
Chapter 7

Selecting Data Files

Introduction

This chapter explains how to select and control the files that provide data for your report. Using the Database menu options, you can relate tables for multi-table reports, change the master table selection, and specify a database scope to limit the records that R&R retrieves.

The explanation of selecting data files is presented in the following sections:

- Types of Database Relations
- Specifying Database Relations
- Modifying Database Relations
- Defining Scan Groups
- Sample Database Relations
- Specifying Database Scope
- Changing the Master Table
- Selecting or Changing a Master Index

In addition to drawing information from the master table, R&R reports can draw information from up to 99 additional tables, called *related tables*, that are joined to the master table or to each other.

To generate a report that draws information from more than one table, you first define database relations among the tables you want to use. (For reports that use a large number of table relations, see Chapter 6, “Setting Defaults,” for information about increasing the number of files that R&R can open simultaneously.)

In any database relation, the table used to initiate the relation is called the *controlling table*; the other table is called the *related table*.

After you select a related table, you also select a related index file that indicates what record or records in the related table contain the same data as the controlling table linking field. R&R uses this index as a cross-reference to the related table.

Types of Database Relations

Three types of database relations are available in R&R: Exact Lookup, Approximate Lookup, and Scan. In addition, as an alternative to setting database relations you can create calculated fields that use R&R's lookup functions to extract single field values from other tables. The following sections explain each relation type and briefly describe the lookup functions.

Exact Lookup Relations

In an exact lookup relation, there is a one-to-one relationship between records in the linked tables. In other words, R&R uses each record in the controlling table to search for one and only one corresponding record in the related table. The resulting relationship increases the number of fields in the composite record structure, but not the number of composite records.

For example, you could set an exact lookup relation between an orders table and a customer table (using a customer number linking field) to have R&R match each customer number in the orders table with its associated customer information (e.g. name and address) in the customer table.

Exact lookup relations can be based on any type of field except a logical or memo field.

Approximate Lookup Relations

The second type of relation is an approximate lookup, also a one-to-one matching of each record in the controlling table with a single record in the related table. In this case, however, R&R locates the first record whose index value is equal to or greater than the linking field value. The resulting relationship also increases the number of fields in the composite record structure, but not the number of composite records.

For example, suppose you have a discounts table and an orders table and you want to assign price discounts based on the quantity of items ordered. The orders table has a QUANTITY field containing total number of items for each order; the discounts table has a MAXQTY field that sets the maximum values for various quantity ranges to establish discounts based on quantity ordered. If you set an approximate lookup relation between the discounts and orders tables using QUANTITY as the linking field, R&R will search for the MAXQTY value that is equal to or greater than each

QUANTITY value and assign the appropriate discount based on that match.

Approximate lookup relations can be based on any type of field except a logical or memo field.

Scan Relations

The third type of relation is called a scan. In this case, there is a one-to-many relationship between table records. In other words, R&R uses each record in the controlling table to search for all the corresponding records in the scanned table. The resulting relationship usually increases the number of composite records, as well as the number of fields in the composite record structure.

For example, suppose you have an employee table and a dependents table. You can set a scan relation to have R&R search for all dependents records associated with each employee number in the employee table.

Scan relations can be based on any type of field except logical or memo.

Single-Field Lookups

As an alternative to setting database relations, you can use R&R's lookup functions — CLOOKUP(), DLOOKUP(), DTLOOKUP(), LLOOKUP(), and NLOOKUP() — to retrieve values from a single field in another table. To do so, you create a calculated field using the appropriate function to return values from a character, date, logical, or numeric field. Then, instead of setting an exact, full-match relation to the other table, you use that calculated field to retrieve the value of the single field.

For example, suppose you are developing an invoice report using RRORDERS as the master table. Without setting a database relation, you could retrieve the value of the PRICE field in the RRPRICES table by creating a calculated field whose expression uses NLOOKUP(). For more information about the lookup functions, see Chapter 10, "Using R&R Functions."

Specifying Database Relations

You use the Database ⇒ Relations command or the Relate button on the Standard Toolbar to set or edit relations between tables. These relations define the composite record structure, making all fields in each table available for your report.

Note that the Character Match, Link Control, and Failure Action group boxes appear only when you select Options. For many database relations, the default settings for these group boxes are appropriate. For information about changing these settings, see the section in this chapter entitled **Changing the Options Settings**.

Follow these steps to establish a database relation for a report:

1. Select Database ⇒ Relations or the Relate button.

If no joins have been set for the report, the New Relation dialog box appears. If one or more relations have already been defined, the Relations dialog appears; select New to display the New Relation dialog (see Figure 7.1).

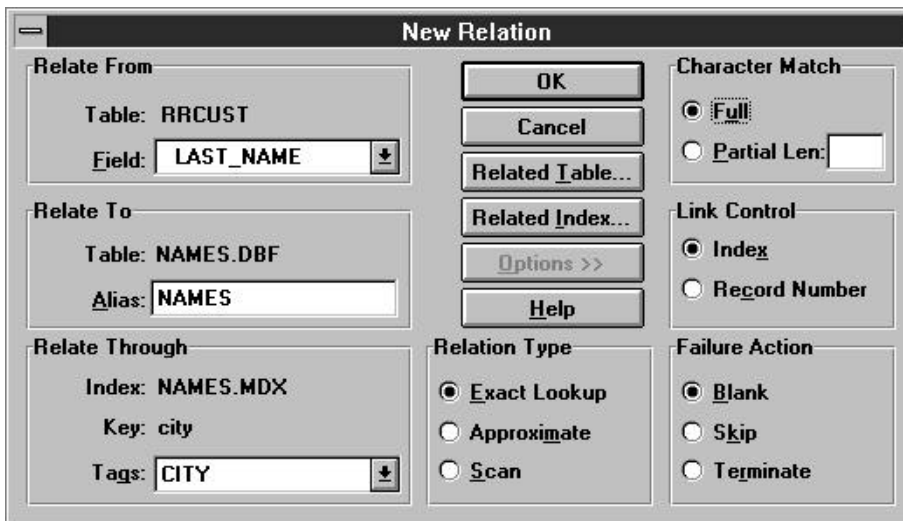


Figure 7.1 New Relation Dialog Box (with Options selected)

2. In the Relate From group box, select a linking field from the menu of fields in the current composite record structure. R&R allows you to use any of three types of linking fields:
 - ◆ A data field from the controlling table that contains the same data as the field or expression used to index the related table.
 - ◆ A calculated field based on the data in the controlling table. The value of this calculated field must also be the same as the value of the field or expression used to index the related table.
 - ◆ A total field based on the data in the controlling table. The value of this total field must also be the same as that of the field or expression used to index the related table.
3. Select Related Table to specify the related table. Assign an alias to the related table or accept the default assigned by R&R (which is the table name without its file extension).
4. Select Related Index to specify a link based on an index file. Select a related table index whose key expression corresponds to the initial linking field. R&R will use this index to access data in the related table. For a multiple index file, you must also select or enter a tag in the “Tags” box.
5. Select the Relation Type: Exact-Lookup, Approximate-Lookup, or Scan.
6. Select OK. R&R displays the Relations dialog box, which includes a plain-English description of the relation. Select Close.

Modifying Database Relations

After you have set one or more database relations, you can modify them as necessary to change the relation type, select a different linking field, and so on. You can also delete existing relations.

Editing a Relation

To edit a relation:

1. Select Database ⇒ Relations to display the Relations dialog (see [Figure 7.2](#)).

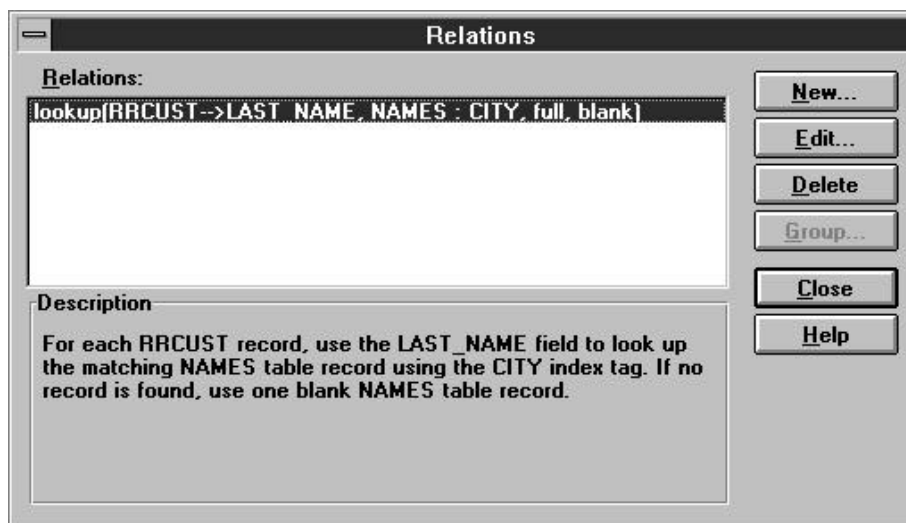


Figure 7.2 Database Relations Dialog

2. Highlight the relation you want to change and select Edit to display the Edit Relation dialog (which is the same as the New Relation dialog).
3. As necessary, select the controlling table, related table, and so on (follow the instructions given in the previous sections). To change the Character Match, Link Control, or Failure Action setting, first select Options.
4. When you are finished editing the relation, select OK.

Deleting a Relation

To delete a relation:

1. Select Database ⇒ Relations.
2. Highlight the relation you want to remove; then select Delete. If fields will be removed from the report definition as a result of deleting the relation, R&R lists those fields.
3. Select OK to delete the relation and remove the fields that are dependent on that relation; select Cancel to retain the relation and the fields.

If the related table controls another relation, R&R will not allow you to delete the selected relation. In this case, you must first delete the secondary relation.

Changing the Options Settings

When you select Options on the New/Edit Relation dialog, the following group boxes display:

- Character Match
- Link Control
- Failure Action

As noted previously, the default settings for these group boxes are appropriate in many instances. The following sections explain the available choices in each group box.

Character Match

If the linking field you select from the controlling table is a character field, the default Character Match setting is “Full.” As a result, R&R matches the entire length of the linking field value to the entire length of the related index key value.

To have R&R match a specified number of characters of the linking field to the same number of characters of the index key value, select “Partial Len” in the Character Match box. In the data-entry box, enter the number of characters to match.

Link Control

For an Exact-Lookup relation based on a numeric linking field, you can specify a record number link instead of an index file to match each record in the controlling table with a specific record in the related table. If you specify a record number link, R&R uses the integer part of the linking field’s value to locate the matching record in the related table.

To specify a record number link, select “Record Number” in the Link Control box. For a record number link, R&R restricts the Relation Type to “Exact Lookup.”

Failure Action

If the linking field value does not match any value in the related table index, R&R executes the *failure action* (that is, an action to follow if it doesn’t find a matching record in the related table) that you specify. By default, if R&R doesn’t find a match between the controlling table linking field and the related table linking field, it creates the composite record anyway, leaving

fields from the related table blank for that record. You can select from two other alternatives in the Failure Action group box:

- Skip: When it does not find a matching record, R&R eliminates the entire composite record from the report.
- Terminate: When it does not find a matching record, R&R stops processing the report and notifies you of the failure.

The failure action you select depends on how you want R&R to proceed when matching records are not found. The following sections provide examples of how each failure action might be used.

Blank Failure Action: Suppose you have defined a Scan relation between an employee table and an employee dependents table. For those employees who have no dependents, you still want to print the employee information; therefore, you would select “Blank” as the failure action.

Skip Failure Action: In an invoice report, suppose you have defined a Scan relation between a customer table and an orders table. You might select “Skip” as the failure action so that R&R will print invoices only for those customers who have placed orders. R&R simply leaves out any composite record that has no order data.

Terminate Failure Action: In an invoice report that has an Exact Lookup relation from a customer table to an address table, you want R&R to stop processing the report if it finds a customer for whom there is no address. Therefore, you might select “Terminate” as the failure action.

Case Sensitivity in Database Relations

If your database software treats character field links case-sensitively, R&R distinguishes between upper and lower case data when relating tables. For example, R&R will not recognize a match between an employee name stored as Smith in an employee table and the same employee stored as SMITH in a benefits table. If related tables use upper and lower case inconsistently, create a calculated linking field to convert letters to uppercase and link to an uppercase index.

Assume that you want to relate two tables (EMPLOYEE and BENEFITS) that both contain the LASTNAME field in any combination of upper and lower case letters. To relate the tables, first define a calculated field called UPLAST using the expression UPPER(LASTNAME). Use the UPLAST calculated field to link the Employee and Benefits tables using an index on the employee name in uppercase. The UPPER function will convert the

LASTNAME field from the employee table to uppercase letters and find the match in the uppercase index.

Defining Scan Groups

A scan group consists of two or more tables scanned by the same controlling table or by a table related to the controlling table by a lookup relation. After you have set the scan relations that make up the group, you select Group on the Relations dialog box to determine the order in which the tables will be scanned and the action R&R will take if no matching records are found in any of the tables in the group.

Determining Scan Order

To determine the order in which tables in a scan group will be scanned, display the current database relations by selecting Database \Rightarrow Relations. Next, select Group to display the Scan Group dialog box (see Figure 7.3).

Aliases of the tables in the scan group appear in the Scan Order box; the order of the aliases here initially determines the order in which R&R will scan these tables.

To change the scan order, first highlight a table alias. To move the alias up one slot in the list, select “Move Up”; to move it down one slot, select “Move Down.” Continue this process until all table aliases for the scan group have been arranged in the desired order.

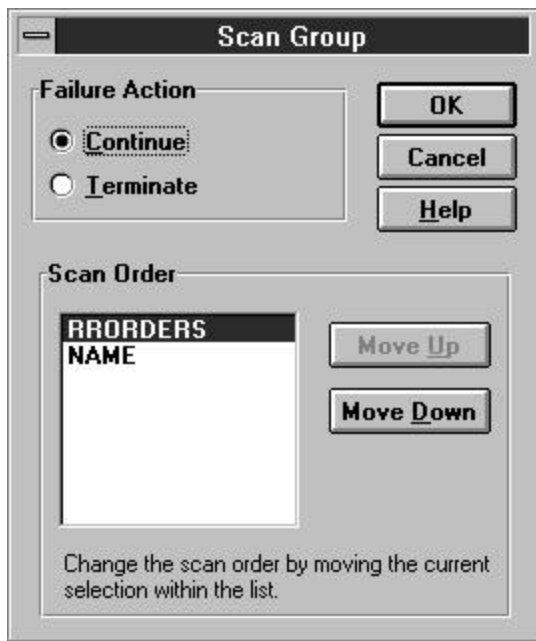


Figure 7.3 Scan Group Dialog Box

Selecting a Group Failure Action

To tell R&R what to do if no matching records are found in any of the tables in a scan group, select either “Terminate” or “Continue” in the Failure Action box. Select Terminate if you want the report to terminate and display an error message when no matching records are found. Select Continue if you want R&R to continue under these circumstances. Note that this group failure action supplements rather than replaces the individual failure action specified for each relation.

When you are finished specifying scan order and failure action, select OK to return to the Relations dialog box. Then Select Close.

Sample Database Relations

The following sections provide examples of these database relations:

- Relation based on table linking field;
- Relation based on calculated linking field;
- Relation based on record number link;
- Partial relation based on partial character link.

Table Linking Field

Assume you are using a database consisting of two tables, RRORDERS.DBF and RRCUST.DBF. The field CUSTNO in the RRORDERS.DBF table contains the same information as the field named CUST_NO in the RRCUST.DBF table. As a result, you can set a database relation that links these tables and thereby makes all fields in both tables available for use in a report.

To set a relation between RRORDERS and RRCUST, you would use your database software to index RRCUST on CUST_NO. In R&R, you would select RRORDERS as the controlling table, select CUSTNO as the linking field, and select the index file you created.

Calculated Linking Field

Assume that you have an eight-character field (PRODID) in your controlling table that contains a product identification code. The first four characters of the code represent the product line, and the last four characters represent the product number. A related table is indexed on one field (PRODNO) that contains the four-character product number.

To relate the tables, first define a calculated field, also called PRODNO, with the expression RIGHT(PRODID,4). The expression for this field will extract the last four characters of the PRODID field (those containing the product number). If you select this calculated field as the initial linking field, R&R can use it to search for corresponding product numbers using the related table index.

Record Number Link

Assume that the controlling table PARTS.DBF has a numeric field containing the part number for a series of products that are numbered starting with 1, and the related table NAMES.DBF contains a name for every part. If the data in NAMES.DBF is arranged in part number order, with no gaps in numbering, you can use part number as the linking field to NAMES.DBF by selecting "Record Number" as the Link Control (use the Options button on the New/Edit Relation dialog to display the Link Control settings).

As a result, the part number from PARTS.DBF can be used to locate corresponding records in NAMES.DBF.

Partial Link

For any database relation that uses a character linking field, you can create a partial match relation that matches data in the initial linking field with part of the data in the index key expression.

For example, assume the related table, PARTS.DBF, contains a field consisting of a subassembly code followed by the actual part number (for example, sss-ppppp, where sss represents the three-character subassembly code). The controlling table, CONTROL.DBF, contains a field with only the subassembly code. If you set a partial relation with a match length of 3 characters, R&R can select records based on the partial match between the three-character subassembly code and the first three characters of the part number.

Specifying Database Scope

You can use the Starting and Ending Scope boxes of the Master Table dialog to select a range of records for R&R to read in the master table. By specifying a range of index values or record numbers, you can tell R&R to read only selected records in the master table. This method is useful when using a large master table, and it produces a report more quickly than selecting records with a query.

To specify a scope:

1. Select Database ⇒ Master Table or the Master Table button on the Standard Toolbar to display the Master Table Dialog.
2. By default, “Beginning of table” and “End of table” are selected as the starting and ending scope values. To limit the records that R&R reads from the master table, select “Start value” and “End value” in the Starting Scope and Ending Scope group boxes.
3. Enter a starting value and an ending value to specify the range of records.

If no master index has been selected for the report, you can enter record number scope values. If the report *does* have a master index, the data type of that index determines what scope values you can use:

- A number for a numeric index;
- A character value (without quotes) for a character index;
- A date for a date index.

The range fully includes the end points. In other words, if you enter A as the low value and M as the high value, R&R reads the first record in which the value begins with A through the last record in which the value begins with M.

4. Select OK. When you run the report, R&R retrieves only those records that fall within the range of the specified scope values.

Note that you can leave the Start value blank to have the scope begin with the first value in the index field or leave the End value blank to have the scope extend through the last value in the index field.

Combining Scope, Master Index, Sorting, Query

You can use a combination of master index and scope to limit the number of records to be sorted when you specify sort fields. Also, when you query on a table that you have limited with a scope, R&R selects only records that match the query *and* that lie within the scope.

For example, if your customer table is indexed on LASTNAME, you can quickly focus on a group of records between Davis and Jones by specifying a low scope of Davis and a high scope of Jones. Then any specified sort affects only the records between Davis and Jones. Also, any query you set applies to only the records within the scope. Assume the records that fall within the low and high scope values of Davis and Jones are the following:

Davis
Drummond
Eagleton
Frank
Frederick
Grant
Hall
Hammond
Jasper
Jenkins
Jones

If you select LASTNAME as the Level 1 Sort field and then select descending order, R&R sorts only the records listed above, producing them in the following order:

Jones
Jenkins
Jasper
Hammond
Hall
Grant
Frederick
Frank
Eagleton
Drummond
Davis

If you then define a query that uses “in the list” with the values Adams, Baker, Hall, and Jones, R&R selects only the records for Jones and Hall.

Changing the Master Table

The table that serves as the initial source of data for a report is called the *master table*; you select this table when you first create a report. Using the Database ⇒ Master Table dialog, you can select a different master table for the report.

To replace the current master table, select Database ⇒ Master Table to display the Master Table dialog box. Then follow these steps:

1. Select Table and then either enter or select a table name in the File Name list box (if necessary, change the drive and/or directory to select from a list of tables in a different location).
2. In the Alias edit box enter a master table alias, a name R&R uses to uniquely identify the master table. You can accept the default value or enter an alternative alias. You are required to use an alternative alias only if another table or memo file used in the current report has already been assigned the default alias.
3. Select Set Index to choose a master index (or change the currently selected index) in the Master Index group box. Then select OK.

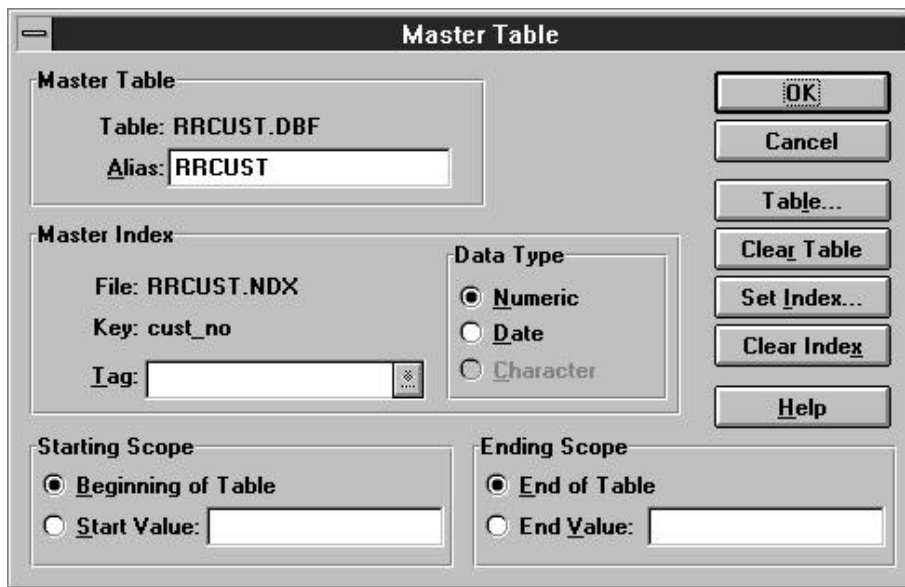


Figure 7.4 Master Table Dialog Box

The structure of the new master table should match that of the master table it is replacing. If fields from the old master table are not in the new one, those fields will be removed from the report. If changing the master table will remove fields from the composite record structure, those fields are listed. Select OK to change to the new table (and remove the listed fields); select Cancel to retain the former table.

Selecting or Changing a Master Index

When you first select a master table, R&R processes data from that table in record number order — that is, in the order that the data was entered in the table. Although you can use Database \Rightarrow Sort Order to select a field or fields to control the order in which data is read, in some cases specifying an index eliminates the need for sorting.

When you select a master index, that index's key expression determines the order in which R&R processes data from the master table. A report sorted by means of a master index will run faster than one with sort fields selected, since R&R does not have to do the sorting. Also, you can use a master index selection in conjunction with scope settings on the Master Table dialog to narrow the range of records that R&R must read and thereby speed report generation. (Note that selecting a Sort field will override any master index order.)

Selecting a Master Index

To select a master index file, follow these steps:

1. Select Database ⇒ Master Table to display the Master Table dialog box. If no index is currently selected, “Record number order” appears next to “File:” in the Master Index Group box.
2. Select Set Index. Select an index file from the File Name list box; if necessary, select a different file extension from the “List Files of Type” box to display only files of a particular type (for example, MDX multiple index files). If you have selected a multiple index file, you can also select an index tag from the Tag list box.
3. Verify that R&R has selected the appropriate data type for the index you specified; if necessary, change the data type selection. Then Select O.K.

Changing a Master Index Selection

To select a different master index (if one has already been specified) or to clear an index selection, do the following:

1. Select Database ⇒ Master Table. The name of the currently selected master index is displayed in the Master Index group box.
2. To clear the index selection and return to record number order, simply select Clear Index. To select a different index, select Set Index. Then select an index from the File Name list box. If you select a multiple index file, you can also select a tag.
3. If you chose a different index, verify that R&R has selected the appropriate data type; if necessary, change the data type selection.
4. When you are finished, select OK.