

Introduction

If you don't use Microsoft Access day in and day out, it's easy to forget some of the mechanics involved in working with its powerful features. TechRepublic contributor [Susan Harkins](#) put together this guide, which provides a rundown of basic information you may need when working with Access queries.

Table of contents

Query anatomy	2
Query types.....	2
Definitions	3
Creating a query	4
More on grouping.....	6
Query properties	7
Query limits	9
Query tips.....	9
Keyboard shortcuts/mouse tricks.....	10

Query anatomy

Getting all your data into a database is only part of your job. Once the data's stored, you'll want to review it, analyze it, and even change it, and you'll depend on the query object to make that happen.

The query object lets you ask a question and then returns only the data that answers that question. The question can be as simple as finding all customers named "Smith." Or it can be complex and demand that the data meet a number of conditions.

The query environment

The query is a graphical interface where you specify a data source, search strings, conditional criteria, sort order, and even groups. Like other Access objects, you work with the query in two modes—Design View and Datasheet View. You'll use Design View to ask questions; Access will return the answers in Datasheet View, which is visually almost identical to a table.

Figure A shows a query in Design View with the results below. The field lists in the top section identify all the fields in each data source. The bottom pane displays the actual fields the query uses to determine which records make it to the results. (All examples in this reference sheet are based on Northwind, the sample database that comes with Access.) Query types

You can use a query to arrange, find, and even limit data. Queries can also evaluate data and return new values. **Figure B** shows the various types of Access query objects. Most of the time, you'll use a query to populate a form or report.

About the select query

The most common query is the select query, which retrieves data, but only the data you specifically request. You might think of this query as a filtering tool because it limits the results in two ways:

- The query returns only the fields you specify, regardless of the number of fields in the underlying table.
- The query returns only the records that meet criteria conditions, regardless of the number of records in the underlying table.

For instance, let's suppose you want a customer phone list for only those customers in the southwest region. This type of query restricts the number of fields and the number of records that make it to the results.

However, a select query doesn't have to limit data. Sometimes, it merely reorganizes the data. You might want all the fields and all the records included in the results, but you might want those results sorted in a specific way.

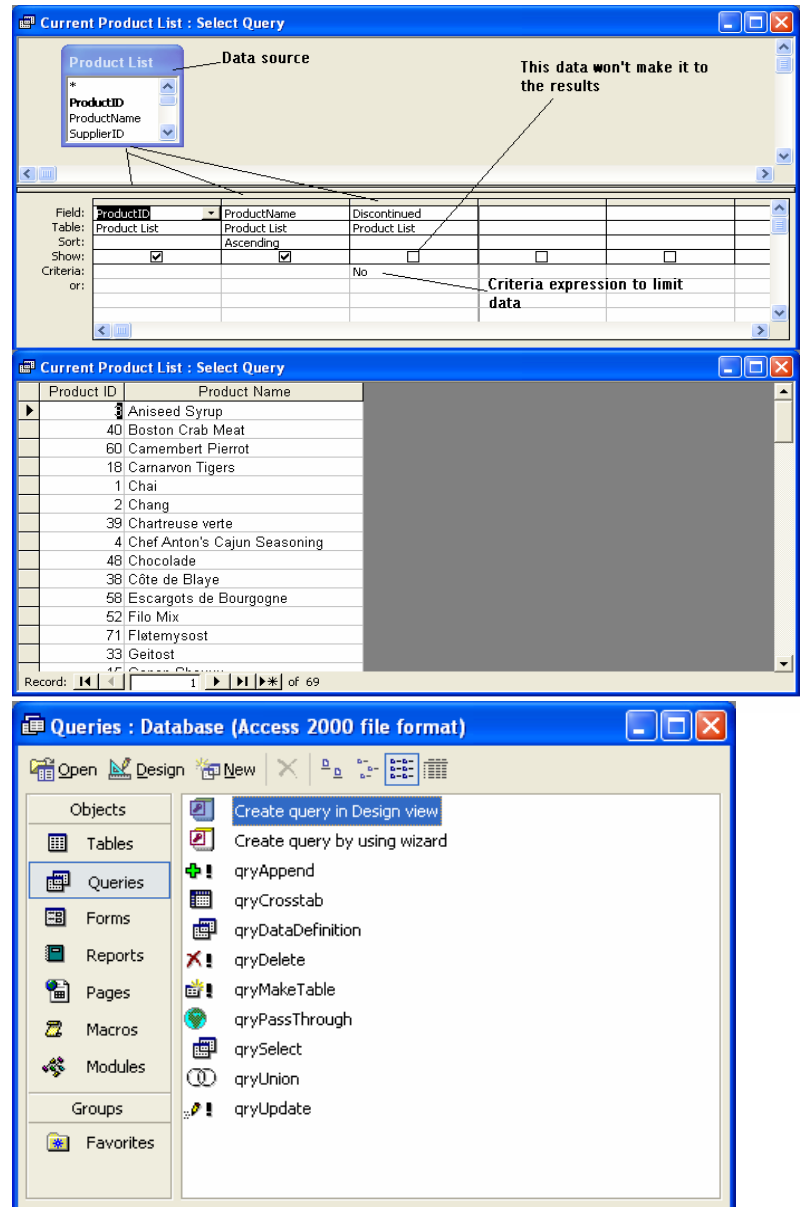


Figure B

About action queries

Action queries don't generally retrieve data. Instead, they act on it. For instance, an update query might increase all product prices by two percent, and a delete query might remove all discontinued products. There are four types of action queries:

- The **update** query replaces or changes existing data.
- The **append** query adds new records to an existing table.
- The **delete** query removes records from an existing table.
- The **make-table** query creates a new table.

About parameter queries

A parameter query prompts you for criteria when you run it. A parameter query is really just a specialized select query, although the underlying query can be an action query. To create a parameter query, use a criteria expression in the form

[*promptfordata*]

where *promptfordata* is a string requesting the appropriate data (criterion). The user responds by entering the requested data, which the query then uses as the actual criteria value. For instance, you might use a parameter query to return orders for geographical regions. Instead of creating a query for each region, you'd use a parameter query and enter the specific region each time you run the query.

About crosstab queries

Crosstab queries summarize values by categories. They're based on a select query, and they can be very complex. The biggest advantage to using a crosstab query is that it can stuff a lot of data into a relatively small area. Each crosstab has three components:

- A column heading
- A row heading
- A summary field

About SQL queries

Technically, all Access queries run SQL statements, but you use the design grid to create them. A SQL-specific query must be written literally in the SQL window because the grid can't accommodate the statements graphically. There are four types of SQL-specific queries:

- The **Union** query combines data from tables and queries with similar structures.
- A **Pass-through** query sends uninterpreted SQL statements to an ODBC database server. In other words, neither Access nor Jet tries to correct your statement before sending it.
- The **Data-definition** query creates, deletes, and alters tables. You'll also use them to create indexes.
- A **subquery** is a SQL SELECT statement that contains another SELECT or action query.

These queries offer functionality that you just can't get using the more familiar select and action queries. You may never need a SQL-specific query, but some problems can only be resolved using one of them.

It's worth noting that a subquery isn't really in the same category as the first three SQL-specific queries. We include it here because you'll probably find them easier to create in the SQL window than in the design grid. The other three can't be created in the design grid at all.

Definitions

Query terms

Action query

A query that acts on the data in some way

Access reference: Working with queries

Calculated field	A query field that evaluates data and returns a value
Cartesian product	A multiple-table query where there's no relationship between the tables; the query returns one record for each record in each unrelated table. In other words, two 10-record tables will return 100 records.
Criteria expression	An expression used to limit data
Crosstab query	A query that summarizes categories
Datasheet View	The view used to display a query's results
Design grid	The graphical interface used to make query specifications
Design View	The mode used to create and modify objects
Group	One or more records that belong to a single category
Join	A rule that determines which values a query acts upon
Operator	A symbol that represents a mathematical operation, a comparison, or a logical or a concatenation task
Parameter query	A query that solicits criteria values when run
Relationship	The association between two tables
Select query	A query that retrieves data
SQL-specific query	Queries that can be written only in the SQL window
Updatable query	A query that passes along changes made in Datasheet view or in a bound form to the underlying data at the table level

Creating a query

Queries allow you to populate forms and reports and display only the data needed at the time. This keeps data moving efficiently and reduces the possibility that sensitive information is exposed to the wrong eyes. Queries can be based on a single table, multiple tables, or on another query.

As you've probably come to expect with Access, a number of wizards make quick work of creating a query:

- The **Simple Query Wizard** creates a simple select query, with one limitation—you can't conditionally limit data.
- The **Crosstab Query Wizard** walks you through the process of creating a crosstab query.
- The **Find Duplicates Query Wizard** locates duplicate entries and records.
- The **Find Unmatched Query Wizard** locates orphan records—child records (or foreign key values) in related tables that don't relate to any parent (or primary key value).

Choose one of the following methods to launch one of these query wizards:

- Click on the Queries shortcut in the Database window and then double-click the Create Query By Using Wizard shortcut.
- Click on the Queries shortcut in the Database window and then click the New button on the Database Window toolbar.
- Choose Query from the Insert menu.
- Choose Query from the New Object button's drop-down list.

Using Design View

More than likely, you'll use Design View to create most of your queries. To open a blank query grid, do one of the following:

- Click on the Queries shortcut in the Database window and double-click the Create Query In Design View shortcut.
- Choose Query from the Insert menu and choose Design View from the New Query dialog box.
- Choose Query from the New Object button's drop-down list and choose Design View from the New Query dialog box.

Regardless of where you start, you'll end up with a blank grid (see the grid in Figure A). At this point, you build the query by:

- Adding the data source(s) by clicking the Show Table button and choosing the appropriate tables and queries from the Show Table dialog box. Add as many tables or queries as necessary to include all the desired data.
- Specifying data fields.
- Specifying criteria expressions.
- Entering calculated fields.
- Specifying sort order.
- Specifying groups.

Creating criteria expressions

A criteria expression is an ordinary expression that evaluates data. If the data matches or meets the expression, the query passes along the data to the results. An expression can be as simple as a literal string, such as "Harkins." Or it can be more complex, such as "Between 1 AND 5," which will match only the values 1, 2, 3, 4, and 5. **Figure C** shows a couple of examples. Criteria can also be the result of a built-in function.

Specifying one condition

Criteria expressions restrict a query; the data must match or meet the specified condition to be included in the query's results. A criteria expression can equal a literal string or value, or it can specify numerous conditions.

Specifying multiple conditions

A query can apply a number of criteria expressions to the same field or across fields. Sometimes, you can use the same expressions to get the different results. The queries in **Figure D** both use the same criteria expressions, but each applies the expressions in a different way. The query on top uses the And operator; the bottom query uses the Or operator. The expressions are the same, but the results will be different because Access applies them differently. The first will return all products that have a unit price value of 1, 2, 3, 4, or 5 *and* that have a quantity value of 5 or more. Only two records meet both conditions. The other query will return all products that have a unit price of 1, 2, 3, 4, or 5 *or* that have a quantity value of 5 or more. There are 71 records that meet one or the other of the two conditions.

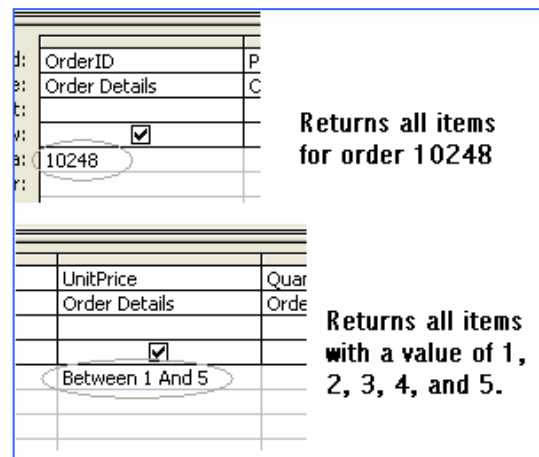


Figure C

More on grouping

The Totals query creates a summarized view of your data based on groups. A group is simply a collection of related records. Keep in mind that a Totals view won't return the same information as a grouped report. For the most part, you'll use a Totals view to summarize data—reducing a common value to just one record. For instance, you might want to see the total for each order by summing the prices of its items. A Totals view will return just one record for the entire order—not a record for each item in the order.

To enable a Totals view, in Design View, choose Totals from the View menu. Doing so will add a Totals row to the grid. Use the Total cell's drop-down menu to choose an aggregate function.

Table A lists the aggregate functions available to group or summarize data.

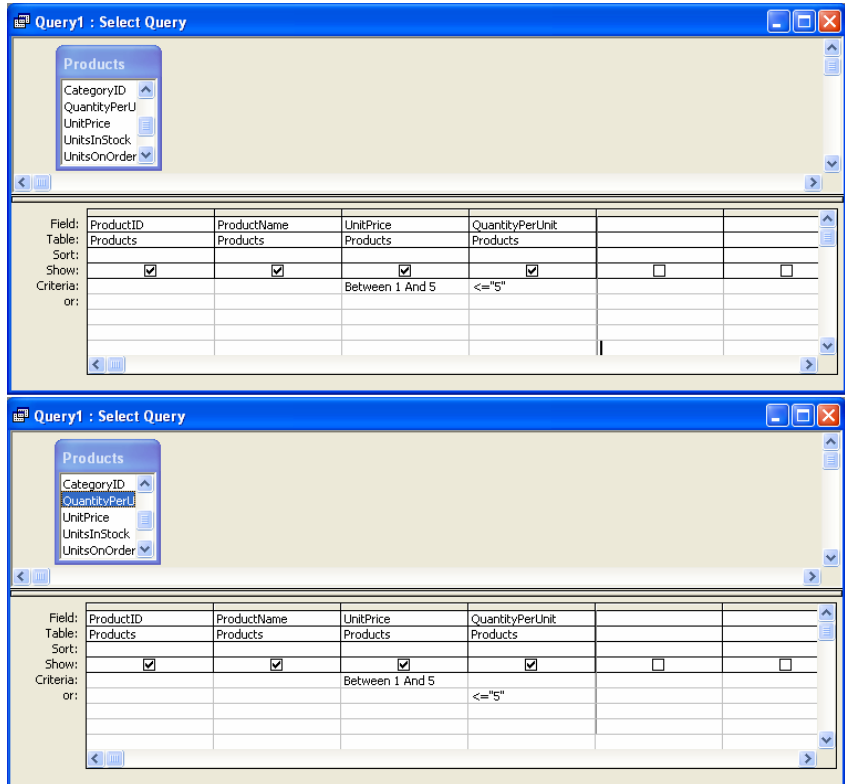


Figure D

Table A

AGGREGATE	EXPLANATION
Sum	Totals the values for each group
Avg	Returns the average of the specified values in each group
Min	Returns the minimum value in each group
Max	Returns the maximum value in each group
Count	Returns the number of items in each group (excluding Nulls and blanks)
StDev	Returns the standard deviation for each group
Var	Returns the variance for each group
First	Returns the first value in the group
Last	Returns the last value in the group

Relationships between data sources

Queries with more than one data source usually depend on the relationship between those tables. **Figure E** shows the join line, which represents the relationship between the two tables. This line tells you a lot about the relationship. The 1 identifies the *one* side of the relationship and the infinity sign identifies the *many* side of the relationship. In addition, the presence of the 1 and the infinity symbol means that the relationship enforces referential integrity—rules that determine when you can add, modify, and delete data.

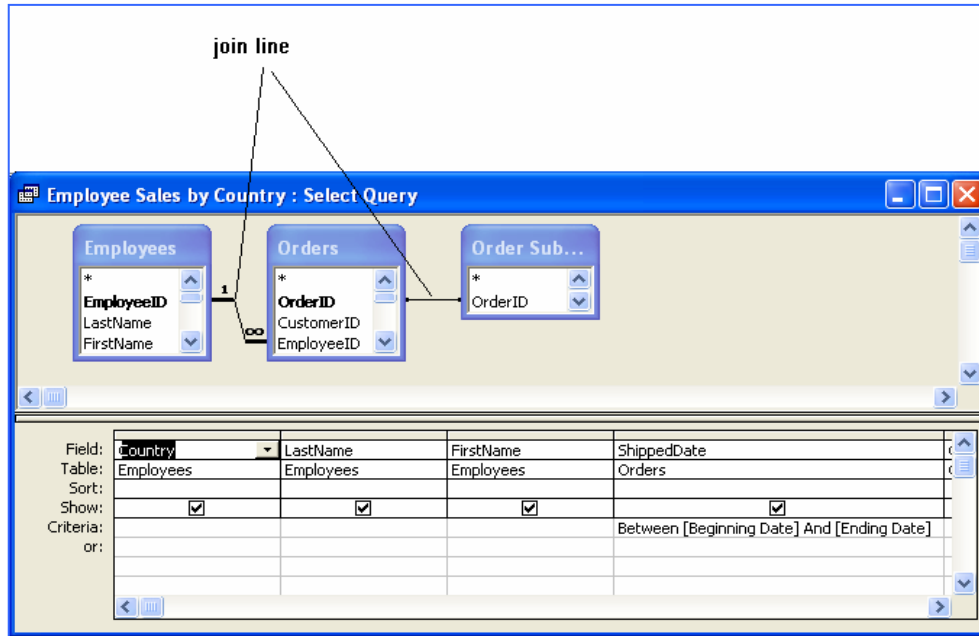


Figure E

When there's no permanent relationship between the two data sources, Access can create one if the following conditions are met:

- Both tables contain a common field of the same name and data type (or one table contains an AutoNumber field and the other contains a Long Integer).
- At least one of the fields is a primary key field.

About joins

A join is a rule that further defines the relationship by determining which records are actually selected or acted upon. Here are the three types of joins that Access supports:

- **Inner join:** This is the most common of joins. It returns only those records from both tables where there is a matching value in the related fields (usually the primary and foreign key values).
- **Left outer join:** This join returns records from both sides of a relationship but includes all the records from the *one* side of a relationship even when there's no matching value on the *many* side.
- **Right outer join:** This join returns records from both sides of the relationship but includes all the records from the *many* side of a relationship, even when there's no matching value on the *one* side.

Query properties

Query properties aren't quite as obvious or intuitive as controls, forms, and reports. You probably won't modify them often, but when you do, open the query in Design View, and click the Properties button on the Query Design toolbar. **Table B** lists the query properties and what they affect.

Table B

Property	Aspect	Explanation
Description	Information	A string that describes the query's purpose.

Access reference: Working with queries

Default View	Display	A setting that defines the default view: Datasheet, PivotChart, or PivotTable. Datasheet is the default setting.
Output All Fields	Usage	Enables access to all fields in a data source, not just the ones specified in grid; No is the default.
Top Values	Display	Returns only a specific number of records, beginning with the first returned record. All is the default. Enter a value or percentage to limit the number of records returned.
Unique Values	Display	Set to Yes to display only the records in which the values of all displayed fields are unique. No is the default.
Unique Records	Display	Set to Yes to display only unique records, regardless of the displayed fields. No is the default.
Run Permissions	Usage	Used in a multiuser environment with a secure workgroup to override the existing user permissions. The default is User's. Set to Owner's to allow the user more permissions.
Source Database	Usage	Specifies the external database in which the query's source tables or queries reside.
Source Connect Str	Usage	Specifies the name of the application used to create an external database.
Record Locks	Usage	Determines the type of locking method used. No Locks is the default and means records aren't locked while the query is run. Use the All Records setting to disable editing while query is run. Users can view query results but not change data. The Edited Records setting allows edits, but by only one person at a time.
Recordset Type	Usage	Determines the type of recordset produced for an attached form. Dynaset is the default; all bound controls based on a single table or a one-to-one relationship can be edited. Data on the <i>many</i> side of a one-to-many relationship can be edited. Use Dynaset (Inconsistent Updates) to edit values on any side of any relationship—use caution when working with this setting. The Snapshot setting produces a recordset that can't be edited.
ODBC Timeout	Usage	An integer value that specifies the number of seconds Access waits before returning a time-out error when the query is run against an ODBC data source.
Filter	Display	A string expression that specifies a subset of data to display when applied.
Order By	Display	A string expression that specifies a sort order.
Max Records	Display	A long integer value that determines the maximum number of records the query can return.
Orientation	Display	Determines the left-to-right field order. The default Left-to-Right displays data as entered in grid, from left to right. The Right-to-Left setting reverses that order.
Subdatasheet Name	Display	A string expression that identifies the table or query, by name, to be bound to the subdatasheet.
Link Child Fields	Display	The <i>many</i> side of the subdatasheet's relationship.
Link Master Fields	Display	The <i>one</i> side of the subdatasheet's relationship.
Subdatasheet Height	Display	An integer value that determines the default height of a subdatasheet. The default is "0", which automatically accommodates all records.
Subdatasheet Expanded	Display	Determines whether the subdatasheet is expanded. The default is No.

Query limits

Table C lists Access' query limitations.

Table C

Attribute	Maximum
Enforced relationships	32 per table minus the indexes on the table
Tables in a query	32
Fields in a recordset	255
Recordset size	1 gigabyte
Sort limit	255 characters in one or more fields
Nested queries	50
Characters in a cell in the query design grid	1,024
Characters for a parameter expression	255
Number of ANDs in a WHERE or HAVING clause	99
Characters in a SQL statement	Approximately 64,000

Query tips

Protect your data

For the most part, an action query can't be undone. That means that although an action query can be beneficial, it can also be dangerous. Before running any type of action query, make a copy of the underlying tables. That way, if the results are not what you expected (or even incorrect), you can revert to the copied tables. After verifying that the results of the action query are correct, you can delete the copied tables. (A make-table query won't change the source table, so you don't need to copy a table before running one.)

Take a peek at the results

Before running an action query (or even a select query), click the View button (instead of the Run button) to get a glimpse of the results. That way, you can see the query's effects, without actually committing the changes to your data.

Boost performance

Avoid using the asterisk (*) character to represent all the fields in the underlying data source. An explicit listing of only the necessary fields will run faster than a query that uses the * character. Even if the query needs all the fields, explicit listings are faster.

Avoid extraneous fields

Include only the fields you really need to get the job done. Extraneous fields slow things down. In addition, if you must display a field for filtering purposes, but you don't need to see those values in the results, be sure to clear that field's Show check box in the design grid. Every little bit helps.

Learn Jet SQL

The query design grid is just a graphical representation of the SQL statement needed to retrieve or act on data. Using your specifications in the design grid, Access creates the actual SQL statement that Jet requires behind the scenes. You can view that statement by clicking View on the Query Design toolbar and choosing SQL View.

Rewrite nested queries

A nested query is a query based on another query—and it can be slow. You can rewrite a nested query as a subquery, which will often run much faster. To rewrite a nested query, open the nested query in the

Access reference: Working with queries

SQL window (see the above tip) and copy it to the Clipboard. Then, open the main query and replace the nested query's reference with the actual statement (paste the contents of the Clipboard). Enclose the nested statement in parentheses. This statement may need a little tweaking before it works, but it should be close enough that you can figure out any needed corrections.

Groups can be slow

Avoid specifying more than one group in a SQL GROUP BY clause, if possible. Jet handles one group well—the more groups you add to the query, the slower the query responds.

Use queries as the middleman

It's a good rule of thumb to base forms and reports on queries instead of the tables. That way you can incorporate changes quickly. You'll find it much easier to open a query in Design View and add/delete tables, fields, and criteria. A form or report based on a single table isn't easy to change.

Change data order

The grid's field order determines the order in which the query displays data in the data source. You can temporarily change that display by moving columns in Datasheet View the same way you would in a table datasheet. To permanently change the order, move the field columns in Design View.

Preload a data source

You don't have to use the Show Tables dialog box in Design View to specify a query's data source. Before opening a new query, select a table or query in the Database window and then launch the new query. Access will assume that the selected table or query is the query's data source and automatically display a field list for that data source.

Exercise caution when running action queries

You can save an action query and run it as often as needed. However, running an action query at the wrong time can have unexpected results, even destroying your data's integrity. To run any query, you simply double-click on it in the Database window, which means there's lots of opportunity to incorrectly run a query out of sequence. Be careful when running queries—make sure you're accessing the appropriate query at the right time.

Adding fields to the grid

There are several ways to add fields to the grid in Design View:

- Double-click on a field in the field list.
- Drag a field from the field list to the grid.
- Enter the field name via the keyboard.
- Choose the field from the Field cell's drop-down list.
- Double-click the asterisk (*) to represent all the fields in the data source. This is the least desired method because it's inefficient and can slow down performance.

Disable AutoJoin

If you don't want Access to automatically assume a relationship, you must turn off the AutoJoin feature by choosing Tools | Options and then clicking the Tables/Queries tab. Clear the Enable AutoJoin check box.

Keyboard shortcuts/mouse tricks

Keystroke	Action
Select text in Datasheet View	
[Shift][Right Arrow]	Extends selection one character to the right
[Ctrl][Shift][Right Arrow]	Extends selection one word to the right
[Shift][Left Arrow]	Extends selection one character to the left
[Ctrl][Shift][Left Arrow]	Extends selection one word to the left

Access reference: Working with queries

Selecting a field or record	
[Tab]	Selects the next field
[F2]	Switches between Edit mode (with insertion point displayed) and Navigation mode
[Shift][Spacebar]	Selects the current record
[Shift][Up Arrow]	Extends selection to the previous record, if the current record is selected
[Shift][Down Arrow]	Extends selection to the next record, if the current record is selected
[Ctrl]A or [Ctrl][Shift][Spacebar]	Selects all records
Extend a selection in Datasheet View	
[F8]	Turns on Extend mode (EXT appears in the lower-right corner of the window); pressing [F8] repeatedly cycles the extension to the word, the field, the record, and all records
[Left Arrow] or [Right Arrow]	Extends a selection to adjacent fields in the same row
[Up Arrow] or [Down Arrow]	Extends a selection to adjacent rows
[Shift][F8]	Cancel the previous extension
[Esc]	Cancel Extend mode
Select or move a column in Datasheet View	
[Ctrl][Spacebar]	Selects the current column or cancels the column selection (Navigation mode only)
[Shift][Right Arrow]	Selects the column to the right, if the current column is selected
[Shift][Left Arrow]	Selects the column to the left, if the current column is selected
[Ctrl][Shift][F8]	Turns on Move mode; press the [Right Arrow] or [Left Arrow] key to move selected column(s) to the right or left
Move the insertion point in Datasheet View	
[Right Arrow]	Moves insertion point one character to the right
[Ctrl][Right Arrow]	Moves insertion point one word to the right
[Left Arrow]	Moves insertion point one character to the left
[Ctrl][Left Arrow]	Moves insertion point one word to the left
[End]	Moves insertion point to the end of the field in single-line fields
[Ctrl][End]	Moves insertion point to the end of the field in multiple-line fields
[Home]	Moves insertion point to the beginning of the field in single-line fields

Access reference: Working with queries

[Ctrl][Home]	Moves insertion point to the beginning of the field in multiple-line fields
Copy and move text in Datasheet View	
[Ctrl]C	Copies the selection to the Clipboard
[Ctrl]X	Cuts the selection and copies it to the Clipboard
[Ctrl]V	Pastes the contents of the Clipboard at the insertion point
[Backspace]	Deletes the selection or the character to the left of the insertion point
[Delete]	Deletes the selection or the character to the right of the insertion point
[Ctrl][Delete]	Deletes all characters to the right of the insertion point
Undo changes in Datasheet View	
[Ctrl]Z or [Alt]+[Backspace]	Undoes typing
[Esc]	Undoes changes in the current field or current record; if both have been changed, press [Esc] twice to undo changes, first in the current field and then in the current record
Enter data in Datasheet View	
[Ctrl];	Inserts the current date
[Ctrl][Shift]:	Inserts the current time
[Ctrl][Alt][Spacebar]	Inserts the default value for a field
[Ctrl]'	Inserts the value from the same field in the previous record
[Ctrl]+	Adds a new record
[Ctrl]-	Deletes the current record
[Shift][Enter]	Saves changes to the current record
[Ctrl][Enter]	Inserts a new line
Refresh fields in Datasheet View	
[F2]	Switches between Edit mode (with insertion point displayed) and Navigation mode
[Alt][Enter]	Displays the Properties window in Design view
[Ctrl][Enter] or [Alt]+D	Opens the selected table (or query, form, report, data access page, macro, or module) in Design view
[F5]	Jumps to the record number control in the Navigation bar; type the record number and press [Enter]
[Tab] or [Right Arrow]	Moves to the next field
[End]	Moves to the last field in the current record (Navigation mode)

Access reference: Working with queries

[Shift][Tab] or [Left Arrow]	Moves to the previous field
[Home]	Moves to the first field in the current record (Navigation mode)
[Down Arrow]	Moves to the current field in the next record
[Ctrl][Down Arrow]	Moves to the current field in the last record (Navigation mode)
[Ctrl][End]	Moves to the last field in the last record (Navigation mode)
[Up Arrow]	Moves to the current field in the previous record
[Ctrl][Up Arrow]	Moves to the current field in the first record (Navigation mode)
[Ctrl][Home]	Moves to the first field in the first record (Navigation mode)
[Page Down]	Jumps down one screen
[Page Up]	Jumps up one screen
[Ctrl][Page Down]	Jumps right one screen
[Ctrl][Page Up]	Jumps left one screen
Navigating in a subdatasheet	
[F5]	Jumps to the record number control; type the record number and press [Enter]
[Ctrl][Shift][Down Arrow]	Expands the record's subdatasheet
[Ctrl][Shift][Up Arrow]	Collapses the subdatasheet
[Tab]	Enters the subdatasheet from the last field of the previous record in the datasheet
[Shift][Tab]	Enters the subdatasheet from the first field of the following record in the datasheet
[Ctrl][Tab]	Exits the subdatasheet and moves to the first field of the next record in the datasheet
[Ctrl][Shift][Tab]	Exits the subdatasheet and moves to the last field of the previous record in the datasheet
[Tab]	Enters the next field in the datasheet from the last field in the subdatasheet
[Down Arrow]	Bypasses the subdatasheet and moves to the next record in the datasheet
[Up Arrow]	Bypasses the subdatasheet and moves to the previous record in the datasheet

TechRepublic books and CDs:

[Fast Track: Microsoft Access 97/2000/XP](#)

[Microsoft Access Resource Guide](#)

Downloads:

[Microsoft Access 2000 Sample Database](#)

[Microsoft Access 2000 Support Log](#)

[Access reference: Working with reports](#)

[Access reference: Working with tables](#)

Articles and columns:

[Use Access as an alternative for departmental-level applications](#)

[Access report viewing is a snap using Snapshot Viewer](#)

[Using Access to build a front end for SQL Server](#)

[Exporting Access schema using XML](#)

[How to manipulate command bar and control objects in Access](#)

TechRepublic communities engage IT professionals in the ultimate peer-to-peer experience, providing actionable information, tools, and services to help members get their jobs done. TechRepublic serves the needs of the professionals representing all segments of the IT industry, offering information and tools for IT decision support and professional advice by job function.

CIO Republic: Get analysis and insight on e-business, leadership, executive careers, business strategy, and technology.

IT Manager Republic: Access technology insights, project and personnel management tips, and training resources.

NetAdmin Republic: Get tips on Windows, NetWare and Linux/UNIX administration, infrastructure design, and network security.

Support Republic: Obtain detailed solutions to desktop hardware, software, and end-user support problems.

IT Consultant Republic: Find information and advice on client and vendor relations, project management, and technology.

TechRepublic site features

Free e-newsletters: Keep up-to-date on any aspect of the IT industry with e-newsletters—from tech stocks to daily software tips, from IT careers to hot trends—delivered right to your e-mail Inbox.

Free downloads: We've collected resources to make your job easier, including ready-to-use IT forms and templates, checklists, tools, executables, Gartner product analyses, and white papers.

TechRepublic's books and CDs: Find the latest books and CDs about today's critical IT topics, including PC troubleshooting, VPN, TCP/IP, Windows client and server issues, and Cisco administration.

Discussion center: Open a discussion thread on any article or column or jump into preselected topics: career, technology, management, and miscellaneous. The fully searchable Discussion Center brings you the hottest discussions and threads and allows you to sort them by topic and by republic.

Try our premium subscription product, TechProGuild, free for 30 days. Our online IT community provides real-world solutions and the latest articles, resources, and discussions affecting frontline IT pros. Get access to more than 250 full-text IT books, along with exclusive downloads and in-depth articles on network and system administration, PC troubleshooting, help desk and support issues, and more.