keywords and Parameters

Syntax Element	Description
completedTimeSpec	Specifies a range of time for completion of the backup or copy. **See Also:** "completedTimeSpec" on page 2-80
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 2-129
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.
BACKED UP *integer* TIMES TO DEVICE TYPE *deviceSpecifier*	Restricts the command to archived logs that have been successfully backed up *integer* or more times to the specified media.
TAG = '*tag_name*'	Specifies the datafile copies and backup sets by tag. Tag names are not case sensitive and display in all uppercase. **See Also:** "BACKUP" on page 2-28 for a description of how a tag can be applied to an individual copy of a duplexed backup set, and also for a description of the default filename format for tags

Example

Listing Backups on a Specific Device: Example The following command lists all backups located on tape and copies located in /tmp:

```
LIST BACKUP DEVICE TYPE sbt;
LIST COPY LIKE '/tmp';
```

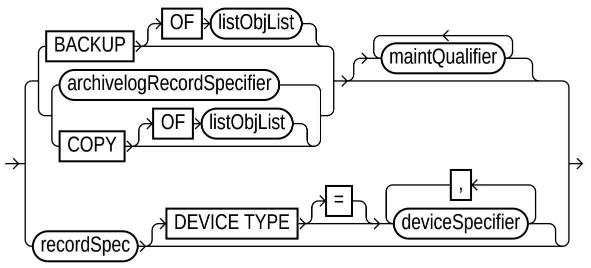
Deleting Archived Logs That Are Already Backed Up: Example The following command deletes only those archived logs that have been successfully backed up three or more times to tape:

```
DELETE ARCHIVELOG ALL BACKED UP 3 TIMES TO DEVICE TYPE sbt;
```

maintSpec

Syntax

maintSpec::=



Purpose

To specify the backup files operated on by the `CHANGE`, `CROSSCHECK`, and `DELETE` commands.

Keywords and Parameters

Syntax Element	Description
BACKUP	Processes files output by the BACKUP command. **With CHANGE BACKUP:** Specify one or more objects using the "CHANGE BACKUP OF *listObjList*" form of the command. Otherwise, CHANGE BACKUP operates on all backup sets, image copies, and proxy copies recorded in the repository. **With CROSSCHECK BACKUP:** If you are running CROSSCHECK BACKUP, then the command crosschecks BACKUP output that has status AVAILABLE or EXPIRED: backup sets (including backup pieces), proxy copies, and image copies. RMAN crosschecks all backups not marked UNAVAILABLE, even if they cannot be restored or if they are incremental backups whose parent full backup or copy no longer exists. Specify one or more objects using the "CROSSCHECK BACKUP OF *listObjList*" form of the command. Otherwise, RMAN crosschecks backups of the whole database. **With DELETE BACKUP:** Deletes backup sets and proxy copies. Specify one or more objects using the "DELETE BACKUP OF *listObjList*" form of the command. Otherwise, RMAN deletes backup sets of the whole database.
BACKUPSET	**When followed by a list of primary keys:** this is actually a case of the recordSpec syntax element in the syntax diagram for maintSpec. In such a case, the keys identify backupsets for use with the CHANGE, CROSSCHECK and DELETE commands. For more details, see "recordSpec" on page 2-198 and "LIST Output" on page 2-168 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. **When not followed by a list of primary keys:** A synonym for BACKUP.

Syntax Element	Description
`COPY`	Processes datafile copies, control file copies, archived redo logs, and image copies of archived redo logs. If you do not specify an option for `CHANGE` `COPY`, then the command operates on all image copies recorded in the repository. If you are running `CROSSCHECK` `COPY`, then by default the command checks all image copies of all files in the database with status `AVAILABLE` or `EXPIRED`. 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. If you do not specify an object, then the command defaults to all copies. Note that `CHANGE COPY OF DATABASE` includes datafiles but not control files. **See Also:** "listObjList" on page 2-185
`archivelogRecordSpecifier`	Processes the specified archived redo logs. **See Also:** "archivelogRecordSpecifier" on page 2-22
`maintQualifier`	Restricts the command based on the specified options. **See Also:** "maintQualifier" on page 2-188
`recordSpec`	Specifies the file that you are performing maintenance on. See "recordSpec" on page 2-198.
`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 2-129

Examples

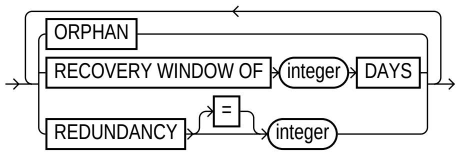
To see the *`maintSpec`* clause in use, refer to the commands where it is used:

- "CHANGE" on page 2-71
- "CROSSCHECK" on page 2-118
- "DELETE" on page 2-123

obsOperandList

Syntax

obsOperandList::=



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

Syntax Element	Description
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:** *Oracle Database Backup and Recovery Advanced User's Guide* for an explanation of orphaned backups

Syntax Element	Description
`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 2-82 for an explanation of the recovery window
`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.

Example

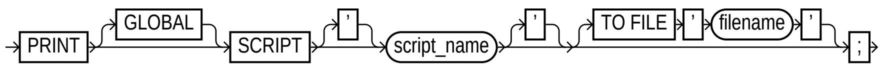
Deleting Obsolete Backups: Example The following command deletes all backups and copies not needed to recover the database to a random point within the last 30 days:

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

PRINT SCRIPT

Syntax

printScript::=



Purpose

To print a local or global stored script to standard output or to a file.

For more information about stored scripts, see "CREATE SCRIPT" on page 2-115.

Restrictions and Usage Notes

- Use this command only at the RMAN prompt.
- You must be connected to the target database that you connected to when you created or replaced the script.
- You must be connected to the recovery catalog, and the recovery catalog database must be open.

Keywords and Parameters

Syntax Element	Description
`GLOBAL`	With the `GLOBAL` option, `PRINT SCRIPT` prints the global script named '`script_name`' instead of the local script. If omitted, RMAN looks for a local or global script `script_name` to print. If a local script is found, it is printed. If no local script is found, but a global script `script_name` is found, the global script is printed. See "CREATE SCRIPT" on page 2-115 for more details about local and global stored scripts.
'script_name'	The name of the script to print.
`TO FILE '` *filename* `'`	With `TO FILE` '*filename*' option, `PRINT SCRIPT` sends its output to the specified file instead of standard output.

Examples

Printing a Script to a File: Example The following example prints a script to the file '`/tmp/backup_db.rman`':

```
PRINT SCRIPT backup_db TO FILE '/tmp/backup_db.rman';
```

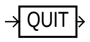
Printing a Script to the Screen: Example This example prints a stored script to standard output (includes sample output):

```
RMAN> PRINT SCRIPT 'backup_db';

printing stored script: backup_db
{
ALLOCATE CHANNEL c1 DEVICE TYPE sbt
BACKUP DATABASE;
}
```

QUIT

Syntax

quit::=



Purpose

To shut down the Recovery Manager utility.

Restrictions and Usage Notes

Execute only at the RMAN prompt, not in a RUN block.

Example

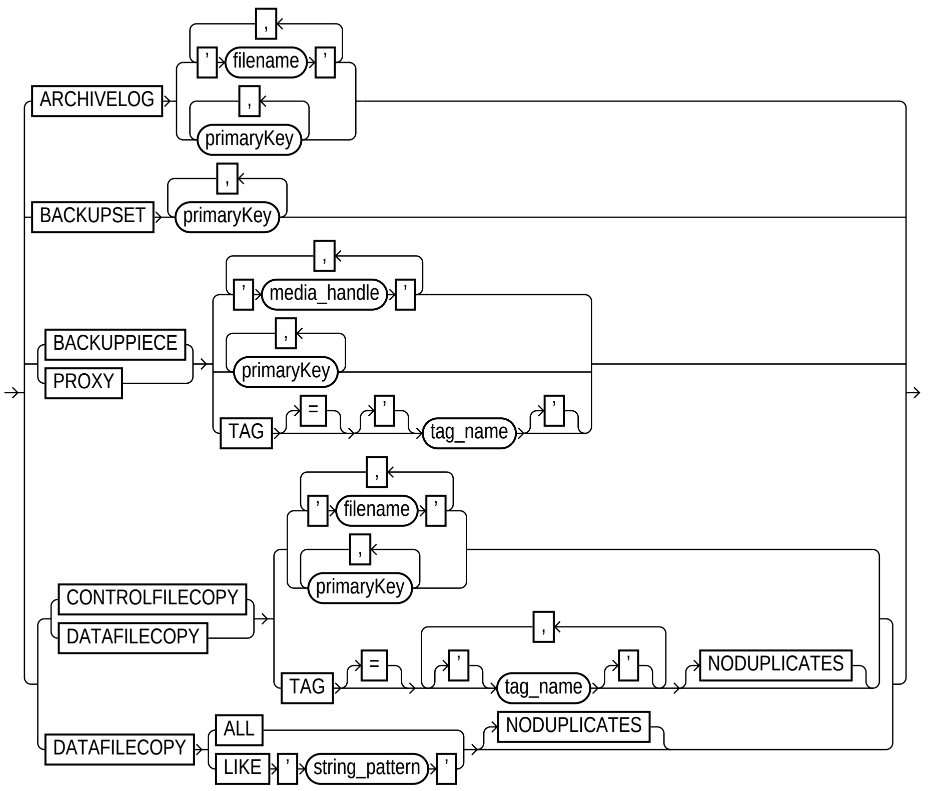
Quitting RMAN: Example This example starts RMAN and then shuts it down:

```
% rman
RMAN> QUIT
```

recordSpec

Syntax

recordSpec::=



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

Syntax Element	Description
`ARCHIVELOG`	Specifies an archived redo log by either *`primary_key`* or `'`*`filename`*`'`.
`BACKUPSET` *`primary_key`*	Specifies a backup set by *`primary_key`*.
`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`*.
`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`.

Examples

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

```
CROSSCHECK BACKUPSET 507, 508, 509;
```

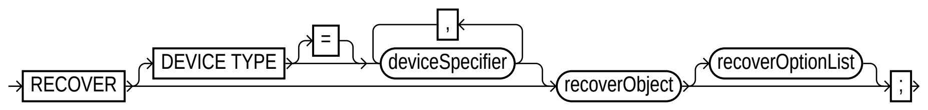
Deleting Datafile Copies: Example This example deletes a specified datafile copy:

```
DELETE NOPROMPT DATAFILECOPY '?/oradata/users01.cpy';
```

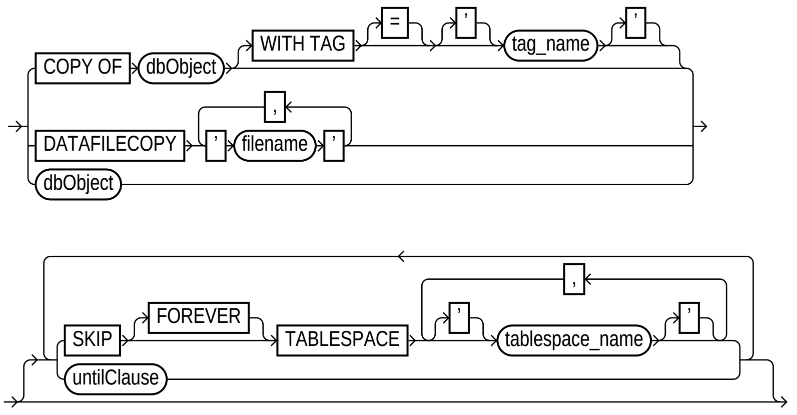
RECOVER

Syntax

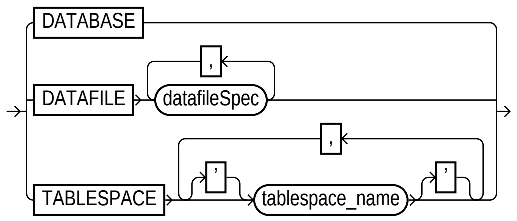
recover::=



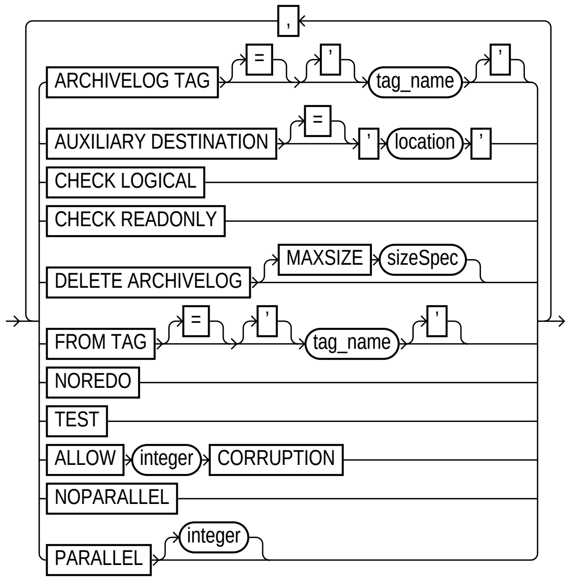
recoverObject::=



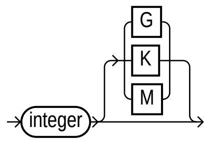
dbObject::=


DATABASE
DATAFILE
,
datafileSpec
TABLESPACE
,
'
tablespace_name
'

recoverOptionList::=



sizeSpec::=



Purpose

The RECOVER command has three uses:

- Performing complete recovery of one or more restored datafiles, or the entire database.
- Performing point-in-time recovery of a database (DBPITR) or tablespace (TSPITR).

- Applying incremental backups to a datafile image copy (*not* a restored datafile) to roll it forward in time.

When performing media recovery, RMAN first looks for archived logs or image copies on disk, and if none are available, then it restores logs from backups to the `LOG_ARCHIVE_DEST_1` destination (or the `SET ARCHIVELOG DESTINATION`) as needed for the recovery.

Complete and point-in-time recovery of a database can use both incremental backups and redo logs. 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. 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:

- *Oracle Database Backup and Recovery Basics* to learn how to recover datafiles.
- "RESTORE" on page 2-231 command for explanation of the default location for restoring archived logs. Note that RMAN automatically specifies the `MAXSIZE` option when staging logs in the flash recovery area.

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.
- RMAN can recover through `RESETLOGS` operations transparently if the parent incarnation backups were restored. If required, the `RECOVER` command can also restore and apply archived logs and incremental backups from prior incarnations.
- If, during recovery, the database encounters redo for adding a datafile, RMAN automatically creates a new datafile if the tablespace containing the added datafile is not skipped during recovery. This situation can arise when a backup

control file is restored prior to recovery, and the backup control file does not contain a record of the recently-added datafile.

- If you need to restore archived log redo or incremental backups during your recovery operation, then you must either configure channels or use ALLOCATE CHANNEL commands in a RUN block with your RECOVER command.
- 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, then you must either use configured channels or manually allocate channels of the same type that created these backups.
- RMAN uses restore failover to try all suitable backups, when it encounters difficulty restoring files needed for the recovery operation. See *Oracle Database Backup and Recovery Advanced User's Guide* for details on restore failover.
- 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.
- If you want to perform DBPITR, the best practice is to enter a SET UNTIL command before both the RESTORE and RECOVER commands. If you run SET UNTIL after the RESTORE operation, then you may not be able to perform media recovery on the database to the target time, because the restored files may have time stamps later than the target time.
- You cannot arbitrarily recover datafiles to different points in time. You can recover the whole database to a single point in time (DBPITR, in which case you should use SET UNTIL, followed by RESTORE DATABASE and RECOVER DATABASE) or recover wholly contained tablespaces to a point in time different from the rest of the database (TSPITR, in which case you must use RECOVER TABLESPACE... UNTIL...). For more information on DBPITR, see t*Oracle Database Backup and Recovery Advanced User's Guide*.For more information on TSPITR, see the procedure described in *Oracle Database Backup and Recovery Advanced User's Guide* .
- 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.
- You must open the database with the RESETLOGS option after incomplete recovery or recovery with a backup control file.

- Temporary tablespaces cannot be recovered. They must be re-created. Note that if you recover the database after restoring a backup control file, you must add new tempfiles to locally-managed temporary tablespaces.
- 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

recover

Syntax Element	Description
`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 2-129

recoverObject

Syntax Element	Description
`COPY OF`	Applies incremental backups to the specified image copy to roll it forward to any time equal to or before the most recent incremental backup of the file. The existing image copy is overwritten, and remains in a fuzzy state during the recovery. `RECOVER COPY` is a method for updating a copy and is *not* a media recovery of a current database file.This is the other half of the incrementally updated backups feature, in conjunction with the `BACKUP... FOR RECOVER OF COPY` syntax. You must meet the following requirements: ■ At least one copy of each datafile that you are recovering must exist. ■ Backup incrementals taken after the image copy that you are recovering must exist. ■ RMAN selects one suitable copy if there are multiple possible copies to which the incrementals can be applied to carry out the operation. **Note:** RMAN issues a warning (not an error) if it cannot recover to the specified time (or current time if none is specified) because no incrementals are available.

Syntax Element	Description
WITH TAG *'tag_name'*	Specifies a tag name to identify the image copy to be rolled forward.
DATAFILECOPY	Applies incremental backups to the specified datafile image copy. Refer to description of RECOVER COPY OF..
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.
untilClause	Specifies a past time, SCN, or log sequence number for termination of the RECOVER command. When used with one or more tablespaces, indicates a TSPITR operation for the named tablespaces. It cannot be used with RECOVER DATAFILE. It should not be used for RECOVER DATABASE (see "Restrictions and Usage Notes" for details). After DBPITR, you must open the database with the RESETLOGS option. **See Also:** "untilClause" on page 2-282

dbObject

Syntax Element	Description
DATABASE	Specifies that the entire database is to be recovered. By default, RMAN performs complete recovery. For incomplete recovery, specify an *untilClause*.

Syntax Element	Description
`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 recorded 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, even if the name in the control file has been updated more recently. For example, assume that a datafile was renamed in the control file. The instance then fails 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 2-121
`TABLESPACE` *`'tablespace_name'`*	Specifies tablespaces by tablespace name.

recoverOptionList

Syntax Element	Description
`recoverOptionList`	Specifies various recovery options.
`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. Note that tag names are not case sensitive and display in all uppercase.
`AUXILIARY DESTINATION [ = ]` *`'location'`*	Can only be used when performing TSPITR. Used to automate the management of auxiliary set files during TSPITR. Specifies a location where auxiliary set datafiles, control files and online logs are created during TSPITR if another location for an individual file is not explicitly specified. If you do not specify `AUXILIARY DESTINATION` for a TSPITR, then you must specify the naming of individual auxiliary set datafiles, control files, and online logs before executing the `RECOVER TABLESPACE`... `UNTIL`... command. Otherwise, TSPITR will fail. **See also:** The chapter on TSPITR in *Oracle Database Backup and Recovery Advanced User's Guide* for more details about the auxiliary destination.

Syntax Element	Description
`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 total number of physical and logical corruptions detected for a file is less than its `MAXCORRUPT` setting, the RMAN command completes and the database populates `V$DATABASE_BLOCK_CORRUPTION` with corrupt block ranges. Otherwise 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 headers of read-only files to ensure that they are current before omitting them from the recovery.
`DELETE ARCHIVELOG [MAXSIZE` *`integer`* `[K|M|G]]`	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. If you do not specify `MAXSIZE`, then RMAN deletes restored archived logs as they are applied. If you specify `MAXSIZE`, then RMAN will not use more than *`integer`* amount of disk space for restored archived logs. If recovery requires the restore of a log larger than the `MAXSIZE` value, then RMAN reports an error indicating that you should increase the `MAXSIZE` value. If `MAXSIZE` is smaller than the backup set containing the logs, then RMAN must read the backup set more than once to extract the logs. Hence, RMAN issues a warning that `MAXSIZE` should be increased. **Note:** If archived redo logs are restored to the flash recovery area then the `DELETE ARCHIVELOG` option is enabled by default.
`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. Note that tag names are not case sensitive and display in all uppercase. **See Also:** "BACKUP" on page 2-28 to learn how a tag can be applied to an individual copy of a duplexed backup set, and to learn about the default filename format for backup tags
`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 the database terminates recovery and issues an error. **Note:** Incremental backups of `NOARCHIVELOG` databases can only be taken after a consistent shutdown.

Syntax Element	Description
`TEST`	Use the `TEST` clause to conduct a trial recovery. A trial recovery is useful if a normal recovery procedure has encountered some problem. It lets you look ahead into the redo stream to detect possible additional problems. The trial recovery applies redo in a way similar to normal recovery, but it does not write changes to disk, and it rolls back its changes at the end of the trial recovery. **Note:** You can use this clause only if you have restored a backup taken since the last RESETLOGS operation. Otherwise, the database returns an error.
`ALLOW` *`integer`* `CORRUPTION`	The `ALLOW` *`integer`* `CORRUPTION` clause lets you specify, in the event of logfile corruption, the number of corrupt blocks that can be tolerated while allowing recovery to proceed. When you use this clause during trial recovery (that is, in conjunction with the TEST clause), *`integer`* can exceed 1. When using this clause during normal recovery, *`integer`* can only be 0 or 1.
`NOPARALLEL`	Specifies not to perform recovery in parallel. Serial execution is the default for `RECOVER`.
`PARALLEL [`*`integer`*`]`	Specification of integer indicates the degree of parallelism, which is the number of parallel threads used in the parallel operation. Each parallel thread may use one or two parallel execution servers. Normally the database calculates the optimum degree of parallelism, so it is not necessary for you to specify *`integer`*. For more complete information on `PARALLEL` see the description of the PARALLEL clause in the discussion of CREATE TABLE in *Oracle Database SQL Reference*.

Examples

Recovering a Tablespace in an Open Database: Example The following example takes tablespace `tools` 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 tools OFFLINE IMMEDIATE";
RESTORE TABLESPACE tools;
# restore only 2M of logs at a time, then delete them
RECOVER TABLESPACE tools DELETE ARCHIVELOG MAXSIZE 2M;
SQL "ALTER TABLESPACE tools 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 `users` to a different location:

```
RMAN> RUN
{
  ALLOCATE CHANNEL dev2 DEVICE TYPE sbt;
  SQL "ALTER TABLESPACE users OFFLINE IMMEDIATE";
  SET NEWNAME FOR DATAFILE '?/oradata/trgt/users01.dbf'
    TO '/tmp/users01.dbf';
  RESTORE TABLESPACE users;
  SWITCH DATAFILE ALL;
  RECOVER TABLESPACE users;
  SQL "ALTER TABLESPACE users ONLINE";
}
```

Performing DBPITR with a Backup Control File and Recovery Catalog: Example Assume that all datafiles and control files as well as archived redo log 40 were lost due to a disk failure. Because you do not have incremental backups, you need to recover the database with available archived redo logs. You do not need to restore tablespace `history` because it has not changed since log 40. After connecting to the target and recovery catalog, follow the example shown here:

```
RMAN> STARTUP FORCE NOMOUNT;
RMAN> RUN
{
  SET UNTIL SEQUENCE 530 THREAD 1;      # Recover database until log sequence 40
  RESTORE CONTROLFILE TO '/tmp/control01.ctl';
  RESTORE CONTROLFILE FROM '/tmp/control01.ctl'; # Replicates to CONTROL_FILES locations
  ALTER DATABASE MOUNT;
  RESTORE DATABASE SKIP TABLESPACE temp, history;
  RECOVER DATABASE SKIP FOREVER TABLESPACE temp;
}
RMAN> ALTER DATABASE OPEN RESETLOGS;
```

If the database uses locally-managed temporary tablespaces, then you must add tempfiles to these tablespaces after restoring a backup control file, using the SQL `ALTER TABLESPACE`... ADD `TEMPFILE` command:

```
RMAN> SQL "ALTER TABLESPACE temp ADD TEMPFILE ''?/oradata/trgt/temp01.dbf'' REUSE";
```

RECOVER and Incrementally Updated Backups: Example Assume that at time t1 you create an image copy of datafile `3`:

```
BACKUP FOR RECOVER OF COPY WITH TAG DATAFILE 3 FORMAT ’/disk1/3img.df’ TAG "DF3CPY";
```

You can also refer to the datafile copy by its tag, with this form of the command:

```
RMAN> RECOVER COPY OF DATAFILE 3 WITH TAG "DF3CPY";
```

At time t2, t3, and t4 you make incremental backups of the database. To roll forward the image copy of datafile `3` to the date of the latest incremental backup, use the RECOVER command. You can identify the datafile by its filename with this form of the command:

```
RMAN> RECOVER DATAFILECOPY '/disk1/3img.df';
```

RECOVER an Image Copy of a Datafile to a Point in Time: Example Assume that you have an image copy backup of a datafile and you want to roll it forward in time using incremental backups. Use RECOVER DATAFILECOPY with the UNTIL TIME UNTIL TIME option. For example, run the following command:

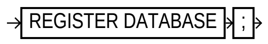
```
RMAN> RECOVER DATAFILECOPY '/disk1/3img.df' UNTIL TIME 'SYSDATE-7';
```

Available incremental backups are applied to the datafile copy to recover it to the desired point in time. Redo from the archived redo logs is not applied by this command.

REGISTER

Syntax

register::=



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: *BRADV015Oracle Database Backup and Recovery Advanced User's Guide*, and "CREATE CATALOG" on page 2-113

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 change the DBID of the copied database with the standalone DBNEWID utility.

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.

See Also: *Oracle Database Utilities*, to learn how to use the DBNEWID utility

Example

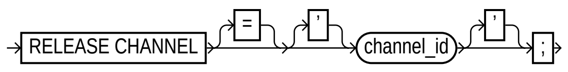
Registering a Database: Example The following commands register a new target database, catalogs an existing datafile copy, then opens the database for use:

```
% rman TARGET / CATALOG rman/rman@catdb
RMAN> STARTUP FORCE MOUNT;
RMAN> REGISTER DATABASE;
RMAN> CATALOG DATAFILECOPY '?/oradata/system01.cpy';
RMAN> ALTER DATABASE OPEN;
```

RELEASE CHANNEL

Syntax

release::=



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 a `RUN` block terminates.

Restrictions and Usage Notes

Execute this command only within a `RUN` block. See "releaseForMaint" on page 2-216 for the form of `RELEASE CHANNEL` used for maintenance channels.

Keywords and Parameters

Syntax Element	Description
`channel_id`	The case-sensitive channel ID used in the `ALLOCATE CHANNEL` command.

Examples

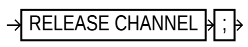
Releasing a Channel: Example in this example, RMAN allocates channels ch1 and ch2. It then makes three identical backup sets of datafiles 1 to 4 to tape, then releases it. RMAN then uses channel ch2 to make three identical backups of datafiles 5 to 7 to tape, and then releases it:

```
RUN {
     SET BACKUP COPIES = 3;
     ALLOCATE CHANNEL ch1 DEVICE TYPE sbt FORMAT 'bkup_%U';
     ALLOCATE CHANNEL ch2 DEVICE TYPE sbt MAXPIECESIZE = 5M;
     BACKUP CHANNEL ch1 DATAFILE 1,2,3,4;
     RELEASE CHANNEL ch1;
     BACKUP DATAFILE 5,6,7;
}
```

releaseForMaint

Syntax

releaseForMaint::=



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, not within a RUN block.
- You must have a maintenance channel allocated in order to release it.

Examples

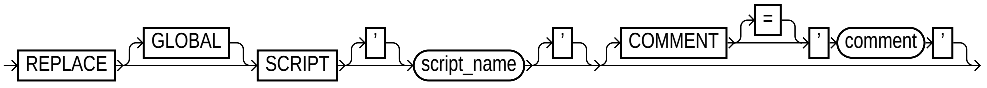
Releasing a Maintenance Channel After a Delete Operation: Example This example allocates and then releases a maintenance channel to the media manager:

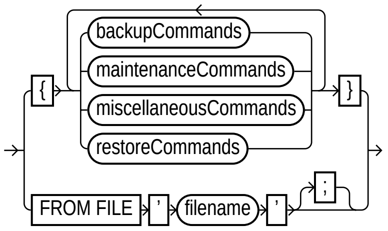
```
ALLOCATE CHANNEL FOR MAINTENANCE DEVICE TYPE sbt;
DELETE NOPROMPT BACKUPPIECE 100;
RUN
{
  ALLOCATE CHANNEL ch1 DEVICE TYPE DISK;
  BACKUP DATAFILE 1;
  RELEASE CHANNEL ch1; # releases RUN channel but not maintenance channel
}
RELEASE CHANNEL; # releases maintenance channel
```

REPLACE SCRIPT

Syntax

`replaceScript::=`





Purpose

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

A stored script is a sequence of RMAN commands, given a name and stored in the recovery catalog for later execution. A stored script may be local (that is, associated with one target database) or global (available for use with any database registered in the recovery catalog).

For more information about stored scripts and commands used to create, update, delete and execute stored scripts, see "CREATE SCRIPT" on page 2-115.

Restrictions and Usage Notes

- Execute `REPLACE SCRIPT` only at the RMAN prompt.
- You must be connected to a target database and recovery catalog. If you are replacing a local script, then you must be connected to the target database that you connected to when you created the script.
- When using `REPLACE SCRIPT`, RMAN must be connected to a recovery catalog, and the catalog database must be open.
- If no script by the specified name exists, one will be created.
- The `@` and `@@` commands do not work within `REPLACE SCRIPT`.

Keywords and Parameters

Syntax Element	Description
`GLOBAL`	Restricts RMAN to replacing or creating a global stored script, instead of a local one. If omitted, RMAN looks for a local stored script *`script_name`* defined on the current target database. If one is found, RMAN updates the local script with the new script contents. If no local script is found, RMAN looks for a global stored script *`script_name`*. If a global script *`script_name`* is found, RMAN updates it with the new script contents.
`'script_name'`	Identifies the local or global script being replaced.
`COMMENT =`*`'comment'`*	An explanatory comment, used in the output of LIST SCRIPT NAMES..
`FROM FILE` *`'filename'`*	The new contents of the script are to be read from this file. The first line of the file must begin with a "`{`", the last line must contain a "`}`" and the commands must be valid within a RUN block.

`{` *`backupCommands`*
`|` *`maintenanceCommands`*
`|` *`miscellaneousCommands`*
`|` *`restoreCommands`*
`}`
	Commands valid in a stored script. These are the same commands supported within a `RUN` block. See "RUN" on page 2-249 for more details about *`backupCommands`*, *`restoreCommands`*, *`maintenanceCommands`*, and *`miscellaneousCommands`*.

Example

Replacing a Recovery Catalog Script: Example This example updates a stored script called `backup_full`:

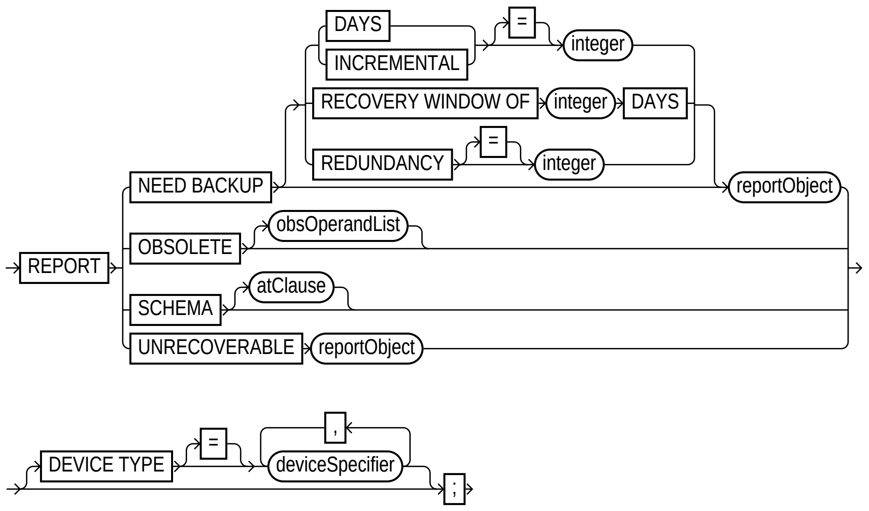
```
REPLACE SCRIPT backup_full
COMMENT 'Run this to back up the database'
{
   # uses configured channel for default device type
   BACKUP DATABASE;
}
```

If there is a local script `backup_full`, it is updated. If there is no local script `backup_full` but there is a global script `backup_full`, the global script is updated.

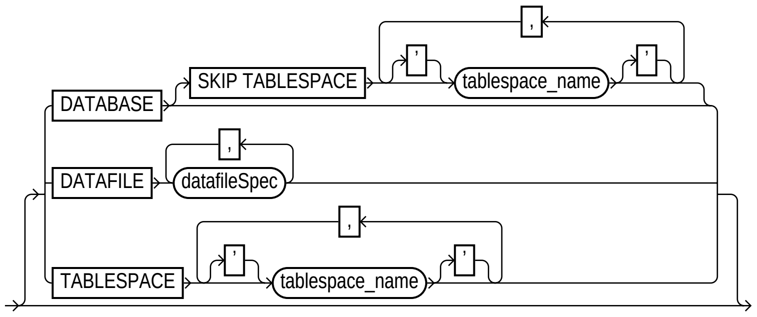
REPORT

Syntax

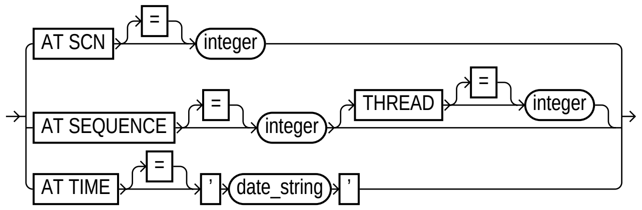
report::=



reportObject::=



atClause::=



Purpose

To perform detailed analyses of the RMAN repository. The Database 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:** *Oracle Database Backup and Recovery Basics* 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

report

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

Syntax Element	Description
`OBSOLETE` *`obsOperandList`*	Lists full backups, datafile copies, and archived logs 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.
`SCHEMA`	Lists the names of all datafiles and tablespaces at the specified point in time.
`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.
`DEVICE TYPE` *`deviceSpecifier`*	Specifies the type of storage device. RMAN only considers backups and copies available on the specified device for its report.

reportObject

Syntax Element	Description
`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. **Note:** RMAN includes objects from prior incarnations.
`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.

atClause

Syntax Element	Description
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.

Report Output

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

- Table 2–21, "Report of Database Schema"
- Table 2–22, "Report of Obsolete Backups and Copies"
- Table 2–23, "Report of Files that Need Backup Due to Unrecoverable Operations"
- Table 2–24, "Report of Files with Fewer Than n Redundant Backups"
- Table 2–25, "Report of Files Whose Recovery Needs More Than n Days of Archived Logs"
- Table 2–26, "Report of Files That Need More than n Incrementals During Recovery"

Table 2–21 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 2–22 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 2–23 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 2–24 Report of Files with Fewer 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 2–25 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.

Table 2–25 Report of Files Whose Recovery Needs More Than n Days of Archived Logs (Cont.)

Column	Indicates
`Name`	The name of the datafile.

Table 2–26 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, which requires a recovery catalog, reports the names of all datafiles and tablespaces one week ago:

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

Report of database schema
File K-bytes    Tablespace           RB segs Datafile Name
---- ---------- -------------------- ------- -------------------
1        307200 SYSTEM               ***     /oracle/oradata/trgt/system01.dbf
2         20480 UNDOTBS              ***     /oracle/oradata/trgt/undotbs01.dbf
3         10240 CWMLITE              ***     /oracle/oradata/trgt/cwmlite01.dbf
4         10240 DRSYS                ***     /oracle/oradata/trgt/drsys01.dbf
5         10240 EXAMPLE              ***     /oracle/oradata/trgt/example01.dbf
6         10240 INDX                 ***     /oracle/oradata/trgt/indx01.dbf
7         10240 TOOLS                ***     /oracle/oradata/trgt/tools01.dbf
8         10240 USERS                ***     /oracle/oradata/trgt/users01.dbf
```

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
---- ------------ ----------------------------------------------
2    9            /oracle/oradata/trgt/undotbs01.dbf
```

```
3    9           /oracle/oradata/trgt/cwmlite01.dbf
4    9           /oracle/oradata/trgt/drsys01.dbf
```

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     /oracle/oradata/trgt/drsys01.dbf.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
---- ----------------------- -----------------------------------
1    full                    /oracle/oradata/trgt/system01.dbf
```

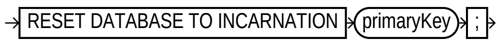
Reporting Obsolete Backups and Copies: Example The following example reports obsolete backups and copies with a redundancy of 1:

```
REPORT OBSOLETE;

Report of obsolete backups and copies
Type                 Key    Completion Time    Filename/Handle
-------------------- ------ ------------------ --------------------
Backup Set           1      OCT 30 2001 15:54:56
  Backup Piece       1      OCT 30 2001 15:54:56 /oracle/dbs/01d7t0t9_1_1
Archive Log          1      OCT 30 2001 04:52:17 /oracle/oradata/trgt/arch/archive1_21.dbf
```

RESET DATABASE

Syntax

reset::=



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.
- A recovery catalog connection is optional. Unlike in catalog mode, RESET DATABASE in nocatalog mode changes the incarnation only for the current RMAN session.
- 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 informs RMAN that you issued a RESETLOGS command.

- If RMAN is connected NOCATALOG, then you can only specify TO INCARNATION if the database is mounted and the control file contains a record of the prior incarnation. If you do not run RESET DATABASE, RMAN recovers to the last incarnation recorded in the control file.
- If RMAN is connected in CATALOG mode, then you can specify TO INCARNATION when the database is mounted. If database is mounted, however, then the control file must have a record of the prior incarnation.

Keywords and Parameters

Syntax Element	Description
TO INCARNATION *primary_ key*	Changes the current incarnation to an older incarnation. Specify the primary key of the DBINC record for the database incarnation. Run LIST INCARNATION OF DATABASE to obtain the key. After you issue RESET DATABASE TO INCARNATION, then you can run RMAN commands such as RESTORE and RECOVER.

Examples

Resetting RMAN to a Previous Incarnation in NOCATALOG Mode: Example In NOCATALOG mode, you must mount a control file that knows about the incarnation that you want to recover. The following scenario makes an old incarnation of database trgt current again:

```
CONNECT TARGET / NOCATALOG

# step 1: start and mount a control file that knows about the incarnation to which
# you want to return. if the current control file does not know about it, then
# you must restore an older control file
STARTUP NOMOUNT;
RESTORE CONTROLFILE UNTIL TIME 'SYSDATE-250';
ALTER DATABASE MOUNT;

# step 2: obtain the primary key of old incarnation
LIST INCARNATION OF DATABASE trgt;

List of Database Incarnations
DB Key  Inc Key DB Name  DB ID            STATUS   Reset SCN  Reset Time
------- ------- -------- -------------    -------  ---------- ----------
```

```
1       2       TRGT     1334358386       PARENT   154381     OCT 30 2001 16:02:12
1       116     TRGT     1334358386       CURRENT  154877     OCT 30 2001 16:37:39

# step 3: in this example, reset database to incarnation key 2
RESET DATABASE TO INCARNATION 2;

# step 4: restore and recover the database to a point before the RESETLOGS
RESTORE DATABASE UNTIL SCN 154876;
RECOVER DATABASE UNTIL SCN 154876;

# step 5: make this incarnation the current incarnation and then list incarnations:
ALTER DATABASE OPEN RESETLOGS;
LIST INCARNATION OF DATABASE trgt;

List of Database Incarnations
DB Key  Inc Key DB Name  DB ID            STATUS  Reset SCN  Reset Time
------- ------- -------- ---------------- ------- ---------- ----------
1       2       TRGT     1334358386       PARENT  154381     OCT 30 2001 16:02:12
1       116     TRGT     1334358386       PARENT  154877     OCT 30 2001 16:37:39
1       311     TRGT     1334358386       CURRENT 154877     AUG 13 2002 17:17:03
```

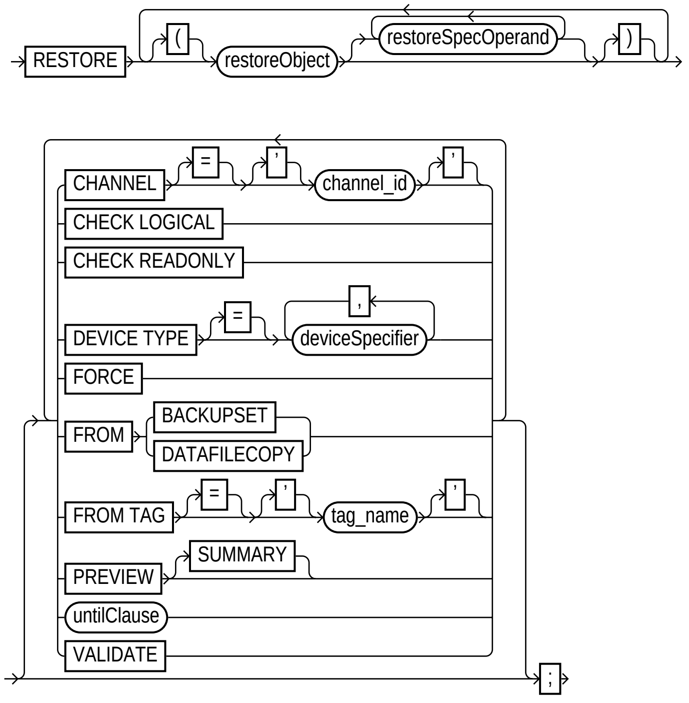
Resetting the Database After Incomplete Recovery: Example This example assumes that an incomplete recovery or recovery with a backup control file was performed in NOCATALOG mode. Later, RMAN is started in CATALOG mode, but the RESYNC command fails because the incarnation has not been reset in the catalog.

```
% rman target / catalog rman/rman@catdb

Recovery Manager: Release 10.1.0.2.0 - Production

Copyright (c) 1995, 2003, Oracle.  All rights reserved.

connected to target database: TRGT (DBID=1334531173)
connected to recovery catalog database

RMAN> RESYNC CATALOG;

RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03009: failure of resync command on default channel at 11/01/2001 12:00:43
RMAN-20003: target database incarnation not found in recovery catalog

RMAN> RESET DATABASE;

new incarnation of database registered in recovery catalog
starting full resync of recovery catalog
full resync complete
```

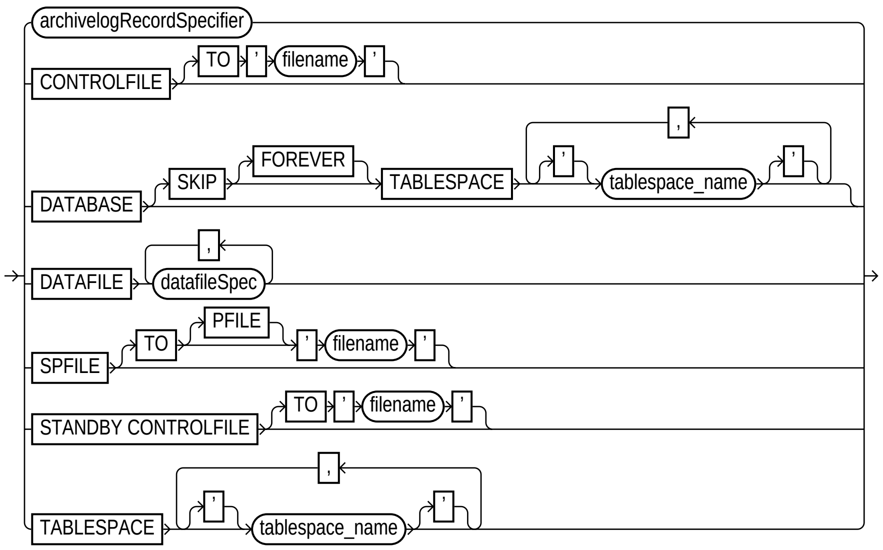
RESTORE

Syntax

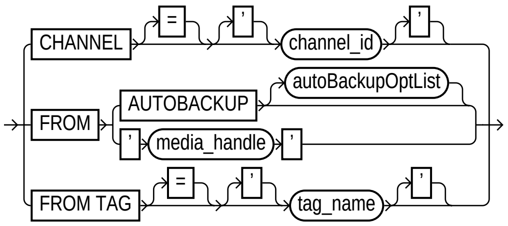
restore::=



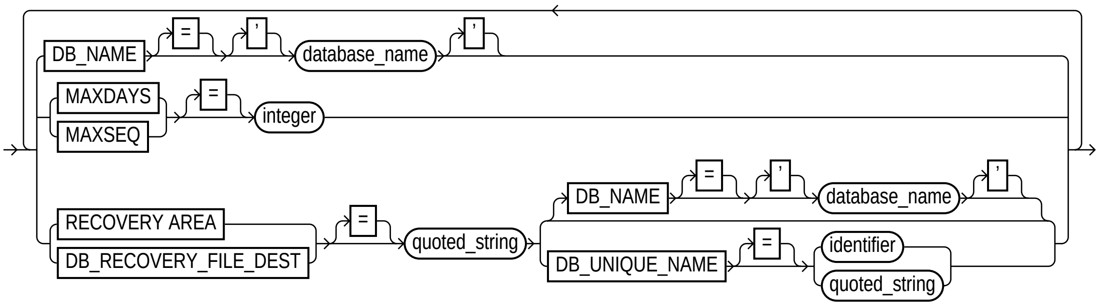
restoreObject::=



restoreSpecOperand::=



autoBackupOptList::=



Purpose

The primary use of RESTORE is to restore files from backups or image copies. 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.

There are two other uses of RESTORE:

- RESTORE... PREVIEW identifies the backups which RMAN will use to perform any RESTORE operation. Output from a RESTORE... PREVIEW is in the same format as the output of the LIST command.
- With the VALIDATE option, RMAN scans existing backups that it would use to perform a RESTORE operation to determine whether the operation can be performed successfully.

RMAN chooses which backups to restore based on the criteria that you specify. For example, you can limit the restore to backups before a given point of time (within the current incarnation) with the *`untilClause`*.

When you run `RESTORE` in `CATALOG` mode with a backup control file, RMAN automatically adjusts the control file to reflect the structure of the restored database.

Locations of Restored Files

If you restore to the default location (that is, you do not run `SET NEWNAME`), 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 run SET NEWNAME and RMAN detects that the default filename cannot be used (for example, because the filename is in use by another database that shares the storage), and if the file is an Oracle Managed File or is on an Automatic Storage Management disk group, then RMAN attempts to create a new file in the same location or disk group.

Note: By default, RMAN 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.

Channel Allocation in a Restore

If you do not manually allocate channels, then RMAN allocates all automatic channels possibly needed by the RESTORE command, subject to any restrictions imposed by the use of the DEVICE TYPE option.

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;
```

If you run RESTORE in this configuration, then RMAN allocates three sbt channels and the two preconfigured DISK channels.

Restore Failover

If a backup piece, image copy or proxy copy is inaccessible (for instance, deleted from the device) or if a block is corrupted, then the RESTORE command automatically looks for a another usable copy of this backup piece or image copy on both the same device and other devices. If no usable copies are available, then RMAN searches for prior backups. RMAN continously searches for prior usable backups until it has exhaused all possibilities.

Restore failover also occurs when restoring archivelogs for use in RECOVER, BLOCKRECOVER and FLASHBACK operations. RMAN records messages about failover due to block corruption in the alert log and trace files.

See *Oracle Database Backup and Recovery Advanced User's Guide* for details on restore failover.

Restoring Files in a Real Application Cluster Configuration

In a Real Application Clusters configuration, RMAN automatically restores backups, control file copies, and datafile copies from channels that can read the files on tape or a local file system. For example, if channel 1 connected to instance 1 can read log 1000 from its tape drive, but channel 2 connected to instance 2 cannot read the same log from its tape drive, then channel 1 restores the log. Autolocation is automatically enabled when the channels meet any of the following criteria:

- Different PARMS settings
- Different CONNECT strings

See Also: *Oracle Database Backup and Recovery Basics* 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 started but not mounted, then it is recommended that you only restore the control file, if necessary (refer to "Restrictions and Usage Notes for RESTORE CONTROLFILE" on page 2-237). 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, run SET NEWNAME commands to rename the datafiles and SWITCH commands to make them the current database files. If you do not use SWITCH, then the repository lists restored datafiles as datafile copies.
- 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 there are no backups available for a lost datafile, RMAN will create an empty datafile with the checkpoint change as creation SCN. During recovery, all archived logs back to the creation of the datafile will be restored, and all changes during the history of the datafile will be re-applied to recreate its contents.
- If datafile names are symbolic links, that is, files pointing to other files, then the control file stores 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 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.
- If the database is started but not mounted in NOCATALOG mode, then the RESTORE SPFILE command requires the FROM AUTOBACKUP clause.
- If you are restoring the server parameter file and the control file in a disaster recovery situation, you cannot run RESTORE CONTROLFILE FROM AUTOBACKUP, mount this control file, and then run RESTORE SPFILE *without* the FROM AUTOBACKUP clause.
- 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;
  ```

- 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 DEVICE TYPE.
- RMAN cannot backup or restore locally-managed temporary tablespaces. RMAN can, however, back up and restore dictionary-managed temporary tablespaces.
- RMAN does not support backup and recovery of the change tracking file. Note that database restore and recovery has no user-visible effect on change tracking. The next incremental backup after any recovery is able to use the change-tracking file.
- If no suitable backups are available in the current incarnation of the database, then you can force RMAN to use backups from a previous incarnation. Using the CHANGE... UNAVAILABLE command, you can make all backups since the

RESETLOGS that ended the incarnation unavailable. Run LIST RECOVERABLE to see valid parent incarnations.

Restrictions and Usage Notes for RESTORE CONTROLFILE

- After you restore a backup control file, you must run RECOVER DATABASE and then open the database with the RESETLOGS option.
- After restoring a backup control file, entries for tempfiles in locally-managed temporary tablespaces are removed. Hence, you must add new tempfiles to these tablespaces after you OPEN RESETLOGS. If you do not, then the database can display the following error for when attempting to sort: `ORA-25153: Temporary Tablespace is Empty`.

Table 2–27 indicates the restrictions that apply in different situations involving the RESTORE CONTROLFILE command.

Table 2–27 RESTORE CONTROLFILE Scenarios

	RESTORE CONTROLFILE;	**RESTORE CONTROLFILE FROM AUTOBACKUP;**	**RESTORE CONTROLFILE ... TO '*filename*';**	**RESTORE CONTROLFILE ... FROM '*media_handle*' or TAG '*user_tag*';**
No catalog, target started in NOMOUNT state	Error. Must specify FROM AUTOBACKUP.	First run SET DBID. Restores to CONTROL_FILES locations.	First run SET DBID. Must specify FROM AUTOBACKUP. Restores only to *filename*.	First run SET DBID. Restores from specified file (cannot restore from TAG). If TO '*filename*' not used, restores to all CONTROL_FILES locations.
No catalog, target mounted or open	Error. Must use TO '*filename*', where *filename* is not in CONTROL_FILES list.	Error. Must use TO '*filename*', where *filename* is not in CONTROL_FILES list.	Restores only to *filename*, where *filename* is not in CONTROL_FILES list.	Restores from specified file. If TO '*filename*' not used, restores to all CONTROL_FILES locations.
Catalog, target started in NOMOUNT state	Restores to CONTROL_FILES locations. Run SET DBID only if DB_NAME not unique in catalog.	Only use with catalog for testing purposes.	Restores only to *filename*, where *filename* is not in CONTROL_FILES list.	Restores from specified file. If TO '*filename*' not used, restores to all CONTROL_FILES locations.
Catalog, target mounted or open	Error. Must use TO '*filename*', where *filename* is not in CONTROL_FILES list.	Do not use with catalog.	Restores only to *filename*, where *filename* is not in CONTROL_FILES list.	Restores from specified file. If TO '*filename*' not used, restores to all CONTROL_FILES locations.

Keywords and Parameters

restore

Syntax Element	Description
`CHANNEL` *`'channel_id'`*	Refer to the *`restoreSpecOperand`* clause.
`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 total number of physical and logical corruptions detected in a file is less than its `MAXCORRUPT` setting, the RMAN command completes and the database populates the `V$DATABASE_BLOCK_CORRUPTION` view with corrupt block ranges. If `MAXCORRUPT` is exceeded, the command terminates without populating the views. If the initialization parameter `DB_BLOCK_CHECKSUM=TRUE`, and if `MAXCORRUPT` and `NOCHECKSUM` are not set, then specifying `CHECK LOGICAL` detects all types of corruption that are possible to detect. **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 2-129
`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.
`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.
`FROM TAG =` *`'tag_name'`*	Refer to the *`restoreSpecOperand`* clause.

Syntax Element	Description
`PREVIEW [SUMMARY]`	When PREVIEW or PREVIEW SUMMARY is appended to any RESTORE command, instead of performing the restore RMAN will report the backups (on disk or sequential media) it will use during the restore. The output will be in the same format as is generated by the LIST BACKUPS and LIST BACKUPS... SUMMARY commands. **See Also:** "LIST" on page 2-164, and specifically the BACKUPS and SUMMARY options.
`untilClause`	Limits the selection to backup sets or file copies that are suitable for a point-in-time recovery to the specified time. In the absence of any other criteria, RMAN selects the most current file copy or backup set to restore. Note that the time specified in the *`untilClause`* must fall within the current incarnation. **See Also:** "untilClause" on page 2-282
`VALIDATE`	Lets RMAN decide which backup sets, datafile copies, and archived logs need to be restored and then scans them to verify their contents. No files will be restored. Use this option periodically to verify that the copies and backup sets required to restore the specified files are intact and usable.

restoreObject

Syntax Element	Description
`restoreObject`	Specifies the objects to be restored. The RESTORE command restores full backups, incremental backups (level 0 only), or copies of datafiles, control files, and archived redo logs.
`archivelogRecordSpecifier`	Restores the specified range of archived redo logs. The default restore location is DB_RECOVERY_FILE_DEST (if one of LOG_ARCHIVE_DEST_n is configured to USE_DB_RECOVERY_FILE_DEST either implicitly or explicitly). Otherwise, the default restore filenames are constructed with the LOG_ARCHIVE_FORMAT and LOG_ARCHIVE_DEST_1 parameters of the target database. These parameters combine in a port-specific fashion to derive the name of the restored log. You can override the default location with the SET ARCHIVELOG DESTINATION command. 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. **See Also:** "archivelogRecordSpecifier" on page 2-22 **Note:** The database can be started, mounted, or open for this operation.

Syntax Element	Description
`CONTROLFILE`	Restores the current control file for a primary database. **See Also:** Table 2–27 for restrictions and usage notes. **Note:** You must always run the RECOVER command after restoring a control file, and must also always open the database with the RESETLOGS option.
`DATABASE [ SKIP [ FOREVER ] TABLESPACE tablespace_name ]`	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 and the server parameter file—you must issue additional RESTORE CONTROLFILE and RESTORE SPFILE commands to restore these files. If you specify the CHECK READONLY option, then RMAN examines the headers of all read-only datafiles 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 2-121
SPFILE [TO [PFILE] *'filename'*]	Restores a primary or STANDBY server parameter file to the location from which it was backed up (default), or to a different location specified by the TO clause. RMAN cannot overwrite a server parameter file currently in use by the target database. Specify UNTIL or TAG options of RESTORE to restore older versions of the server parameter file. By default RMAN restores the most current server parameter file. If the server parameter file is lost, connect to the target (and catalog if used) and then run SET DBID. Run STARTUP FORCE NOMOUNT before running RESTORE SPFILE (with FROM AUTOBACKUP if in NOCATALOG mode). Then run STARTUP FORCE to restart the database with the restored server parameter file. **See Also:** "Restrictions and Usage Notes for the SET DBID Command" on page 2-256

Syntax Element	Description
`STANDBY CONTROLFILE [ TO 'filename' ]`	Restores the current control file for a standby database. **See Also:** Table 2–27 for restrictions and usage notes. **Note:** You must always run the `RECOVER` command after restoring a control file, and must also always open the database with the `RESETLOGS` option.
`TABLESPACE 'tablespace_name'`	Restores all datafiles in the specified tablespaces. The translates the tablespace name internally into a list of datafiles. If you rename a tablespace (for example, from `users` to `customers`), then so long as an additional tablespace with the old name (`users`) has not been created, you can use either the old name (`users`) or the new name (`customers`) for the tablespace. RMAN detects that the tablespace has changed its name and updates the recovery catalog on the next resynchronization.

restoreSpecOperand

Syntax Element	Description
`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 AUTOBACKUP [autoBackupOptionList]`	Restores a control file autobackup. You can only specify this option on the `RESTORE CONTROLFILE` and `RESTORE SPFILE` commands. When restoring either type of file in `NOCATALOG` mode, the `FROM AUTOBACKUP` clause is required. 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. **See Also:** Table 2–27 for restrictions and usage notes.
`FROM 'media_handle'`	Specifies the name of the control file copy or backup piece containing a control file. 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. **See Also:** Table 2–27 for restrictions and usage notes.

Syntax Element	Description
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. Note that tag names are not case sensitive. **See Also:** "BACKUP" on page 2-28 for a description of how a tag can be applied to an individual copy of a duplexed backup set, and for a description of the default filename format for tags

autoBackupOptList

Syntax Element	Description
autoBackupOptList	Parameters that control the search for a control file autobackup.
DB_NAME = 'database_name'	Provides a DB_NAME to be used in searching for control file autobackups.
MAXDAYS = *integer*	Limits the search for a control file autobackup to within the specified number of days in the past. See the FROM AUTOBACKUP option of "restoreSpecOperand" on page 2-241 for details on how MAXDAYS affects the behavior of RESTORE.
MAXSEQ = *integer*	Specifies the highest sequence number for the control file autobackup search. See the FROM AUTOBACKUP option of "restoreSpecOperand" on page 2-241 for details on how MAXSEQ affects the behavior of RESTORE.
(RECOVERY AREA| DB_RECOVERY_FILE_DEST) = *quoted_string*	Specifies path to flash recovery area to search for autobackups. RECOVERY AREA and DB_RECOVERY_FILE_DEST are synonyms.
DB_NAME = *database_name*	Provides the DB_NAME of the database in the specified flash recovery area that is the target of the restore operation.
DB_UNIQUE_NAME = { *identifier* | *quoted-string* }	Provides the DB_UNIQUE_NAME of the database in the specified flash recovery area that is the target of the restore operation.

Examples

Restoring a Tablespace: Example This example takes a tablespace offline, restores it, then performs media recovery:

```
SQL "ALTER TABLESPACE users OFFLINE IMMEDIATE";
RESTORE TABLESPACE users;
RECOVER TABLESPACE users;
```

```
SQL "ALTER TABLESPACE users ONLINE";
```

Restoring the Control File When Using a Recovery Catalog: Example This example restores the control file to its default location, replicates it automatically to all `CONTROL_FILES` locations, and mounts the database:

```
RUN
{ # SET DBID is not necessary when connected to a recovery catalog
  STARTUP FORCE NOMOUNT;
  RESTORE CONTROLFILE;
  ALTER DATABASE MOUNT;
}
```

Restoring the Control File with a Tag: Example This `NOCATALOG` example restores the control file specified by a tag, and then mounts the database:

```
CONNECT TARGET /
STARTUP NOMOUNT;
SET DBID 320066378;  # required when restoring control file in NOCATALOG mode
RESTORE CONTROLFILE FROM TAG 'monday_cf_backup';
ALTER DATABASE MOUNT;
```

Restoring the Database with a Backup Control File: Example This example restores the control file to a temporary location, replicates it to all control file locations specified in the `CONTROL_FILES` initialization parameter, and then restores and recovers the database:

```
CONNECT TARGET /
STARTUP NOMOUNT;
SET DBID 320066378;  # required when restoring control file in NOCATALOG mode
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE sbt;
  RESTORE CONTROLFILE TO '/tmp/control01.ctl' FROM AUTOBACKUP;
  RESTORE CONTROLFILE FROM '/tmp/control01.ctl'; # restores to all CONTROL_FILES locations
  ALTER DATABASE MOUNT;
  RESTORE DATABASE;
  RECOVER DATABASE;
}
ALTER DATABASE OPEN RESETLOGS;
# if the database uses locally-managed temporary tablespaces, then add new tempfiles
# to these tablespaces after the RESETLOGS
SQL "ALTER TABLESPACE temp ADD TEMPFILE ''?/oradata/trgt/temp01.dbf'' REUSE";
```

Restoring Archived Redo Logs to a New Location: Example This example restores all archived redo logs to the `/oracle/temp_restore` directory:

```
RMAN> 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 backward for 5 months:

```
RMAN> SET DBID 320066378;  # required when restoring control file in NOCATALOG mode
RMAN> RUN
{
  SET UNTIL TIME ’23-JUN-2001 00:00:00’;
  SET CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE sbt 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;
}
```

Restoring the Server Parameter File to Current Location: Example The following series of commands restores the current server parameter file in NOCATALOG mode:

```
rman TARGET /
RMAN> SET DBID 1447326980 # set dbid to dbid of target database
RMAN> STARTUP FORCE NOMOUNT; # start instance with dummy SPFILE
RMAN> RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE sbt;
  RESTORE SPFILE FROM AUTOBACKUP; # FROM AUTOBACKUP needed in NOCATALOG mode
}
RMAN> STARTUP FORCE; # start with restored SPFILE and open database
```

Previewing a Restore with RESTORE PREVIEW: Example ’The following example shows the results of a RESTORE PREVIEW, which identifies the backupsets to use in restoring datafile 1 of a database:

```
RMAN> restore datafile 1 preview;

Starting restore at 10-OCT-03
using target database controlfile instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=18 devtype=DISK


List of Backup Sets
===================
BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ ---------------
25      Full    264M       DISK        00:00:42     10-OCT-03
        BP Key: 25 Status: AVAILABLE Compressed: NO Tag: FOURTH_INC
        Piece Name: /ade/banand_hosted5/oracle/work/v1/0pf3hr3o_1
   List of Datafiles in backup set 25
   File LV Type Ckp SCN    Ckp Time  Name
   ---- -- ---- ---------- --------- ----
   1       Full 228006     10-OCT-03 /disk1/oracle/dbs/tbs_01.f
Finished restore at 10-OCT-03
```

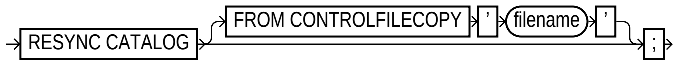
Validating a Restore with RESTORE VALIDATE: Example The following example illustrates using `RESTORE VALIDATE` for the restore of datafile 1, as in the previous example:

```
RMAN> RESTORE DATAFILE 1 VALIDATE;

Starting restore at 10-OCT-03
using channel ORA_DISK_1

channel ORA_DISK_1: starting validation of datafile backupset
channel ORA_DISK_1: restored backup piece 1
piece handle=/disk1/oracle/work/v1/0pf3hr3o_1 tag=FOURTH_INC
channel ORA_DISK_1: validation complete
Finished restore at 10-OCT-03
```

RESYNC

Syntax

resync::=



Purpose

To perform a full resynchronization of the recovery catalog. You can also use `RESYNC CONTROLFILE` to resynchronize the current control file with the RMAN repository in a control file copy.

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 you run `RESYNC CATALOG`, RMAN creates a snapshot control file in order to obtain a read-consistent view of the control file, then updates the recovery 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, 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 of the recovery catalog 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 resynchronizes metadata about the physical schema if 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, because 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.

The primary use for `RESYNC CONTROLFILE` occurs when you re-create the control file (for example, to change the database name), which causes you to lose RMAN records. You can then resynchronize the newly created control file with an old copy.

Restrictions and Usage Notes

- You must be connected to a recovery catalog when running `RESYNC CATALOG`, but a catalog connection is not required for `RESYNC CONTROLFILE`.
- 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

Syntax Element	Description
`CATALOG`	Updates the recovery recovery catalog with RMAN metadata in the current control file (default) or a control file copy.
`CONTROLFILE`	Updates the current control file (and recovery catalog, if RMAN is connected to one) with RMAN metadata from a control file copy.

Syntax Element	Description
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. **Note:** The control file copy can either be in the current database incarnation, or created in a prior incarnation (that is, prior to the most recent OPEN RESETLOGS).

Examples

Resynchronizing the Recovery Catalog in ARCHIVELOG Mode: Example This example performs a full resynchronization after archiving all unarchived redo logs:

```
CONNECT TARGET / CATALOG rman/rman@catdb
SQL "ALTER SYSTEM ARCHIVE LOG ALL";
RESYNC CATALOG;
```

Resynchronizing the Current Control File from a Backup: Example This example updates the RMAN repository in the current control file with metadata from a backup control file:

```
CONNECT TARGET / NOCATALOG
RESYNC CONTROLFILE FROM CONTROLFILECOPY '/tmp/cfile.dbf';
```

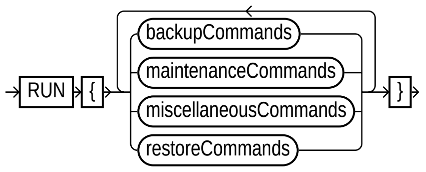
Resynchronizing the Recovery Catalog After a Structural Change: Example This example adds a datafile to tablespace users and then resynchronizes the catalog:

```
#!/usr/bin/tcsh
# connect in nocatalog mode and add datafile
rman TARGET / NOCATALOG <<EOF
SQL "ALTER TABLESPACE users ADD DATAFILE ''?/oradata/trgt/users03.dbf''
     SIZE 1M AUTOEXTEND ON NEXT 10K MAXSIZE 10M";
EXIT
EOF
# connect in catalog mode and resynchronize
rman TARGET / CATAOG rman/rman@catdb <<EOF
RESYNC CATALOG;
EOF
```

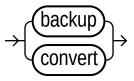
RUN

Syntax

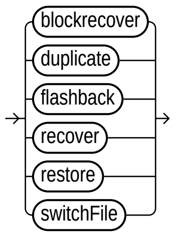
run::=



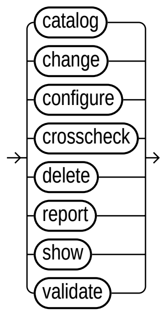
backupCommands::=



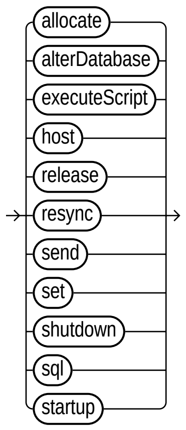
restoreCommands::=



maintenanceCommands::=



miscellaneousCommands::=



Purpose

The RUN command lets you group a series RMAN commands into a block to be executed sequentially. It also creates a scope within which a script can override default configured channels for a task using the ALLOCATE CHANNEL and RELEASE CHANNEL commands, and other parameters using the SET command with appropriate arguments. On completing the execution of the commands listed in the RUN block, the channels allocated within the RUN block are released and settings returned to their values.

Upon reading the closing brace of the RUN block, RMAN compiles the list of job commands into one or more job steps and then executes the steps 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 `tools` offline, restores it, then performs complete media recovery:

```
RUN
{
  SQL "ALTER TABLESPACE tools OFFLINE IMMEDIATE";
  RESTORE TABLESPACE tools;
  RECOVER TABLESPACE tools;
  SQL "ALTER TABLESPACE tools ONLINE";
}
```

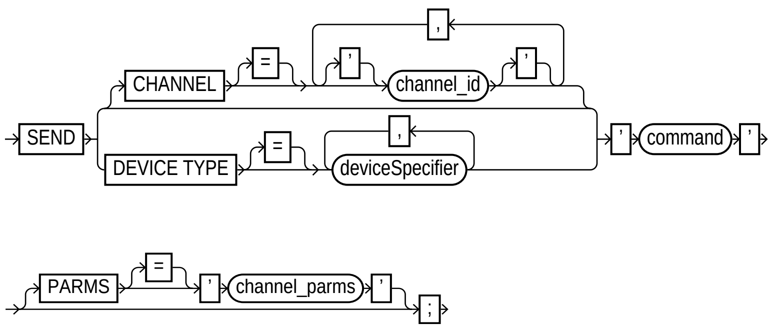
Executing an RMAN Script: Example This example executes the stored script `backup_db`:

```
RUN { EXECUTE SCRIPT backup_db; }
```

SEND

Syntax

send::=



Purpose

To send a vendor-specific string to one or more channels supported by a media manager. Refer to your media management documentation to determine which commands are supported.

Restrictions and Usage Notes

- You must only `SEND` commands supported by the media manager. The contents of the string are not interpreted by the databasethe database, but are passed unaltered to the media management subsystem.

Keywords and Parameters

Syntax Element	Description
`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. the database uses the channel ID to report I/O errors.

Syntax Element	Description
`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 2-129
`'command'`	Specifies a vendor-specific media management command. **See Also:** Your media management documentation to determine which commands are supported
`PARMS =` *`'channel_parms'`*	Parameters for the channel communicating with the media manager.

Example

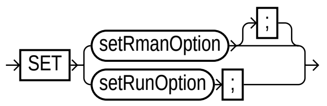
Sending a String to the Media Manager: Example This example sends vendor-specific commands to a media manager:

```
RMAN> SEND 'VAR=a82';
sent command to channel: ORA_SBT_TAPE_1

RMAN> BACKUP DATAFILE 2;
```

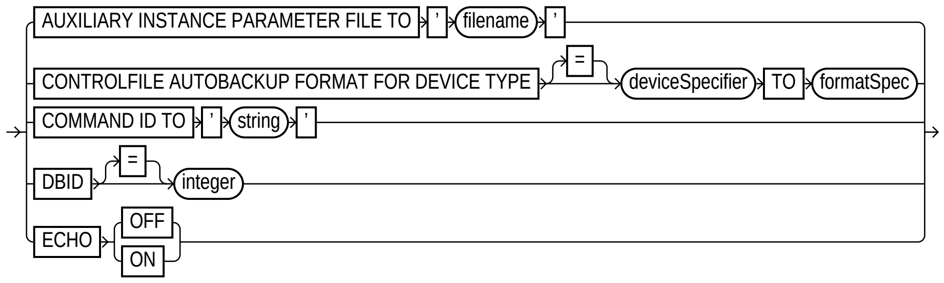
SET

Syntax

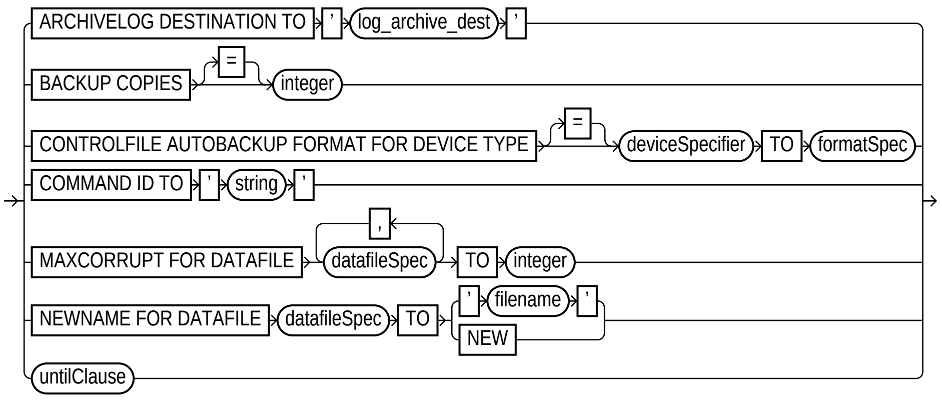
set::=



setRmanOption::=


AUXILIARY INSTANCE PARAMETER FILE TO
'
filename
'
CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE
=
deviceSpecifier
TO
formatSpec
COMMAND ID TO
'
string
'
DBID
=
integer
ECHO
OFF
ON

setRunOption::=



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 use the SET command either at the RMAN prompt or within a RUN block. Within a RUN block, the SET command sets attributes that persist until the end of the RUN block. The specified attributes affect all statements within RUN that follow the SET command. When you use SET outside of a RUN block the attributes you set persist until you exit the RMAN client.

Use the SET command outside a RUN block to:

- Display executed RMAN commands in the message log.
- Specify a database's database identifier (DBID) when restoring a control file or server parameter file.

Use SET specified within a RUN block to:

- Specify new filenames for restored datafiles
- 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 backup sets 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.
- `SET BACKUP COPIES` does not apply to the `BACKUP AS COPY` command.
- 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 the following specialized circumstances:

- You are not connected to a recovery catalog and want to restore the control file or server parameter file.
- You are connected to a recovery catalog and want to restore the control file, but the database name is not unique in the recovery catalog.
- The server parameter file is lost and you want to restore it.

See Also: Table 2–27 for `RESTORE CONTROLFILE` usage notes.

Keywords and Parameters

setRmanOption

Syntax Element	Description
AUXILIARY INSTANCE PARAMETER FILE TO '*filename*'	For use in customizing TSPITR with an automatic auxiliary instance. Specifies the path (on the host running the RMAN client) to the client-side parameter file to use in starting the instance. **See Also:** *Oracle Database Reference* for more on V$SESSION.CLIENT_INFO
COMMAND ID TO '*string*'	Enters the specified string into the V$SESSION.CLIENT_INFO column of all channels. Use this information to determine which database 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:** *Oracle Database Reference* for more on V$SESSION.CLIENT_INFO
CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE *deviceSpecifier* TO *formatSpec*	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 Note that the %F substitution variable is required to be in the new formatSpec, and that no other substitution variable is legal in a control file autobackup formatSpec. **See Also:** "formatSpec" on page 2-156 for the semantics of the %F substitution variable.

Syntax Element	Description
`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 2-256
`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. To force RMAN to echo the commands, run the `SET ECHO ON` command before running your command file. The command is useful 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/pwd@prod1 CATALOG rman/rman@rcat < in_file > out_file` By running `SET ECHO ON`, you enable the commands contained in `in_file` to be visible in `out_file`.

setRunOption

Syntax Element	Description
`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. **Note:** The `SET NEWNAME` command supports Automatic Storage Management disk groups. **See Also:** "datafileSpec" on page 2-121
`'`*`filename`*`'`	Specifies a user-defined filename or Automatic Storage Management disk group for the restored datafile. If you set the `NEWNAME` to a disk group and run a `RESTORE`, then RMAN restores the file i If the original file is an Oracle Managed File or is on an Automatic Storage Management disk group, then RMAN attempts to delete the original file so that it will not be orphaned.

Syntax Element	Description
NEW	Creates an Oracle-managed file in the directory specified in DB_CREATE_FILE_DEST. If the original file is an Oracle Managed File or is on an Automatic Storage Management disk group, then RMAN attempts to delete the original file so that it will not be orphaned. You cannot use this option when using the DUPLICATE command or performing RMAN TSPITR. **See Also:** *Oracle 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 the database will allow in a specified datafile or list of datafiles. If a BACKUP or CREATE CATALOG command detects more than the specified number of corruptions, then the command terminates. 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 2-121
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 2-282

Syntax Element	Description
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:** BACKUP COPIES option is not valid when files are created in flash recovery area. Backups to the flash recovery area cannot be duplexed.. **Note:** Control file autobackups on disk are a special case and are never duplexed: RMAN always writes one and only copy.
COMMAND ID TO '*string*'	Enters the specified string into the V$SESSION.CLIENT_INFO column of all channels. Use this information to determine which database server sessions correspond to which RMAN channels. The SET COMMAND ID command applies only to channels that are already allocated. The V$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$SESSION.CLIENT_INFO column will be cleared. **See Also:** *Oracle Database Reference* for more on V$SESSION.CLIENT_INFO

Syntax Element	Description
CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE *deviceSpecifier* TO *formatSpec*	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 Note that the %F substitution variable is required to be in the new formatSpec, and that no other substitution variable is legal in a control file autobackup formatSpec. **See Also:** "formatSpec" on page 2-156 for the semantics of the %F substitution variable.

Examples

Restoring the Control File When Databases Share the Same Name: Example The following example uses the DBID to restore the control file because multiple target databases share the same DB_NAME in the catalog. After you have restored the target control file, you can mount the database to restore the rest of the database:

```
rman TARGET / CATALOG rman/rman@catdb
RMAN> STARTUP FORCE NOMOUNT;
RMAN> SET DBID = 862893450; # needed to distinguish target from others with same DB_NAME
RMAN> RESTORE CONTROLFILE; # assuming catalog has automatic channel allocation information
RMAN> ALTER DATABASE MOUNT;
```

Setting the Command ID: Example This example sets the command ID, backs up the users tablespace, 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 MAXSETSIZE 5M TABLESPACE users;
  SQL 'ALTER SYSTEM ARCHIVE LOG ALL';
}
```

Duplexing a Backup Set: Example Assume that you have used the `CONFIGURE` command to set duplexing as follows:

```
CONFIGURE ARCHIVELOG COPIES FOR DEVICE TYPE sbt TO 4;
CONFIGURE DATAFILE COPIES FOR DEVICE TYPE sbt TO 3;
```

The following example overrides these configurations and makes two copies of each datafile and archived log in the backup:

```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE sbt;
  SET BACKUP COPIES = 2;
  BACKUP DATAFILE 1,2,3,4,5;
  BACKUP ARCHIVELOG ALL;
}
```

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 with a nondefault format. First start RMAN and then run:

```
CONNECT TARGET / NOCATALOG
STARTUP FORCE NOMOUNT
SET DBID 676549873;
RUN
{
  SET UNTIL TIME '10/10/2001 13:45:00';
  SET CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '?/oradata/cf_%F.bak';
  RESTORE CONTROLFILE FROM AUTOBACKUP MAXSEQ 100;
}
ALTER DATABASE MOUNT;
```

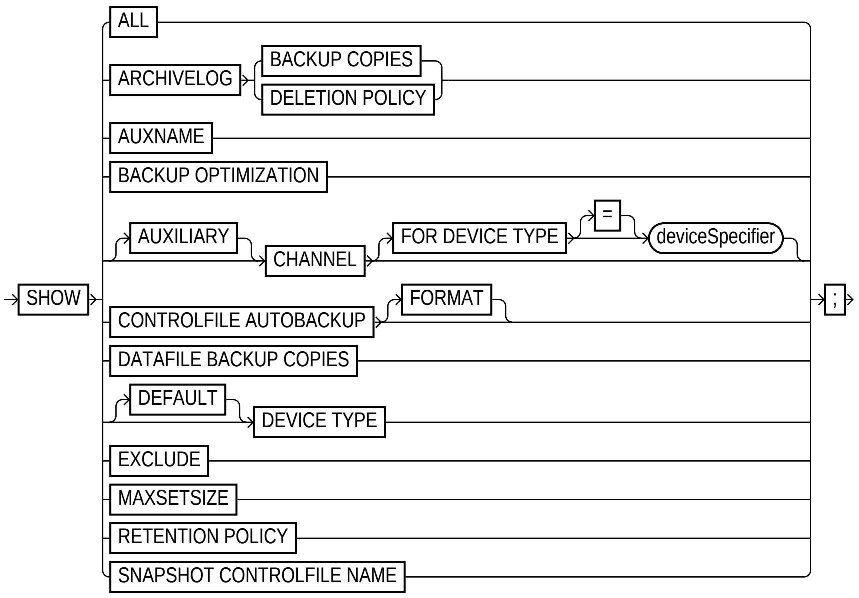
Restoring the Server Parameter File: Example This example restores a lost server parameter file:

```
CONNECT TARGET / CATALOG rman/rman@catdb
SET DBID 676549873;  # set dbid so rman knows the database name
STARTUP FORCE NOMOUNT # rman starts database with a dummy server parameter file
RESTORE SPFILE;
STARTUP FORCE; # needed so that RMAN restarts database with restored server parameter file
```

SHOW

Syntax

show::=



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, not in a RUN block.
- If SHOW ALL is executed when connected to a target database, only node-specific configurations and database configurations are displayed. Thus,

in a standby configuration, SHOW ALL on the primary database or the standby database shows the node-specific configuration for the primary or standby databases, for all values except retention policy, tablespace exclude and auxiliary names.

Keywords and Parameters

Syntax Element	Description
ALL	Displays all user-entered CONFIGURE commands as well as default configurations.
ARCHIVELOG BACKUP COPIES	Shows the currently configured degree of duplexing for archived redo log backups.
ARCHIVELOG DELETION POLICY	Shows the currently configured archived redo log deletion policy.
AUXNAME	Displays the CONFIGURE AUXNAME settings.
BACKUP OPTIMIZATION	Displays the CONFIGURE BACKUP OPTIMIZATION settings: ON or OFF (default).
[AUXILIARY] 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.
CONTROLFILE AUTOBACKUP	Displays the CONFIGURE CONTROLFILE AUTOBACKUP settings: ON or OFF.
FORMAT	Displays the format for the control file autobackup file for configured devices.
{DATAFILE | ARCHIVELOG} BACKUP COPIES	Displays the CONFIGURE ... BACKUP COPIES setting for datafiles and archived redo logs: 1, 2, 3, or 4.
[DEFAULT] DEVICE TYPE	Displays the configured device types and parallelism settings. If DEFAULT is specified, then SHOW displays the default device type and settings.
EXCLUDE	Displays only the tablespaces that you have specified should be excluded.
MAXSETSIZE	Displays the CONFIGURE MAXSETSIZE settings.
RETENTION POLICY	Displays the settings for CONFIGURE RETENTION POLICY for the current target database.
SNAPSHOT CONTROLFILE NAME	Displays the CONFIGURE SNAPSHOT CONTROLFILE settings.

Examples

Showing Channel Configurations: Example This example shows commands relevant for displaying automatic channel configurations:

```
RMAN> SHOW CHANNEL;
RMAN> SHOW DEVICE TYPE;
RMAN> SHOW DEFAULT DEVICE TYPE;
RMAN> SHOW MAXSETSIZE;
```

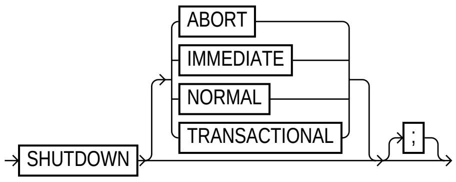
Showing All Configurations: Example This example shows all persistent configurations for the target database (and includes sample output):

```
RMAN> 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

shutdown::=



Purpose

To shut down the target database without exiting RMAN. This command is equivalent to using the SQL*Plus SHUTDOWN statement.

> **See Also:** *Oracle 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

- 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; the database 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

Syntax Element	Description
`ABORT`	Shuts down the target instance, with the following consequences: ■ All current client SQL statements are immediately terminated. ■ Uncommitted transactions are not rolled back until next startup. ■ All connected users are disconnected. ■ Crash recovery will be performed on the database at next startup.
`IMMEDIATE`	Shuts down the target database immediately, with the following consequences: ■ Current client SQL statements being processed by the database are allowed to complete. ■ Uncommitted transactions are rolled back. ■ All connected users are disconnected.
`NORMAL`	Shuts down the database with normal priority (default option), which means: ■ No new connections are allowed after the statement is issued. ■ Before shutting down, the database waits for currently connected users to disconnect ■ The next startup of the database will not require instance recovery.
`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 terminate 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 terminated, 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;
```

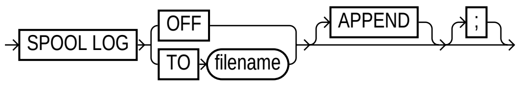
Shutting Down a Database in NOARCHIVELOG Mode: Example This example backs up a database running in NOARCHIVELOG mode:

```
STARTUP FORCE DBA;
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
# executing the preceding commands ensures that database is in proper state
# for NOARCHIVELOG backups
BACKUP COPIES 2 DATABASE;
ALTER DATABASE OPEN;
```

SPOOL

Syntax

spool::=



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 by default. If you specify APPEND, RMAN will append its output to the end of the file.

If the specified file cannot be opened for writing. Instead, RMAN turns SPOOL to OFF and continues execution.

See Also: "cmdLine" on page 2-75 for a description of LOG files

Restrictions and Usage Notes

Execute the SPOOL command outside of a RUN block.

Keywords and Parameters

Syntax Element	Description
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.

Examples

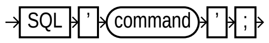
Spooling RMAN Output to a File: Example This example directs RMAN output to standard output for the backup of datafile 1, then directs output to a log file for the backup of datafile 2, then directs output to a different log file for the whole database backup:

```
BACKUP DATAFILE 1;
SPOOL LOG TO '/tmp/df2log.f';
BACKUP DATAFILE 2;
SPOOL LOG OFF;
SPOOL LOG TO '/tmp/dblog.f';
BACKUP DATABASE;
SPOOL LOG OFF;
```

SQL

Syntax

sql::=



Purpose

To execute a SQL statement or a PL/SQL stored procedure from within Recovery Manager.

Restrictions and Usage Notes

- 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 ''?/oradata/trgt/temp1.dbf''
       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 *Oracle Database SQL Reference*

Keywords and Parameters

Syntax Element	Description
'*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;"
```

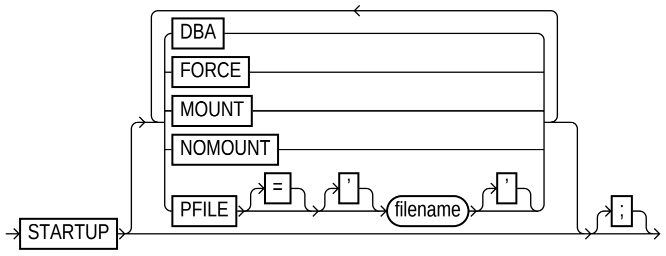
Executing a PL/SQL Stored Procedure Within RMAN: Example This example issues a PL/SQL stored procedure called `scott.update_log`:

```
RUN
{
  SQL ' BEGIN scott.update_log; END; ';
}
```

STARTUP

Syntax

startup::=



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)

Additionally, the RMAN `STARTUP` command can start an instance in `NOMOUNT` mode even if no server parameter file or initialization parameter file exists. This feature is useful when you need to restore a lost server parameter file.

> **See Also:** *Oracle 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

- You cannot use the RMAN STARTUP command to open the recovery catalog database: execute a STARTUP statement in a SQL*Plus session instead.

Keywords and Parameters

If you do not specify any options, then RMAN mounts and opens the database with the default server parameter file.

Syntax Element	Description
STARTUP	If you specify only STARTUP with no other options, then the instance starts, then mounts and open the database.
DBA	Restricts access to users with the RESTRICTED SESSION privilege.
FORCE	If the database is open, then FORCE shuts down the database with a SHUTDOWN ABORT statement before re-opening it.If the database is closed, then FORCE opens the database.
MOUNT	Starts the instance, then mounts the database without opening it
NOMOUNT	Starts the instance without mounting the database. If no parameter file exists, then RMAN starts the instance with a "dummy" parameter file. You can then run RESTORE SPFILE to restore a backup server parameter file.
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=/tmp/initTRGT.ora;
```

Starting an Instance Without a Parameter File: Example The following example starts an instance without using a parameter file, then runs RESTORE SPFILE:

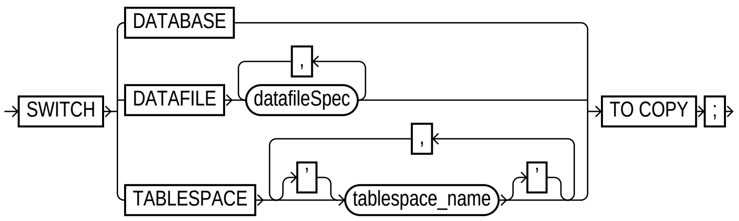
```
SET DBID 1447326980;
STARTUP FORCE NOMOUNT; # RMAN starts instance with dummy parameter file
```

```
RESTORE SPFILE FROM AUTOBACKUP; # restore a server parameter file
STARTUP FORCE; # restart instance with restored server parameter file
```

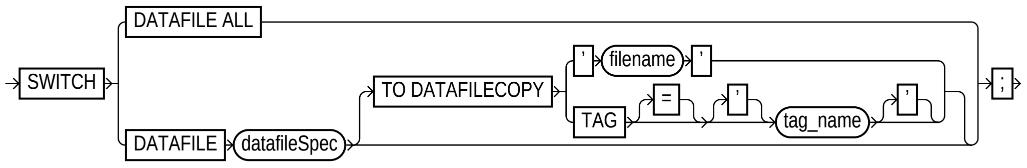
SWITCH

Syntax

switch::=



switchFile::=



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 PL/SQL `ALTER DATABASE RENAME FILE` statement: the names of the files in the RMAN repository are updated, but the database does not actually rename the files at the operating system level. 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 the forms of `SWITCH` in the `switch` syntax diagram outside of a RUN block. Execute the forms of `SWITCH` in the `switchFile` syntax diagram within a `RUN` block.

- 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

switch

Syntax Element	Description
DATABASE TO COPY	Renames the datafiles and control files to use the filenames of image copies of these files. RMAN switches to the latest image copy of each file. After a database switch, RMAN considers the previous database files as datafile copies.
DATAFILE *datafileSpec* TO COPY	Specifies the datafile that you wish to rename. As with `DATABASE TO COPY`, specifies to switch this datafile to the latest image copy. After the switch, the control file no longer considers the specified file as current.
TABLESPACE *'tablespace_name'* TO COPY	Switches all datafiles within the tablespace, as with `SWITCH DATAFILE ... TO COPY`.

switchFile

Syntax Element	Description

DATAFILE *datafileSpec* TO DATAFILECOPY {*'filename'* | TAG = *'tag_name'* }	Specifies the datafile that you wish to rename. After the switch, the control file no longer considers the specified file as current. For example, this command points the control file from `tbs_1.f` to `cp1.f`:
	
	`SWITCH DATAFILE '?/dbs/tbs_1.f' TO DATAFILECOPY '?/dbs/copies/cp1.f';`
	
	If you do not specify a `TO` option, then RMAN uses the filename specified on a prior SET NEWNAME command in the RUN block for this file number as the switch target.
	
	The filename or tag provided in the `TO DATAFILECOPY` clause 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 '?/dbs/df2.copy';`
	
	Note that if you specify a tag and more than one copy uses this tag name, then RMAN uses the most current copy, that is, the one needing the least recovery.
	
	The following command switches datafile 3 to the most recently created datafile copy tagged `mondayPMcopy`:
	
	`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

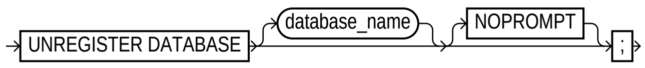
Switching Datafile Filenames After a Restore: Example This example allocates one disk device and one tape device to allow RMAN to restore from disk and tape.

```
RUN
{
  ALLOCATE CHANNEL dev1 DEVICE TYPE DISK;
  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";
}
```

UNREGISTER DATABASE

Syntax

unregister::=



Purpose

To unregister a database from the recovery catalog.

See Also: "DROP DATABASE" on page 2-133 to learn how to delete a database and unregister it with one command.

Restrictions and Usage Notes

- Execute only at the RMAN prompt.
- RMAN must be connected to the recovery catalog in which the target database is registered.
- You can identify the database to unregister in one of three ways:
  - Connect RMAN to the target database
  - Provide the database_name argument to identify the database to unregister, if the database name is unique;
  - Use SET `DBID` to identify the database if RMAN is not connected to the target database and the database_name is not unique in the recovery catalog.

Keywords and Parameters

Syntax Element	Description
`database_name`	Specifies the name of the target database that you are unregistering. You do not have to specify *`db_name`* if RMAN is connected to the target database.

Syntax Element	Description
`NOPROMPT`	Specifies that RMAN should not prompt for confirmation before unregistering the database.

Example

Unregistering a Database: Example In this example, you connect to the target database `test1` and then unregister it:

```
rman TARGET SYS/oracle@test1 CATALOG rman/rman@catdb

RMAN> UNREGISTER DATABASE NOPROMPT;
```

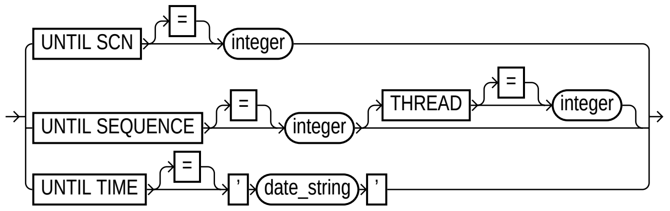
Unregistering a Database That is Not Unique in Catalog: Example The following UNIX shell script unregisters database `testdb` from the recovery catalog. Because multiple databases called `testdb` are registered in the recovery catalog, and because RMAN is not connected to the target database (which has already been deleted from the file system), you must run `SET DBID`:

```
rman CATALOG rman/rman@catdb
RMAN> RUN
{
  SET DBID 1334531173;   # specifies test database by DBID
  UNREGISTER DATABASE testdb NOPROMPT;
}
```

untilClause

Syntax

untilClause::=



Purpose

A subclause that specifies an upper limit by time, SCN, or log sequence number for various RMAN operations.

> **See Also:** *Oracle Database Backup and Recovery Basics* to learn how to set the 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

Syntax Element	Description
`UNTIL SCN =` *`integer`*	Specifies an SCN as an upper limit. RMAN selects only files that can be used to recover up to but not including the specified SCN. For example, `RESTORE DATABASE UNTIL SCN 1000` chooses only backups that could be used to recover to SCN 1000.
`UNTIL SEQUENCE =` *`integer`* `THREAD =` *`integer`*	Specifies a redo log sequence number and thread as an upper limit. RMAN selects only files that can be used to recover up to but not including the specified sequence number. For example, `REPORT OBSOLETE UNTIL SEQUENCE 8000 THREAD 1` reports only backups that could be used to recover through log sequence 7999.
`UNTIL TIME = '`*`date_string`*`'`	Specifies a time as an upper limit. RMAN selects only files that can be used to recover up to but not including the specified time. For example, `LIST BACKUP UNTIL TIME 'SYSDATE-7'` lists all backups that could be used to recover to a point one week ago.

Examples

Performing Incomplete Recovery Until a Log Sequence Number: Example This example assumes that log sequence 1234 was lost due to a disk failure and the database needs to be recovered by using available archived redo logs.

```
RUN
{
  SET UNTIL SEQUENCE 1234 THREAD 1;
  RESTORE CONTROLFILE TO '?/oradata/cf.tmp';
  RESTORE CONTROLFILE FROM '?/oradata/cf.tmp'; # restores to all CONTROL_FILES locations
  ALTER DATABASE MOUNT;
  RESTORE DATABASE;
  RECOVER DATABASE;  # recovers through log 1233
  ALTER DATABASE OPEN RESETLOGS;
  # you must add new tempfiles to locally-managed temporary tablespaces after restoring
  # a backup control file
  SQL "ALTER TABLESPACE temp ADD TEMPFILE ''?/oradata/trgt/temp01.dbf'' REUSE";
}
```

Performing Incomplete Recovery to a Specified SCN: Example This example (which assumes a mounted database) recovers the database until a specified SCN:

```
RUN
{
  ALLOCATE CHANNEL ch1 TYPE sbt;
  RESTORE DATABASE;
  RECOVER DATABASE UNTIL SCN 1000;  # recovers through SCN 999
  ALTER DATABASE OPEN RESETLOGS;
}
```

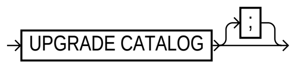
Reporting Obsolete Backups: Example This example assumes that you want to be able to recover to any point within the last week. It considers as obsolete all backups that could be used to recover the database to a point one week ago:

```
REPORT OBSOLETE UNTIL TIME 'SYSDATE-7';
```

UPGRADE CATALOG

Syntax

upgradeCatalog::=



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

None.

Example

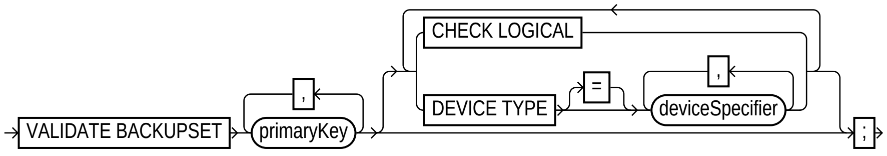
Upgrading a Recovery Catalog: Example This example connects to recovery catalog database `recdb` at the operating system command line and then upgrades it to a more current version:

```
% 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

validate::=



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` 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. For validating image copies, run `RESTORE VALIDATE FROM DATAFILECOPY`.

Restrictions and Usage Notes

- 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

Syntax Element	Description
`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 `V$DATABASE_BLOCK_CORRUPTION` is populated 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 2-129

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_SBT_TAPE_1
channel ORA_SBT_TAPE_1: sid=14 devtype=SBT_TAPE
using channel ORA_DISK_1
channel ORA_SBT_TAPE_1: starting validation of datafile backupset
channel ORA_SBT_TAPE_1: restored backup piece 1
piece handle=09dg9kkl_1_1 tag=TAG20020208T125443 params=NULL
channel ORA_SBT_TAPE_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	Catalog View Describes ...
RC_ARCHIVED_LOG	V$ARCHIVED_LOG	Archived and unarchived redo logs
RC_BACKUP_CONTROLFILE	V$BACKUP_DATAFILE	Control files in backup sets
RC_BACKUP_CORRUPTION	V$BACKUP_CORRUPTION	Corrupt block ranges in datafile backups
RC_BACKUP_DATAFILE	V$BACKUP_DATAFILE	Datafiles in backup sets
RC_BACKUP_FILES	V$BACKUP_FILES	RMAN backups and copies known to the repository.
RC_BACKUP_PIECE	V$BACKUP_PIECE	Backup pieces
RC_BACKUP_REDOLOG	V$BACKUP_REDOLOG	Archived redo logs in backup sets
RC_BACKUP_SET	V$BACKUP_SET	Backup sets for all incarnations of the database
RC_BACKUP_SPFILE	V$BACKUP_SPFILE	Server parameter files in backups
RC_CHECKPOINT		Deprecated in favor of RC_RESYNC
RC_CONTROLFILE_COPY	V$DATAFILE_COPY	Control file copies on disk
RC_COPY_CORRUPTION	V$COPY_CORRUPTION	Corrupt block ranges in datafile copies
RC_DATABASE	V$DATABASE	Databases registered in the recovery catalog
RC_DATABASE_BLOCK_CORRUPTION	V$DATABASE_BLOCK_CORRUPTION	Database blocks marked as corrupted in the most recent RMAN backup or copy
RC_DATABASE_INCARNATION	V$DATABASE_INCARNATION	Database incarnations registered in the recovery catalog
RC_DATAFILE	V$DATAFILE	Datafiles registered in the recovery catalog
RC_DATAFILE_COPY	V$DATAFILE_COPY	Datafile copies on disk

Table 3–1 Recovery Catalog Views

Recovery Catalog View	Corresponding V$ View	Catalog View Describes ...
RC_LOG_HISTORY	V$LOG_HISTORY	Online redo log history indicating when log switches occurred
RC_OFFLINE_RANGE	V$OFFLINE_RANGE	Offline ranges for datafiles
RC_PROXY_ARCHIVEDLOG	V$PROXY_ARCHIVEDLOG	Archived log backups taken with the proxy copy functionality
RC_PROXY_CONTROLFILE	V$PROXY_DATAFILE	Control file backups taken with the proxy copy functionality
RC_PROXY_DATAFILE	V$PROXY_DATAFILE	Datafile backups that were taken using the proxy copy functionality
RC_REDO_LOG	V$LOG and V$LOGFILE	Online redo logs for all incarnations of the database since the last catalog resynchronization
RC_REDO_THREAD	V$THREAD	All redo threads for all incarnations of the database since the last catalog resynchronization
RC_RESYNC	n/a	Recovery catalog resynchronizations
RC_RMAN_CONFIGURATION	V$RMAN_CONFIGURATION	RMAN configuration settings
RC_RMAN_STATUS	V$RMAN_STATUS	Historical status information about RMAN operations.
RC_STORED_SCRIPT	n/a	Names of scripts stored in the recovery catalog
RC_STORED_SCRIPT_LINE	n/a	Contents of the scripts stored in the recovery catalog
RC_TABLESPACE	V$TABLESPACE	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. If a log that has not been archived is cleared, a record is inserted with the NAME column set to NULL.

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.

Column	Datatype	Description
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.
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.
IS_RECOVERY_DEST_FILE	VARCHAR2(3)	This copy is located in the flash recovery area: YES or NO.

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.
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.

Column	Datatype	Description
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) 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).
BLOCKS	NUMBER	The number of blocks in the file.
AUTOBACKUP_DATE	DATE	The date of the control file autobackup.
AUTOBACKUP_SEQUENCE	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#.

Column	Datatype	Description
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 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.
CORRUPTION_TYPE	VARCHAR2(9)	Same as RC_DATABASE_BLOCK_CORRUPTION.CORRUPTION_TYPE.

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.
BACKUP_TYPE	VARCHAR2(1)	The type of the backup: D (full or level 0 incremental) or I (incremental level 1).
INCREMENTAL_LEVEL	NUMBER	The level of the incremental backup: NULL, 0 , or 1.
COMPLETION_TIME	DATE	The completion time of the backup.
FILE#	NUMBER	The absolute file number of the datafile. Note that when FILE#=0, the record refers to the control file. See the note following this table for special semantics of other columns when FILE#=0.
CREATION_CHANGE#	NUMBER	The creation SCN of the datafile.
RESETLOGS_CHANGE#	NUMBER	The SCN of the most recent RESETLOGS in the datafile header.

Column	Datatype	Description
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. See the note following this table for special semantics when FILE#=0.
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, 0, or 1) specified when this backup was created. This value can be different from the INCREMENTAL_LEVEL column because if you run, for example, a level 1 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 1 and INCREMENTAL_LEVEL is 0.
PIECES	NUMBER	The number of backup pieces in the backup set that contains this backup datafile.

RC_BACKUP_FILES

This views lists backups known to the RMAN repository as reflected in the recovery catalog. This view corresponds to the V$BACKUP_FILES view.

Note that it is often more convenient to access this information using the LIST BACKUP and LIST COPY commands from within RMAN.

Column	Datatype	Description
PKEY	NUMBER	The primary key for the backup.
BACKUP_TYPE	VARCHAR2(32)	The type of the backup: BACKUP SET, COPY or PROXY COPY.
FILE_TYPE	VARCHAR2(32)	Type of the file backed up: DATAFILE, CONTROLFILE, SPFILE, REDO LOG, COPY (for an image copy backup) or PIECE (for a backup piece).
KEEP	VARCHAR2(3)	Whether this backup has KEEP attributes set that override the retention policy. Values are YES or NO.
KEEP_UNTIL	DATE	Date after which this backup will be considered obsolete.
KEEP_OPTIONS	VARCHAR2(13)	"Keep attributes" affecting retention for this backup. Possible values are: ■ LOGS (retain all redo logs needed to recover this backup as long as the backup is retained), ■ NOLOGS (redo logs may be considered obsolete even if this backup must be retained), and ■ NULL (let the configured retention policy apply to this backup).
STATUS	VARCHAR2(16)	Status of the backup. Possible values are: AVAILABLE, UNAVAILABLE, EXPIRED.
FNAME	VARCHAR2(1024)	Filename of this piece, copy or filename of the file included in this backup set. For example, for row with backup_type is "BACKUP SET" and file_type is "DATAFILE", FNAME is the name of the datafile in the backup. On the other hand, if BACKUP_TYPE is "BACKUP SET" and file_type is "PIECE", then fname shows the name of backup piece.
TAG	VARCHAR2(32)	The tag for this backup piece or image copy. (Valid only if FILE_TYPE is PIECE or COPY.)
MEDIA	VARCHAR2(80)	Media ID for the media on which the backup is stored. Valid only if BACKUP_TYPE is "BACKUP SET" and FILE_TYPE is "PIECE".
RECID	NUMBER	Recidof the control file record corresponding to this row.
STAMP	NUMBER	Timestamp of the control file record corresponding to this row.
DEVICE_TYPE	VARCHAR2(255)	Device type on which this backup is stored. Valid only if FILE_TYPE is "PIECE" or "COPY".
BLOCK_SIZE	NUMBER	Block size for the backup or copy (in bytes).

Column	Datatype	Description
COMPLETION_TIME	NUMBER	Time when this backup was completed. Valid only if FILE_TYPE is PIECE or COPY
COMPRESSED	VARCHAR2(3)	Whether the backup piece represented by this row is compressed. Valid only if file-type is PIECE (since image copies cannot be compressed, by definition).
OBSOLETE	VARCHAR2(3)	Whether this backup piece or copy is obsolete. Possible value: YES, NO. Valid only if FILE_TYPE is PIECE or COPY
BYTES	NUMBER	Size of file described by this row. If FILE_TYPE is BACKUP SET, this represents the total size of the backup set. If FILE_TYPE is PIECE or COPY, then this represents the size of the individual file. If FILE_TYPE is DATAFILE, ARCHIVED LOG, SPFILE or CONTROL FILE, the value represents how much data was incorporated into the backup set (but note that the corresponding backup set may be smaller, if compression was used in creating the backup set).
BS_KEY	NUMBER	Backup set key. Valid only if FILE_TYPE is BACKUP SET.
BS_COUNT	NUMBER	Backup set count. Valid only if FILE_TYPE is BACKUP SET.
BS_STAMP	NUMBER	Backup set timestamp. Valid only if FILE_TYPE is BACKUP SET.
BS_TYPE	VARCHAR2(32)	Type of backup set contents (datafiles or archived redo logs). Valid only if FILE_TYPE is BACKUP SET.
BS_INCR_TYPE	VARCHAR(32)	Backup set incremental type (full or not). Valid only if FILE_TYPE is BACKUP SET.
BS_PIECES	NUMBER	Number of pieces in backup set. Valid only if FILE_TYPE is BACKUP SET.
BS_COPIES	NUMBER	Number of copies of this backup set. Valid only if FILE_TYPE is BACKUP SET.
BS_COMPLETION_TIME	DATE	Completion time of the backup set. Valid only if FILE_TYPE is BACKUP SET.
BS_STATUS	VARCHAR2(16)	Status of the backup set. Possible values are AVAILABLE, UNAVAILABLE, EXPIRED, or OTHER. (OTHER means that not all pieces of the backup set have the same status, which can happen if some are AVAILABLE and others UNAVAILABLE..) Valid only if FILE_TYPE is BACKUP SET.
BS_BYTES	NUMBER	Sum of the sizes of all backup pieces in the backup set. Valid only if FILE_TYPE is BACKUP SET.
BS_COMPRESSED	VARCHAR2(3)	Whether the backup pieces of this backup set are compressed. Valid only if FILE_TYPE is BACKUP SET.
BS_TAG	VARCHAR2(1024)	Tag or tags of the backup pieces of this backup set. If pieces have different tags, BS_TAGS will contain a comma-separated list of all tags for pieces in the backup set. Valid only if FILE_TYPE is BACKUP SET.

Column	Datatype	Description
BS_DEVICE_TYPE	VARCHAR2(255)	Type of device on which this backup set is stored. If multiple copies of this backup set exist and are stored on different devices, this field will contain a comma-separated list of all device types (for example, for a backup set that is on disk and also backed up on tape, BS_DEVICE_TYPE might contain "DISK, SBT_TAPE". Valid only if FILE_TYPE is BACKUP SET.
BP_PIECE#	NUMBER	Number of backup pieces that make up this backup set. Valid only if FILE_TYPE is BACKUP SET.
BP_COPY#	NUMBER	Number of copies of this backup set. Valid only if FILE_TYPE is BACKUP SET.
DF_FILE#	NUMBER	File number of the datafile described by this row. Valid only if FILE_TYPE is "DATAFILE".
DF_TABLESPACE	VARCHAR2(30)	Tablespace name for the datafile described by this row. Valid only if FILE_TYPE is "DATAFILE".
DF_RESETLOGS_CHANGE#	NUMBER	Resetlogs change of the datafile described by this row. Valid only if FILE_TYPE is "DATAFILE".
DF_CREATION_CHANGE#	NUMBER	Creation change number of the datafile described by this row. Valid only if FILE_TYPE is "DATAFILE".
DF_CHECKPOINT_CHANGE#	NUMBER	Checkpoint change number of the datafile described by this row. Valid only if FILE_TYPE is "DATAFILE".
DF_CKP_MOD_TIME	DATE	Checkpoint time of the datafile described by this row. Valid only if FILE_TYPE is "DATAFILE".
RL_THREAD#	NUMBER	Redo log thread number of the archived redo log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".
RL_SEQUENCE#	NUMBER	Redo log sequence number of the archived redo log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".
RL_RESETLOGS_CHANGE#	NUMBER	Resetlogs change number of the archived redo log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".
RL_FIRST_CHANGE#	NUMBER	First change number in the archived redo log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".
RL_FIRST_TIME	DATE	Time of the first change in the archived redo log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".
RL_NEXT_CHANGE#	NUMBER	Change umber after the archived log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".
RL_NEXT_TIME	DATE	Time of the first change after the archived log described by this row. Valid only if FILE_TYPE is "ARCHIVED LOG".

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), L (archived redo log).
INCREMENTAL_LEVEL	NUMBER	The level of the incremental backup: NULL, 0, or 1.
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.

Column	Datatype	Description
MEDIA_POOL	NUMBER	The number of the media pool in which the backup is stored.
CONCUR	VARCHAR2(3)	Specifies whether backup media supports concurrent access: YES or NO.
TAG	VARCHAR2(32)	The tag for the backup piece. Refer to description in BACKUP for default format for tag names.
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 Oracle® Database unless an older recovery catalog is upgraded.
BYTES	NUMBER	The size of the backup piece in bytes.
IS_RECOVERY_DEST_FILE	VARCHAR2(3)	This backup piece is located in the flash recovery area: YES or NO.

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$BACKUP_SET. SET_STAMP and SET_COUNT form a concatenated key that uniquely identifies the backup set to which this record belongs in the target database control file.
SET_COUNT	NUMBER	The SET_COUNT value from V$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.

Column	Datatype	Description
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.
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 level 1), L (archived redo log).
INCREMENTAL_LEVEL	NUMBER	The level of the incremental backup: NULL, 0, or 1.
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).

Column	Datatype	Description
CONTROLFILE_INCLUDED	VARCHAR2(7)	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.
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_BACKUP_SPFILE

This view lists information about server parameter files in backup sets.

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.
BSF_KEY	NUMBER	The primary key of the server parameter file 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$BACKUP_SPFILE. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The stamp from V$BACKUP_SPFILE. 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.
MODIFICATION_TIME	DATE	The time when the server parameter file was last modified.
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).
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.
COMPLETION_TIME	DATE	The time when the backup set completed.
BYTES	NUMBER	The size of the backup set in bytes.

RC_CHECKPOINT

This view is deprecated. See RC_RESYNC on page 3-43 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.
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).
CONTROLFILE_TYPE	VARCHAR2(1)	The type of control file copy: B (normal copy) or S (standby copy).

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_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.
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).
IS_RECOVERY_DEST_FILE	VARCHAR2(3)	This copy is located in the flash recovery area: YES or NO.

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$COPY_CORRUPTION. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The stamp from V$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.
CORRUPTION_TYPE	VARCHAR2(9)	Same as RC_DATABASE_BLOCK_CORRUPTION.CORRUPTION_TYPE.

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_BLOCK_CORRUPTION

This view gives information about database blocks that were corrupted after the last backup. It corresponds to the V$DATABASE_BLOCK_CORRUPTION 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.
FILE#	NUMBER	The absolute file number of the datafile.
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.
CORRUPTION_TYPE	VARCHAR2(9)	The type of block corruption in the datafile. Possible values are: ■ ALL ZERO. The block header on disk contained only zeros. The block may be valid if it was never filled and if it is in an Oracle7 file. The buffer will be reformatted to the Oracle8 standard for an empty block. ■ FRACTURED. The block header looks reasonable, but the front and back of the block are different versions. ■ CHECKSUM. The optional check value shows that the block is not self-consistent. It is impossible to determine exactly why the check value fails, but it probably fails because sectors in the middle of the block are from different versions. ■ CORRUPT. The block is wrongly identified or is not a data block (for example, the data block address is missing) ■ LOGICAL. Specifies the range is for logically corrupt blocks. CORRUPTION_CHANGE# will have a nonzero value.

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(8)	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.
PRIOR_RESETLOGS_CHANGE#	NUMBER	The SCN of the RESETLOGS operation that created the parent of this incarnation.
PRIOR_RESETLOGS_TIME	DATE	The time stamp of the RESETLOGS operation that created the parent of this incarnation.

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.
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 bytes.
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.

Column	Datatype	Description
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.
AUX_NAME	VARCHAR2(1024)	Indicates the auxiliary name for the datafile as set by CONFIGURE AUXNAME.

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.
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#.

Column	Datatype	Description
ONLINE_FUZZY	VARCHAR2(3)	YES / NO. If set to YES, this copy was made after an instance failure 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, the recovery process 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	DATE	The time when the copy completed.
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_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.
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).
SCANNED	VARCHAR2(3)	Whether RMAN scanned the file (YES or NO). If YES, then this copy was created by a server process that examined every block in the file, for example, by the RMAN COPY or RESTORE command. If NO, then RMAN did not examine every block in the file, as when RMAN inspects a non-RMAN generated image copy or restores by proxy copy. Whenever RMAN creates or restores a datafile copy, it adds rows to the V$DATABASE_BLOCK_CORRUPTION view and RC_DATABASE_BLOCK_CORRUPTION view if it discovers corrupt blocks in the file. If RMAN has scanned the entire file, then the absence of corruption records for this copy means that no corrupt blocks exist in the file. If RMAN did not scan the file, then the absence of corruption records means that corrupt blocks may or may not exist in the file.
IS_RECOVERY_DEST_FILE	VARCHAR2(3)	This datafile copy is located in the flash recovery area: YES or NO.

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_ARCHIVEDLOG

This view contains descriptions of archived log backups that were taken using the proxy copy functionality. It corresponds to the V$PROXY_ARCHIVEDLOG 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.
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.
XAL_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$PROXY_ARCHIVEDLOG. RECID and STAMP form a concatenated primary key that uniquely identifies this record in the target database control file.
STAMP	NUMBER	The proxy copy stamp from V$PROXY_ARCHIVEDLOG. 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.
DEVICE_TYPE	VARCHAR2(255)	The type of media device that stores the proxy copy.
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.
STATUS	VARCHAR2(1)	The status of the backup set: A (available), U (unavailable), X (expired), or D (deleted).
THREAD#	NUMBER	The number of the redo thread.
SEQUENCE#	NUMBER	The log sequence number.
RESETLOGS_CHANGE#	NUMBER	The RESETLOGS SCN of the database incarnation to which this archived log belongs.

Column	Datatype	Description
RESETLOGS_TIME	DATE	The RESETLOGS time stamp of the database incarnation to which this archived log belongs.
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 redo log in operating system blocks.
BLOCK_SIZE	NUMBER	The block size for the copy in bytes.
DEVICE_TYPE	VARCHAR2(255)	The type of sequential media device.
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.

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.
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.

Column	Datatype	Description
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).
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.
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#.

Column	Datatype	Description
ONLINE_FUZZY	VARCHAR2(3)	YES/NO. If set to YES, this copy was made after an instance failure 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).
KEEP	VARCHAR2(3)	Indicates whether this proxy copy has a retention policy different from the value for CONFIGURE RETENTION POLICY (YES or NO).
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.
KEEP_OPTIONS	VARCHAR2(10)	The KEEP options specified for this backup. Options can be LOGS (RMAN keeps logs needed to recover this backup), NOLOGS (RMAN does not keep logs needed to recover this backup), or NULL (the backup has no KEEP options and will be obsolete based on retention policy).

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.
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_RMAN_STATUS

This view contains information about the history of RMAN operations on all databases associated with this recovery catalog. It contains essentially the same information as V$RMAN_STATUS, except that it does not contain information about current sessions.

All RMAN operations such as backups, restores, deletion of backups, and so on are logged in this table. The table is organized to show the status of each RMAN session (the invocation of an RMAN client, including all actions taken until the RMAN client exits), operations executed during the session, and recursive operations.

RC_RMAN_STATUS also contains the RSR_KEY, PARENT_KEY and SESSION_KEY columns, which do not appear in V$RMAN_STATUS.

Column	Datatype	Description
SID	NUMBER	The session ID of the session that executed this RMAN operation.
RECID	NUMBER	The recid of the corresponding row in the control file.
STAMP	NUMBER	The timestamp of the row in the control file. (Because control file records are reused, you must combine the timestamp and recid to get a value unique across all records in RC_RMAN_STATUS.)
PARENT_RECID	VARCHAR2(40)	If ROW_TYPE=SESSION (that is, this row has no parents and represents an RMAN session), then this column contains NULL. Otherwise, it contains the recid of the parent row of this row.
PARENT_STAMP	VARCHAR2(40)	If ROW_TYPE=SESSION (that is, this row has no parents and represents an RMAN session), then this column contains NULL. Otherwise, it contains the timestamp of the parent row of this row.
SESSION_RECID	NUMBER	If ROW_TYPE=SESSION (that is, this row has no parents and represents an RMAN session), then this column contains NULL. Otherwise, it contains the recid of the row representing the session associated with this row.
SESSION_STAMP	NUMBER	If ROW_TYPE=SESSION (that is, this row has no parents and represents an RMAN session), then this column contains NULL. Otherwise, it contains the timestamp of the row representing the session associated with this row.

Column	Datatype	Description
ROW_LEVEL	NUMBER	This is the level of this row. ■ If ROW_LEVEL=0 then this is a session row (that is, ROW_TYPE=SESSION and the row represents an invocation of the RMAN client). ■ If ROW_LEVEL=1 then this row represents a command entered in the RMAN client and executed. (ROW_TYPE=COMMAND for rows at level 1.) ■ IF ROW_LEVEL>1 then this row represents a recursive operation, a sub-operation of an RMAN command (such as a control file autobackup performed in conjunction with a database backup). (ROW_TYPE=RECURSIVE OPERATION for rows at levels >1.)
ROW_TYPE	VARCHAR2(19)	This is the type of operation represented by this row. Possible values are: ■ SESSION, for rows at level 0 ■ COMMAND, for rows at level 1 ■ RECURSIVE OPERATION, for rows at level >1
COMMAND_ID	VARCHAR2(33)	The user-specified ID of the operation. The user can change this using the SET COMMAND ID syntax in RMAN. By default, the command ID is set to the time at which RMAN is invoked, in ISO standard format.
OPERATION	VARCHAR2(33)	This is the name of the operation presented by this row. For SESSION operations, this column is set to ’RMAN’. For COMMAND operations, it describes the command executed, such as "BACKUP", "RESTORE", "CONFIGURE", "REPORT" and so on.
STATUS	VARCHAR2(23)	The status of the operation described by this row. Possible values are: COMPLETED, COMPLETED WITH WARNINGS, COMPLETED WITH ERRORS, and FAILED.
MBYTES_PROCESSED	NUMBER	If the operation represeted by this row performed some data transfer (such as backing up or restoring data) then this column contains the number of megabytes processed in the operation. Otherwise, this row contains NULL.
START_TIME	DATE	The start time for the operation represented by this row.
END_TIME	DATE	The end time for the operation represented by this row.
RSR_KEY		Unique key for this row.
PARENT_KEY		The value of RSR_KEY for the parent row of this row.
SESSION_KEY		The value of RSR_KEY for the session row associated with this row.

RC_STORED_SCRIPT

This view lists information about scripts stored in the recovery catalog. The view contains one row for each stored . (Note that RMAN's commands for management such as `LIST    NAMES` and `LIST    ` provide more convenient ways of viewing this information.)

Column	Datatype	Description
`DB_KEY`	`NUMBER`	The primary key for the database that owns this . 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 .

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 .

Column	Datatype	Description
DB_KEY	NUMBER	The primary key for the database that owns this . Use this column to form a join with almost any other catalog view.
SCRIPT_NAME	VARCHAR2(100)	The name of the stored .
LINE	NUMBER	The number of the line in the . The line of a is uniquely identified by SCRIPT_NAME and LINE.
TEXT	VARCHAR2(1024)	The text of the line of the .

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 ID 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.
BIGFILE	VARCHAR2(3)	Indicates whether this tablespace is a tablespace created with the BIGFILE option.

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 Oracle8*i*, 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 A–1 Deprecated RMAN Syntax

Deprecated in Release	Deprecated Syntax	Preferred Current Syntax
10.0.1	`BACKUP ... INCREMENTAL LEVEL [2,3,4]`	Levels **other than** `0` and 1 are deprecated.
10.0.1	`BACKUP ... PARMS`	`CONFIGURE CHANNEL ... PARMS`
10.0.1	`BACKUP ... DISKRATIO`	n/a
10.0.1	`CONFIGURE CHANNEL ... PARMS="BLKSIZE"`	n/a
10.0.1	`COPY`	`BACKUP AS COPY`
10.0.1	`RESTORE ... PARMS`	`CONFIGURE CHANNEL ... PARMS`
10.0.1	`SEND ... PARMS`	`CONFIGURE CHANNEL ... PARMS`
9.2	`REPLICATE`	`RESTORE CONTROLFILE FROM ...`
9.2	`SET AUTOLOCATE`	Now enabled by default.
9.0.1	`ALLOCATE CHANNEL FOR DELETE`	n/a
9.0.1	`ALLOCATE CHANNEL ... TYPE`	`CONFIGURE CHANNEL ... DEVICE TYPE`
9.0.1	`ALLOCATE CHANNEL ... KBYTES`	`CONFIGURE CHANNEL ... MAXPIECESIZE`

Table A–1 Deprecated RMAN Syntax (Cont.)

Deprecated in Release	Deprecated Syntax	Preferred Current Syntax
9.0.1	ALLOCATE CHANNEL . . . READRATE	CONFIGURE CHANNEL . . . RATE
9.0.1	. . . ARCHIVELOG . . . LOGSEQ	. . . ARCHIVELOG . . . SEQUENCE
9.0.1	BACKUP . . . SETSIZE	BACKUP . . . MAXSETSIZE
9.0.1	CHANGE . . . CROSSCHECK	CROSSCHECK
9.0.1	CHANGE . . . DELETE	DELETE
9.0.1	REPORT . . . AT LOGSEQ	REPORT . . . AT SEQUENCE
9.0.1	SET AUXNAME	CONFIGURE AUXNAME
9.0.1	SET DUPLEX	SET BACKUP COPIES CONFIGURE BACKUP COPIES
9.0.1	SET LIMIT CHANNEL . . .	ALLOCATE CHANNEL . . . CONFIGURE CHANNEL . . .
9.0.1	SET SNAPSHOT	CONFIGURE SNAPSHOT
9.0.1	UNTIL LOGSEQ (see "untilClause")	UNTIL SEQUENCE (see "untilClause")
8.1.7	CONFIGURE COMPATIBLE	n/a
8.1.5	ALLOCATE CHANNEL CLONE	CONFIGURE AUXILIARY CHANNEL
8.1.5	CHANGE . . . VALIDATE	CROSSCHECK
8.1.5	CLONE (see "cmdLine")	AUXILIARY (see "cmdLine")
8.1.5	CONNECT CLONE	CONNECT AUXILIARY
8.1.5	MSGLOG (see "cmdLine")	LOG (see "cmdLine")
8.1.5	RCVCAT (see "cmdLine")	CATALOG (see "cmdLine")

B

RMAN Compatibility

This section contains these topics:

- About RMAN Compatibility
- RMAN Compatibility Matrix
- RMAN Compatibility: Scenario

About RMAN Compatibility

The following table describes the components of an RMAN environment. Each component has a release number associated with it.

Component	Release Number Refers to ...
RMAN client	Version of RMAN client (displayed when you start RMAN)
Recovery catalog database	Version of Oracle database
Recovery catalog schema in recovery catalog database	Version of RMAN client used to create the recovery catalog
Target database	Version of Oracle database
Auxiliary database	Version of Oracle database

For example, you can use a release 9.0.1 RMAN client with:

- A release 9.0.1 target database
- A release 9.0.1 duplicate database
- A release 8.1.7 recovery catalog database whose catalog tables were created with RMAN release 9.0.1

Determination of Catalog Schema Version

To determine the current release of the catalog schema, you must run a SQL query.

1. Use SQL*Plus to connect to the recovery catalog database as the catalog owner. For example, enter:

   ```
   % sqlplus rman/rman@catdb
   ```

2. Query the `rcver` catalog table. For example, run this query:

   ```
   SQL> SELECT * FROM rcver;

        VERSION
        ------------
        08.01.05
        09.00.01
   ```

   If multiple versions are listed, then the last row is the current version, and the rows before it are prior versions. In the preceding example, the current catalog schema version is 09.00.01 and the previous version was 08.01.05.

RMAN Compatibility Matrix

In general, the rules of RMAN compatibility are as follows:

- You can create 8.X or 9.X RMAN catalog schema in any Oracle database release 8.1.X (or higher) and Release 10*g* RMAN catalog schema in any Oracle database release 9.0.1 (or higher).
- The recovery catalog schema version must be greater than or equal to the RMAN client version.
- Ideally, the versions of the RMAN client and the target database should be the same (although there are other legal combinations, listed in Table B–1).
- While backing up a Release 10g database using the 9.X RMAN client, you cannot include a controlfile that was created using compatible=10.0.0 in a datafile backupset. The workaround is to turn controlfile autobackup ON.

Table B–1 shows version requirements for RMAN components. Note the following conventions when interpreting this table:

- ">=8.1.7" means 8.1.7, 9.0.1, 9.2.0 and 10.1.0 and their patches
- ">=8.0.6" means 8.0.6, 8.1.7, 9.0.1, 9.2.0 and 10.1.0 and their patches

When using an older version of the RMAN client with a newer version of the database, you do not get the features of the newer version. For example, when using the Oracle9*i* RMAN client to back up an Oracle Release 10g database, you will not have access to features like the flash recovery area, flashback database, TSPITR with an RMAN-managed auxiliary instance, or recovery through resetlogs.

Table B–1 RMAN Compatibility Table

Target/Auxiliary Database	RMAN client	Catalog Database	Catalog Schema
8.0.6	8.0.6	>=8.1.7	>=8.0.6
8.1.7	8.0.6.1	>=8.1.7	>=8.1.7
8.1.7	8.1.7	>=8.1.7	>=RMAN client
8.1.7.4	8.1.7.4	>=8.1.7	8.1.7.4
8.1.7.4	8.1.7.4	>=8.1.7	>= 9.0.1.4
9.0.1	9.0.1	>=8.1.7	>= RMAN client
9.2.0	>=9.0.1.3	>=8.1.7	>= RMAN client
10.1.0	>=9.0.1.3	>=9.0.1	>= RMAN client

RMAN Compatibility: Scenario

Assume that you maintain a production databases of the following releases:

- 8.1.7
- 9.0.1
- 9.2.0
- 10.1.0

You want to record metadata about these databases in a single recovery catalog database. According to Table B–1, you can use a single 9.2.0 recovery catalog database with a 10.1.0 catalog schema for all target databases.

The solution for this combination of target databases is to do the following:

- Use a single 9.2.0 catalog database to store all metadata.
- Use a single 10.1.0 catalog schema for all databases.
- Ensure that the version of the RMAN client used to back up each target database matches the release of the target database being backed up.

Index