PARADOX
FOR WINDOWS

USER'S GUIDE

BORLAND

"How wonderful that we have met with paradox.
Now we have some hope of making progress."

– Niels Bohr

Paradox for Windows

Version 1.0

User's Guide

Borland International, Inc. 1800 Green Hills Road
P.O. Box 660001, Scotts Valley, CA 95067-0001, USA

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CHAPTER 1

Introduction

The Paradox *User's Guide* is a complete guide to using Paradox on a standalone system or network. You'll learn about the Paradox environment, and you'll see how to perform the tasks required to manage your data.

If you're a new user, read *Getting Started* to learn the basic tasks and concepts needed to best use Paradox.

A word about Windows

To gain the full benefits of Paradox, you should first familiarize yourself with Microsoft Windows. This manual assumes you already understand Windows and Windows-specific terminology. For help with Windows, see your Windows documentation.

The Paradox manuals

The *User's Guide* is one of a set of five books that accompany Paradox. Your Paradox package includes these other books:

- *Getting Started* introduces you to basic Paradox features. It contains a tutorial with detailed examples of Paradox operations and has a technical topics section that covers configuration and networking. If you're new to Paradox, you should read the tutorial first and try out the examples. If you're an experienced database user, you might want to skim the tutorial for a quick overview of Paradox.
- *Learning ObjectPAL* gives you step-by-step instructions on using the ObjectPAL™ language, the Paradox for Windows application language.
- The *ObjectPAL Developer's Guide* contains a comprehensive description of ObjectPAL and is specifically aimed at programmers and application developers who want to create custom database applications.

- The *ObjectPAL Reference* lists all ObjectPAL methods and procedures by type.

Printing conventions

The Paradox manuals use special typefaces to help you distinguish among keys you press, names of Paradox objects, menu commands, and text that you type. These conventions exist only to make the manual more readable—you don't need to observe them when you use Paradox.

Table 1-1 Printing conventions used in this manual

Convention	Applies to	Examples
Bold	Any message displayed by Paradox	Paradox displays the message **Record is now locked**
Italic	Names of Paradox objects, glossary terms, example elements, emphasized words	*Answer* table, *relational database*
ALL CAPS	DOS files and directories, reserved words, operators, types of queries	SAMPLE directory, CUSTOMER.DB, C:\WINDOWS
Initial Caps	Fields, menu commands, object names	Price field, Edit | Cut command, *Custord* form
Keycap font	Keys on your computer's keyboard	*F1*, *Enter*
`Monospaced font`	ObjectPAL code	`myTable open ("sites.db")`
Type-in font	Text that you type in	**Customer No**

Icons used in this manual

This manual uses icons in the left column to help you quickly scan and locate the information you want.

The *mouse* icon indicates information about a mouse shortcut or mouse operation.

The *right-click* icon indicates the use of the right mouse button. Right-clicking an object displays its properties.

The *keyboard* icon indicates information about keyboard equivalents for operations commonly performed with the mouse.

The *tip* icon indicates a tip or shortcut you may want to try.

The *disk* icon indicates an object that is included in the sample files provided with Paradox.

The *dBASE* icon indicates information specific to dBASE tables.

Note and Caution

This manual uses ***Note*** and ***Caution*** in the left column to point out additional information.

Note Describes additional, sometimes optional, information.

Caution Warns you when you might be at risk of losing or corrupting data.

The sample files

Your Paradox disks include sample files that you may have installed along with Paradox. These files are located in the SAMPLE directory (unless you specified otherwise when you installed them). If you installed Paradox in the default location, the full path of the sample files is C:\PDOXWIN\SAMPLE.

The sample tables contain information used by the fictitious Marine Adventures and Sunken Treasure (MAST) company. This company sells diving equipment and supplies to dive shops around the world. For a full description of the MAST company, see Chapter 1 in *Getting Started.*

The examples in this manual use the MAST sample data.

If you've experimented with the sample data, your screen may look different than the screens shown in this manual. You might want to reinstall the sample tables before working through the examples in this manual. See *Getting Started* for information on installing Paradox and the sample tables.

In addition to selling equipment, MAST schedules diving expeditions using the Dive Planner, a Paradox application that lets users interactively gather information and plan trips. The tables, forms, ObjectPAL scripts and methods, and associated Paradox objects used in the Dive Planner are located in the DIVEPLAN directory (if you installed them when you installed Paradox). The Dive Planner, which has full help systems for both developers and end users, is discussed briefly in the *ObjectPAL Developer's Guide.*

The SAMPLE directory

The six tables located in the SAMPLE directory are referred to and used in the examples in this manual. The following tables show their structures. See Chapter 2 for information about field types and sizes.

CONTACTS.DB

Contacts contains information about people who work in the customer dive shops.

Name	Type	Size	Key
Last Name	A	10	
First Name	A	20	
Company	A	30	
Phone	A	15	

CUSTOMER.DB

Customer contains information about customer dive shops.

Name	Type	Size	Key
Customer No	N		*
Name	A	30	
Street	A	30	
City	A	15	
State/Prov	A	20	
Zip/Postal Code	A	10	
Country	A	20	
Phone	A	15	
First Contact	D		

ORDERS.DB

Orders contains information about orders placed by customer dive shops.

Name	Type	Size	Key
Order No	N		*
Customer No	N		
Sale Date	D		
Ship Date	D		
Ship VIA	A	7	
Total Invoice	$		
Amount Paid	$		
Balance Due	$		
Terms	A	6	
Payment Method	A	7	
Month	A	3	

LINEITEM.DB

Lineitem contains information about the specific items in each order.

Name	Type	Size	Key
Order No	N		*
Stock No	N		*
Selling Price	$		

Name	Type	Size	Key
Qty	N		
Total	$		

STOCK.DB *Stock* contains information about the stock on hand at MAST that customers can order.

Name	Type	Size	Key
Stock No	N		*
Vendor No	N		
Equipment Class	A	30	
Model	A	20	
Part No	A	15	
Description	A	30	
Catalog Description	F	10	
Qty	N		
List Price	$		

VENDORS.DB *Vendors* contains information about the suppliers who sell goods to MAST.

Name	Type	Size	Key
Vendor No	N		*
Vendor Name	A	30	
Street	A	30	
City	A	20	
State/Prov	A	20	
Country	A	15	
Zip/Postal Rt	A	10	
Phone	A	15	
FAX	A	15	
Preferred	A	3	

The sample tables all work together. When you link tables to access related information, you form a *data model* of your information. A data model is a graphical representation of linked tables. Paradox data models use different kinds of arrows to symbolize different kinds of links. You can link the sample tables to form the data model shown in Figure 1-1. (This is only one of many possible data models.) Data models are discussed in Chapter 10.

Figure 1-1 A data model

Note The *Contacts* table is not shown in this data model.

The DIVEPLAN directory

In addition to the tables found in SAMPLE, this manual refers to two tables used in the Dive Planner. These files are located in the DIVEPLAN directory (unless you specified otherwise during installation).

BIOLIFE.DB *Biolife* contains information about the marine life you are likely to encounter at various diving expedition locations.

Name	Type	Size	Key
Species No	N		*
Category	A	15	
Common Name	A	30	
Species Name	A	40	
Length (cm)	N		
Length (in)	N		
Notes	M	50	
Graphic	G		

SHIPWRCK.DB *Shipwrck* contains information about sunken ships located at various diving expedition locations.

Name	Type	Size	Key
Ship Name	A	20	*
Site No	N		
Category	A	15	
Type	A	20	
Interest	A	25	
Tonnage	N		
Length (ft)	N		
Length (m)	N		
Beam (ft)	N		
Beam (m)	N		
Cause	A	15	
Date Sunk	D		

Name	Type	Size	Key
Comments	M	40	
Passengers/Crew	N		
Survivors	N		
Condition	A	12	
Graphic	G		

dBASE sample files

All the sample files included with Paradox are Paradox tables. If you prefer to work with dBASE tables, you can convert the tables to dBASE format using the Copy table utility.

Copying tables from one format to another is discussed in Chapter 8.

Note If you want to build multi-table forms or reports with dBASE tables, you'll need to create indexes for them. If you create production indexes that correspond to the keys in the Paradox tables, you should be able to build the same data models in both formats. Creating indexes on dBASE tables is discussed in Chapter 9.

CONTACTS.DBF If you copy CONTACTS.DB to CONTACTS.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
LAST_NAME	C	10	
FIRST_NAME	C	20	
COMPANY	C	30	
PHONE	C	15	

CUSTOMER.DBF If you copy CUSTOMER.DB to CUSTOMER.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
CUSTOMER_N	N	20	4
NAME	C	30	
STREET	C	30	
CITY	C	15	
STATE_PROV	C	20	
ZIP_POSTAL	C	10	
COUNTRY	C	20	
PHONE	C	15	
FIRST_CONT	D		

ORDERS.DBF If you copy ORDERS.DB to ORDERS.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
ORDER_NO	N	20	4
CUSTOMER_N	N	20	4
SALE_DATE	D		
SHIP_DATE	D		
SHIP_VIA	C	7	
TOTAL_INVO	N	20	4
AMOUNT_PAI	N	20	4
BALANCE_DU	N	20	4
TERMS	C	6	
PAYMENT_ME	C	7	
MONTH	C	3	

LINEITEM.DBF If you copy LINEITEM.DB to LINEITEM.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
ORDER_NO	N	20	4
STOCK_NO	N	20	4
SELLING_PR	N	20	4
QTY	N	20	4
TOTAL	N	20	4

STOCK.DBF If you copy STOCK.DB to STOCK.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
STOCK_NO	N	20	4
VENDOR_NO	N	20	4
EQUIPMENT_	C	30	
MODEL	C	20	
PART_NO	C	15	
DESCRIPTIO	C	30	
CATALOG_DE	M		
QTY	N	20	4
LIST_PRICE	N	20	4

VENDORS.DBF If you copy VENDORS.DB to VENDORS.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
VENDOR_NO	N	20	4
VENDOR_NAM	C	30	
STREET	C	30	
CITY	C	20	
STATE_PROV	C	20	
COUNTRY	C	15	
ZIP_POSTAL	C	10	
PHONE	C	15	
FAX	C	15	
PREFERRED*	C	3	

* You may want to change the field type of Preferred to L.

BIOLIFE.DBF If you copy BIOLIFE.DB to BIOLIFE.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
SPECIES_NO	N	20	4
CATEGORY	C	15	
COMMON_NAM	C	30	
SPECIES_NAM	C	40	
LENGTH_CM	N	20	4
LENGTH_IN	N	20	4
NOTES	M		
GRAPHIC	M*		

* Because dBASE does not support graphic fields, data can't be displayed in the graphic field.

SHIPWRCK.DBF If you copy SHIPWRCK.DB to SHIPWRCK.DBF, Paradox converts the table to the dBASE type. Its structure looks like this:

Name	Type	Size	Dec
SHIP_NAME	C	20	
SITE_NO	N	20	4
CATEGORY	C	15	
TYPE	C	20	
INTEREST	C	25	
TONNAGE	N	20	4
LENGTH_ _FT	N	20	4
LENGTH_ _M	N	20	4
BEAM_ _FT_	N	20	4
BEAM_ _M_	N	20	4

Name	Type	Size	Dec
CAUSE	C	15	
DATE_SUNK	D		
COMMENTS	M		
PASSENGERS	N	20	4
SURVIVORS	N	20	4
CONDITION	C	12	
GRAPHIC	M*		

* Because dBASE does not support graphic fields, data can't be displayed in the graphic field.

PART I

Basics

In this part you'll learn about the concepts and techniques you need to work most effectively with Paradox.

- Chapter 2, "Fundamentals," introduces database concepts and terminology, and discusses the Paradox family of objects.
- Chapter 3, "Working on the Desktop," shows you how to use the Paradox Desktop and the File menu to perform some of your most common tasks.

CHAPTER 2

Fundamentals

This chapter introduces the essential terms and concepts you'll use throughout Paradox.

- You'll be introduced to the Paradox object set, including tables, forms, reports, queries, scripts, and libraries.
- You'll learn about design objects (like boxes, lines, graphs, and crosstabs) that you can incorporate into your forms and reports.
- You'll see how Paradox uses relational database design to help you manage your data.

Paradox objects

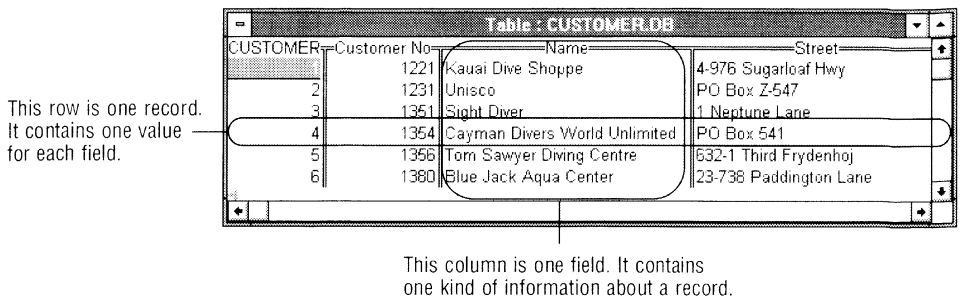
Paradox gives you a wide variety of ways to store, display, and present data. The components you use to store and present your data are called *objects*. An object can be a table, form, report, query, script, or library. These objects make up the Paradox object set.

Note Paradox also includes a set of design objects, discussed in "Design objects" later in this chapter.

Tables

Paradox arranges data in *tables*. Tables have *rows* and *columns*. Each row contains all available information about a particular item. This is called a *record*. Each column contains one category of the data that makes up a record. This is called a *field*. Figure 2-1 shows how tables categorize data into records and fields.

Figure 2-1 A table



Paradox field types

Paradox categorizes fields into several types. Each field's type determines the kind of data it contains.

Table 2-1 Paradox field types

Field type	Field size	Description
Alphanumeric	1 to 255	Contains letters, numbers, special symbols (like %, &, #, and =), or any other printable character.
Number	N/A	Contains numbers in the range -10^{307} to 10^{308} of up to 15 significant digits. Number fields are best used when you want to perform calculations on the values in the field. Use an alphanumeric field, rather than a number field, when you want to include parentheses or hyphens (as in phone numbers and zip codes).
Currency	N/A	Contains numbers in the range -10^{307} to 10^{308} of up to 15 significant digits. Currency fields are exactly like number fields, but are formatted to display decimal places and a currency symbol. Regardless of the number of decimal places displayed, Paradox recognizes up to six decimal places when performing internal calculations on currency fields.
Date	N/A	Contains any valid date from January 1, 100 to December 31, 9999. Paradox correctly handles leap years and leap centuries and checks all dates for validity.

Field type	Field size	Description
Short number	N/A	Contains whole numbers in the range -32,767 to 32,768. Short number fields do not allow the same formatting options as number fields, and should be used only by advanced Paradox users.
Memo	1 to 240 in .DB file; unlimited in .MB file	Contains text that is variable in length and usually too long to be stored in an alphanumeric field. Memo fields can contain letters, numbers, special symbols (like %, &, #, and =), or any other printable character, as well as line breaks, tabs, and other print control characters. Memo fields can be virtually any length. The size value you assign refers to the amount of the memo Paradox stores in the table. This can be from 1 to 240 characters. Paradox stores the entire memo outside the table (in the .MB file). Paradox retrieves the data from the .MB file as you scroll through the records of the table. The amount of data a memo field contains is limited only by the disk space available on your system.
Formatted memo	0 to 240 in .DB file; unlimited in .MB file*	Formatted memo fields are similar to memo fields except you can format their text. Paradox recognizes and stores text attributes (different typefaces, styles, colors, and sizes) as well as formatting preferences (such as tabs, line returns, and justification) and stores them with the data.
Binary	0 to 240 in .DB file; unlimited in .MB file*	Contains data that Paradox can't interpret. A common use of a binary field is to store sound. Paradox cannot display or interpret binary fields, but ObjectPAL can access them. Binary fields should be used only by Paradox application developers and advanced users.
Graphic	0 to 240 in .DB file; unlimited in .MB file*	Contains graphics (pictures). You can create graphics in a painting or drawing application, or scan existing images and use them as values in a graphic field.

Field type	Field size	Description
OLE	0 to 240 in .DB file; unlimited in .MB file*	Contains objects placed in your table from other Windows applications that support OLE (Object Linking and Embedding) as a server. The advantage of using the OLE field type to place data is that, through OLE, you can access and make changes to the OLE object from within Paradox.

* Specifying a field size is optional for these field types.

dBASE field types

Paradox lets you create and use dBASE tables as easily as Paradox tables. If you use dBASE tables, be aware that their field types differ from Paradox field types.

Table 2-2 dBASE field types

Field type	Field size	Description
Character	1 to 254	Contains any printable character (including blank spaces).
Float number	1 to 20	Contains numeric data in a binary floating-point format. You specify how many decimal places to store. Paradox counts the decimal point and sign (if any) as part of the field size.
Number	1 to 20	Contains numeric data in a BCD (Binary Coded Decimal) format. Use number fields when you need to perform precise calculations on the data in the field. Calculations on number fields take more time, but give you greater precision than float number fields. You specify how many decimal places to store. Paradox counts the decimal point and sign (if any) as part of the field size.
Date	8 (automatic)	Contains dates. The default format for entering and displaying dates is established by the settings in your Windows Control Panel, but you can format dBASE date fields the same way you format Paradox date fields, by inspecting the field in either the table or design document you're using. You don't have to specify a size for a date field—it's always 8.
Logical	N/A	Contains values representing true or false (yes or no). You can specify the values you want to accept as true and false by inspecting the logical field and choosing Logical Format from its properties.

Field type	Field size	Description
Memo	N/A	Contains blocks of text that are too large to be stored in a character field. The contents of memo fields are stored in a file with the table's name and the .DBT extension. You don't need to specify a field size for memo fields.

What's a BLOB?

Paradox memo, formatted memo, graphic, OLE, and binary field types can contain binary large object files (BLOB™ files). Certain rules apply to this group as a whole, and these field types are sometimes discussed collectively as BLOB fields. A dBASE memo field is also a BLOB field.

Temporary tables

Certain Paradox operations create temporary tables that last only until you change your private directory or end the Paradox session.

Paradox stores all temporary tables in your private directory. Table 2-3 lists and describes Paradox's temporary tables. You can edit and query a temporary table as you would any other table. If you want to save one of these tables, use File | Utilities | Rename to rename it.

Caution You should not use any temporary table's name as the name of a Paradox object. If you do use a temporary table's name, Paradox deletes your object when you change your private directory or end the Paradox session.

Table 2-3 Temporary tables

Name	Contains	Created during
Answer	Results from a query	Query
Changed	Unchanged copy of changed records	CHANGETO query or Add operation (update)
Crosstab	Results of a crosstab	Running a crosstab object in a form
Deleted	Deleted records	DELETE query
Errchng	Records that couldn't be changed	CHANGETO query
Errdel	Records that couldn't be deleted	DELETE query
Errins	Records that couldn't be inserted	INSERT query
Export	The table specification of exported fixed-length text	Export operation
Import	The table specification of imported fixed-length text	Import operation
Inserted	Inserted records	INSERT query

Name	Contains	Created during
*Keyviol**	Records with duplicate key values	Restructure *or* Add operation (append)
Locks	All active locks on a table	File|Multiuser|Display Locks
Pal$src	List of source code, objects, and methods in your form	Language|Browse Sources
*Problems**	Unconverted records	File|Utilities|Import *or* Restructure
Struct	Table definition	Create *or* Restructure

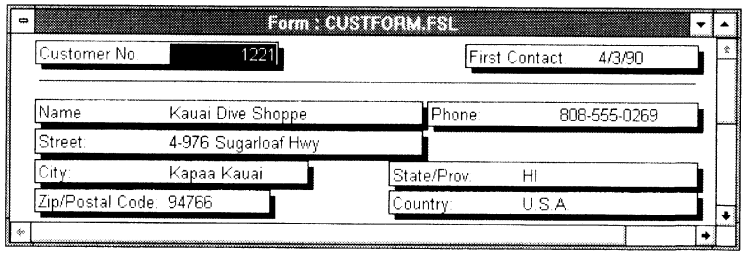
* If you perform more than one operation that results in this temporary table within one session, Paradox creates additional temporary tables with the same name and numbers them. For example, *Keyviol1, Keyviol2,...*

Forms

Sometimes it's more convenient to work with the data from your tables one record at a time, rather than with an entire table full of data. *Forms* let you see as much (or as little) of your data as you want in the format you prefer. Figure 2-2 shows a form created by Paradox that displays only one record at a time.

Figure 2-2 A form

This form shows one record of the table at a time



When you view data in a form, you see the same data as in the table, but Paradox arranges it differently. If you edit data in the form, Paradox updates the data in the table.

You can use Paradox's design tools to create custom form layouts. You can design forms that display several records from a table or even records from several tables at the same time.

Forms are described in Chapter 12.

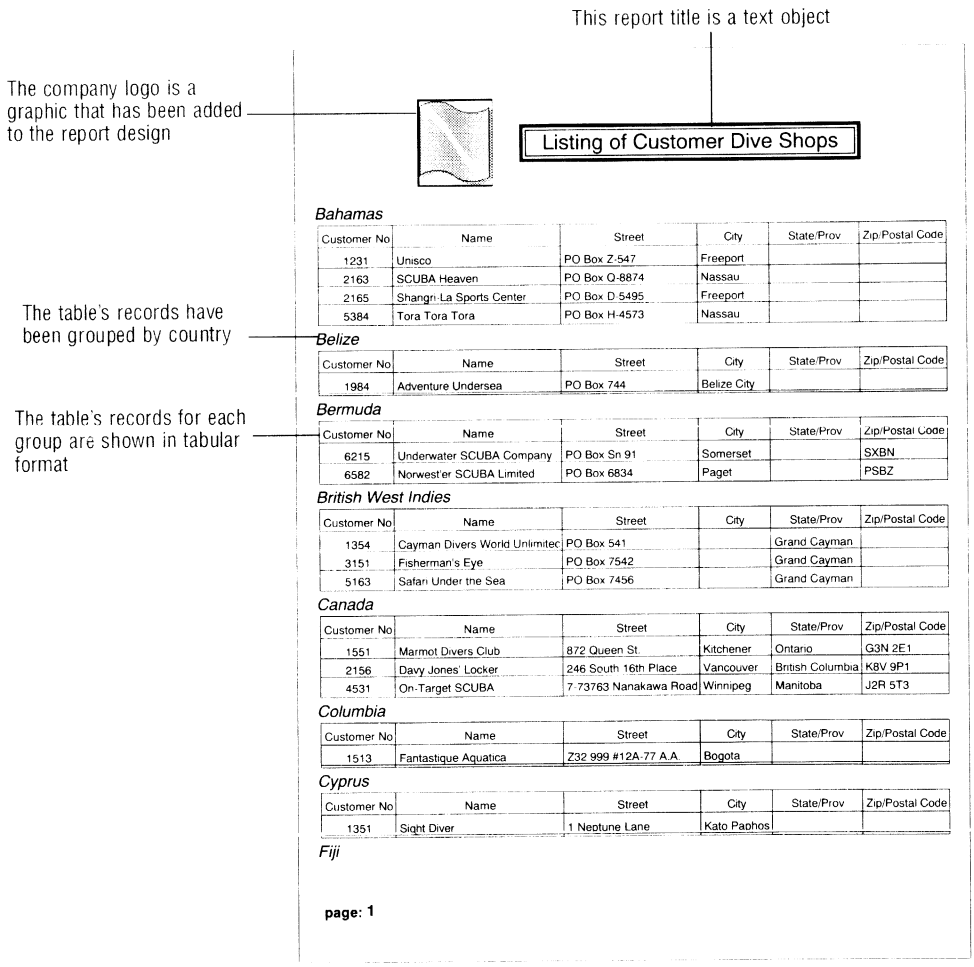
Reports

Many people need to work with their data in printed *reports*. Paradox reports are flexible and powerful. You can sort and group records, calculate fields and totals, and arrange your data in an almost infinite variety of formats, including mailing labels.

Reports, like forms, take advantage of Paradox's design features and tools. Using these tools, you can customize your reports to look just the way you want. And because it's so easy to link tables together, you can combine data from several tables into one report that communicates exactly what you want.

Figure 2-3 shows one of the many report designs you can create with Paradox.

Figure 2-3 A report



Reports are described in Chapter 13.

Queries

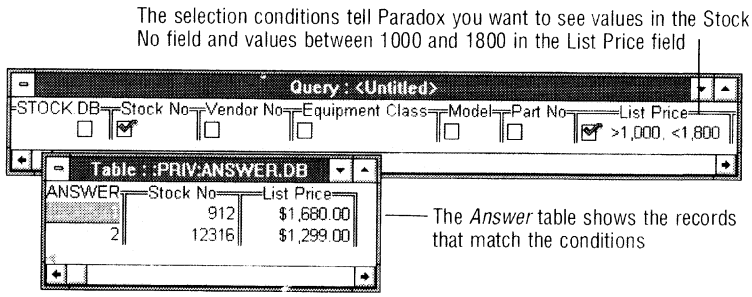
A Paradox *query* is a question you ask about the data in your tables. You can use queries to

- Find or select data from a table
- Combine data from more than one table
- Perform calculations on the data in a table
- Insert data into a table
- Delete data from a table
- Change values in a table
- Define groups and sets of data on which to perform calculations and comparisons

Paradox gives you a simple, yet powerful, way to ask questions about a table's data. In the Paradox Query window, you choose which tables you want to ask questions about. Then you enter an example of the data you want, and Paradox gives you an answer based on your example. This is called *query by example.*

Figure 2-4 shows a query that gives examples of the fields you want to see (and a range of values within one of those fields) and the answer Paradox gives.

Figure 2-4 A query



Queries are described in Chapters 6 and 7.

Scripts

Scripts are pieces of ObjectPAL code that you can create to perform operations automatically. (ObjectPAL is the Paradox application language.) ObjectPAL code is usually attached to objects in forms, but you can also create standalone scripts that perform operations you specify independently of a form. For example, you can write a script to open a particular table and perform a calculation on one or more of its fields. Paradox runs this type of script directly from the

Desktop, not from triggering an event on an object in a form. See your ObjectPAL documentation for information on writing scripts.

Libraries

A library is an object you can use to store ObjectPAL code. This lets you easily share code among forms, scripts, and other libraries. For more information, refer to your ObjectPAL documentation.

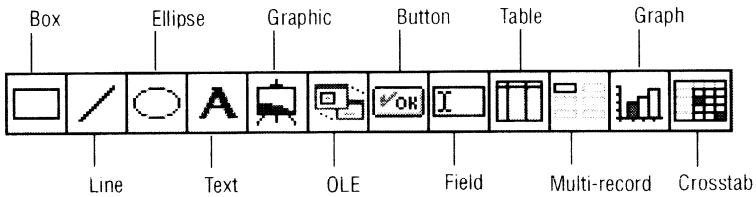
Design objects

In addition to the major objects already discussed, Paradox includes a set of *design objects*. You can create these objects using special SpeedBar tools and place them in the documents you design, such as forms and reports.

In a form, the underlying *page* you place objects on is also an object. You can change its color or add ObjectPAL methods to it. (A *method* is a piece of ObjectPAL code.) Methods placed on the page can be triggered by the document being opened or closed, clicked or double-clicked, or a variety of other events.

You create design objects using the design tools on each design window's SpeedBar. Figure 2-5 shows the type of object each tool creates.

Figure 2-5 Tools to create design objects



Text objects

A *text object* is an object that contains text. You create a frame, then type text into it. The text can be any length, and you can format it any way you want.

A common use of a text object is to place titles on forms or reports, or to label fields or tables.

Boxes, lines, and ellipses

Boxes, *lines*, and *ellipses* are objects you can place in designs for added visual appeal. You can draw boxes or ellipses around the fields or tables of a design, or use lines to point out interesting features.

Fields

You can place fields from your tables individually in a form or report. Use the Field tool to draw a frame, then give it the definition you want. You can define a *field object* as a field from an existing table, or

you can create calculated or summary fields that perform operations on your data.

Table frames

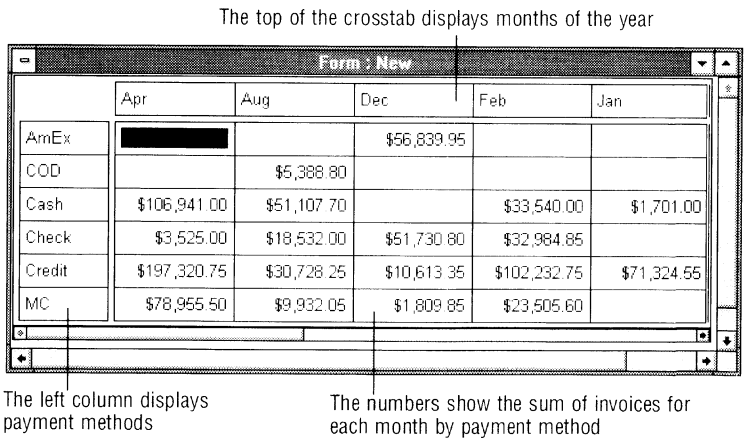
A table is one of Paradox's major objects, as discussed earlier. In a design document (a form or report) you can use the Table tool to draw a table frame, then define the table it represents (the "real" table). Tables in design documents arrange fields and field labels in a tabular format, but with greater flexibility than you'll find in a Table window.

Crosstabs

A *crosstab* converts data from its database structure of records and fields to a spreadsheet-like structure. It summarizes the data from one field into groups determined by the values in one or more other fields, like sales by product by month. The crosstab object lets you analyze your data by one or more factors, which are listed down the left side and across the top of the crosstab object.

Suppose you want to see if there is a time of year when customers charge their orders more often than they pay cash. You can create a crosstab like the one in Figure 2-6 that shows the sum of invoices per month by payment method.

Figure 2-6 A crosstab

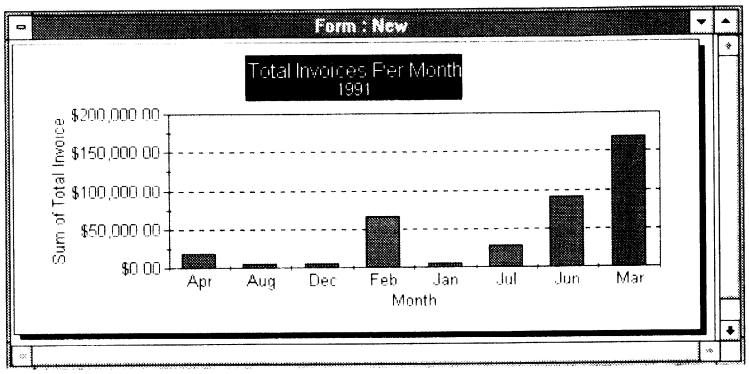


Graphs

Sometimes the most effective way to analyze your data and present it to others is when you see it in a *graph*. Paradox lets you easily create a graph of your data. You can modify the graph type, layout, and properties to design exactly the graph you want. Paradox automatically updates a graph when you update the graph's source table, in both network and standalone environments.

Figure 2-7 shows a graph of invoice totals by month. By looking at this graph, you can immediately see when most of the orders are being placed.

Figure 2-7 A graph



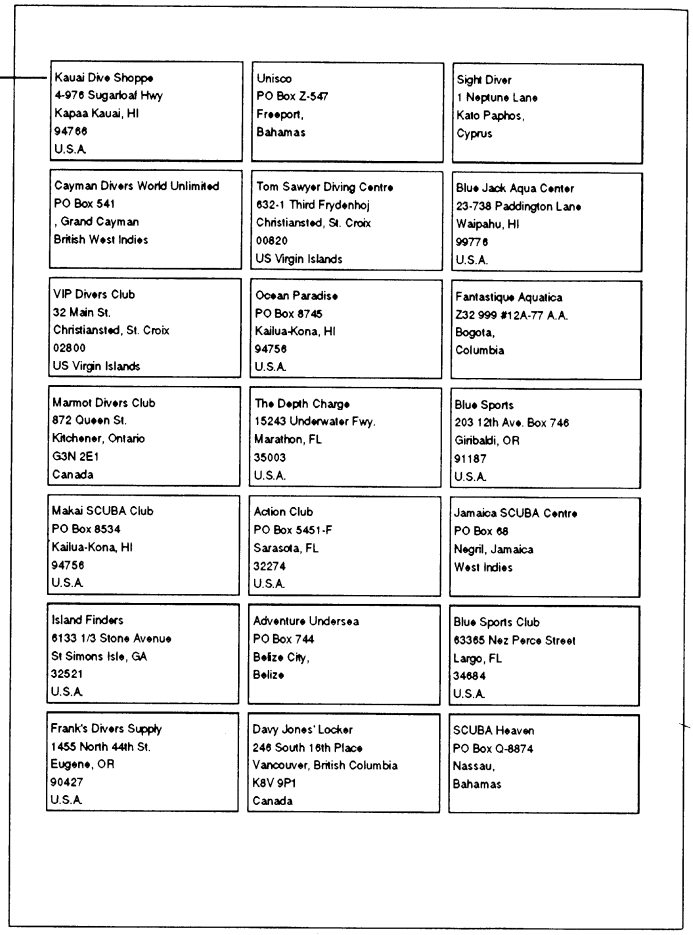
Multi-record objects

A *multi-record object* is a repeating pattern of fields. You specify the layout for one record, then tell Paradox how many times across and down the page you want the pattern to repeat, and Paradox lays out your data for you. Multi-record objects provide an easy way to see more than one record at a time (as with tables) in the layout you want (as with forms).

A common use for a multi-record object is to create mailing labels. Figure 2-8 shows a report created on the *Customer* table that uses a multi-record object to define the layout of the labels.

Figure 2-8 Mailing labels in a multi-record object

Each region contains one record of the table



Kauai Dive Shoppe 4-976 Sugarloaf Hwy Kapaa Kauai, HI 94766 U.S.A.	Unisco PO Box Z-547 Freeport, Bahamas	Sight Diver 1 Neptune Lane Kato Paphos, Cyprus
Cayman Divers World Unlimited PO Box 541 , Grand Cayman British West Indies	Tom Sawyer Diving Centre 632-1 Third Frydenhoj Christiansted, St. Croix 00820 US Virgin Islands	Blue Jack Aqua Center 23-738 Paddington Lane Waipahu, HI 99776 U.S.A.
VIP Divers Club 32 Main St. Christiansted, St. Croix 02800 US Virgin Islands	Ocean Paradise PO Box 8745 Kailua-Kona, HI 94756 U.S.A.	Fantastique Aquatica Z32 999 #12A-77 A.A. Bogota, Columbia
Marmot Divers Club 872 Queen St. Kitchener, Ontario G3N 2E1 Canada	The Depth Charge 15243 Underwater Fwy. Marathon, FL 35003 U.S.A.	Blue Sports 203 12th Ave. Box 746 Giribaldi, OR 91187 U.S.A.
Makai SCUBA Club PO Box 8534 Kailua-Kona, HI 94756 U.S.A.	Action Club PO Box 5451-F Sarasota, FL 32274 U.S.A.	Jamaica SCUBA Centre PO Box 68 Negril, Jamaica West Indies
Island Finders 6133 1/3 Stone Avenue St Simons Isle, GA 32521 U.S.A.	Adventure Undersea PO Box 744 Belize City, Belize	Blue Sports Club 63365 Nez Perce Street Largo, FL 34684 U.S.A.
Frank's Divers Supply 1455 North 44th St. Eugene, OR 90427 U.S.A.	Davy Jones' Locker 246 South 16th Place Vancouver, British Columbia K8V 9P1 Canada	SCUBA Heaven PO Box Q-8874 Nassau, Bahamas

Buttons

Buttons are objects you can place in Paradox forms and attach to ObjectPAL methods. (A *method* is a piece of ObjectPAL code.) When you use the form, you can click the button to perform the operation defined in the method. You can add text or a graphic to a button to make its function obvious.

Note Although you can attach methods to any object in a form, buttons are especially designed for this purpose.

You can place as many buttons as you want in a form and attach different methods to them. Or you can attach several different methods to the same button, each triggered by a different event. See your ObjectPAL documentation for information on writing methods.

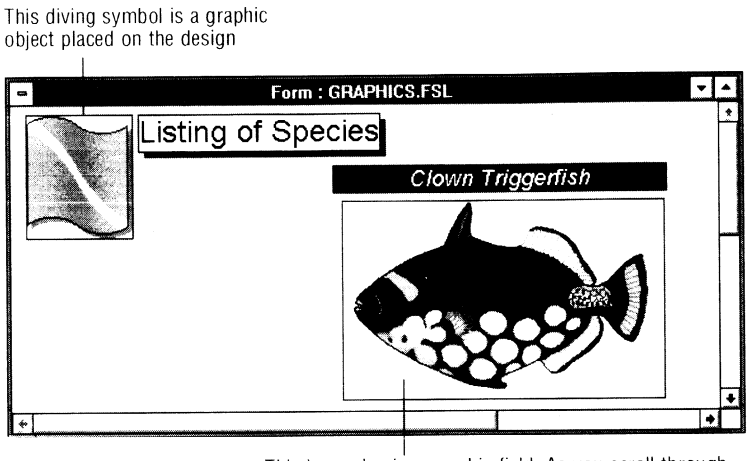
Graphics

Graphics are images or artwork you can place in a graphic field type in a Paradox table, or as independent graphic objects in forms or reports.

Paradox accepts graphics from .BMP, .EPS, .PCX, .TIF, and .GIF files or from the Windows Clipboard.

Figure 2-9 shows a form that has several graphic objects.

Figure 2-9 Graphics in a design



OLE objects

OLE stands for *Object Linking and Embedding*. Using OLE, you can create a container that holds an object from another application. When you identify the object you want the container to hold, Paradox inserts the object into the container.

Because OLE provides a link between the table and its source file, you can double-click an OLE object in Paradox to open its source application. This gives you an easy way to make changes to the OLE value without exiting Paradox.

File extensions for Paradox objects

An object is a file on your disk, sometimes represented by an icon on your screen. Table 2-4 lists the file extensions of all files used by Paradox.

Table 2-4 File extensions for Paradox objects

Extension	Type of object
.CFG files	Configuration file
.DB files	Paradox table

Extension	Type of object
.DBF files	dBASE table
.DBT files	Memos for a dBASE table
.FAM files	Paradox's listing of related files (like a table's .TV file)
.FDL files	Delivered form
.FSL files	Saved form
.FTL files	Temporary form
.INI files	Configuration file
.LDL files	Delivered library
.LSL files	Saved library
.LTL files	Temporary library
.MB files	Memos for a Paradox table
.MDX files	Maintained index of a dBASE table
.NDX files	Non-maintained index of a dBASE table
.PX files	Primary index of a Paradox table
.QBE files	Saved query
.RDL files	Delivered report
.RSL files	Saved report
.RTL files	Temporary report
.SDL files	Delivered script
.SSL files	Saved script
.STL files	Temporary script
.TV files	Table view settings for a Paradox table
.TVF files	Table view settings for a dBASE table
.VAL files	Validity checks and referential integrity for a Paradox table
.X*nn* files	Secondary single-field index for a Paradox table, numbered
.Y*nn* files	Secondary single-field index for a Paradox table, numbered
.XG*n* files	Composite secondary index for a Paradox table
.YG*n* files	Composite secondary index for a Paradox table

Data basics

Paradox is a *relational database system* for your personal computer. This section introduces the concepts of keys, indexes, and referential integrity. For information on databases, see *Getting Started.*

Keys

Paradox supports both Paradox and dBASE table formats. If you use Paradox tables you should understand how Paradox uses keys. (dBASE tables use indexes, but do not use Paradox primary keys the way Paradox tables do.)

A *primary key* (usually just called a *key*) is a field (or group of fields) containing data that uniquely identifies each record of a table.

A key requires a unique value for each record (row) of a table. This ensures you don't have duplicate records in the table. A table that has a key defined is said to be a *keyed table*.

A table's key establishes the default sort order for the table. Paradox sorts the table's records based on the values in the field(s) you define as the table's key. This makes it easy for Paradox to find records quickly and to process certain operations.

A keyed field can have only one blank value.

You can leave only one record's key blank. Paradox considers all subsequent blanks to be duplicates and does not accept records containing them.

Composite keys

You can create a key on a single field or group of fields. When you specify a group of fields as a table's key, the group is called a *composite key*.

Paradox does not allow records with duplicate values in the key. When a table has a composite key, Paradox allows duplicate values in an individual field of the key, as long as values are not duplicated across *all* fields of the key. In other words, the fields of the key, *taken as a whole*, must uniquely identify a record.

For example, the *Contacts* table may have several entries with the last name Lombardi. Likewise, it may have many entries with the first name Ron. Neither of these fields (Last Name or First Name) is enough to identify a record as unique. But the *combination* of them may be. So the key for the *Contacts* table could be a composite of Last Name and First Name. Of course, even this may not be enough. It's entirely possible to have duplicate first *and* last names in the table (like several entries for John Smith). It may be a good idea to include another field of the table in the composite key. *You must always include enough fields in a composite key to ensure the uniqueness of each record of the table.* If you can't reasonably expect a composite key to handle all cases of duplicate data, it's a good idea to define an ID field that identifies one and only one record of the table. Customer No in the *Customer* table is such an ID field.

Indexes

An index determines an order in which Paradox can access the records in a table. Both Paradox and dBASE let you create indexes to specify the order in which records are accessed. However, the way indexes work is different for Paradox and dBASE tables.

When you create an index, Paradox creates a file that contains the indexed field's values and their corresponding locations. Paradox

refers to the index file when locating and displaying the records in a table.

You can use an index to view the records in a different order from the default order. However, the records remain stored in the same physical location where you originally entered them.

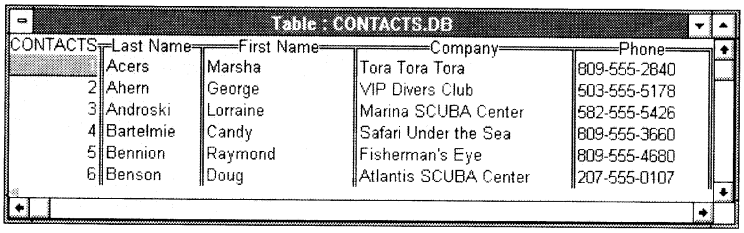
Primary indexes on Paradox tables

Paradox organizes the records of a keyed table according to the values in the field(s) of the table's key. This is its *primary index.*

By default, all indexes organize and access data in ascending order (A to Z or 0 to 9). By creating an index based on the Last Name field of the *Contacts* table, you tell Paradox to organize the table by the values in the Last Name field, as shown in Figure 2-10.

Figure 2-10 A primary index on Last Name

Paradox sorts the records of the table according to the values in Last Name. The Last Name field has no duplicate values.

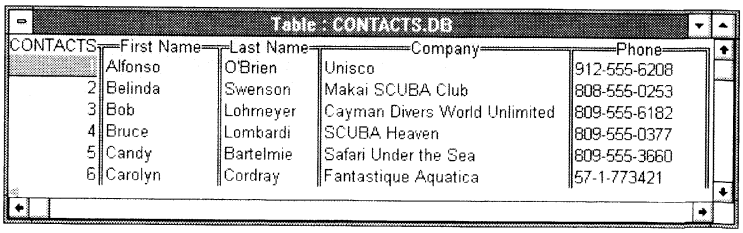


CONTACTS	Last Name	First Name	Company	Phone
	Acers	Marsha	Tora Tora Tora	809-555-2840
2	Ahern	George	VIP Divers Club	503-555-5178
3	Androski	Lorraine	Marina SCUBA Center	582-555-5426
4	Bartelmie	Candy	Safari Under the Sea	809-555-3660
5	Bennion	Raymond	Fisherman's Eye	809-555-4680
6	Benson	Doug	Atlantis SCUBA Center	207-555-0107

If you prefer to organize the table by first names, you can make First Name the primary index. Paradox then displays the records according to the value in that field, as shown in Figure 2-11.

Figure 2-11 A primary index on First Name

Paradox sorts the records of the table according to the values in First Name. There are no duplicate values in this field.



CONTACTS	First Name	Last Name	Company	Phone
	Alfonso	O'Brien	Unisco	912-555-6208
2	Belinda	Swenson	Makai SCUBA Club	808-555-0253
3	Bob	Lohmeyer	Cayman Divers World Unlimited	809-555-6182
4	Bruce	Lombardi	SCUBA Heaven	809-555-0377
5	Candy	Bartelmie	Safari Under the Sea	809-555-3660
6	Carolyn	Cordray	Fantastique Aquatica	57-1-773421

Note In Figure 2-11 the First Name field appears before the Last Name field. This is because the field you define as a table's key (primary index) must be the first field in the table's structure. (You can move

columns in the Table window, but this does not affect the table's structure.)

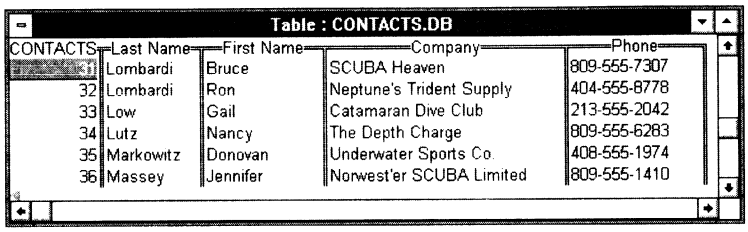
A primary index from a composite key

When you create a composite key, Paradox creates a primary *composite index*, which organizes the records by the first field of the key (according to the table's structure), then the next field, and so on. Figure 2-12 shows the *Contacts* table with a composite key made up of the Last Name and First Name fields.

Figure 2-12 A composite index

There can be duplicate values in Last Name (like Lombardi) *or* in First Name (like Ron), but the *combination* of first and last names must be unique for each record (no two Ron Lombardis).

Paradox sorts records on the first field in the composite key, then on the next field, and so on.



CONTACTS	Last Name	First Name	Company	Phone
31	Lombardi	Bruce	SCUBA Heaven	809-555-7307
32	Lombardi	Ron	Neptune's Trident Supply	404-555-8778
33	Low	Gail	Catamaran Dive Club	213-555-2042
34	Lutz	Nancy	The Depth Charge	809-555-6283
35	Markowitz	Donovan	Underwater Sports Co.	408-555-1974
36	Massey	Jennifer	Norwest'er SCUBA Limited	809-555-1410

Secondary indexes on Paradox tables

When working with Paradox tables, you can use a *secondary index* to define an alternate view order for the table. For example, if you sometimes want to view the *Contacts* table by First Name values, but need to keep the table's key order intact, you can create a secondary index on First Name and use it to temporarily change the view order of the records.

Note Secondary indexes can be either automatically maintained by Paradox or non-maintained. (Primary indexes are always maintained.) When the index is maintained, Paradox updates the index file whenever you update the table. A non-maintained index is not automatically updated when you update the table, but you can open a non-maintained index for use on a table. To do this you use the Order/Range dialog box to specify the index you want to use while working with a table. You can use only one non-maintained index at a time. Chapter 9 discusses creating different types of indexes, and Chapter 4 discusses using the Order/Range dialog box.

When you view a table using a secondary index, the physical location of the records in the table does not change.

Secondary indexes can also be used in linking Paradox tables. See Chapter 10 for details.

You can create a composite secondary index.

You can create an index on a group of fields. This is a *composite secondary index*. It organizes the data by the first field of the index first, then by the second, and so on.

Indexes on dBASE tables

When working with dBASE tables, Paradox uses an index to organize the records according to the values in one or more fields. Creating indexes on dBASE tables is described in Chapter 9.

Although Paradox supports both .MDX files and .NDX files, it is recommended that you use a dBASE *production index* (the .MDX file which uses the table's name as its file name) whenever possible. Although you can create non-production .MDX files as well as .NDX files, Paradox automatically maintains the production index. See Chapter 9 for details.

Referential integrity

Referential integrity assures that a field or group of fields in one table (called the *child* table) match the values in the key of another table (called the *parent* table). The value found in the child table that matches the key of the parent table is called the *foreign key*. Referential integrity provides you with a way of handling changing values in the parent table that affect the foreign keys in all its child tables. (Referential integrity is available only between Paradox tables.)

Suppose you have an *Orders* table with a Customer No field. You want to be very sure the value you enter in that field represents a customer who can be found (and billed) in your *Customer* table. To ensure this you define Customer No in *Orders* as a foreign key pointing to *Customer*. Then, each time you enter a value in the Customer No field of *Orders*, Paradox checks the Customer No field of *Customer* to make sure the entry is valid.

Cascading updates

Suppose you need to change a value in a parent table's key. Referential integrity gives you a way to make the same change in all matching foreign key records of the child table.

Using the example of *Customer* and *Orders*, suppose you change the Customer No value of a record in *Customer*. Unless you use referential integrity, all records in the child table (*Orders*) that belonged to the parent record become orphaned—they are no longer associated with a valid record in *Customer*. Using referential integrity, Paradox can cascade the change from *Customer* to *Orders*. Paradox finds all records in *Orders* that match the changed value in *Customer's* key and changes them to the new value.

Paradox terms and concepts

This section discusses basic terms and concepts used throughout the Paradox documentation and applied throughout the product. Even if you've worked with Paradox or other relational databases before, you'll find this section helpful in your overall understanding of Paradox.

Alias

An *alias* is a name you can assign as a shortcut to a directory. Suppose you have a collection of tables, text files, scripts, forms, reports, and graphics all in one directory where you're working on an ObjectPAL application. This collection of files is located in a directory called C:\PARADOX\PROJECTS\NEW\PLANNER. Using the Alias Manager dialog box, you can give that full path a name—an *alias*. For example, if you create an alias for this directory called :MYWORK:, you can use :MYWORK: instead of the full directory path when you need files from C:\PARADOX\PROJECTS\NEW\PLANNER.

Aliases give you several powerful advantages:

- You can avoid typing long path names.
- File references within forms, reports, and similar Paradox objects can use alias names rather than full paths. This makes your applications portable. You can move the entire application without recoding all references (just change the alias definition). Used this way, an alias is a *variable* for a directory path.
- You can change the definition of an alias at any time. All forms, reports, or other Paradox objects that refer to the alias automatically refer to the new definition of the alias. For example, you can design a complex multi-table form using files on your computer's hard disk, referencing tables with an alias to a directory on your disk. When you're ready to share the form on a network, you simply move the tables on which the form is based to a network directory and redefine the alias to point to that directory. The form then knows where to find the tables on the network.

Working directory

A Paradox working directory is the directory containing the tables and objects you're currently working with. For example, if you're working with tables, forms, reports, and queries in the C:\PDOXWIN\BUDGET directory, C:\PDOXWIN\BUDGET is your working directory.

The working directory controls which files Paradox displays in File | Open or File | Save dialog boxes. When you install Paradox on a local drive (a drive on your standalone machine, *not* on a network),

Paradox creates a directory named WORKING below the system directory. This is your default working directory. (For information on the default working directory on a network-installed copy of Paradox, see *Getting Started.*)

Whatever directory you specify as your working directory, the files displayed in File | Open and File | Save dialog boxes are the files of *that* directory. It is recommended that you use working directories to organize your files. Changing working directories is discussed in Chapter 3.

Note Paradox assigns your working directory the alias :WORK:. Paradox overrides any other alias you may have specified as long as the directory is your working directory.

Private directory

In a multiuser environment, you need a place to put your temporary objects. Temporary tables such as *Answer* or *Inserted* (created as a result of a query) must be stored in a nonshared directory or else they could be overwritten by other users. Every person who uses Paradox on a network must identify a private directory where Paradox can place temporary objects.

Files contained in your private directory are displayed with the working directory's files in all File | Open or File | Save types of dialog boxes. They appear at the bottom of the list, prefixed with :PRIV:. They are visible and available to you, but not to other network users.

You can specify the location of your private directory with the File | Private Directory command, discussed in Chapter 3. Paradox assigns the :PRIV: alias to your private directory.

On a standalone system, your default private directory is named PRIVATE and is located beneath your system directory. (If Paradox is installed on a network, see *Getting Started* for information about where your default private directory is located.)

Note Paradox assigns your private directory the alias :PRIV:. Paradox overrides any other alias you may have specified as long as the directory is your private directory.

Object Inspector

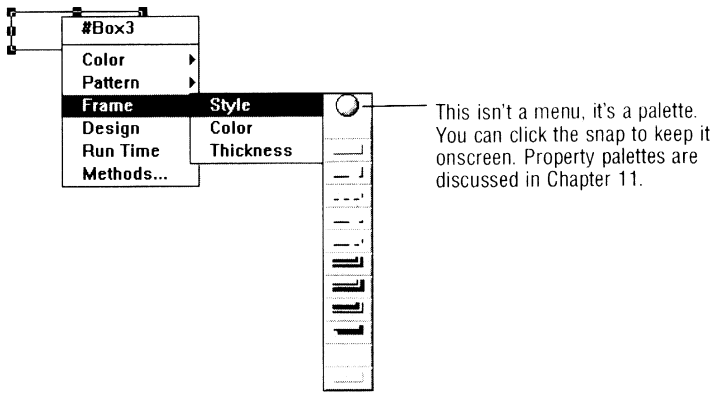
Every Paradox object has a self-contained menu. For Paradox's major objects—tables, forms, and so on—this menu contains commands (such as View, Design, or Run). For design objects, this menu contains the object's property choices (such as color, number format, or text style). You view an object's menu by *inspecting* the object. This is Paradox's Object Inspector™ feature.

The easiest way to inspect an object is to right-click it (click it with the right mouse button). The object's menu appears. Click the property or command you want.

Inspect design objects to change their properties.

Suppose you want to change a box's frame. First you inspect (right-click) the box. You'll see a menu of available properties. From this menu, choose Frame | Style, and the Frame Style palette appears. Click the style you want, and Paradox changes the box's frame. Figure 2-13 shows the inspected object.

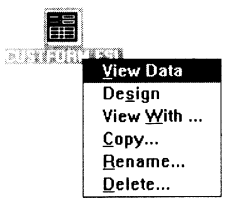
Figure 2-13 Inspecting an object



Inspect objects to choose commands.

Suppose you want to modify a form's design. From the Folder window or the Browser (both discussed in Chapter 3) you inspect the form object's icon. You'll see a menu of available commands. Choose Design, and Paradox opens the form in the Form Design window. Figure 2-14 shows the inspected form icon.

Figure 2-14 Inspecting a form object's icon



You can inspect almost anything.

Design objects and object icons are not the only things you can inspect in Paradox. Right-clicking almost anything—a table's grid, tools on the SpeedBar, the axes of a graph,—displays that object's menu. You can inspect and change just about anything you see onscreen.

Each object has unique properties.

When you inspect and change an object's properties, you change *only the inspected object*. Changing the color of one box, for example, does not change the color of all boxes. Each object is unique and has unique properties.

Complex objects like tables have many available properties. A table has properties for each column, each heading, and the grid. With this many options, you can create just the look you want. (Chapter 4 discusses table properties in detail.)

If you prefer to use the keyboard to inspect an object, you can

- Press *Tab* to select an object and press *F6* (in the Form Design or Report Design windows).
- Select the part of a table you want to inspect and press the appropriate key combination (*F6* for the selected field, *Shift+F6* for all fields, *Ctrl+H* for headers, *Ctrl+G* for the grid, and so on). See Appendix A for a complete list of keyboard shortcuts.

When Paradox displays the object's menu, you can use the arrow keys to move through your options, and press *Enter* to make your choice.

CHAPTER 3

Working on the Desktop

This chapter discusses what the Paradox Desktop is and how you can use it to best work in Paradox. You'll learn how to

- Use the Desktop and its SpeedBar
- Create and save objects, and open existing objects
- Use the Browser
- Change your working directory and set a private directory
- Create and use an alias
- Set system information and multiuser settings

For background on some of the tasks discussed in this chapter, you should be familiar with the terms and concepts introduced in Chapter 2.

The Desktop

The Desktop is Paradox's most powerful tool. It is the "parent" window to all windows that appear in Paradox. Using the Desktop, you can

- Control file management
- Set the working environment
- Control multiuser data access
- Define defaults and preferences

A *session* is the time from when you open Paradox to when you exit. Many of the preferences you define remain in effect for the full session—until you exit Paradox. Paradox lets you save other preferences permanently.

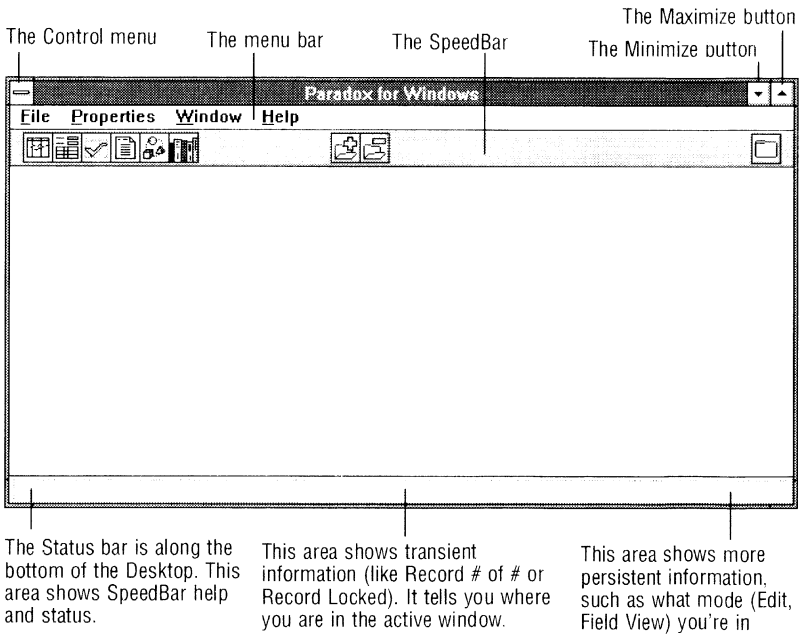
The Desktop is the primary Paradox workspace. All windows are opened on the Desktop and are contained by the Desktop.

Each type of major object in Paradox (like tables, queries, or reports) appears in its own type of window. For example, forms always appear in a Form window, and queries always appear in a Query window.

Each type of window has some specialized commands and functions that apply only to that type. But the Desktop contains *all* windows, and the commands and functions of the Desktop remain available in all of them.

The Desktop is the first thing you see when you start Paradox.

Figure 3-1 The Paradox Desktop at startup



From the Desktop, you can move objects, set preferences, open and close files, and create new objects.

The File, Properties, Window, and Help menus are always available on the Desktop, even if you have no windows open.

Using the Desktop SpeedBar

Below the menu, each window has a collection of buttons and tools. This is called the SpeedBar. As its name implies, the SpeedBar is there to speed up your tasks. Many buttons provide quick equivalents to

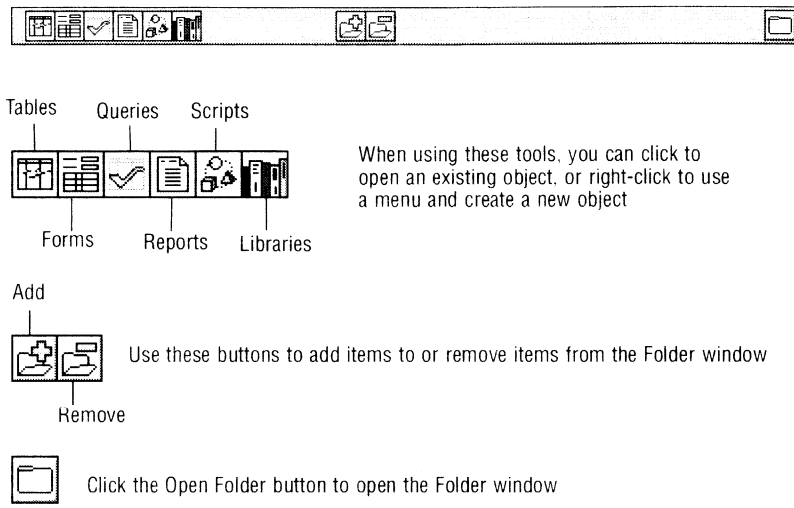
menu commands or keystrokes. Others provide handy ways for you to navigate through your data.

What's it called?

If you want to know the name of a tool or button on the SpeedBar, simply point to it. Its name appears in the left side of the status bar.

Like the menus, the SpeedBar changes when the active window changes. Each window has a unique SpeedBar. Figure 3-2 describes what operations you can perform using the Desktop's SpeedBar.

Figure 3-2 The Desktop's SpeedBar

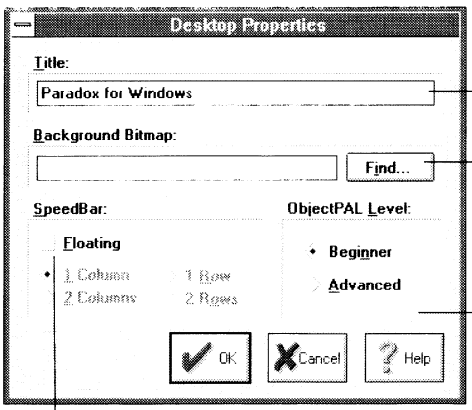


Setting properties

The Properties menu controls the appearance of the Desktop. When you choose Properties | Desktop, you'll see the Desktop Properties dialog box, shown in Figure 3-3.

Paradox saves changes you make to Desktop properties in your PDOXWIN.INI file.

Figure 3-3 The Desktop Properties dialog box



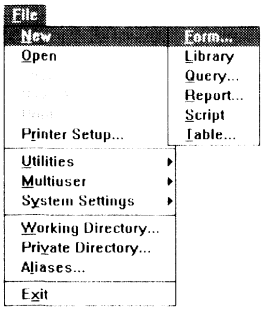
Type the text you want to appear on the Desktop's title bar in the Title text box. The text you type will replace the words "Paradox for Windows" on the title bar.

If you want, you can have a picture appear as a background to the Desktop. Type the name of the graphic file you want to see in the Background Bitmap text box, or choose its Find button to open the Select File dialog box. All graphic files in the working directory and your private directory are shown in the file list. You can type the name (including the full path) of a file that isn't in the working directory, or choose the Path list to use a file from a different aliased directory, or choose Browse to open the Browser and choose a bitmap from a different directory.

You can use the SpeedBar panel to change the configuration of Paradox's SpeedBar. If you check Floating, Paradox detaches the SpeedBar from its position under the menu. You can then choose to display the SpeedBar in one or two columns or one or two rows. Drag the title bar of the floating SpeedBar to move it.

To return the floating SpeedBar to its position under the menu, choose Fix from its Control menu.

Creating new objects

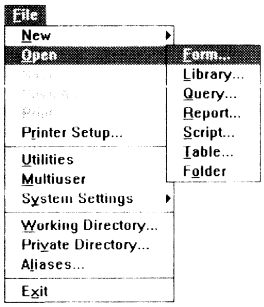


Choose File | New to create a new object in Paradox. You'll see a menu of all the types of objects you can create. Each type of object is discussed separately in this manual.

- For information on creating new tables, see Chapter 9.
- For information on creating new forms and reports, see Chapter 10.
- For information on creating new queries, see Chapter 6.
- See your ObjectPAL documentation for information on creating new scripts and libraries.

If you prefer, you can also create new tables, forms, queries, reports, scripts and libraries by right-clicking the appropriate button on the Desktop's SpeedBar and choosing New.

Opening existing objects



Choose File | Open to open any Paradox object. You'll see a menu of available objects (as shown in the figure to the left). Choose the type of object you want to open.

If you prefer, you can click the appropriate Desktop SpeedBar button to open a table, form, query, report, script, or library. You can also open an object by double-clicking its icon, either on the Desktop, from the Browser, or in the Folder window (the Browser and the Folder window are discussed later in this chapter).

In addition to the major Paradox object types, you can also open the working directory's Folder window from the Desktop File menu.

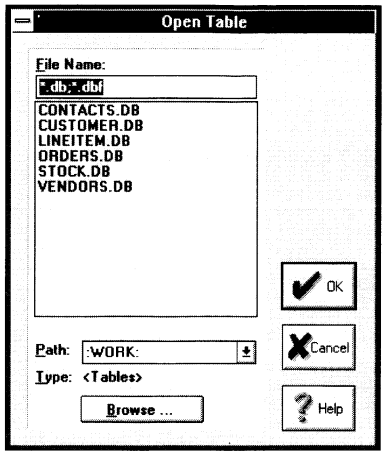
Opening tables and queries

When you choose File | Open | Table you'll see the Open Table dialog box, which lists all tables in the working directory. If you have tables in your private directory, Paradox includes them in the list, with the alias :PRIV: (see Chapter 2 for information on using Paradox aliases).

Example 3-1 Opening a table

To open a table,

1. Choose File|Open|Table. You'll see the Open Table dialog box.



This dialog box shows all tables in the working directory. If you choose File|Open|Query you see a similar dialog box that shows all queries in the working directory. The two dialog boxes work the same way.

2. To choose a table using the mouse, you can either double-click the table name in the File Name list, or click the table name in the File Name list and click OK.

3. To choose a table using the keyboard, you can type the table name in the File Name text box, or press ***Tab*** to move to the file list, then use the arrow keys to select the table you want and press ***Enter*** to open the table.

The File Name text box

You can type the name of the table you want to open in the File Name text box. If you like, you can type the full path of a table that isn't in the working directory. You can also use wildcards to filter the files displayed in the file list. By default, Paradox uses *.db; *.dbf to display all Paradox and dBASE tables in the working directory.

The Path list

The Path list shows what directory Paradox is looking in. If an alias is available, Paradox displays the alias name, rather than the full path, in the Path list. By default, Paradox looks in your working directory, so when you open the Open Table dialog box, the Path list shows the working directory's alias (:WORK:).

If you type a path in the File Name text box to access a file in a different directory, Paradox stores that path temporarily on the Path list. This lets you return to a non-aliased directory quickly. The path remains on the Path list until you exit Paradox.

To open a file that isn't in the working directory, you can

- Type the file name (including the full directory path) in the File Name text box.
- Use the Path list to choose a different aliased directory.

Note An alias is a name you define for a directory path. Paradox uses the alias to identify the directory, then displays that directory's files in the file list. See Chapter 2 for more information about aliases, and "Using aliases" later in this chapter for information about defining aliases.

- Choose Browse to open the Browser, shown in Figure 3-5. Use the Browser to find a file that isn't in the working directory.

  The Browser is discussed in "Using the Browser" later in this chapter.

The Type list

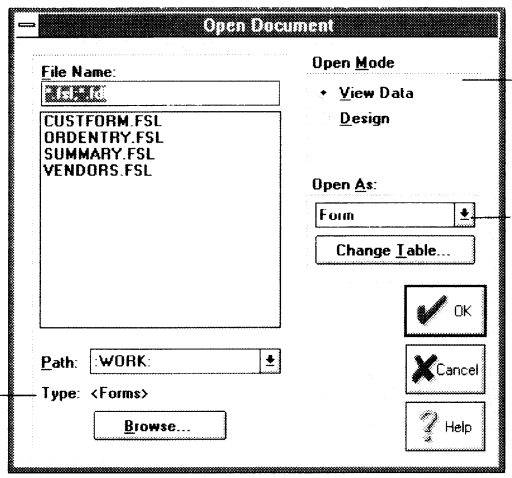
The Type list shows what type of file you're opening. By default, if you choose File | Open | Table, Paradox displays the word <Tables> in the Type list. If you choose File | Open | Query, you'll see the word <Queries> in the Type list and all queries in your working (and private) directory in the file list.

In some dialog boxes, you can click the Type list's drop-down arrow to choose a different type of file to open. For example, if you choose File | Utilities | Copy, you can use the Type drop-down list to choose the type of file you want to copy—a table, form, report, or any other available type. When the Type drop-down list is inappropriate for the action you perform in a dialog box, it becomes unavailable.

Opening design documents

When you choose to open a form or report, you'll see the Open Document dialog box, like the one in Figure 3-4.

Figure 3-4 The Open Document dialog box



Use the left side of the Open Document dialog box as you would the Open Table dialog box described in "Opening tables or queries" earlier in this chapter.

Open Mode
- View Data
- Design
- Print

You can either view the data in the document or view the document's design. Use the Open Mode panel to make this choice. When you open a report, you also have the option of printing directly from the Open Document dialog box.

Paradox gives you the option of opening forms as reports or reports as forms, or of opening the document using a different master table—a different table from the one on which it was originally designed. See Chapters 12 and 13 for information on using these options.

Opening scripts

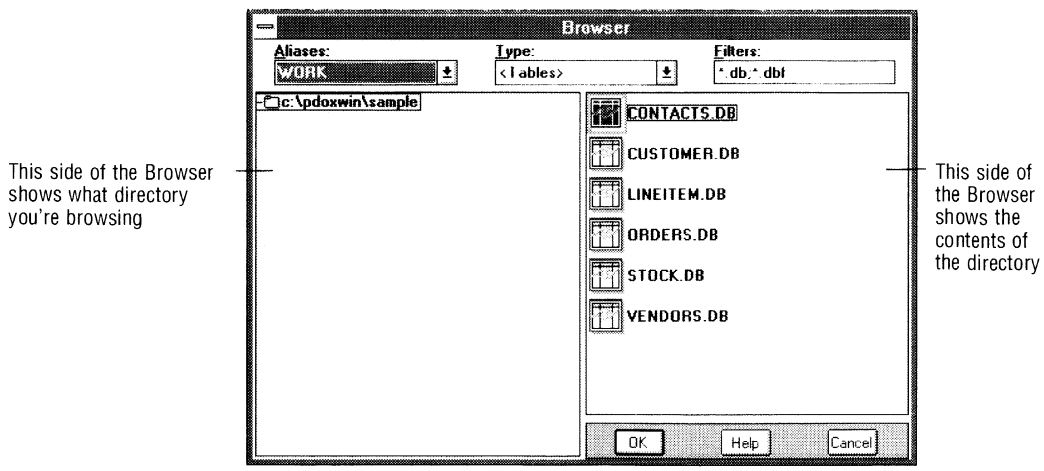
Open Mode
- Play
- Design

When you open a script, the Open Document dialog box looks similar to the dialog box used to open a form or report (described above). The Open As panel doesn't appear, and the Open Mode options panel is different. You have the choice of running the script or opening the Script window and making changes to the script. See your ObjectPAL documentation for information on editing scripts.

Using the Browser

Most file selection dialog boxes have a Browse button. Choose the Browse button to open the Browser, shown in Figure 3-5.

Figure 3-5 The Browser



Use the Browser to work with files that aren't located in the working directory. Using the Browser, you can

- Choose a single file. (Choose a directory and click the icon of the file you want. Choose OK to close the Browser. Paradox enters the file in the File Name text box.)
- Change directories to view the files in a directory that has no alias. (Choose a directory and click OK. Paradox displays the contents of that directory in the File Name list and that directory's path in the Path text box.)

If you want to view the files in a directory that has an alias, it's quicker to use the Path list instead of the Browse button.

The Browser differs from the Windows File Manager in that it recognizes Paradox file types and aliases.

What does the Aliases list do?

An alias is a name you give to a directory. Use the Browser's Aliases list to choose an alias. (You can also use the Aliases list to choose a drive letter or directory in the conventional way.) The Browser shows the contents of the directory you choose.

For example, suppose you want to see the files located in C:\PDOXWIN\FINANCE\BUDGET. If you've defined an alias (for example, :BUDGET:) for the directory, you'll see :BUDGET: when you use the Browser's Aliases list. Simply choose :BUDGET: to see the files in the directory it identifies.

Note You define aliases from the Alias Manager dialog box, discussed in "Using aliases" later in this chapter.

What does the Type list do?

Use the Type list to choose the type of file the Browser displays. Choose the type of file you want (like <Forms> or <Tables>). Choose <Files> if you want to see *all* files displayed.

You'll see all files (including Paradox and dBASE) of the chosen type.

What does the Filters list do?

A filter lets you be specific about the file extension you want the Browser to display. Use the Filters list to choose the file extension of the file format you're browsing for. Although the Type list gives you a certain degree of filtering, it doesn't distinguish between Paradox and dBASE files. In the Filters list, you can type ***.DB** for Paradox tables, or ***.DBF** for dBASE tables.

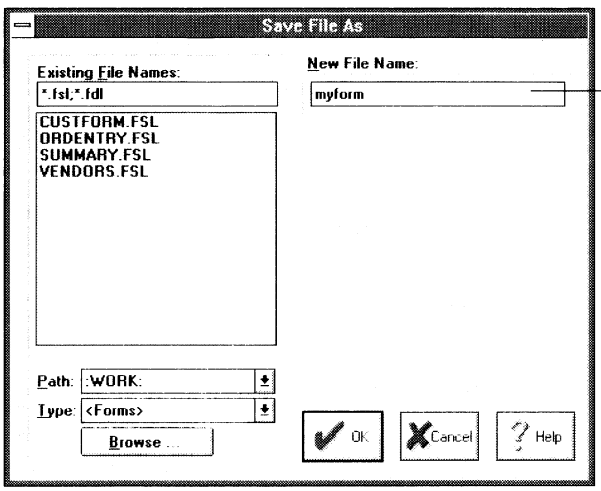
You can also use filters to browse by file name rather than file extension. To do this, you type the file name followed by a period and an asterisk. For example, you type **Customer.*** to browse for any type of file named CUSTOMER. Paradox then shows all objects named Customer, whether they are forms, reports, queries, or even the data files about a table (such as its .PX, .TV, or .MB files.)

Note If you browse by file name and want to see a variety of file types, you must first choose <Files> from the Type list.

Saving objects

Choose File | Save to save a newly created form, report, script, or query. You'll see the Save File As dialog box, shown in Figure 3-6.

Figure 3-6 The Save File As dialog box



This dialog box is similar to the Open Document dialog box, discussed earlier in this chapter. Type the name of the file you're saving in the New File Name text box. You don't need to type an extension; Paradox recognizes the type of file you're saving from the Type specification. Paradox saves the file when you choose OK.

Note Paradox saves the file in the working directory unless you specify otherwise by either typing a full path in the New File Name text box, using the Path drop-down list to choose an aliased directory, or using the Browse button to choose a different directory.

With the Save File As dialog box, you can

- Use the Existing File Names text box to filter the displayed saved files.
- Use the Path list to choose a different directory alias. Paradox saves the file to the alias you choose.
- Use the Type list to choose the type of the document you're saving.

- Choose Browse to open the Browser. You can
  - Change directories and click the icon of the file you want. When you choose OK, Paradox enters the file in the New File Name text box. The file you save overwrites this file.
  - Change directories and choose OK. Paradox displays the contents of that directory in the file list and saves the file to that directory.

Note After you've named a file for the first time, choosing Save doesn't open a dialog box; it simply saves the active file.

If you want to save a file under a different name, choose Save As to display the Save File As dialog box again. Use it as though you were saving the file for the first time.

Saving table data and properties

You don't use the Save or Save As commands to save a table's data or properties. This is because

- Paradox automatically saves the data you enter as soon as you leave each record.
- You name the table when you create it.
- You save changes to a table's property by choosing Properties | View Properties | Save from the Table window. (If you make changes to a table's properties and don't save them, Paradox prompts you to save them when you close the table.)
- You use File | Utilities | Copy or File | Utilities | Rename (described in Chapter 8), instead of Save As, to copy or rename a table.

Saving design documents

You must save design documents from their design windows. (The File | Save and File | Save As commands are dimmed when you're viewing data.) When you save a design document, you're saving the design itself, not the data. Paradox automatically saves data to the appropriate table as soon as you leave each record.

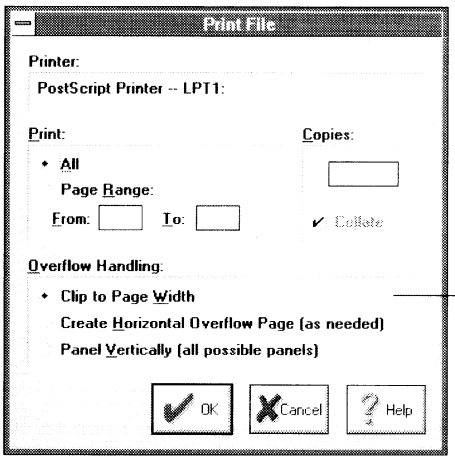
Printing documents

Choose File | Print to print a table, form, or report.

When you print a table, Paradox creates a default report in a tabular format, using the table's name as a page header and including page numbers and the current date. If you have long memos in your table, the default report format may not be appropriate. See Chapter 13 for information on creating custom reports.

When you choose File | Print, you'll first see a message indicating that the file is being prepared. Then you'll see the Print File dialog box, shown in Figure 3-7. Use this to choose the options you want. When you choose OK, the file begins printing.

Figure 3-7 The Print File dialog box



Note Paradox uses this dialog box when you print from a Table or Report window. The dialog box you use to print a form is different, and is discussed in Chapter 12.

Use the Overflow Handling options panel to tell Paradox how you want to treat data that is too wide to fit on the printed page.

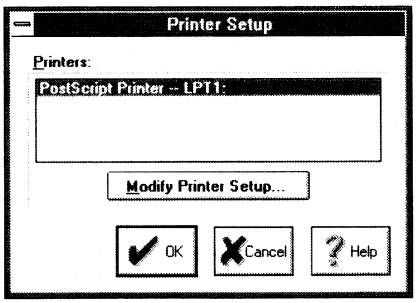
- Choose Clip to Page Width if you want Paradox to clip (trim) all data that doesn't fit across the page.
- Choose Create Horizontal Overflow Page if you want Paradox to print additional pages whenever necessary to fit all the data.
- Choose Panel Vertically if you want Paradox to print a second page for each page of the report, regardless of how many pages actually have data that overflow.

The difference between the Create Horizontal Overflow Page option and the Panel Vertically option is shown in Figure 13-28 in Chapter 13.

Using Printer Setup

Choose File | Printer Setup to display the Printer Setup dialog box, shown in Figure 3-8.

Figure 3-8 The Printer Setup dialog box



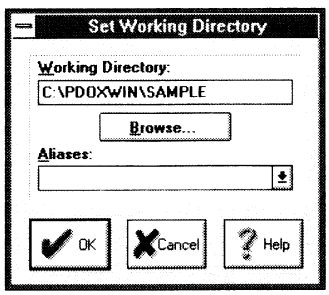
Choose the printer you want to use, or choose Modify Printer Setup to choose a different printer or to configure an existing printer differently. Paradox opens the Windows Control Panel Printers Setup dialog box.

Changing working directories

Your working directory is the directory that contains the tables and objects you're currently working with.

To specify a new working directory, choose File | Working Directory. You'll see the Set Working Directory dialog box, shown in Figure 3-9.

Figure 3-9 The Set Working Directory dialog box



Either type the full path of the directory you want to work in or choose its alias from the Aliases list

Enter the location (the full path) of the directory you want in the Working Directory text box, or choose Browse to open the Browser. You can choose any directory from the Browser. Paradox enters the directory you choose in the Working Directory text box. When you choose OK, Paradox closes all open windows (prompting you to save changes as necessary) and "moves" to that directory.

If the directory you want to move to has an alias, click the Aliases drop-down list and select the alias you want. When you choose OK, Paradox places the alias name in the Working Directory text box. For example, if you select the alias DIVEPLAN, Paradox places **:DIVEPLAN:** in the Working Directory text box. When you choose OK again, Paradox places the full path of the working directory in the text box and moves to that directory.

Note Paradox uses the :WORK: alias for the working directory. Even if you've assigned an alias to a directory, by default Paradox uses the :WORK: alias for whatever directory is currently your working directory.

It's a good idea to give a directory an alias if you intend to access files in the directory from a different directory (see Chapter 2). Aliases give you easier accessibility to your files. For example, if you're using the BUDGET working directory, but want to open a table located in a different directory *without changing working directories*, you can simply choose the directory alias you want from the Path list of the Open Table dialog box. The files from that directory are then displayed in the dialog box, but BUDGET is still your working directory.

Storing working directory preferences

When you specify a directory as your working directory, Paradox creates a file called PDOXWORK.INI and stores it in the directory. This file contains the last saved state of the Desktop (which windows were open and their sizes).

Paradox saves changes you make to the Desktop while in your working directory whenever you change working directories or exit Paradox.

If you delete the PDOXWORK.INI, Paradox uses default Desktop settings.

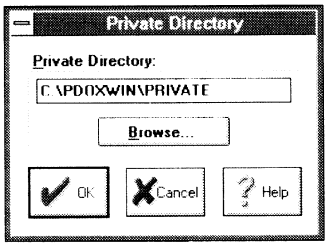
Setting a private directory

The private directory is where Paradox stores all temporary tables you create. The contents of your private directory are displayed in most file lists in dialog boxes. You can choose :PRIV: (the alias for your private directory) from any dialog box's Path list or from the Browser.

When you install Paradox on a local drive (a drive on your standalone machine, *not* on a network), Paradox creates a directory named PRIVATE below the system directory. This is your default private directory. (For information on the default private directory on a network-installed copy of Paradox, see *Getting Started*.)

To identify a different directory to use as your private directory, choose File | Private Directory. You'll see the Private Directory dialog box, shown in Figure 3-10.

Figure 3-10 The Private Directory dialog box



Enter the full path of the directory you want to use, or choose Browse to open the Browser in which you can choose the directory you want

Enter the directory you want in the Private Directory text box, or choose Browse to select a directory using the Browser. Your private directory must be different from any other user's private or working directory. You cannot specify a floppy disk drive as a private directory.

Choose OK to change private directories. Paradox closes any open windows and prompts you to save any changes you've made.

Caution When you change private directories, Paradox releases any locks you've placed on any tables and deletes all your temporary tables. Make sure you don't need any of your temporary tables before you change private directories.

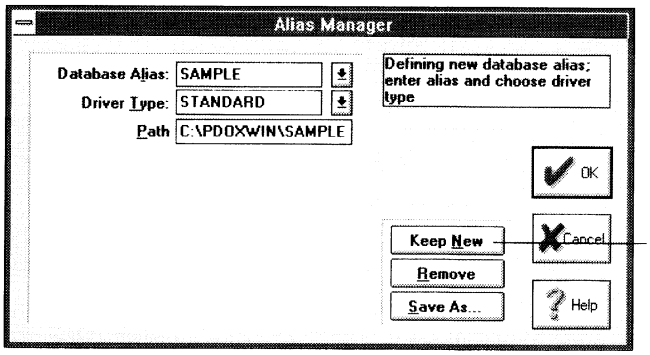
Using aliases

A database in Paradox is a named collection of files. These files can be located in a directory on your local machine or network. In Paradox, you can assign a name (an *alias*) to a database. (See Chapter 2 for more information on aliases.) Use the Alias Manager dialog box to assign an alias to a database.

When you choose File | Aliases you'll see the Alias Manager dialog box. Figure 3-11 shows a new alias entered into the dialog box.

Figure 3-11 The Alias Manager dialog box

Choose New, then type the alias you want to give the directory in the Database Alias text box and the directory's full path in the Path text box. Choose Keep New to save the alias for the current session, or Save As to save it permanently.



Creating a new alias

You can create aliases for local or network directories from the Alias Manager dialog box.

Example 3-2 Creating a new alias

To create a new alias, open the Alias Manager dialog box and follow these steps:

1. Choose New.
2. Type the name (alias) you want to give the directory in the Database Alias text box.
3. Choose the driver you want from the Driver Type list. The Driver Type list shows all the drivers you're connected to.

   If you want to create a database of Paradox and/or dBASE tables, choose STANDARD.
4. Enter the full path of the directory location in the Path text box.
5. If you want this to be a temporary alias, existing only until you exit Paradox, choose Keep New. Then choose OK or Cancel to close the Alias Manager dialog box.
6. If you want this alias to be permanent—usable any time you use Paradox—choose Save As. You'll see the Save File As dialog box, discussed earlier in this chapter. By default, Paradox stores saved aliases in ODAPI.CFG. You'll be prompted to overwrite the existing ODAPI.CFG. This is not dangerous. When you overwrite, all you do is add the new alias. No existing configuration settings are lost. You can even undo the change by deleting the alias (again using the Alias Manager dialog box) later.

7. In the Alias Manager dialog box, you can either create another alias or choose OK or Cancel to exit the Alias Manager dialog box.

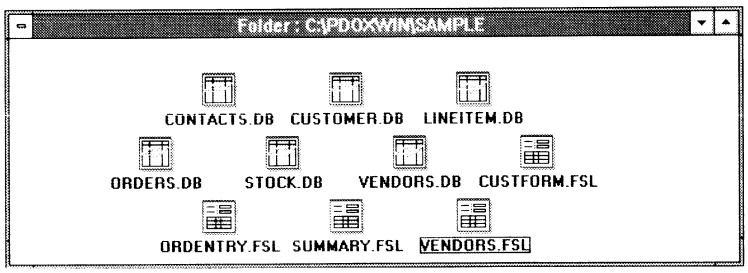
You can change an alias definition using the Alias Manager dialog box by choosing it from the Database Alias list and changing its definition in the Path text box.

Using the Folder window

Using the Folder window provides a quick way for you to view and access the contents of the working directory.

When you open the Folder window (either by choosing File | Open | Folder or by clicking the Open Folder button on the SpeedBar), you'll see the working directory's Folder window. You can use the Folder window to display object icons for Paradox objects. Figure 3-12 shows a typical Folder window.

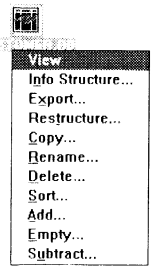
Figure 3-12 The Folder window



Note The Folder window doesn't have to be open for you to use a working directory. Most dialog boxes that have file lists display the contents of the working directory. The Folder window is simply a quick way for you to view and access objects you use frequently.

When you open the Folder window, the Folder and Window menu choices appear on the menu bar. The Window menu is common to all Windows applications. Use the Tile and Cascade commands to control the display of multiple windows on the Desktop. Choose Arrange Icons to control the display of minimized windows on the Desktop (not the icons in the Folder window). Choose Close All to close all open windows on the Desktop. Paradox prompts you to save any changes before closing each window. The titles of all open windows are displayed on the Window menu. Click a title to activate the window.

Using object icons



You can inspect any icon in the Folder window to display a menu of actions appropriate to the object type. To inspect an icon, either right-click it or select it and press *F6*. If you right-click a table's icon, you can choose to view, copy, restructure, sort, or perform a number of other operations on the table. (These are the same options you find in the File | Utilities menu.)

The top menu choice is the object's default action. You can double-click an object to perform its default action. For most objects, the default action is View. When you double-click one of these objects, Paradox opens it. For example, a table object's default action is View. When you double-click a table icon, Paradox opens the table in its Table window.

Adding and removing icons

When you open the Folder window for the first time, no icons appear in it. You must place the icons for objects you want to display.

If you rename or delete files without using the Paradox Rename or Delete utilities (for example, if you use a DOS command or the Windows File Manager), Paradox does not update the Folder window. You must perform these functions from within Paradox. See Chapter 8 for information on using Paradox object utilities.

Adding icons

Choose Folder | Add Item or click the Add Item SpeedBar button to add an object to the Folder window. You'll see the Select File dialog box, which works like the Open Table dialog box, discussed in the "Opening existing objects" section earlier in this chapter. Choose the file you want to add to the folder.

You can add several object icons at once. In the Select File dialog box, *Ctrl*+click each file you want, or *Shift*+click to select a range. Paradox highlights selected file names. Choose OK to add them all to the Folder window.

Removing icons

Choose Folder | Remove Item or click the Remove Item SpeedBar button to remove an object's icon from the Folder window. You'll see the Remove Item From Folder dialog box. All objects currently displayed in the folder are listed. Choose the object(s) you want to remove from the Folder window.

You can also remove an icon by selecting it and pressing *Del*.

Removing an item from the Folder window *does not* delete it. The file still exists, it just isn't shown in the Folder window.

Arranging icons

Choose Folder | Tidy Icons to have Paradox arrange the icons in the Folder window.

Showing all files

Choose Folder | Show All Files to display all Paradox objects in the working directory in the Folder window.

Object icons

Icons are graphical representations of Paradox objects.

When a window is minimized, it appears on the Desktop as an icon. This is the same icon that appears in a folder to represent the object. Each type of object has its own type of icon. The name of the object that the icon represents appears below the icon.

Figure 3-13 shows the icons for the set of major Paradox objects.

Figure 3-13 Common Desktop icons

The Form icon represents a form.

The Script icon represents a script.

The Query icon represents a query.

The Report icon represents a report.

The Library icon represents an ObjectPAL Library.

The Folder icon represents the Folder window.

The Table icon represents a table.

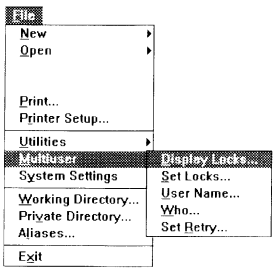
Getting help

The Help menu is one way of accessing Paradox's Help system. You can also choose any Help button or press *F1* at any time to open the Help system.

- When you use the Help menu, you use the menu commands to choose the subject you want help on.
- When you choose any Help button from a dialog box, you get help on using that dialog box.
- When you press *F1* to get help, Paradox assumes that you want help with the task you're currently working on and selects a help topic accordingly. This type of help is called *context sensitive*; the context in which you ask for help determines the help provided.

For more information about Paradox's Help system, see Chapter 4 in *Getting Started* or choose Help | Using Help.

Using multiuser settings



Use the File | Multiuser commands to set preferences for your network use and to get information about other users in a multiuser environment.

Traditionally, the term *multiuser* has been equivalent to the term *network*. This can be true in Paradox too, but sometimes you can place yourself in a multiuser situation even if you work on a standalone system.

For example, if you open a table, Paradox places a lock on it. This means that you are ensured an accurate view of the table; it can't be deleted while you're using it. This is true whether you open the table in a form, a report, a query, or any other type of object.

Sometimes these automatic locks can prevent you from performing an operation on a table. For example, you'll be prevented from deleting an open table. In these circumstances, the various windows of table data act as various users of the table.

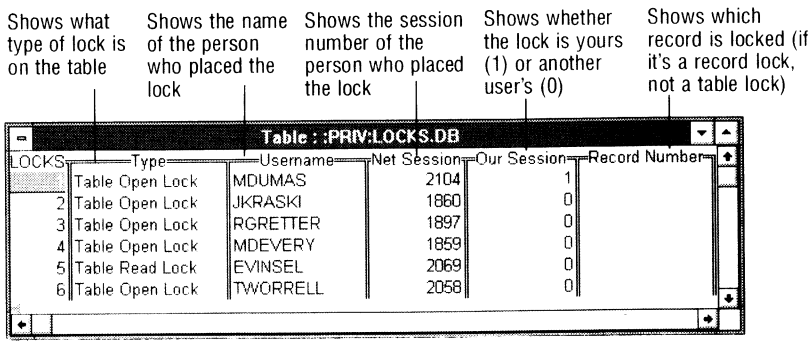
Displaying lock information

Suppose you're prevented from performing a table operation. Paradox lets you see what type of lock is placed on the table and who placed it.

Choose File | Multiuser | Display Locks to view information about locks currently in place on a table. In the Select File dialog box that appears, choose the table whose locks you want information about.

Paradox looks for all locks on the table and opens the *Locks* table, which gives you information about the locks placed on the table.

Figure 3-14 The *Locks* table



Note Paradox automatically places a lock on the table when checking for locks. This lock always appears in the *Locks* table as **Table Open Lock** even though by the time you're seeing it, the lock has already been removed.

Setting locks

If you work in a multiuser environment you need to control access to shared tables. Paradox lets you control access record-by-record, or on an entire table.

What are record locks?

For some operations (such as standard data entry) you need only to access and change one record at a time. Paradox manages this kind of access using *record locks* that are automatically placed and released for you.

Record locks prevent two users from editing the same record at the same time. You can't edit a value without first acquiring a record lock. As soon as you move off the record, Paradox automatically unlocks it.

You can place a record lock manually by choosing Record | Lock or pressing *F5*. (You must first enter Edit mode.) Once you lock a record, no other user can change it until you release the lock. You can release a record lock by

- Moving off the record
- Choosing Record | Unlock
- Pressing *Shift+F5*

Paradox posts the record's value when you release the lock. If you want to post the value and retain the lock on the record, choose Record | Post/Keep Locked or press *Ctrl+F5*.

What are Desktop-level locks?

Some operations (such as restructuring or deleting a table) require more than simple record locks. For these operations you need greater access to a table and restrictions on other users' access to it. Paradox

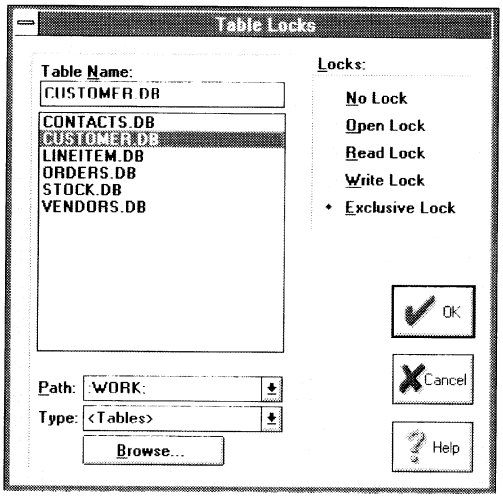
manages this kind of access using Desktop-level locks that you must explicitly request and release.

Desktop-level locks are different from record locks.

- They lock the whole table.
- They have varying levels of strength and provide varying levels of protection.
- You must explicitly place and remove them.

You set or remove Desktop-level locks using the Table Locks dialog box. Choose File | Multiuser | Set Locks to open the Table Locks dialog box, shown in Figure 3-15.

Figure 3-15 The Table Locks dialog box



Choose the table you want to lock or unlock, then choose the type of lock you want

dBASE tables don't support a Read Lock, so this option is dimmed when you choose a dBASE table from the Table Name list in the Table Locks dialog box.

If you want to view the current locks on a table—record or Desktop locks that you or other users have placed—use the File | Multiuser | Display Locks command, described in the preceding section.

To place a lock on the table, choose the table and choose the kind of lock you want. You can choose only one kind of Desktop-level lock at a time for each table, and you can place or remove a lock on only one table at a time.

There are different levels of Desktop-level locks. Each provides a different level of access.

- *No Lock* means *you* have placed no Desktop-level lock on the table. Choose No Lock to unlock a table that you've locked.

Note This doesn't mean there is no lock on the table. Other users may have placed record locks or Desktop-level locks. Use File | Multiuser | Display Locks to view all existing locks.

- *Open Lock* means the lock Paradox automatically places on any table that any user (including you) has opened in any window (using a table, form, or other object). If this type of lock is in place, it prevents you or anyone else from obtaining an exclusive lock on the table. All users (including you) must remove open locks (by closing any windows containing the table's data) before Paradox can obtain an exclusive lock. Choose Open Lock to place this type of lock on a table without actually opening the table.

- *Read Lock* means that you can read (view) and write to (edit) the table. All other users with sufficient rights can read—they can view data—but are locked from writing to the table (unless they place a write lock on the same table).

  When you place a read lock on a table, no other user can place a lock on it that prevents you from reading it—your right to read is guaranteed. Other users can put a write lock on the table, which will enable them to write to it, and prevent you from writing to it.

- *Write Lock* means you can read and write to the table. All other users can read but cannot write to the table. Other users can place a read lock on a table that you have a write lock on.

- *Exclusive Lock* means that you have read and write access to the table, and no other users have any rights of any kind. You can get an exclusive lock only if no other user has placed an open, read, or write lock on the table.

Table 3-1 The effects of locking from the Desktop

Lock level	Your rights	Other users' rights	Locks other users can place
None	None	All	All*
Open	Read, (Write if no other user has a read lock)	Read, Write	All except exclusive if no record lock in place. Otherwise only Open.
Read	Read, (Write if no other user has a read lock)	Read	Open, Read
Write	Read, Write	Read	Open
Exclusive	All	None	None

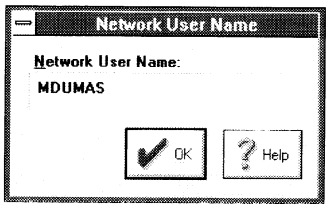
* No Lock means no Desktop-level locks are placed by you. If another type of lock is in place (a record lock or open lock), you won't be able to obtain an exclusive lock.

Paradox maintains a Desktop-level lock until you either exit Paradox or remove the lock (by choosing No Lock).

Viewing your user name

Choose File | Multiuser | User Name to display the Network User Name dialog box, shown in Figure 3-16.

Figure 3-16 The Network User Name dialog box



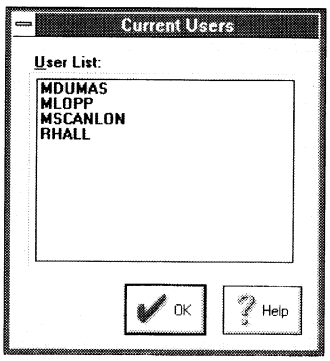
Paradox shows your network user name in this dialog box

The Network User Name dialog box shows the name you use to log on to a network. If you aren't attached to a network, Paradox displays a message informing you of that.

User information

Choose File | Multiuser | Who to display the Current Users dialog box, shown in Figure 3-17.

Figure 3-17 The Current Users dialog box



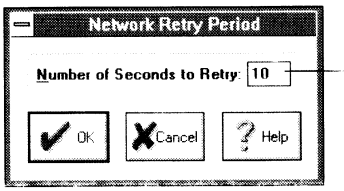
This list shows the network user names of all users currently using Paradox

This dialog box shows a list of all users who are using the same Paradox network installation you are. If you're not connected to a network, the list is blank.

Setting a retry period

Choose File | Multiuser | Set Retry to display the Network Retry Period dialog box, shown in Figure 3-18.

Figure 3-18 The Network Retry Period dialog box



If you attempt to open a network table and find you're locked out of it, you can automatically retry opening it. Enter the number of seconds you want Paradox to continue trying before giving up.

If you set the retry period to 30, Paradox attempts to open the table for 30 seconds. While the attempt is being made, you're prevented from any other activity on your system. If you don't want to wait long, set a low retry period.

Setting system information

Use the File | System Settings menu to get or change information about your system and environment.

Setting a refresh rate

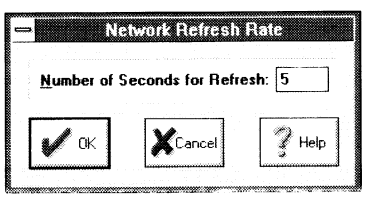
Choose File | System Settings | Auto Refresh to specify a time interval for Paradox to automatically refresh the display of tables you monitor. This is useful for monitoring remote tables that may change without any action on your part—like a shared table on a network.

Note When you're editing, you don't need to tell Paradox when to refresh your screen. Paradox always refreshes your display whenever you make a change, regardless of your Auto Refresh settings.

Note Screen refreshes are available only for Paradox tables.

When you choose Auto Refresh you'll see the Network Refresh Rate dialog box, shown in Figure 3-19. Use this to set the number of seconds you want before the screen refreshes. Choose 0 to turn off Auto Refresh.

Figure 3-19 The Network Refresh Rate dialog box

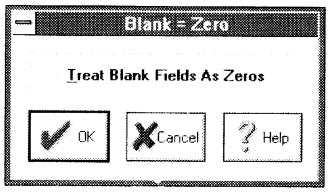


The more you refresh your screen, the higher the demand you place on your network. Choose a longer time between refreshes to lighten the work load on the network.

Setting Blank As Zero

If you want, you can tell Paradox to interpret blanks in calculated fields as the number zero. By default, Paradox treats blanks in calculations in queries, forms, or reports no differently than blanks in other types of fields. To set blanks equal to zero, choose File | System Settings | Blank As Zero. Paradox opens the Blank = Zero dialog box, shown in Figure 3-20.

Figure 3-20 The Blank = Zero dialog box



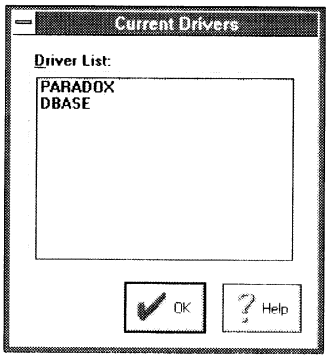
Check the check box if you want blank values to equal zero in number fields

Note Blank As Zero works on Paradox number, currency, and short field types, and on dBASE number and float number field types.

Driver information

Choose File | System Settings | Drivers to display the Current Drivers dialog box, shown in Figure 3-21.

Figure 3-21 The Current Drivers dialog box



All database drivers currently accessible by Paradox are shown

This shows the types of database drivers you can use. You can create a table of the type of any driver you see in this dialog box.

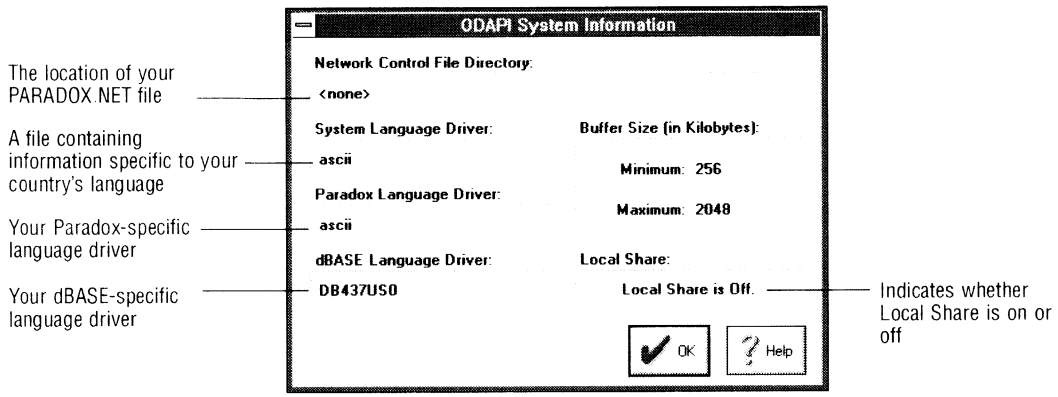
ODAPI information

ODAPI is the database engine used by Paradox. Choose File | System Settings | ODAPI to view your current ODAPI system settings.

You can change ODAPI settings only from the Configuration utility ODAPICFG.EXE. By default, this utility is installed when you install Paradox and is placed in the Paradox for Windows group on your Windows Program Manager. Using the Configuration Utility is discussed in Chapter 14 in *Getting Started.*

When you choose ODAPI, Paradox opens the ODAPI System Information dialog box, shown in Figure 3-22.

Figure 3-22 The ODAPI System Information dialog box



This dialog box is provided so you can view your current ODAPI settings. All settings are explained in Chapter 14 in *Getting Started.*

PART II

Working with existing objects

In this part you'll learn how to control and customize your view of data, and how to ask questions about the data in your tables.

- Chapter 4, "Viewing data," shows you how to customize the display of data in both tables and forms and how to print tables.
- Chapter 5, "Entering and editing data," discusses how to enter, change, and save data in your tables.
- Chapter 6, "Querying your data," introduces Paradox's query by example method of asking questions about your data.
- Chapter 7, "Advanced queries," discusses the more complex and powerful queries available.
- Chapter 8, "Using object utilities," discusses how to copy, rename, delete and perform a variety of other operations on your Paradox objects.

CHAPTER 4

Viewing data

This chapter discusses viewing data in tables, forms, and reports. You'll learn how to

- Customize your view of a table
- Inspect properties in tables and forms
- Use menu commands and the SpeedBar to work with tables and forms
- Preview reports onscreen

Windows on your data

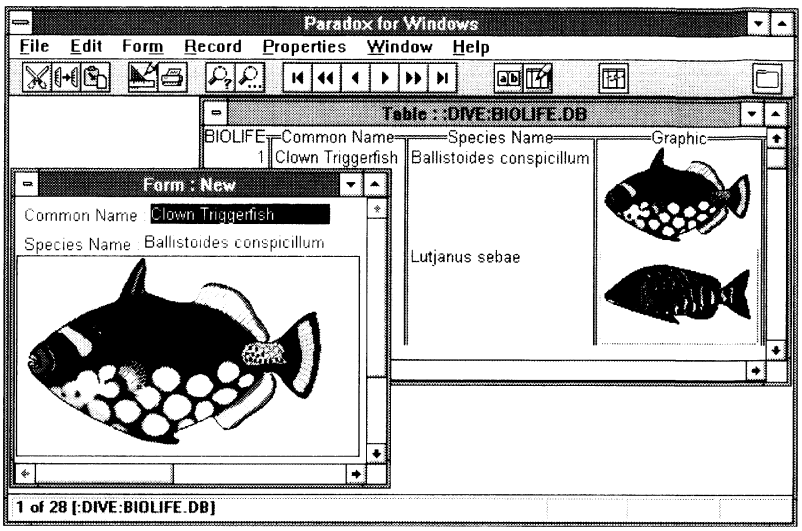
Paradox gives you several ways to view your data:

- Use the Table window to view data in columns and rows. You can use either the default table format or customize the table to get exactly the view you want.
- Use the Form window to display the records of a table in a non-tabular way. Forms give you tremendous flexibility. You can see all or some of the fields from a table, or link tables to choose fields from a combination of source tables.
- Use the Report window to preview a report onscreen, before you print it. You can scroll through an onscreen document the way you would browse through a stack of papers.

Because Paradox displays each view in its own window, you can have several views open at the same time. The combinations are limitless—giving you the ability to see exactly the data you want. Figure 4-1 shows the *Biolife* table and a form for the *Biolife* table, open at the same time on the Desktop. The Form window is active, so the menu and SpeedBar you see in the figure apply to the form. When

the Table window for the table is active, the menu and SpeedBar change.

Figure 4-1 Different views of your data



Using a table

This section explains what tables are, how to work in a Table window, how to change the view by changing table properties, and how to print tables.

If you want information on creating a new table, see Chapter 9.

If you want information on using tables for entering and editing data, see Chapter 5.

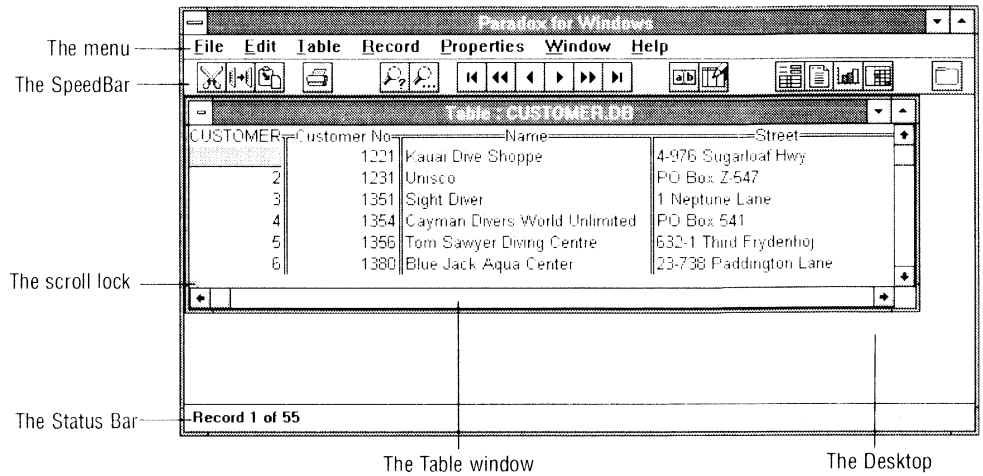
Depending on different situations, you may not always want to view your data the same way. Paradox provides virtually unlimited ways for you to view the data in your tables.

To open a table, choose File | Open | Table from the Paradox Desktop. You'll see the Open Table dialog box, discussed in Chapter 3. Choose the table you want to open.

When a table's icon is visible on the Desktop or in the Folder window, you can double-click it to open the table directly, bypassing the Open Table dialog box.

Paradox opens the table in a Table window. Figure 4-2 shows the *Customer* table in its Table window.

Figure 4-2 A Table window



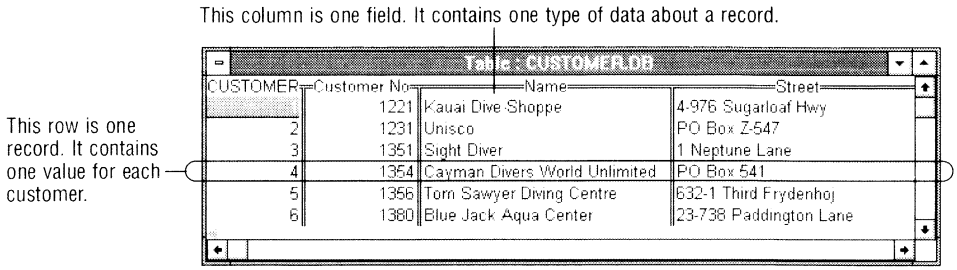
When you open a table, the Desktop's menu and SpeedBar change to show operations you can perform on the table.

Note Commands that involve data entry operations are dimmed until you enter Edit mode. See Chapter 5 for information about working in the Table window in Edit mode.

Rows and columns, records and fields

Paradox tables are organized in rows and columns. Each row, called a *record*, contains all available information about one certain thing. Each column, called a *field*, contains one piece of the information that makes up a record. Figure 4-3 illustrates the records and fields of a table.

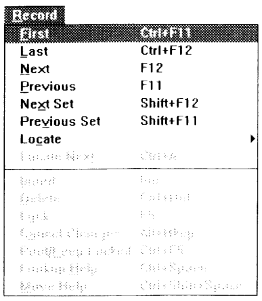
Figure 4-3 Rows and columns



Field types

Paradox fields hold a wide variety of information. Paradox provides a distinct field type for each kind of information. A field's type determines what kind of information you can store in it. Field types are described in Chapter 2.

Moving around a table



Use the Record menu or the SpeedBar navigation buttons to move through the records of the table. If you use the Record menu,

- Choose First to move to the first record of the table.
- Choose Last to move to the last record of the table.
- Choose Next to move to the next record of the table.
- Choose Previous to move to the previous record of the table.
- Choose Next Set to move to the next set of records displayed in the Table window. For example, if records one through six are displayed, choosing Next Set displays records six through eleven (the sets overlap by one record).
- Choose Previous Set to move to the previous set of records displayed in the Table window.

You can also use the keyboard to move around the table. You can use *Home, End,* and the arrow keys to move from field to field. See Appendix A for details on using the keyboard.

Using scroll bars

Use the Up and Down scroll arrows on the Table window's vertical scroll bar to scroll through the table one record at a time. Use the Left and Right scroll arrows on the horizontal scroll bar to scroll through the columns of the table.

When you drag the box on the vertical scroll bar to scroll through the records of the table, the records themselves don't dynamically move. Instead, Paradox displays the range of record numbers as they would appear *if you released the scroll box* on the Desktop's status bar. When you see the range that you want to scroll to, release the scroll box. Paradox updates the view of the table.

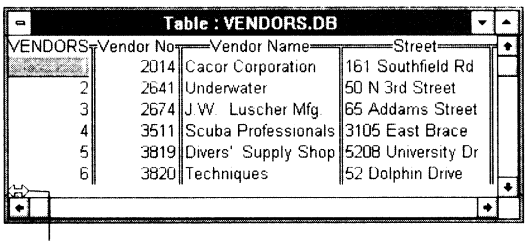
Note If the table is keyed, Paradox displays the range of *values in the key field* (or the first field of a composite key) on the Desktop's status bar as you move the vertical scroll box.

Using scroll lock

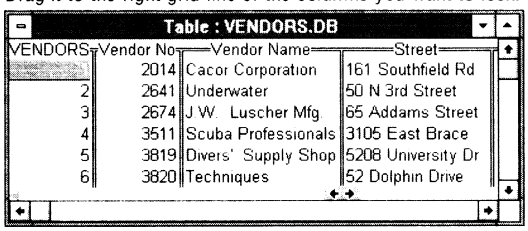
If you want to lock one or more columns into place as you move horizontally through the table's columns, you can place a *scroll lock* to the right of the column(s) you want to remain onscreen. The scroll lock looks like a triangle in the lower left corner of the Table window (see Figure 4-2). To place a lock, use the mouse to drag the triangle to the right side of the column you want to lock. The pointer changes to a double-headed arrow and the lock itself changes to two triangles. Position the scroll lock on the right grid line of the rightmost column you want to lock. All columns to the left of the lock remain stationary as you move through the table's columns.

Figure 4-4 Using a scroll lock

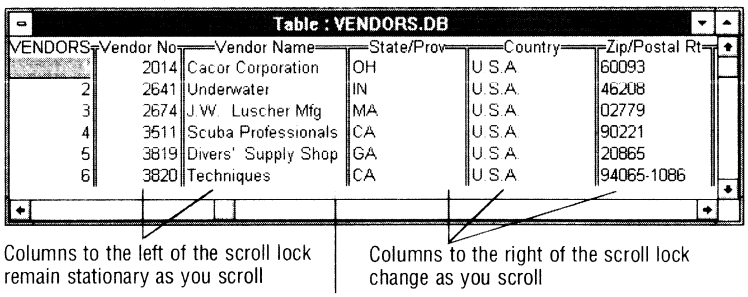
The scroll lock appears in the lower left corner of the Table window



When you point to the scroll lock, the pointer changes to a double-headed arrow. Drag it to the right grid line of the columns you want to lock.



When you move the scroll lock, it looks like this.



Columns to the left of the scroll lock remain stationary as you scroll

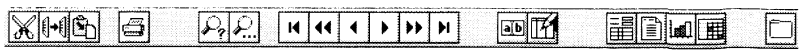
Columns to the right of the scroll lock change as you scroll

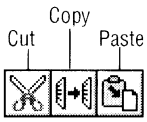
The Scroll lock

Using the Table window's SpeedBar

The following figure shows the Table window's SpeedBar. Use the SpeedBar's buttons as quick shortcuts for navigating through the table or performing menu commands. Figure 4-5 shows what each button does.

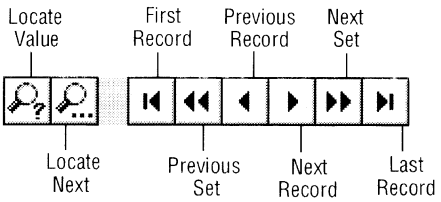
Figure 4-5 The Table window's SpeedBar



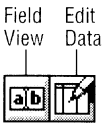


Use the Cut, Copy, and Paste buttons to move data to and from the Windows Clipboard

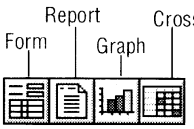
Click the Print button to print the table's preferred report. If you haven't specified a preferred report, Paradox creates and prints a default report.



Use the navigation buttons to move around the Table window and the Locate buttons to find values



Click the Field View button to enter and exit Field View, or the Edit Data button to enter and exit Edit mode



When you click the quick object button of your choice, Paradox opens that object in its own window

Click the Open Folder button to open the Folder window

Changing the view

You can change the *properties*—the visual display and preferences—of the table you're viewing. Paradox lets you move and resize columns, change the display of grid lines, and control the display and format of data.

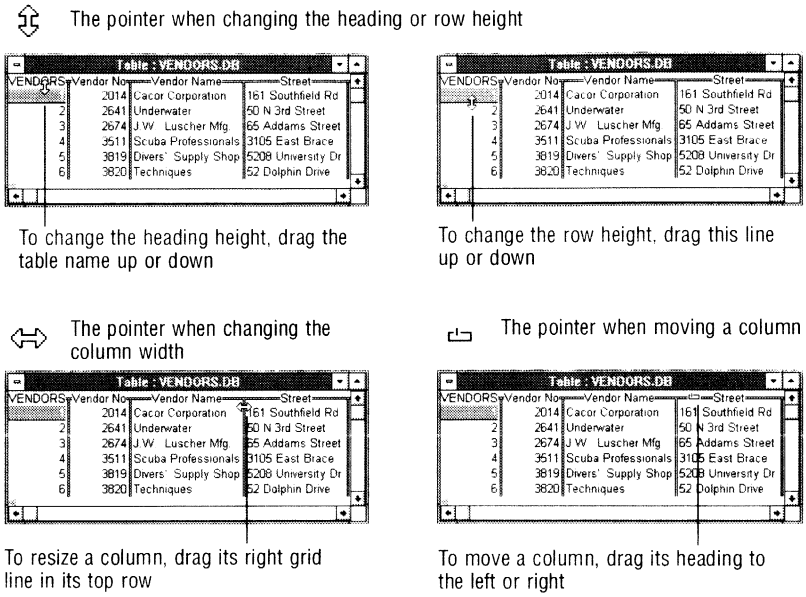
You can change the properties of a table by either right-clicking the area you want to change, selecting the area you want to change and pressing the appropriate shortcut key, or by choosing the appropriate command from the Properties menu. Using any of these methods, you'll see a menu appear over the part of the table you want to change. Choose options from this menu to change the view of the table.

Using direct manipulation

Direct manipulation means you point, click, and drag directly on the object you want to change. You can directly manipulate the size, shape, or position of any object.

Figure 4-6 shows how the pointer changes shape as it passes over places where you can click and drag to resize or move columns or change the heading or row height.

Figure 4-6 Directly manipulating a table



Manipulating columns

To move a column using the mouse, click and hold the column's heading. When the pointer is in the right place, it changes as shown in Figure 4-6. Drag the column to its new position.

If you want to use the keyboard to *rotate* the order of columns, select the column you want and press *Ctrl+R*. Paradox moves the column to the last position in the table and shifts all other columns one position to the left.

You can resize a column using the mouse by clicking its right grid line in either the heading area or the top row of data. You'll know it's in the correct area when the pointer changes to the double-headed arrow shown in Figure 4-6. Drag the grid line to the left or right to increase or decrease the width of the column.

Manipulating rows

You can resize the table's rows (increase or decrease the row height of all rows) by clicking and dragging the line under the first record number in the table (see Figure 4-6).

- Drag the line up to decrease the row height.
- Drag the line down to increase the row height.

Paradox resizes all rows to match the row height you specify.

Inspecting and changing properties

When you want to change the properties of any area of a table, you *inspect* it to display its property options.

To inspect the properties of a table using the mouse, right-click the area you want to change. You can inspect individual fields (columns) of the table, the grid, or the column headings.

Right-click the grid to inspect grid properties, or a column's heading directly to inspect heading properties.

You can also inspect properties using menu commands or shortcut keys.

- Press *F6* or *Ctrl+M* or choose Properties | Data Properties to change the selected field.
- Press *Shift+F6* or *Shift+Ctrl+M* to change *all* fields.
- Press *Ctrl+G* or choose Properties | Grid Properties to change the grid.
- Press *Ctrl+H* or choose Properties | Heading Properties to change the selected column heading.
- Press *Shift+Ctrl+H* to change *all* column headings.

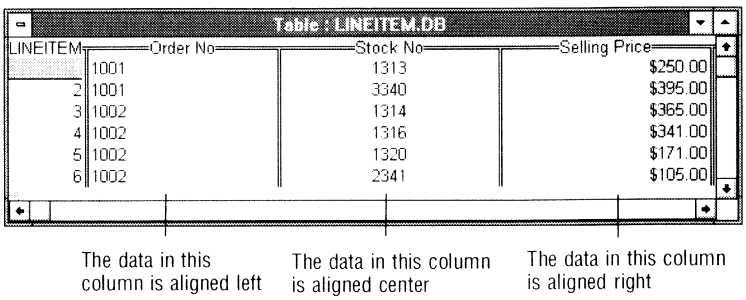
All fields and all headings have Alignment, Color, and Font as choices from their properties menus.

Note If your table does not yet contain any data, you must enter Edit mode before you can inspect data columns. Press *F9* or click the Edit Data SpeedBar button to enter Edit mode. (See "Entering and exiting Edit mode" later in this chapter for details.)

Setting alignment

Alignment refers to the placement of the data in the field or text in the heading. Text and data can be aligned horizontally (at the left, center, or right of the column) or vertically (at the top, center, or bottom of the row). Figure 4-7 shows the *Lineitem* table with three fields using three different horizontal alignments.

Figure 4-7 Alignment choices



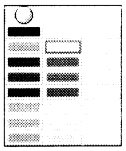
Aligning text in a formatted memo field

Inspect text in a formatted memo field and choose Alignment to center the text or align it on the right, left, or both sides. In a table this alignment is based on the column width and row height. In a form this alignment is based on the size and shape of the field object.

You can align just a part of the memo. Any line you select can have its own alignment setting.

Choosing colors

Whichever part of the table you inspect, you'll see the Color property. You can change the color of the table's background, grid lines, individual fields, column backgrounds and text, and heading backgrounds and text.

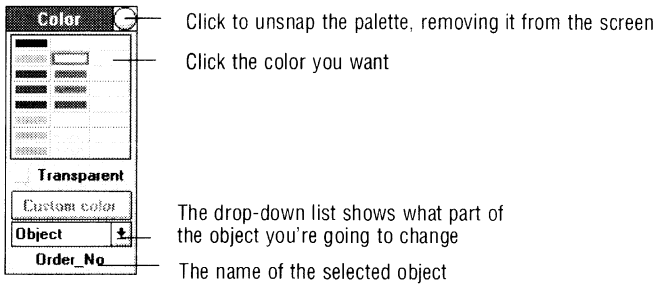


When you choose Color, Paradox displays the Color palette. You can apply any color on the palette to the table. When you click the color you want, the palette disappears and the part of the table you were inspecting is changed to that color.

If you know you'll be changing the color of several parts of the table, click the snap at the top of the Color palette. This changes the look of the palette (as shown in Figure 4-8), and snaps it to the screen. You can move it wherever you want by clicking the title bar and dragging, and you can keep it onscreen as long as you need it—simply unsnap it when you're done.

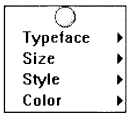
You can change the background color of all the columns at the same time by pressing *Shift+F6*. You'll see the All properties menu. When you choose a color from this menu, Paradox applies it to all columns.

Figure 4-8 The floating Color palette



See Chapter 11 for information on using the floating Color palette.

Choosing font options



You can change the appearance of the text in your fields or headings by inspecting the text and choosing Font from the menu. When you choose Font, you then choose whether you want to change the typeface, size, style, or color of the font.

- Choose Typeface to display a menu of available typefaces. The typefaces you'll see on the palette are determined by the fonts you've installed on your system. Standard typefaces include Helvetica, Times Roman, Courier, and System. You might have different, more, or fewer fonts.

  Click the typeface you want to apply to the selected area of the table.

- Choose Size to change the type size of the text. Paradox displays a menu of available sizes. Click the size you want to change the selected text to.

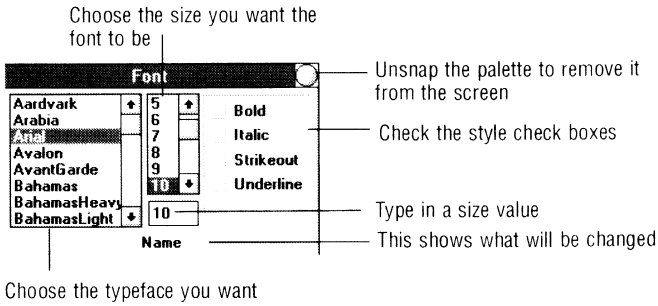
- Choose Style to change the text style.

  - Normal removes all style attributes from the text.
  - Bold displays the text in a heavier style.
  - Italic displays the text at a slanted angle.
  - Strikeout displays the text with a horizontal line running through it.
  - Underline displays the text with a horizontal line beneath it.

- Choose Color to change the color of the text you've selected.

If you want to change more than one of these attributes at the same time, click the snap at the top of the Font menu to display the Font palette, shown in Figure 4-9.

Figure 4-9 The Font palette

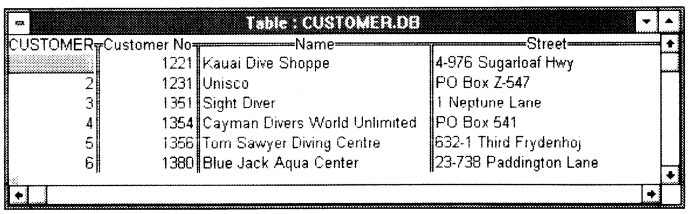


You can leave this palette onscreen for as long as you like; simply click the snap to remove it from the screen. To change a font using the Font palette, select the field you want to change, and choose the options you want from the palette. The selected text changes as you choose options.

Example 4-1 Changing the properties of a table

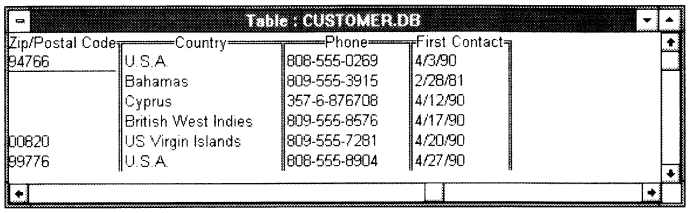
Suppose you want to change the look of the *Customer* table.

1. Click the Open Table SpeedBar button and choose CUSTOMER.DB from the dialog box that appears.



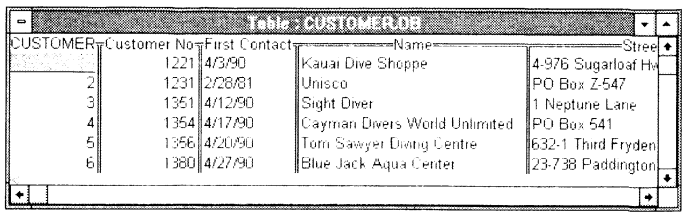
CUSTOMER	Customer No	Name	Street
1	1221	Kauai Dive Shoppe	4-976 Sugarloaf Hwy
2	1231	Unisco	PO Box Z-547
3	1351	Sight Diver	1 Neptune Lane
4	1354	Cayman Divers World Unlimited	PO Box 541
5	1356	Tom Sawyer Diving Centre	632-1 Third Frydenhoj
6	1380	Blue Jack Aqua Center	23-738 Paddington Lane

2. Scroll the table using the scroll bar on the bottom of the Table window until you see the First Contact field.

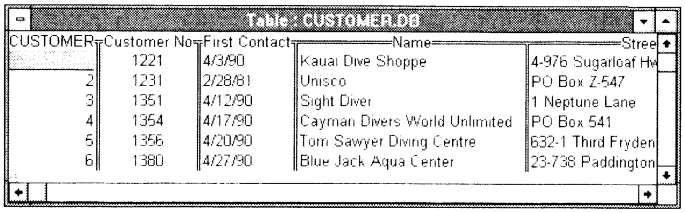


Zip/Postal Code	Country	Phone	First Contact
94766	U.S.A.	808-555-0269	4/3/90
	Bahamas	809-555-3915	2/28/81
	Cyprus	357-6-876708	4/12/90
	British West Indies	809-555-8576	4/17/90
00820	US Virgin Islands	809-555-7281	4/20/90
99776	U.S.A.	808-555-8904	4/27/90

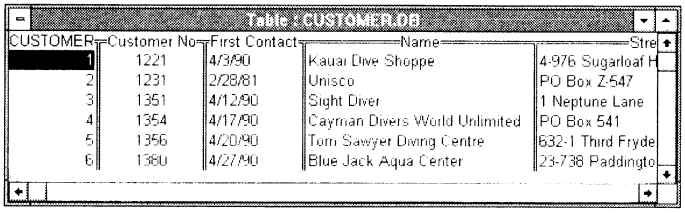
3. Point to the heading of the First Contact field. The pointer changes to a rectangle, indicating that you can drag the field to a new location. Drag the mouse and place the First Contact field to the right of the Customer No field.



4. Right-click in the Customer No field. Select Alignment from the menu that appears and choose Center. The values in the Customer No field are now center aligned in the column.



5. Right-click in the first column where the table name appears. Select Color and change the background of the record number field to white.



6. To restore the original default properties to the *Customer* table, choose Properties|View Properties|Restore from the Desktop menu.

Choosing properties based on a range of data

You can change the properties of all data in a field that meets a certain requirement. For example, in the Qty field of the *Lineitem* table, suppose you want to display all quantities less than five on a white background. You can do this using the Data Dependent property.

Alphanumeric, number, short number, date, and currency field types (as well as dBASE character, number, float number, date, and logical field types) all have the Data Dependent property choice. Use this to establish a range of values for which the field's display is visually different.

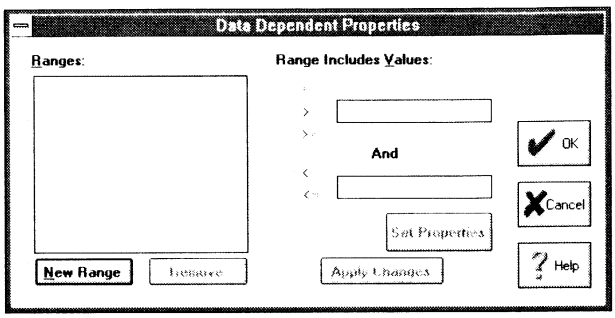
To specify a data dependent range, inspect the field and choose Data Dependent from its menu. You'll see the Data Dependent Properties dialog box, shown in Example 4-2.

Any ranges you've already specified appear in the Ranges list box. You can specify as many different ranges as you want.

Example 4-2 Specifying properties for a range

To specify a range of values,

1. Open the *Lineltem* table and select a record in the Qty field. Inspect it and choose Data Dependent from the menu that appears. Paradox opens the Data Dependent Properties dialog box.



2. Choose New Range.

3. Enter the values that establish the range in the Range Includes Values panel of the dialog box:

   Choose the >= button, then enter **0** in the top text box. This sets the beginning of the range as greater than or equal to zero.

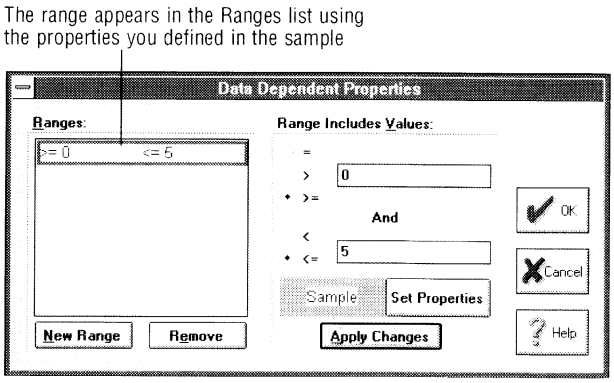
   Then choose the <= button and enter **5** in the bottom text box. This sets the end of the range as less than or equal to five.

   The word And, in the Range Includes Values panel, helps you read the range as "greater than or equal to zero *and* less than or equal to five."

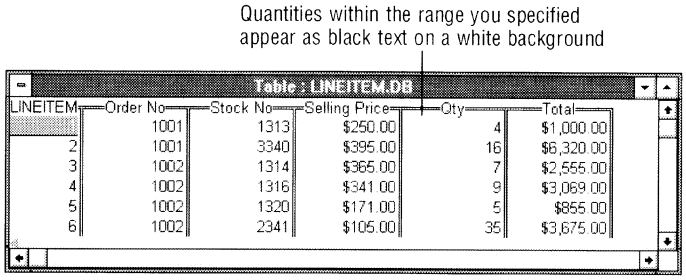
4. Once you've specified the range, you must set the properties for all values that fall within the range. To do this, inspect (right-click) the Sample area or click the Set Properties button.

   You'll see the Font Sample properties menu, from which you can set the background and text colors, as well as the text style, size, and typeface properties. Set the properties to black text on a white background.

   Choose Apply Changes to accept the range specification and properties you've chosen. The range then appears in the Ranges list, using the properties you set.



5. Choose OK to return to the Table window. Your table should now look like the following figure.

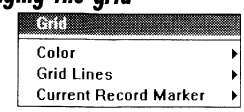


The range you specify in the Data Dependent Properties dialog box doesn't have to be numeric. You can set a range of dates or match text strings. For example, you could have one range that specified that all State field values in the *Customer* table that are equal to CA be displayed in yellow italic text, or that all dates in 1991 be displayed in blue underlined text.

To apply the properties you've chosen to the ranges you've specified, choose OK. Paradox closes the Data Dependent Properties dialog box, finds the values in the ranges and changes their properties.

Note The properties of a data dependent range override those you may specify for a column. If, for example, you choose a blue background color for a column, any records that fall within a data dependent range specification are not affected. These records continue to use the background color for the range, rather than for the column as a whole.

Changing the grid



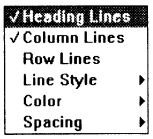
The grid is the pattern of lines that appear between the columns (and, optionally, the rows) of the table. You can change the grid's color, style, and number of lines displayed, and set properties for a current record marker.

Changing the grid's background color

The grid's background includes any space in the Table window that isn't taken up by the table itself. Change the grid's background by inspecting the grid and choosing Color from its menu. You'll see the Color palette, described earlier in this chapter.

You change the background of a single column by inspecting it and choosing Color. You can change all the column backgrounds at the same time by pressing *Shift+F6*. You'll see the All properties menu. Paradox applies changes you make using this menu to all columns.

Changing grid lines



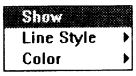
You can customize the grid in virtually any way you want. Inspect the grid and choose Grid Lines. Paradox lets you control what lines you display. You can choose

- *Heading Lines* to show or hide a line in the heading area
- *Column Lines* to show or hide the vertical lines of the grid
- *Row Lines* to show or hide the horizontal lines between the records of the table

Paradox provides more options that specify what the lines look like. You can choose

- *Line Style* to choose from five different types of lines, including several styles of dashed lines. You'll see the Line Style palette (shown at left). Choose the style you want and Paradox changes all lines of the grid.
- *Color* to change the color of the lines.
- *Spacing* to choose the number of lines between each column or row. You can display single, double, or triple lines.

Changing the current record marker



If you want, you can choose to display a *current record marker*. This is a horizontal line that appears beneath the current record. Inspect the grid and choose Current Record Marker. You can choose

- *Show* to turn the display of the current record marker on or off.
- *Line Style* to display the Line Style palette. Paradox displays the current record marker in the style you choose.
- *Color* to display the Color palette. Paradox displays the current record marker in the color you choose.

Viewing quick objects

You can use the Table | Quick commands or Quick SpeedBar buttons to view a form, graph, crosstab, or report. The document you see when you choose a Quick command depends on whether you've specified a preferred object.

If you have done so (using Properties | Preferred), the object you'll see is the one you've specified. If you haven't specified a preferred object, Paradox creates a default design for the object type you selected.

Note When you view your table's data in an alternate format (like a form or report) the property settings you've chosen in the Table window do not appear. You can customize the form or report individually to get the look you want for it.

When you choose Preferred | Form, Graph, or Crosstab, you'll see a dialog box with the word <Forms> displayed in the Type list. (Graphs and crosstabs are objects that can be placed on a form.) Choose the form you want. The form you choose must contain the table you're viewing in its data model.

Instead of using the Properties | Preferred command, you can right-click the Quick Form, Quick Report, Quick Graph, or Quick Crosstab SpeedBar buttons to specify your preferred objects.

If you don't have a preferred graph or crosstab for a table, but have more than one form, you can assign an additional form as the preferred graph or crosstab. Then you'll be able to view it from the Quick Graph or Quick Crosstab command or SpeedBar button.

When you choose Preferred | Report, you'll see the Choose Preferred Report dialog box with the word <Reports> in the Type list. Choose the report you want.

Note The report you choose as a table's preferred report can be a multi-table report. In this case, the table must be the master table in the report's data model.

There are four types of quick objects:

- Choose Table | Quick Form to view your preferred (or default) form for the table. The Form window opens on top of the open Table window (shown in Figure 4-12). From the Form window, you can use the Table View command or SpeedBar button to return to the view of the table, or you can simply click somewhere in the Table window to activate it.
- Choose Table | Quick Report to preview your preferred report or a default report for the table.
- Choose Table | Quick Graph to view your preferred graph or a default graph of the table's data.You'll see the Define Graph Object dialog box, discussed in Chapter 14.
- Choose Table | Quick Crosstab to view your preferred crosstab or a default crosstab of the table's data. You'll see the Define Crosstab dialog box, discussed in Chapter 14.

Saving table properties

Choose Properties | View Properties | Save to save all the changes you've made to a table's properties, including property changes to individual fields. Paradox saves data as it is entered, so File | Save and File | Save As are not necessary and are dimmed in the Table window.

Paradox saves the properties you define in the .TV file. (Properties for dBASE tables are saved in the .TVF file.) For example, the properties you define for the *Customer* table are saved in CUSTOMER.TV.

Note If you attempt to close a Table window without saving property changes, Paradox displays a dialog box asking if you want to save your changes.

If you change properties, then change your mind about them, you can choose Properties | View Properties | Restore to restore the original properties. Paradox restores all properties to the settings they had when you opened (or previously saved) the table properties.

You can delete a table's .TV (or .TVF) file by choosing Properties | View Properties | Delete. When you delete a table's unique property file, Paradox uses default property settings.

Creating default table properties

Suppose you know that you'll most often want number fields displayed in the General format, or date fields aligned left, or text displayed in blue. Paradox gives you the ability to establish default properties for each field type and to store them in a default file.

You can create a default table.

One way to establish default properties for each field type is to create a table in your private directory that includes one of each available field type. Name this table *Default*.

Open *Default* in a Table window. Enter Edit mode and inspect each field to set the properties for that field type. When you're finished, choose Properties | View Properties | Save to save the property settings in the DEFAULT.TV file.

Whenever you work with a table that *doesn't* have its own .TV file, Paradox applies the settings from DEFAULT.TV to it. Table-specific .TV files override the settings of the DEFAULT.TV.

You can copy any table to DEFAULT.DB.

Another way to create a DEFAULT.TV file is to use a table you've already customized to your liking, and copy it to DEFAULT.DB in your private directory. Paradox then uses its .TV file for default property settings.

If you're short on disk space, you can use the Windows File Manager to delete DEFAULT.DB, and any other DEFAULT files (like .PX or .VAL files) that were copied along with the table. All you really need is DEFAULT.TV.

You can create default property files for dBASE tables.

You create a default property file for a dBASE table the same way you do for a Paradox table. The only difference is that dBASE table properties are stored in a file with the .TVF extension. The default property file for dBASE tables is DEFAULT.TVF.

Emptying the table

You can choose Table | Empty to remove all records from the table you're viewing. Paradox displays a message warning you that all data will be removed from the table. You'll be prompted to confirm the removal or cancel the operation.

Caution You cannot undo an empty operation. Once Paradox removes the data you cannot retrieve it. Be sure you have backup tables of any data you might need before emptying a table.

For more information on emptying tables, see Chapter 8.

Viewing the table's structure

There might come a time when you've changed the view of the table to the extent that you've forgotten its true field order. Or you might want to see what validity checks or table lookups have been defined for a table. You need to view the table's structure.

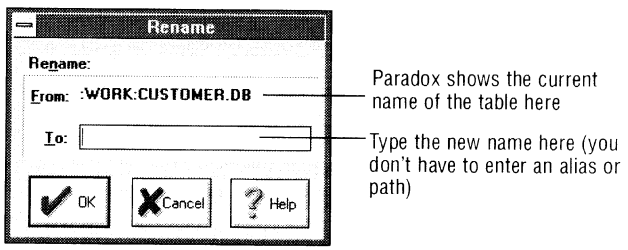
Choose Table | Info Structure to display the Structure Information dialog box. This dialog box is similar to the Create Table and Restructure Table dialog boxes, but you can't make any changes to the table's structure from it—it is purely a viewing tool. As you move through the Field Roster, Paradox displays each field's validity checks. If you want information about table lookup, secondary indexes, table language driver, or referential integrity, make the appropriate choice from the Table Properties list.

For more information on using the Structure Information dialog box, see Chapter 8.

Renaming the table

Choose Table | Rename to rename the table you're viewing. You'll see the Rename dialog box, shown in Figure 4-10.

Figure 4-10 The Rename dialog box



Enter the name you want to give the table in the New Name text box.

For more information on renaming tables, see Chapter 8.

Restructuring the table

Choose Table | Restructure to open the Restructure dialog box for the table you're viewing. Restructuring tables is discussed in detail in Chapter 9.

Sorting the table

When you sort a table, you tell Paradox to rearrange the order of the records in the table and display them in the order you specify.

Sorting keyed tables

If a table is keyed, Paradox always keeps its records sorted according to the values in the key field (or fields).

- If you want to *view* the table in a different order without changing the actual location of records in the table, you can use the Table | Order/Range command.
- If you do want to change the actual location of records in the table, you can sort the keyed table to a new table.

Use the Table\|Order/Range command to view a keyed table in a different order.

You cannot override the sort order established by a table's key. What you can do, however, is use a maintained secondary index to change the view order of the keyed table. This gives you a sorted view of the records, but doesn't change the physical location of the records in the keyed table. Use the Order/Range dialog box—not the Sort Table dialog box—to change the view of a keyed table. (See "Viewing a different order or range" later in this chapter.)

Use the Sort command to sort a keyed table to a new table.

If you want to change the actual location of the records in a keyed table, you can sort the keyed table to a new table. The new table created by the sort operation is unkeyed. The original table remains unchanged.

Sorting unkeyed tables

If a table is not keyed, records appear in the table in the order in which you entered them. See "Keys in Paradox tables" in Chapter 9 for information on creating keys.

When you sort an unkeyed table, you change the actual location of the records in the table. You tell Paradox the fields on which you want the table sorted. Paradox then rearranges the records based on field values. You can sort an unkeyed table to itself, or create a new sorted table, leaving the original intact.

Using Sort

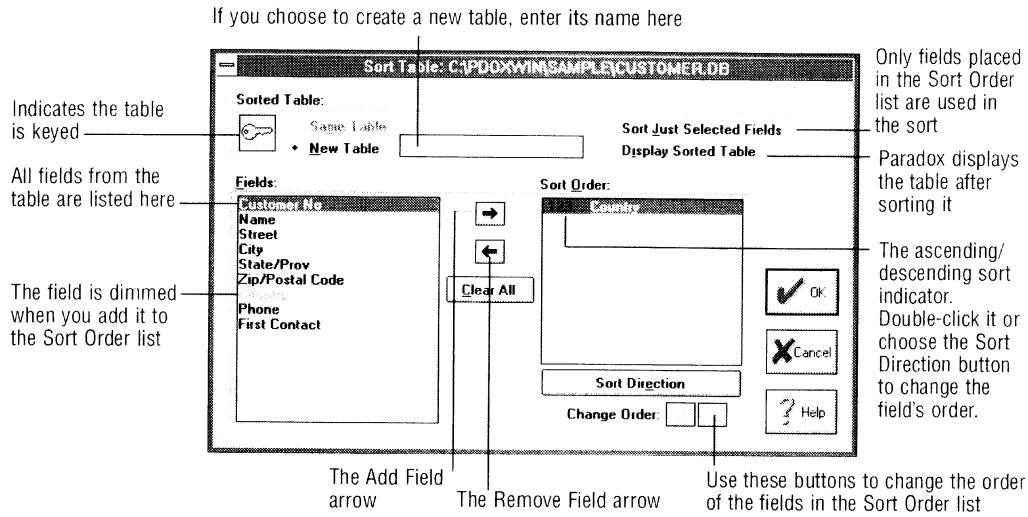
To sort a table, you can

- Choose Table | Sort from an open Table window.
- Choose File | Utilities | Sort, then choose the table you want to sort from the Select File dialog box.

- Inspect a table's icon in the Folder window and choose Sort.

Any of these methods displays the Sort Table dialog box, as shown in Figure 4-11.

Figure 4-11 The Sort Table dialog box



Specifying the sort order

You specify the order in which you want to sort the records of the table by selecting fields in the Fields list and adding them to the Sort Order list. When Paradox performs the sort operation, it sorts records based on the values in the first field in the Sort Order list, then on the values in the second field, and so on.

You don't have to put all the fields from the Fields list in the Sort Order list. Paradox adds any fields you don't explicitly put in the Sort Order list to the end of that list before performing the sort (unless you've checked Sort Just Selected Fields). In any case, Paradox includes all fields in the result (whether the result is the same or a new table).

Note If you don't add any fields to the Sort Order list, Paradox sorts the table in the order of the fields in the Fields list. If you check Sort Just Selected Fields, you must place at least one field in the Sort Order list.

There are some field types you can't sort on.

Paradox can't sort on BLOB fields in Paradox tables, or on memo or logical fields in dBASE tables. These types of fields are displayed in the Fields list, but are dimmed and cannot be selected for placement in the Sort Order list.

Adding fields to the Sort Order list

To add a field from the Fields list to the Sort Order list, select the field in the Fields list and choose the Add Field arrow or press *Alt+A*.

The field appears in the Sort Order list immediately below the selected field. The field name remains in the Fields list, but is dimmed to indicate that it's no longer available.

To insert a field at the top of the Sort Order list,

1. Select the top field in the Sort Order list.
2. Add the field you want. It appears selected below the top field.
3. Use the Change Order up arrow to move the field to the top position.

To add a consecutive group of two or more fields from the Fields list to the Sort Order list, click a field at one end of the range and drag to the other end of the range. (Or, using the keyboard, move to the top field in the range, hold *Shift* and press ↓ until all the fields you want are selected.) Then choose the Add Field arrow or press *Alt+A* to move the selected range of fields to the Sort Order list. If the range of fields you select extends over fields that can't be sorted on, or over fields that have already been added to the Sort Order list, Paradox ignores them.

Removing selected fields from the Sort Order list

To remove a single field from the Sort Order list, select it and choose the Remove Field arrow (or press *Alt+R*). The field returns to the Fields list. To remove a range of fields, select the range, then choose the Remove Field arrow (or press *Alt+R*). The Remove Field arrow is available only when a field is selected in the Sort Order list.

Removing all fields from the Sort Order list

To remove all fields from the Sort Order list, making those fields available again in the Fields list, choose Clear All (or press *Alt+C*). Clear All is available whenever there is a field in the Sort Order list.

Rearranging fields in the Sort Order list

To move a field or group of fields to a different position in the Sort Order list, select the field(s) you want, then click the up or down Change Order arrows.

Note

The Change Order arrows are available only when two or more fields are on the Sort Order list.

Using ascending or descending sort order

Each field in the Sort Order list is preceded by a sort order indicator that shows whether the sort order within the field is ascending (shown as **123...**) or descending (shown as **...321**). The default is ascending.

To reverse the sort order for a field, double-click the sort order indicator or select the field and choose the Sort Direction button.

The same table/new table option

Paradox gives you an option for how you can save the results of a sort:

- Choose Same Table if you want the result of the sort to overwrite the existing sort order of the table you are sorting. If you choose Same Table, keep these rules in mind:
  - Same Table is available only if you're sorting an unkeyed table. Sorting a keyed table to the same table would conflict with the primary index established by the key, which Paradox does not allow.
  - If you sort the table to itself, you must close all windows that include the table's data before you perform the sort; this means the table's window as well as any forms, reports, or other documents that use fields from the table.
- Choose New Table if you want the result of the sort to create a new table. Type the name of the new table in the New Table text box.
  - If you enter the name of an existing table, Paradox prompts you to confirm overwriting the existing table.
  - If you overwrite an existing table, you must close all windows that include that table's data before you perform the sort.

The Sort Just Selected Fields option

When you check Sort Just Selected Fields, Paradox sorts only those fields that appear in the Sort Order list. All the fields of the source table are included in the resulting sorted table, but they are not sorted beyond the fields listed in the Sort Order list.

Note If you check Sort Just Selected Fields and there is a case of two or more records with identical values in their sorted fields, Paradox cannot sort those records and places them in the table as a group, but unsorted within the group.

If you *don't* choose Sort Just Selected Fields, Paradox performs the sort first on the fields in the Sort Order List, then—if there are two or more records with identical values in their sorted fields—on the fields remaining in the Fields List (in the order in which they appear).

The Display Sorted Table option

When you check Display Sorted Table and perform the sort, Paradox opens the sorted table when the Sort Table dialog box is closed.

Performing the sort

When you have finished specifying the sort order, and have chosen the options you want, choose OK to perform the sort.

Sorting on a network

When you sort tables in a multiuser environment, Paradox automatically places a lock on the table you're sorting. This means other users can't modify its contents or structure. If another user has

a lock on the table, you won't be able to begin sorting until that user finishes working with it.

When you sort to a new table, Paradox automatically places a lock on that table as well as the original table for the duration of the sort.

Using a form

Using Paradox forms, you can display data and graphics from a table virtually any way you want. You can see just what you want to see, just the way you want to see it.

This section discusses the Form window, the default form, how to use the Form window's SpeedBar, and how to navigate among records and fields.

For information on creating or modifying forms in the Form Design window, see Chapter 12.

For information on using forms to enter or edit data, see Chapter 5.

Opening a form

To open a form from the Desktop, choose File | Open | Form. You'll see the Open Document dialog box, described in Chapter 3. Use this to choose the form you want. From the Open Document dialog box, you can choose to either view the form's data or change the form's design. This section discusses viewing a form's data.

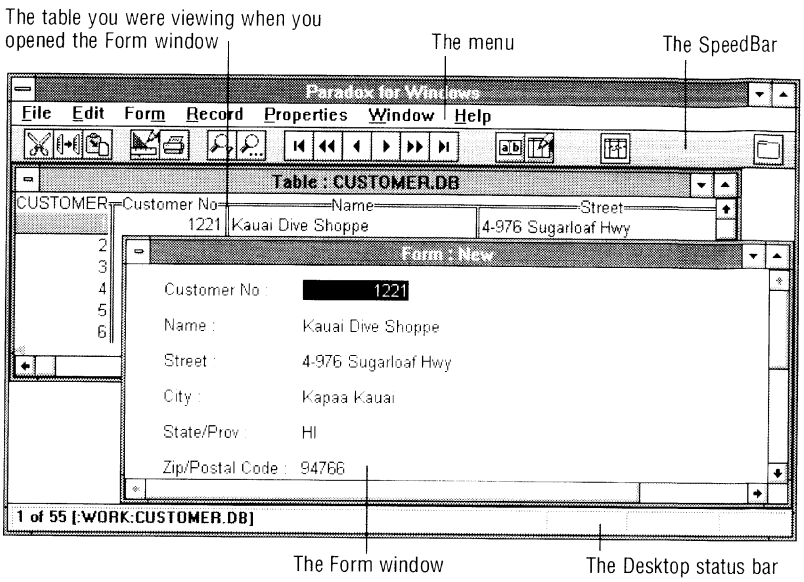
Opening a form from a table

From a Table window, you can open a quick form on that table's data in any of three ways:

- Click the Quick Form button on the SpeedBar.
- Choose Table | Quick Form.
- Press *F7*.

If you haven't identified a form as a preferred form for the table (see "Viewing quick objects" earlier in this chapter), Paradox creates a default form for you. Figure 4-12 shows the default form created from the *Customer* table.

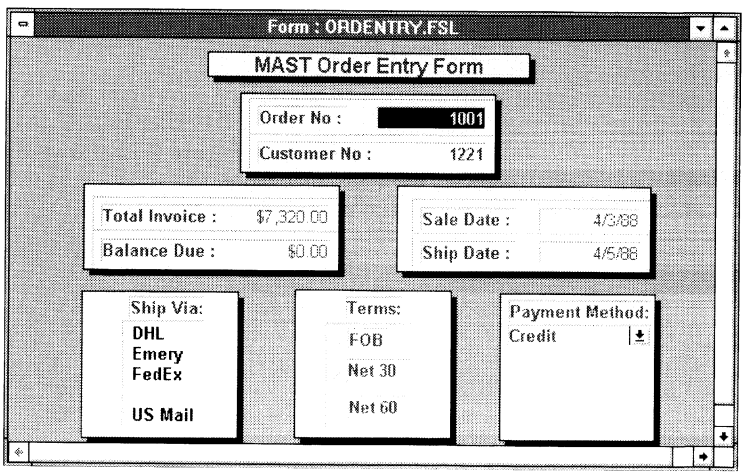
Figure 4-12 The Form window



Note When you open a preferred or default form from the table's window, Paradox moves to the record in the form that is currently selected in the table. For example, if you've selected record number 12 in the table, the form opens with record number 12 visible.

Figure 4-13 shows the *Ordentry* form. You can see how different it is from a default form's layout and design.

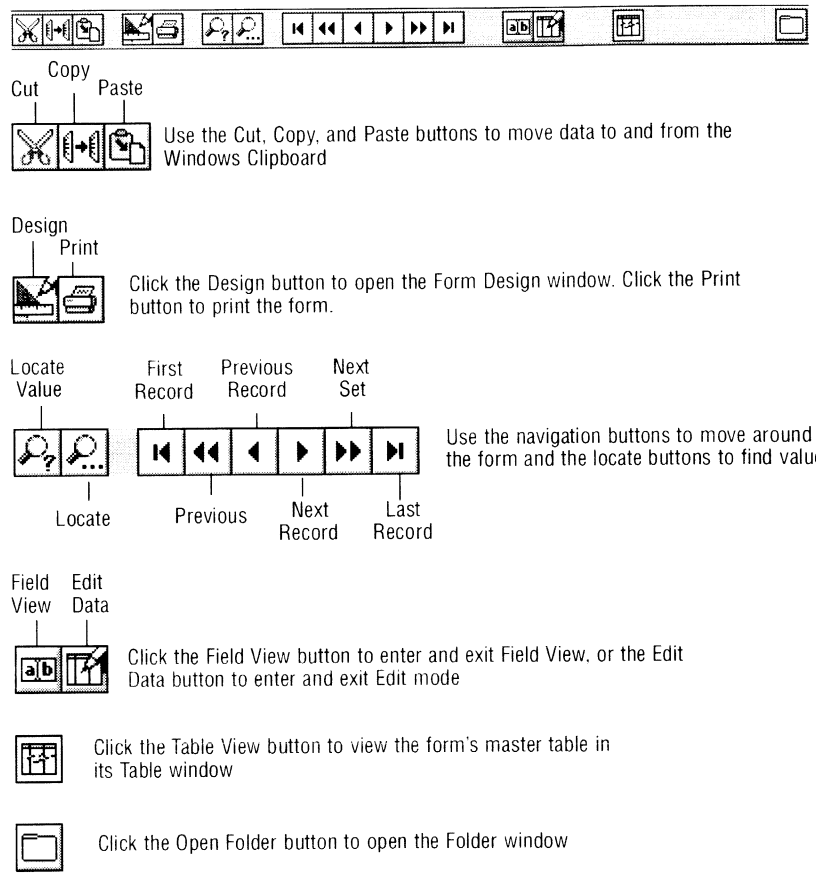
Figure 4-13 The *Ordentry* form



Using the Form window's SpeedBar

Figure 4-14 shows the buttons available on the Form window's SpeedBar.

Figure 4-14 The Form window's SpeedBar



Viewing the form's source table

You can always view the table on which the form was built. If you opened the form from a Table window, choosing Form | Table View activates the table's window (or opens it if you've closed it). If you opened the form from the Desktop, choosing Form | Table View (or clicking the Table View SpeedBar button or pressing *F7*) opens the source table of a single-table form, or the master table of a multi-table form.

Moving among fields

You can move to any field on a form by clicking it. If you choose to use the keyboard, use *Tab* to move to any field on a single-table form.

Tab moves from field to field in left-to-right, top-to-bottom order. When you reach the last (most bottom-right) field, pressing *Tab* returns to the first (most top-left) field on the screen.

Note Using *Tab* is reliable and predictable in simple forms. As a form becomes more complex, with more objects on it, tab order can become confusing. You can always use your mouse to move quickly to the object you want.

Using *Shift+Tab* reverses the tab order. The sequence of movement is right-to-left, bottom-to-top.

Note If you've turned a field's Tab Stop property off, you won't be able to use *Tab* or the arrow keys to move to it. The field is simply bypassed in the tab order. To turn Tab Field on or off, inspect the field in the Form Design window.

When you're working in a multi-table form, you can use *F3* and *F4* to move from the master region to the detail region and back again.

Moving among records

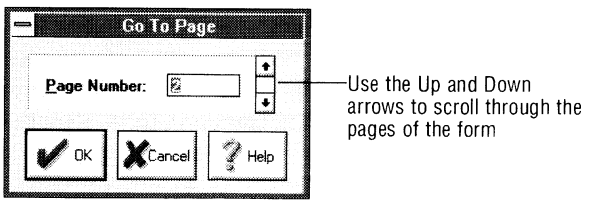
To move among the records of a form, you can

- Choose the Record menu's First, Last, Next, Previous, Next Set, and Previous Set commands.
- Click the navigation buttons on the SpeedBar.
- Press the appropriate keyboard key (like *PgUp* or *PgDn*). See Appendix A for a complete listing of shortcut keys.

Moving through pages

If you're using a multi-page form, choose Form | Page to navigate quickly through its pages. You can go quickly to the first, last, next, or previous page. If you know the page number you want, choose Form | Page | Go To to display the Go To Page dialog box shown in Figure 4-15. You can scroll through the form's pages and choose OK to go to the one you want (or type the page number directly into the dialog box and choose OK).

Figure 4-15 The Go To Page dialog box



Using Flicker-Free Draw

Sometimes you may notice that the screen flashes a bit when you move from field to field. This is especially noticeable when the form

you're working with has a dark background. To suppress this behavior, choose Properties | Designer and check Flicker-Free Draw.

Turning Flicker-Free Draw on *does* eliminate some screen flickering, but it may cause the movement from one field to another to be somewhat slower on some graphic adaptors. Experiment using your form with Flicker-Free Draw on and off to see what works best for you.

Using Zoom

Choose Properties | Zoom to get a closer or more distant view of the form. Zoom in to increase the scale of the Form window. You can zoom in to 400% of the original size of your document. Zoom out to get a broader picture of the screen. You can zoom out to 25% of the original size of your document.

In addition to the general range, Paradox gives you three automatic zoom choices:

- *Fit Width*, which proportionally resizes the form so that its full width can be displayed within the window
- *Fit Height*, which proportionally resizes the form so that its full height can be displayed within the window
- *Best Fit*, which proportionally resizes the form so that both its full height and full width can be displayed within the window

These proportions are retained when you resize the Form window, expanding or contracting as necessary.

Saving Form window settings

If you like the way you've specified the settings in the Form window you're working with, choose Properties | Form Options | Save Defaults. Paradox saves the ruler, grid, and zoom property settings as they appear on the Properties menu for use as default settings in all Form windows.

Printing a form

You can print a form by choosing File | Print from the Form window. The details of printing forms are discussed in Chapter 12.

Working with data in a table or a form

Icons represent tables or forms.

With some minor exceptions, the operations described in this section work the same, whether you use a table or a form.

This icon represents tables. Information that is unique to tables is accompanied by this icon.

This icon represents forms. Information that is unique to forms is accompanied by this icon.

Entering and exiting Field View

When you move to a field, Paradox selects the entire field. When you want to move the insertion point around in the field, you must enter *Field View*.

When you enter Field View, Paradox places the insertion point at the end of the existing contents of a field. You can then move around within the field.

How do I enter Field View?

You can enter Field View in a variety of ways:

- Select the field and choose Table | Field View or Form | Field View.
- Select the field and click the Field View button on the SpeedBar.
- Select the field and press *F2*.
- Click twice in the field. (You'll place the insertion point wherever you click in the field.)

How do I leave Field View?

You can exit Field View by unchecking Table | Field View, clicking the Field View SpeedBar button, clicking a different field, or pressing *F2*. Additionally, pressing *Enter*, *Tab*, or *Alt* with an arrow key lets you exit Field View and move to a different field in one step.

What are the types of Field View?

Paradox has three types of Field View:

- *Field View:* Lets you move the insertion point around in a field character by character.
- *Persistent Field View:* Lets you move to another field and remain in Field View. To enter Persistent Field View, press *Ctrl+F2*.
- *Memo View:* On memo and formatted memo fields, gives you some word-processing capabilities and gives your keyboard greater functionality. For example, you can insert a line break or a tab character. To enter Memo View, press *Shift+F2*.

All types of Field View are discussed in detail in Chapter 5.

When viewing a table, if you enter Field View on a memo, formatted memo, graphic, or OLE field, Paradox displays the field's value in a single-field window on top of the table.

When viewing a form, Paradox doesn't display a special window to show you the contents of a memo, formatted memo, graphic, or OLE field. These fields are always displayed in the size and shape you specify from the Form Design window.

Selecting fields

When you move to a field, Paradox highlights it. This indicates that the field is *selected*. If you type anything into a highlighted field,

you'll replace the existing contents with the data you type. You can select more than one field at a time, or select a portion of a field's value.

You can select multiple fields.

You can select multiple fields across rows and columns, simply by drawing a box around the ones you want. Fields selected this way must be adjoining.

Note You can select multiple fields only in tables, not in forms.

To select a group of fields using the mouse, select the field where you want to begin (don't enter Field View) and drag to draw a box around the fields you want. The pointer changes to a four-headed arrow.

To select a group of fields using the keyboard, select the field where you want to begin (don't enter Field View) and hold down *Shift*, while pressing the arrow keys to place a box around the fields you want.

You can select all fields.

If you want to select all fields in the table (this means you're selecting the entire table) choose Edit | Select All. Paradox places a box around the whole table.

Copying data

If you want to copy data to the Windows Clipboard, select the data you want and choose Edit | Copy. You can paste data you've copied to the Clipboard into other fields or other Windows applications.

- Select a field and choose Edit | Copy to copy the entire field value.
- To copy only a portion of a field's data, enter Field View (see "Entering and exiting Field View," earlier in this chapter) and select the data you want. Then choose Edit | Copy.

When using a Table window, you can copy more than one field at a time. When you make your selection, lines appear around the selected data.

- To copy a whole column, double-click the column heading to select the column, then choose Edit | Copy.
- To copy a whole row, double-click an unselected record number. (If the record number is selected when you double-click, you'll enter Field View.)
- To copy multiple field values, either choose Edit | Select All followed by Edit | Copy (this copies all the values in the table to the Clipboard), or click and drag over the specific fields you want to select and choose Edit | Copy.

Note You can copy multiple field values only in a table, not in a form. You cannot paste multiple field values back into a table. You can,

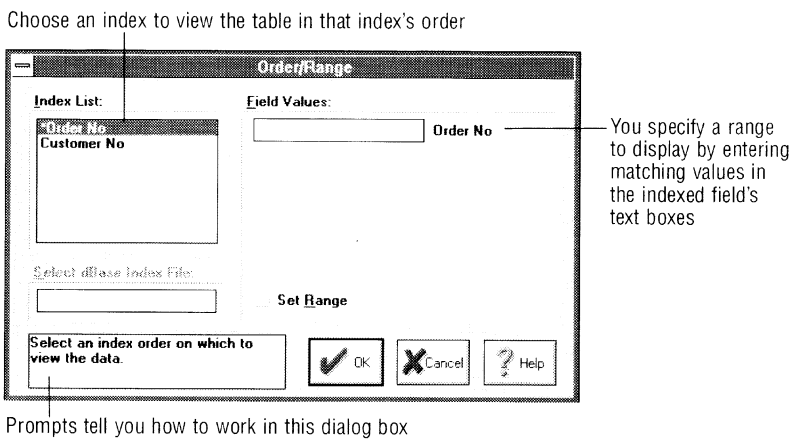
however, paste them into any other application that accepts them (for example, Quattro Pro for Windows).

Viewing a different order or range

Suppose you want to view a keyed table in a different order than that established by the primary index. You can use a secondary index to change the view. You can also specify a range of values in the index and tell Paradox you want to view only values within that range.

To use either of these options choose Table | Order/Range (or Form | Order/Range). You'll see the Order/Range dialog box, shown in Figure 4-16.

Figure 4-16 The Order/Range dialog box



To view the table in the order of a secondary index, choose the index you want from the Index list. The index fields appear in the Field Values panel. Choose OK, and Paradox displays the table in the view order of the chosen index.

Note If you want to specify a descending instead of an ascending view order, or a case-sensitive as opposed to a case-insensitive view order, you must first define the index you use to the specifications you want. You cannot modify an index from the Order/Range dialog box.

To specify a range of values you want to see, first choose the index you want to use from the Index list. If the index field is a type that allows a range to be set, the field name appears next to a text box in the Field Values panel.

The index you choose defines the viewing order of the table. It groups like values together, so Paradox can find them quickly. When you specify a range, you tell Paradox which group(s) you want to see.

You can specify exact matches.

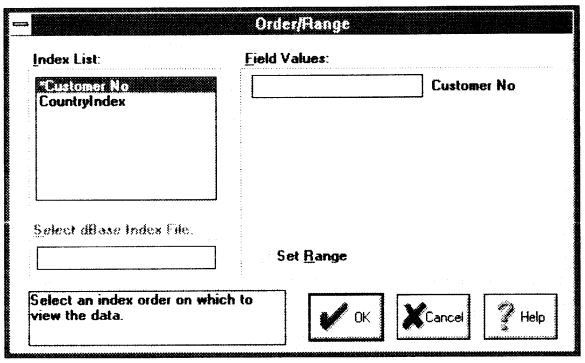
An exact match on a range means you want Paradox to display only those records whose value matches exactly the value you specify.

Specify the value you want by entering it in the text box in the Field Values panel. For example, if you have an index on the Country field of the *Customer* table, and you enter **Canada** as the value you want to match, Paradox displays only those records of the table with Canada as their Country value.

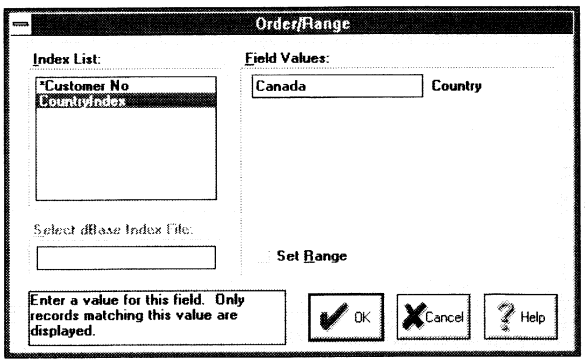
Example 4-3 Locating exact values

Suppose you want to see only your Canadian customers.

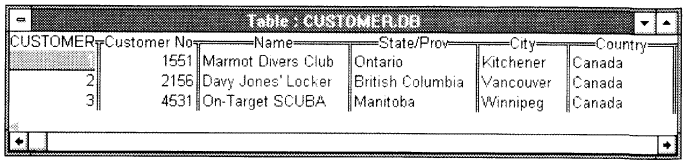
1. Open the *Customer* table.
2. Choose Table|Restructure and create a secondary index of the Country field. (See Chapter 9 for information on creating secondary indexes.)
3. Choose Table|Order/Range.



4. Choose the index you created on Country and type **Canada** in the text box in the Field Values panel.



5. Choose OK.



6. Paradox shows only those records within the range (Canada) you set.

You can specify a range of values.

You don't have to set an exact match for a field. If, for example, you want to see all records that fall within a specific range, you can use the Set Range check box.

To set a range on one of the fields in the index, place the insertion point in the text box for that field and check Set Range.

Note If you check Set Range without first placing the insertion point in a text box, Paradox automatically chooses the last field for which you have specified a value.

When you check Set Range, you'll see another text box appear below the first text box in the Field Values panel. To define the range of values you want Paradox to display, enter the low value in the top text box and the high value in the bottom text box.

For example, if you have an index on the Sale Date field of the *Orders* table, and you want to see all orders for the year 1991, you can enter **1/1/91** in the top text box and **12/31/91** in the bottom text box. When you view the table, only those records that have sale dates within that year are displayed.

Note Paradox doesn't recognize blanks as part of a match or range specification. A blank matches all records in the field. Blanks are allowed only in the last field of a composite index.

You can match partial strings.

If you want to, you can match partial values of range matches on alphanumeric fields. Suppose you've divided responsibility for contacting customers alphabetically among your employees. One employee is responsible for taking care of customers whose names begin with the letters A through J. To view this range of customers, you would

1. Choose an index on the Name field. This sorts the records of the *Customer* table alphabetically by name.
2. Enter **A** in the top text box. This tells Paradox you want to begin the range with names that start with the letter A.
3. Enter **J** in the bottom text box. This tell Paradox you want to end the range with the names that start with the letter J.

4. Check Match Partial Strings. (Match Partial Strings is unavailable until you check Set Range with an alphanumeric field in the Field Values panel.) This tells Paradox you don't care what the full field value is, as long as it starts with a letter that falls within the range.

When you choose OK and view the table, Paradox displays all records for customers whose names fall within the range.

You can use ranges on a composite index.

If you choose a composite index from the Index list, the fields of the index appear (in their table order) in the Field Values area.

When setting ranges on a composite index, keep in mind that

- You don't have to specify a range for *every* field of the index, but you can't skip over a field. For example, if you have a three-field index, you can
  - Set a range on the first, but not the second or third
  - Set a range on the first and second, but not the third

  But you cannot
  - Set a range on the first and third, skipping the second
- You can specify exact matches *and* range matches on the same composite index, but you can use a range match only on the last of the fields for which you define a match. Using the example of the three-field index, you can
  - Set an exact match on the first and second, and a range match on the third
  - Set an exact match on the first, a range match on the second, and leave the third blank
  - Set a range match on the first, and no range on the second or third

  But you cannot
  - Set a range match on the first and an exact match on the second or third

What happens when you use a quick form?

Suppose you set an Order/Range from the Table window, then click the Quick Form SpeedBar button to open your preferred form. Even if you've set a different Order/Range for use on the form, Paradox uses the table's Order/Range setting in both windows because the table was opened first. Likewise, if you open a form first, then click the Table View SpeedBar button to open a Table window, the table will use the form's Order/Range setting. Paradox uses the settings of the window you open first.

You can save an Order/Range setting with a form. (You can't save an Order/Range setting with a table.) Simply specify the Order/Range setting you want, then save the form from either the Form window or the Form Design window.

Using Order/Range with dBASE tables

When you open the Order/Range dialog box for a dBASE table, the Index list shows all tags included in the table's production index (the .MDX file that shares the table's name). Choose a tag and use the dialog box the same way you would for a Paradox table.

Choose NO INDEX if you want to view the table in an unindexed order.

If you want to use a different index (an .NDX file or a tag from a different .MDX file), enter its name (including its extension) in the Select dBASE Index File text box. You can then use it as you would any other index.

When you change the view of a dBASE table's order, the record numbers (which show each record's true location in the table) are shown out of order.

Note You cannot use a composite index on a dBASE table to set a range. You can, however, use an expression index.

Using Order/Range affects the scroll bar.

When you use the Order/Range dialog box on a dBASE table, the vertical scroll bar thumb always appears in the center of the scroll bar. You can move it, to move through the table, but it will return to the center after you drag it.

Showing deleted records in dBASE tables

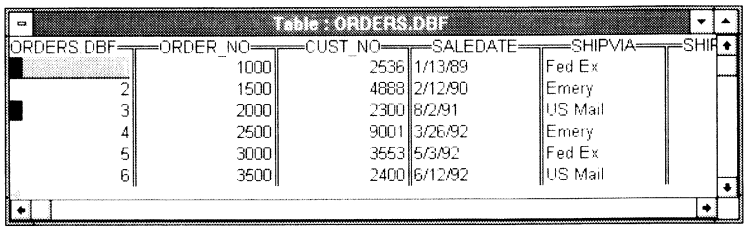
When you delete a record from a dBASE table, Paradox doesn't erase it from the table; it simply hides it or marks it as deleted (depending on the option you specify). If you want to see deleted records, you can choose Table | Show Deleted (or Form | Show Deleted).

In a Table window, Paradox displays deleted records marked by a box in the record number column (see Figure 4-17).

Note When you view a deleted record in a Form window, the status bar displays **(Record deleted)** following the table name.

Figure 4-17 Viewing deleted records in a dBASE table

Markers indicate records 1 and 3 are deleted



You can undelete dBASE deleted records.

If you want to recover a deleted record in a dBASE table, use the Record | Undelete command or press *Ctrl+Del* while you're on the deleted record, in Edit mode, with Show Deleted on. Undelete is available only when you've selected a deleted record.

Caution

Show Deleted and Undelete are available only for dBASE tables. When you delete a record from a Paradox table it is permanently erased and cannot be recovered.

To permanently erase a dBASE record, restructure the table and check Pack Table.

Deleted records affect the scroll bar.

If you delete a significant number of records from a dBASE table, you may notice that the vertical scroll bar treats the table as if deleted records are still present, even if you have Show Deleted off.

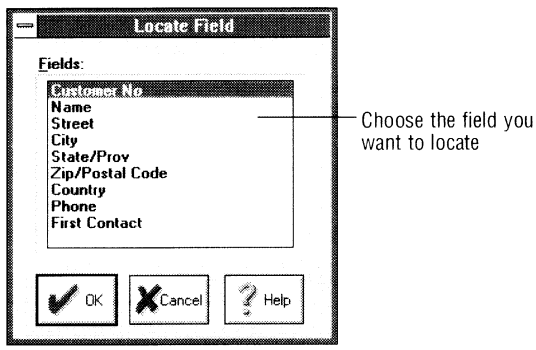
Locating information

Use the Locate commands on the Record menu to find records, fields, and values in a table or form.

Locating fields

Choose Record | Locate | Field to move to a particular field of a table. You'll see the Locate Field dialog box, shown in Figure 4-18.

Figure 4-18 The Locate Field dialog box

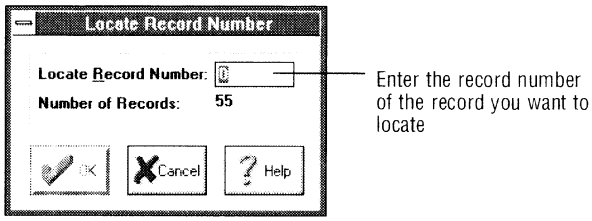


The Fields list shows all of the table's fields. Choose the one you want and choose OK to move to it (OK is dimmed until you choose a field). This feature is especially useful if you're working on a large table with many fields. It is sometimes faster and more precise than using the scroll bars or pressing *Tab* repeatedly. Paradox defaults to the selected field the first time you use the Locate Field dialog box. After that, Paradox defaults to the last field you searched for.

Locating records by record number

Choose Record | Locate | Record# to move to a particular record of a table. You'll see the Locate Record Number dialog box, shown in Figure 4-19.

Figure 4-19 The Locate Record Number dialog box

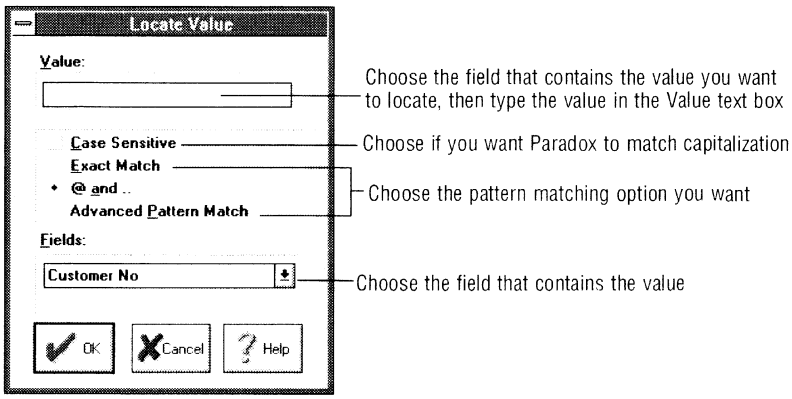


The record number of a Paradox table is assigned automatically by Paradox and can't be edited. It shows the record's position in the table.

Locating values

Choose Record | Locate | Value to move to a particular value in a field. You'll see the Locate Value dialog box, shown in Figure 4-20.

Figure 4-20 The Locate Value dialog box



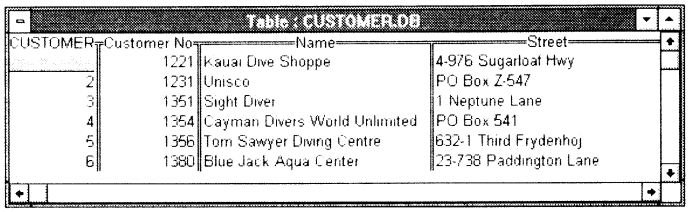
Choose the field in which the value is to be found from the Fields list, and enter the value you want in the Value text box. When you choose OK, Paradox moves to the first occurrence in the table of the value. Choose Record | Locate Next to move to the next occurrence. When you've located all matching values, Paradox displays a message in the center of the the Desktop's status bar.

Check Case Sensitive if you want Paradox to locate only those values that match the capitalization of the value you enter in the Value text box.

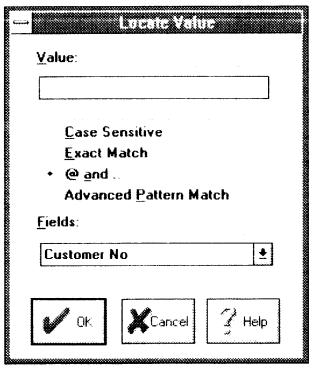
Example 4-4 Locating values

Suppose you want to locate all your Canadian customers.

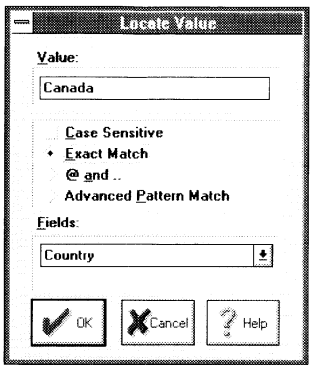
1. Open the *Customer* table.



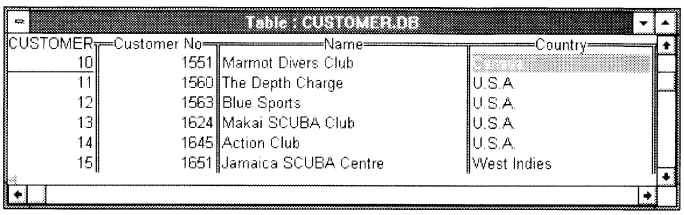
2. Click the Locate Field Value SpeedBar button.



3. Choose Country from the drop-down list in the Fields panel.
4. Enter **Canada** in the Value text box.
5. Choose the Exact Match button.



6. Choose OK. Paradox locates the first occurrence of Canada.



7. To locate other occurrences of Canada, click the Locate Next SpeedBar button.

You can match simple patterns.

By default, Paradox makes available the @ and .. wildcard operators for simple pattern matching.

- @ represents any single character.
- .. represents any value.

If you don't want to match a pattern, choose the Exact Match button. Paradox then locates only values that match exactly what you enter in the Value text box.

You can match advanced patterns.

Choose the Advanced Pattern Match radio button if you want to use Paradox's advanced wildcard operators. Table 4-1 shows a list of the advanced wildcard operators you can use to match patterns.

Table 4-1 Wildcard operators used in advanced pattern matching

Wildcard	Operation
^	Beginning of field
$	End of field
*	Match none or more of the expression before the *
+	Match one or more of the expression before the +
?	Match one or none of the expression before the ?

Wildcard	Operation
|	Match either the characters before or after the vertical bar
[ ]	Match any characters contained within the brackets
[^]	Match any characters not contained within the brackets
( )	Group contained characters
\	Use following wildcard operator as a regular character
\r	Carriage return
\n	Linefeed
\t	Tab
\f	Formfeed

You can combine wildcard operators to create sophisticated locate criteria. Table 4-2 shows examples of some patterns and the results they yield.

Table 4-2 Examples of pattern matching

Pattern	Result
..blue..	Blue Sports, Divers of blue-green, Blue Glass Happiness
blue..	Blue Sports, Blue Glass Happiness
^blue..	Blue Sports, Blue Glass Happiness
^blue	Blue Sports, Blue Glass Happiness
^blue|^dive	Blue Sports, Divers of blue-green, Divers' Grotto
^(blue|dive)	Blue Sports, Divers of blue-green, Divers' Grotto
abc	abc
abc+	abc, abcc, abccc (any number of c's)
abc*	ab, abc, abcc, abccc, (no c or any number of c's)
abc?	ab, abc (no c or one c)
[abc]	a, b, or c
[^abc]	Anything except a, b, or c
[a-z]	Any character in the range a-z
[]\^*^]	The characters], /, \, *, or ^
(abc)	abc
(abc)+	abc, abcabc, abcabcabc
a|(an)	Either a or an
c..k	The longest possible string that begins with c and ends with k
c[^]k	A single word that begins with c and ends with k

After you've located a value, Choose Record | Locate Next to move to the next occurrence of that value in the table. Locate Next is dimmed until you first choose Locate | Value.

You may find it faster to use the Locate and Locate Next buttons on the SpeedBar.

Choose Record | Locate | and Replace to move to a particular value in a field and change that value. Since replacing a value is an editing task, the Locate | and Replace command is dimmed in the Table window. See Chapter 5 for information on using this command.

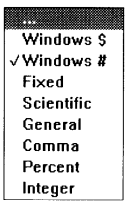
Changing the display of data

You can change the appearance of data in a table or a form by changing field properties.

The choices on a field's menu vary, depending on the type of data in the field. Alphanumeric field properties are different from number field properties, which are different from date properties, and so on.

Changing a field's properties does not change the data or how it is stored. It provides you with another degree of flexibility when you view the data.

Changing the number format



You can change the format in which a number is displayed by inspecting the field and choosing Number Format. You can inspect a field in the Table window or the Form Design window. You'll see a menu of the number formats you've most recently used. (By default, the menu looks like the one in the figure to the left.)

Choose one of the formats to apply it to the number field you're inspecting.

- *Windows #* is the default format for Paradox number fields. Paradox uses the format you specify from the Windows Control Panel.
- *Windows $* uses the currency symbol and format that you defined in the Windows Control Panel.
- *Fixed* displays number values with two decimal places. Trailing zeros are displayed. Thousand separators are not used. Negative numbers are preceded by a minus sign (–).
- *Scientific* displays number values in exponential notation (with two decimal places), a decimal number from 1 to 10 multiplied by a power of 10. Negative numbers are preceded by a minus sign (–).

  Any number format uses scientific notation to display numbers that are too big to fit. The Scientific format *always* uses scientific notation.
- *General* displays number values with up to two decimal places if the number includes a decimal value. Trailing zeros and thousand

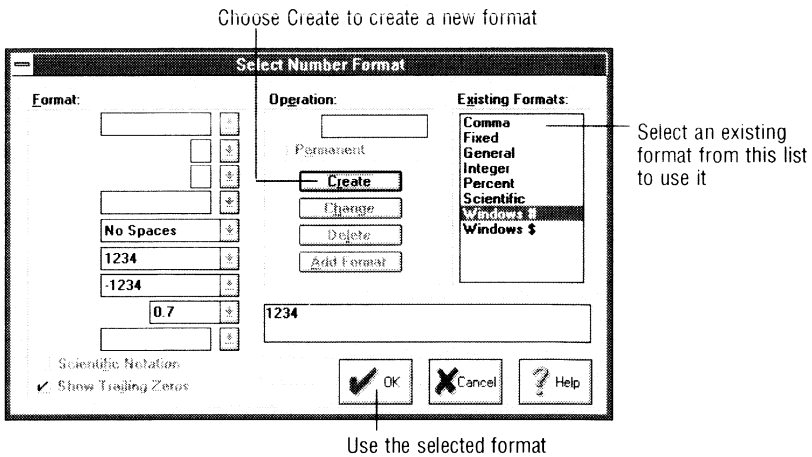
separators are not displayed. Negative numbers are preceded by a minus sign (–).

- *Comma* displays number values with two decimal places. Trailing zeros are displayed. Thousand separators are used and displayed as a comma. Negative numbers are displayed in parentheses.
- *Percent* displays numbers followed by the percent sign (%). For example, the value .5 is displayed as 50%. Thousand separators are not used. Negative numbers are preceded by a minus sign (–).
- *Integer* displays whole numbers only. Decimal values are rounded when you convert to the Integer format. If you convert to a format that displays decimals, they are returned. Thousand separators are not used. Negative numbers are preceded by a minus sign (–).

You can define your own number formats by choosing the ellipsis (...) at the top of the number format menu. You'll see the Select Number Format dialog box. Name your own formats and use any of the options available to create custom formats from this dialog box.

Note You can create, delete, or change only custom formats, not Paradox provided formats.

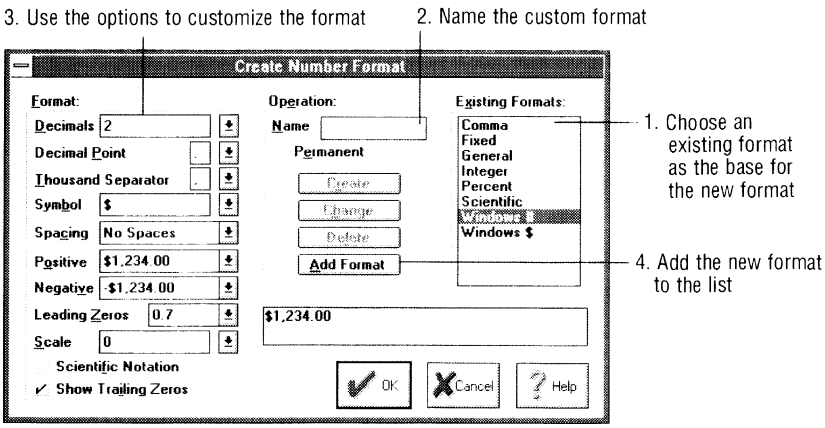
Figure 4-21 The Select Number Format dialog box



You can create custom number formats.

If you want to define your own number format, choose Create. The name of the dialog box changes to Create Number Format, and the Format panel displays available options for creating the format you want, as shown in Figure 4-22.

Figure 4-22 The Create Number Format dialog box



Enter the name you want to give the format in the Name text box and choose the properties for the format using the drop-down lists in the Format panel.

If you want to use a Windows Control Panel default format for a particular option, you can right-click that format option's text box. You'll see a menu of defaults you can use. This lets you define your custom format more quickly.

Note Set the Windows number and currency formats from the Windows Control Panel.

To customize a number format,

- Choose Decimals to specify the number of decimal places you want to display. You can display up to 15 decimal places, simply by typing the number you want in the Decimals text box.
- Choose Decimal Point to choose either a period (.) or a comma (,) as your decimal point.
- Choose Thousand Separator to specify whether you want to display a thousand separator. You can choose a period (.) or a comma (,) as your thousand separator.
- Choose Symbol to specify what type of symbol you want displayed with the number. Available symbols include $, inch, lb, kg, cm, mi, and DM. Define your own symbol by typing it in the Symbol text box.
- Choose Spacing if you want to place a space between the number and the symbol that precedes it. You can specify that you want a space between the symbol and the number for all positive values, for all negative values, or for all values.

Note The Spacing option is not available unless you've chosen a symbol.

- Choose Positive if you want to display a plus sign (+) for positive numbers. The drop-down list gives you several options for where you'd like the plus sign to appear.
- Choose Negative if you want to display an indicator with all negative numbers. You can indicate that a number is negative using a minus sign (–) or parentheses. The drop-down list gives you several options for where the minus sign or parentheses can appear.
- Choose Leading Zeros to specify the number of digits before the decimal place you want to display. For example, if you enter the number **466** in a field that has Leading Zeros set to four, Paradox displays the number **0466** as soon as you move off the field.

  If you enter the number **03031** in a number field with less than five leading zeros, Paradox displays the number **3031**. Using a number format with five leading zeros, however, ensures that Paradox displays the initial zero in the five-digit number. This is useful if you plan on storing zip codes in number fields.
- Choose Scale to multiply the number by a given power of 10. If, for example, you enter **3** in the Scale text box, you'll see the example number multiplied by 10^3. Choose a negative value to divide the number by a given power of 10.
- Check Scientific Notation to display the number in scientific notation format.
- Check Show Trailing Zeros to display trailing zeros. This means that numbers with no decimal value will display as many zeros after the decimal point as you've specified in the Decimals box.

When you've defined and named the number format you want, choose Add Format to add it to the Existing Formats list. The name of the format will appear on the Number Format menu when you inspect number fields.

If you check the Permanent check box, Paradox saves the number format you specify in PDXWIN.INI. If Permanent is unchecked, the number format is available only until you exit Paradox.

Note You can name custom formats for number, currency, date, time, timestamp, and logical fields. You must give each format a unique name, regardless of the data type it applies to. For example, you cannot give a number format and a date format the same name.

You can delete any format you've created.

To delete a format you've created, choose it from the Existing Formats list and choose Delete. You can delete only those formats

you've created. The Delete button is dimmed when you choose an existing format that cannot be deleted.

You can change any format you've created.

To change a format you've created, choose it from the Existing Formats list and choose Change. Paradox displays the format definition in the Format panel of the dialog box. Make the changes you want and choose Accept to confirm the changes and add the format back to the Existing Formats list.

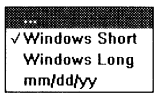
You can change only those formats you've created. The Change button is dimmed when you choose an existing format that cannot be changed.

Changing the currency format

You change currency formats the same way you change number formats, by picking a predefined format from the Number Format menu, or by creating a custom format from the Select Number Format dialog box.

Changing the date format

Date fields have a Date Format property. Choose this to change the way that Paradox displays a date.



When you choose Date Format, Paradox displays a menu of the date formats you've most recently used. (By default, the menu looks like the one in the figure to the left.) Choose one of the formats to apply it to the selected date field.

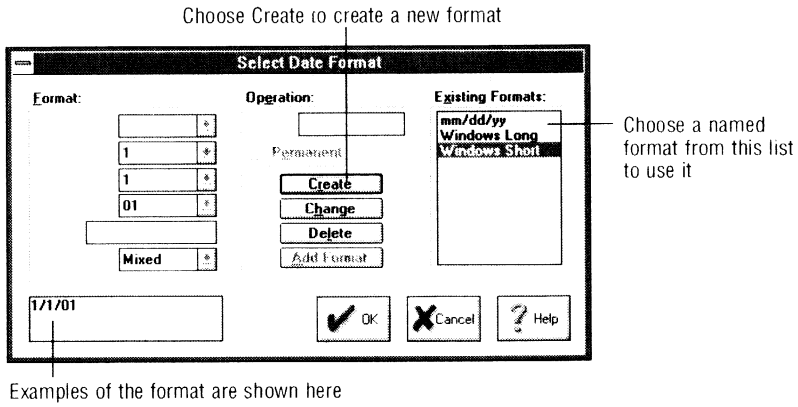
- *Windows Short* uses the short date format you define in the Windows Control Panel International dialog box.
- *Windows Long* uses the long date format you define in the Windows Control Panel International dialog box.
- *mm/dd/yy* displays dates using two-digit numbers for the month, followed by the day, followed by the year, each separated by a slash mark (/).

Note For each of these formats, a two-digit *yy* value is assumed to be in the current century. For dates earlier or later than the twentieth century, you must specify all digits of the year.

You can create custom date formats.

You can define your own date formats by choosing the ellipsis (...) at the top of the date format menu. You'll see the Select Date Format dialog box.

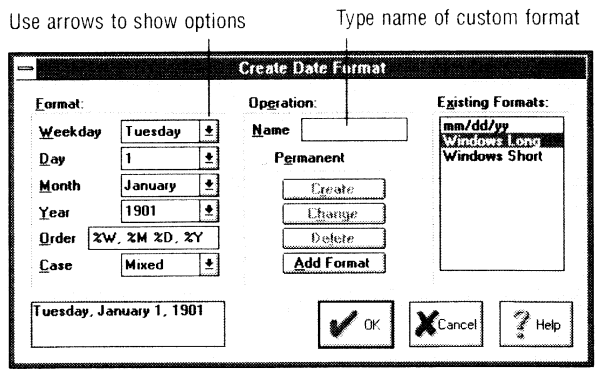
Figure 4-23 The Select Date Format dialog box



To create a customized date format, click Create. The name of the dialog box changes to Create Date Format, and the Format panel displays available options for creating the format you want, as shown in Figure 4-24.

If you want to use a Windows Control Panel default format for a particular option, you can right-click that format option's text box. You'll see a menu of defaults you can use. This lets you define your custom format more quickly.

Figure 4-24 The Create Date Format dialog box



- Choose Weekday to specify how you want the day of the week to appear—as a full word or an abbreviation. (Weekday is dimmed until you specify to display weekdays using the %W in the Order text box.)
- Choose Day to specify whether you want the day value to be displayed with or without a leading zero.

- Choose Month to specify whether you want the month value to be spelled out as a word or to appear as a number.
- Choose Year to specify whether you want four digits of the year to display, or just the last two.
- Choose Order to specify the order in which you want the weekday (%W), day (%D), month (%M), and year (%Y) values to appear. Delete a value if you don't want that part of a date to appear, or type in a value that you do want included in the date format.
- Choose the Case area if you've specified that you want words, rather than numbers to be displayed for months and weekdays. You can choose
  - Mixed, which displays the words in initial uppercase format
  - Lower, which displays the words in all lowercase letters
  - Upper, which displays the words in all capital letters

When you've defined and named the date format you want, choose Add Format to add it to the Existing Formats list.

If you check Permanent, Paradox saves the date format you specify in PDXWIN.INI. If Permanent is unchecked, the date format is available only until you exit Paradox.

You can delete any format you've created.

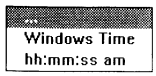
To delete a format you've created, choose it from the Existing Formats list and choose Delete. You can delete only those formats you've created. The Delete button is dimmed when you choose an existing format that cannot be deleted.

You can change any format you've created.

To change a format you've created, choose it from the Existing Formats list and choose Change. Paradox displays the format definition in the Format panel of the dialog box. Make the changes you want and choose Accept to confirm the changes and add the format back to the Existing Formats list.

You can change only those formats you've created. The Change button is dimmed when you choose an existing format that cannot be changed.

Changing the time format



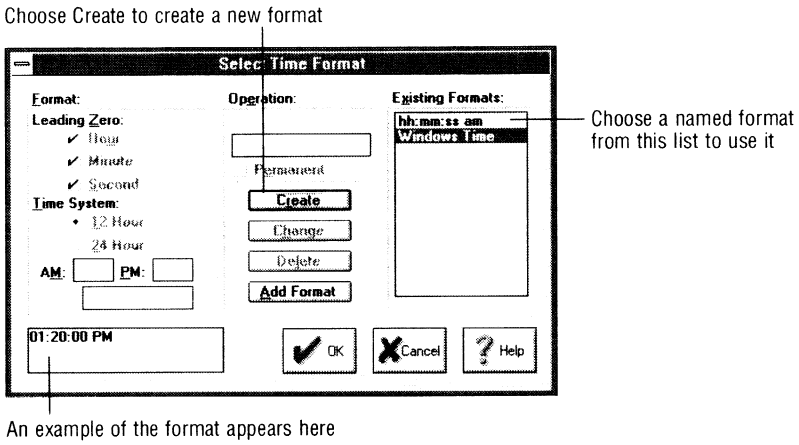
In a form, you can place *special fields* that contain data about the form itself or the table on which the form is based. For example, the Now field displays the current time. You can change the time format by inspecting any undefined field or the Now field and choosing Format | Time Format. You'll see a menu of available time formats, like the one shown at the left. Choose one of the formats to apply it to the selected date field.

- *Windows Time* uses the time format you define from the Windows Control Panel International dialog box.
- *hh:mm:ss am* displays two digits of hours, minutes, and seconds, separated by colons and followed by "am" or "pm."

You can create custom time formats.

You can define your own time formats by choosing the ellipsis (...) at the top of the time format menu. You'll see the Select Time Format dialog box.

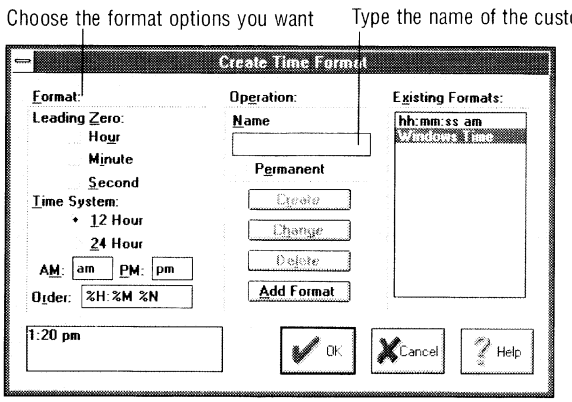
Figure 4-25 The Select Time Format dialog box



To create a customized Time format, click Create. The name of the dialog box changes to Create Time Format, and the Format panel displays available options for creating the format you want, as shown in Figure 4-26.

If you want to use a Windows Control Panel default format for a particular option, you can right-click that format option's text box. You'll see a menu of defaults you can use. This lets you define your custom format more quickly.

Figure 4-26 The Create Time Format dialog box



- Check the Hour, Minute, or Second check box under Leading Zeros if you want Paradox to display a zero in front of 1-digit values.
- Choose either 12 Hour or 24 Hour under Time System to specify a 12- or 24-hour clock. If you choose 12 Hour, you can specify the values you want Paradox to display as AM and PM.
- Choose Order to specify the order in which you want the hour (%H), minute (%M), second (%S), and am/pm indicator (%N) values to appear. Delete a value if you don't want that part of a date to appear, or type in a value that you do want included in the time format.

When you've defined and named the time format you want, choose Add Format to add it to the Existing Formats list.

If you check Permanent, Paradox saves the time format you specify in PDXWIN.INI. If Permanent is unchecked, the time format is available only until you exit Paradox.

You can delete any format you've created.

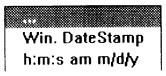
To delete a format you've created, choose it from the Existing Formats list and choose Delete. You can delete only those formats you've created. The Delete button is dimmed when you choose an existing format that cannot be deleted.

You can change any format you've created.

To change a format you've created, choose it from the Existing Formats list and choose Change. Paradox displays the format definition in the Format panel of the dialog box. Make the changes you want and choose Accept to confirm the changes and add the format back to the Existing Formats list.

You can change only those formats you've created. The Change button is dimmed when you choose an existing format that cannot be changed.

Changing the timestamp format



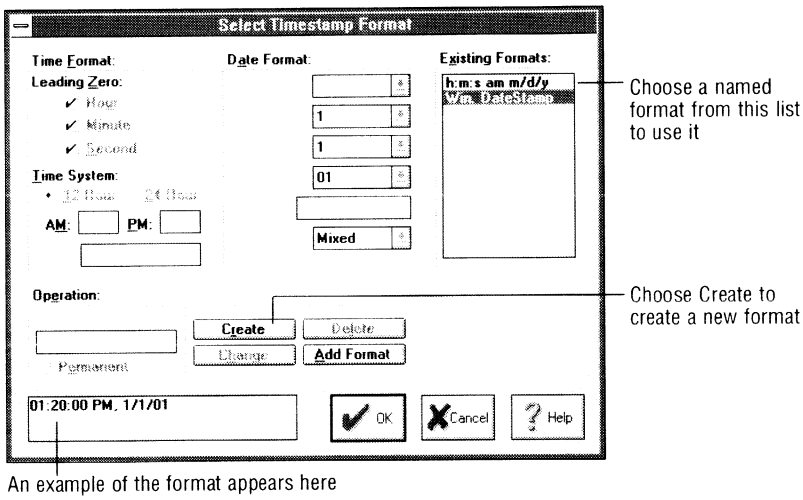
In a form, you might use ObjectPAL to assign a time variable to an undefined field. You can change the field's timestamp format by inspecting it and choosing Format | Timestamp Format. You'll see a menu of available time formats, like the one shown at the left. Choose one of the formats to apply it to the selected date field.

- *Win. DateStamp* uses the date and time formats you define in the Windows Control Panel International dialog box.
- *h:m:s am m/d/y* displays hours, minutes, and seconds, separated by colons and followed by "am" or "pm" and the month, day, and year.

You can create custom timestamp formats.

You can define your own timestamp formats by choosing the ellipsis (...) at the top of the timestamp format menu. You'll see the Select Timestamp Format dialog box.

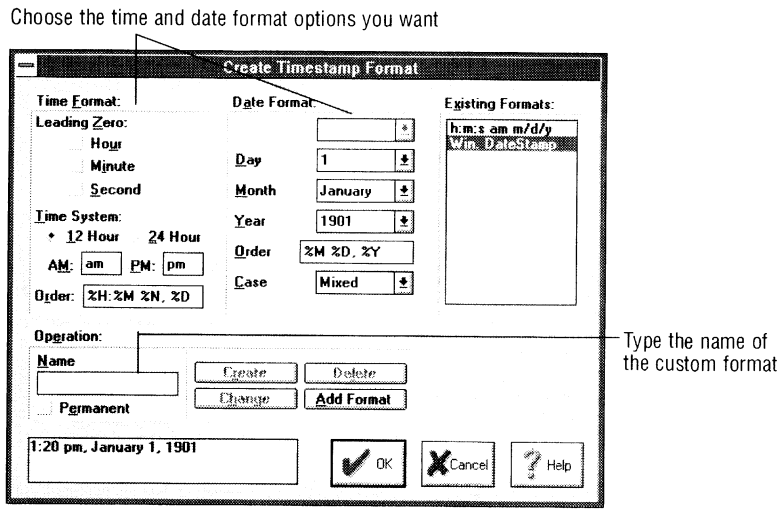
Figure 4-27 The Select Timestamp Format dialog box



To create a customized timestamp format, click Create. The name of the dialog box changes to Create Timestamp Format, and the Date Format and Time Format panels display available options for creating the format you want, as shown in Figure 4-28.

If you want to use a Windows Control Panel default format for a particular option, you can right-click that format option's text box. You'll see a menu of defaults you can use. This lets you define your custom format more quickly.

Figure 4-28 The Create Timestamp Format dialog box



- Use the Date Format panel like the Create Date Format dialog box, described earlier in this chapter. The only difference is that in the Create Timestamp Format dialog box, %D determines where the date appears in the timestamp.
- Use the Time Format panel like the Create Time Format dialog box, described earlier in this chapter.

Name the new format and choose Add Format. Paradox places the timestamp format in the Existing Formats list.

If you check Permanent, Paradox saves the timestamp format you specify in PDXWIN.INI. If Permanent is unchecked, the timestamp format is available only until you exit Paradox.

You can delete any format you've created.

To delete a format you've created, choose it from the Existing Formats list and choose Delete. You can delete only those formats you've created. The Delete button is dimmed when you choose an existing format that cannot be deleted.

You can change any format you've created.

To change a format you've created, choose it from the Existing Formats list and choose Change. Paradox displays the format definition in the Format panel of the dialog box. Make the changes you want and choose Accept to confirm the changes and add the format back to the Existing Formats list.

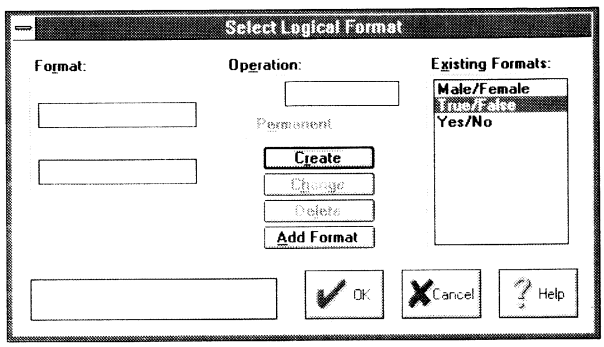
You can change only those formats you've created. The Change button is dimmed when you choose an existing format that cannot be changed.

Changing logical formats

Undefined field objects and dBASE logical fields have the Logical Format property which lets you choose what values to accept as true and false in the logical field. When you inspect a logical field and choose Logical Format, you'll see a menu of your most recent formats (like True/False or Male/Female).

To specify additional logical values, choose the ellipsis (...) at the top of this menu. You'll see the Select Logical Format dialog box.

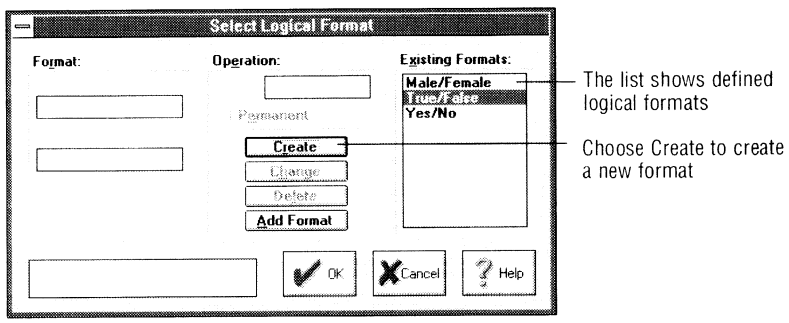
Figure 4-29 The Select Logical Format dialog box



To create a customized logical format, click Create. The name of the dialog box changes to Create Logical Format, and the Format panel displays available options for creating the format you want, as shown in Figure 4-30.

- Enter the value you want to represent True in the True text box. (For example, type **full**).
- Enter the value you want to represent False in the False text box. (For example, type **empty**).

Figure 4-30 The Create Logical Format dialog box



Name the new format and choose Add Format. Paradox places the logical format in the Existing Formats list.

If you check Permanent, Paradox saves the logical format you specify in PDXWIN.INI. If Permanent is unchecked, the logical format is available only until you exit Paradox.

You can delete any format you've created.

To delete a format you've created, choose it from the Existing Formats list and choose Delete. You can delete only those formats you've created. The Delete button is dimmed when you choose an existing format that cannot be deleted.

You can change any format you've created.

To change a format you've created, choose it from the Existing Formats list and choose Change. Paradox displays the format definition in the Format panel of the dialog box. Make the changes you want and choose Accept to confirm the changes and add the format back to the Existing Formats list.

You can change only those formats you've created. The Change button is dimmed when you choose an existing format that cannot be changed.

Changing memo and formatted memo fields

Paradox stores memo and formatted memo fields in a separate file (with the .MB extension for Paradox tables or a .DBT extension for dBASE tables), not in the table itself. The table contains a portion of the field (you specify how much from the Create Table dialog box for a Paradox table), plus a pointer to the .MB or .DBT file. Paradox searches for the contents of these fields whenever you display them onscreen.

Controlling memo display

Depending on the speed of your system and the size of your memo or formatted memo fields, you may find that displaying memos can sometimes be slow. This is because memo data is stored outside the table, in a separate file. To increase performance, Paradox gives you a way to avoid displaying memo fields until you really want to see them. Use the Complete Display property to control the display of memo data.

In a Table window, inspect the memo field.

When you view data in a Table window, inspect the memo (or formatted memo) field and use the Complete Display property to control the display of memo and formatted memo fields.

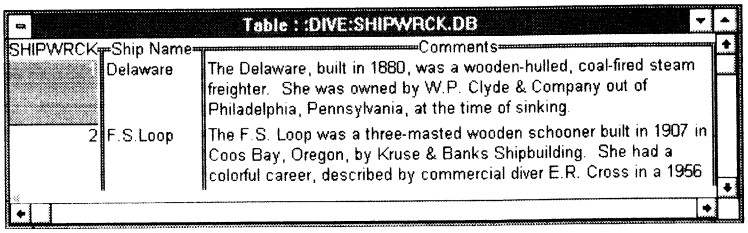
Check Complete Display if you want to see all the record values displayed all the time.

Uncheck Complete Display if you want to see only the value of the current field.

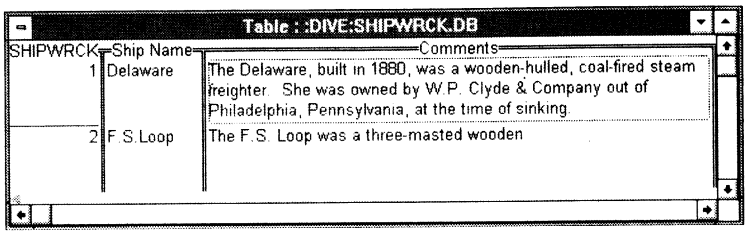
Example 4-5 Complete display of memo fields

1. Open the *Shipwrck* table.

2. Inspect the Comments field and check Complete Display. Paradox displays the memo values for all visible records.



3. Inspect the Comments field again and uncheck Complete Display. Paradox shows the complete memo only for the selected record.



When you check Complete Display, you'll see the entire contents of all memo fields, regardless of which field is selected.

When you uncheck Complete Display on a Paradox table, Paradox displays only the amount of data stored with the table (not the contents of the .MB file) until you move to the field. The portion of data displayed is followed by an ellipsis (...) to indicate further data. When the field is selected, Paradox displays the full memo value.

When you uncheck Complete Display on a dBASE table, Paradox displays a marker indicating the existence of data until you move to the field. When the field is selected, Paradox displays the complete memo value.

You can move through the records of the table more quickly if you uncheck Complete Display.

In a Form Design window, inspect the field object and choose Run Time\|Complete Display.

When you view data in a Form window, use the Run Time | Complete Display property of the memo field object to control the display of memo and formatted memo data. (You can change a property of a field only in the Form Design window; see Chapter 12.)

Changing graphic and OLE fields

In addition to the Alignment, Color, Font, and Complete Display properties, graphic and OLE field types also have a Magnification property.

Using Magnification, you can shrink the size of the displayed graphic or OLE object to 25% or 50% of its original size, or expand its size by 200% or 400%. By default, a graphic or OLE object is displayed at 100% of its original size.

Another magnification choice, Best Fit, shrinks the graphic or OLE object to fit in the field, while retaining the proportions of the original object. If you have chosen Best Fit, changing the column width or row height changes the way Paradox displays the contents of the field.

For fastest performance, you should display graphic and OLE objects at 100%. Best Fit usually gives the slowest performance.

Note When using a form, you can change the magnification property of a graphic or OLE object only in the Form Design window.

Previewing a report

Reports in Paradox are usually printed documents. It's more common to view your data through a table or a form. But there might be times when you want to view a report onscreen, especially to verify its accuracy before printing. Paradox provides the Report window so you can view a report.

Note You cannot enter or edit data in a report. The Report window is solely a viewing tool.

This section discusses viewing your data in the Report window. You can customize the look of a report in the Report Design window. For information about working in the Report Design window, see Chapter 13.

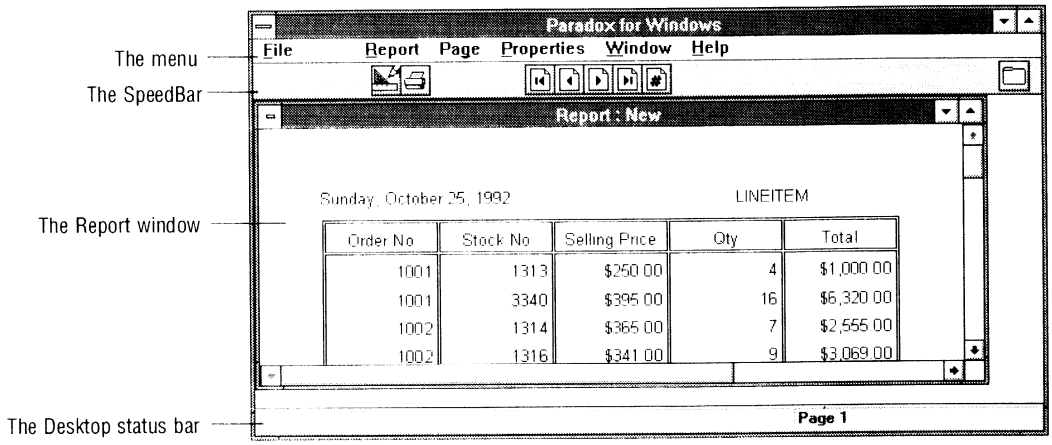
The Report window

Click the Quick Report SpeedBar button or choose Table | Quick Report to open a Report window and preview the table's preferred report. If you haven't identified a preferred report, Paradox creates a default report for you.

You can also preview a report you've previously created by choosing File | Open | Report. You'll see the Open Document dialog box, discussed in Chapter 3.

Choose the report you want and choose View Data from the Open Mode options area. When you choose OK, the report opens in the Report window. Figure 4-31 shows a default report on the *Lineitem* table.

Figure 4-31 The Report window



Note Use the Report window's scroll bars to move around on the displayed page. To move to different pages, use the SpeedBar buttons or the Page menu.

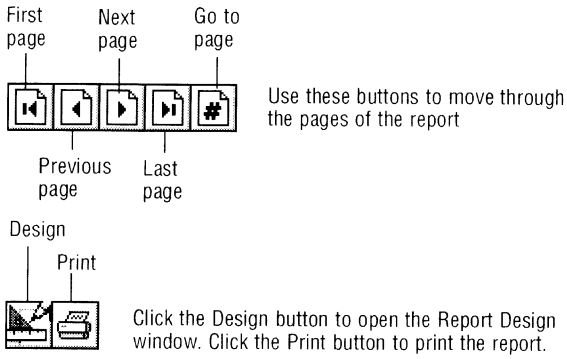
Because the only thing you can do in the Report window is view or print your data, you have somewhat limited menu commands available.

- The File and Window menus are available in all Paradox windows.
- You can use the Report menu to either toggle to the Report Design window or print the report you're previewing.
- You can use the Page menu to move to the first, last, next, or previous pages, or to go to a page you specify in the Go To Page dialog box.
- You can use the Properties menu to display the Desktop Properties dialog box (discussed in Chapter 2), use Zoom, or save properties.

Using the Report window's SpeedBar

As with the menu, your choices on the Report window's SpeedBar are limited. The following figure shows the available buttons.

Figure 4-32 The Report window's SpeedBar



Printing the report

When you want to print the report, you can choose Report | Print or File | Print. You have the option of printing the current page or the entire report. Printing reports is discussed in detail in Chapter 13.

CHAPTER 5

Entering and editing data

This chapter discusses data-entry tasks you'll perform using Paradox. You'll learn how to use Edit mode and

- Insert and delete records
- Work in Field View, Persistent Field View, and Memo View
- Cut, copy, and paste data and files
- Undo your changes
- Locate values using Paradox's search and replace techniques
- Enter graphics and OLE objects in your tables and edit special field types: memos, formatted memos, and fields with validity checks
- Lock records
- Use table lookup
- Use Move Help to move a dependent record from one master to another master

For step-by-step instructions on editing data, see Chapter 5 of *Getting Started.*

Entering Edit mode

Overview of editing data

You edit data by opening a table or a form and entering Edit mode.

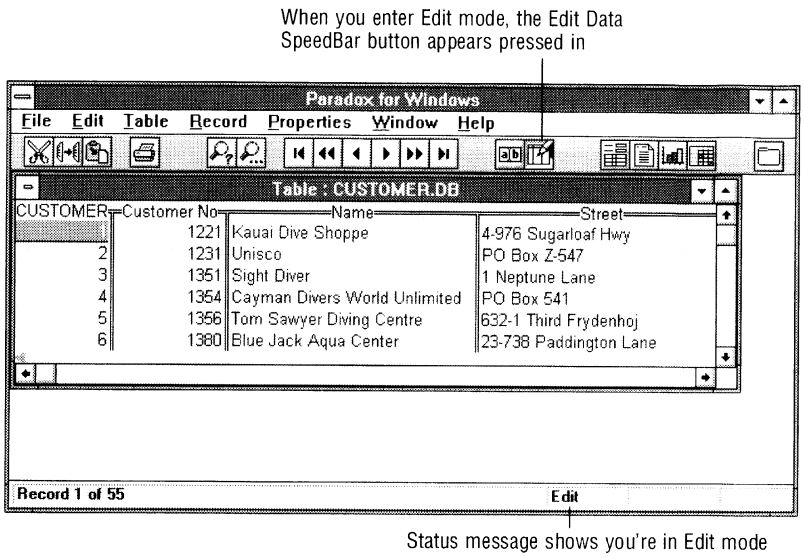
1. Open a table or form by choosing File | Open as described in Chapter 3.
2. Enter Edit mode using one of these methods:
   - Choose Table | Edit Data or Form | Edit Data.
   - Click the Edit Data SpeedBar button.

- Press *F9*.

3. Make the changes you need.
4. Leave Edit mode by clicking the Edit Data SpeedBar button, choosing Table | End Edit, or pressing *F9*.

Figure 5-1 shows the *Customer* table in Edit mode.

Figure 5-1 A table in Edit mode



Keyboard shortcuts

Table 5-1 shows some keyboard shortcuts.

Table 5-1 Keys to use while entering and editing data

Key	Action
Ctrl+Backspace	Delete the word to the left of the insertion point or the current selection.
Ctrl+D	Duplicate the information from the record above the selected field to the selected field.
Esc	Undo a field edit (you must press *Esc* before you leave the field).
Alt+Backspace	Undo changes to a record (before you leave the record).
Spacebar	Enter the current date in a date field. (Paradox enters the components of a date field separately, so if your date format has more than one component, press *Spacebar* more than one time.)
Double-click	In Field View, select a word in an alphanumeric, memo, formatted memo, (or dBASE character or memo) field.

Key	Action
Home	Move to the leftmost field of the table, remaining on the selected record.
Ctrl+Home	Move to the leftmost field of the first record of the table.
End	Move to the rightmost field of the table, remaining on the selected record.
Ctrl+End	Move to the rightmost field of the last record of the table.

Additional keyboard shortcuts are listed in Appendix A.

Once you're in Edit mode, you can position the insertion point in any of the table's fields and begin typing. (This replaces the existing contents of the field.) In most field types, you simply select the field you want and type a value in it.

Note Entering data in memo, formatted memo, graphic, and OLE fields can be different. These field types are discussed in "Entering special data types" later in this chapter.

If you need to position the insertion point at some particular point within the field (for example, to change a spelling or typing error) you should enter Field View. (Field View is discussed later in this chapter; see "Using Field View.")

Icons represent tables or forms.

Most of the techniques and tools discussed in this chapter apply to both tables and forms. Some information, however, is unique to tables or forms.

This icon represents tables. Information that is unique to tables is accompanied by this icon.

This icon represents forms. Information that is unique to forms is accompanied by this icon.

Inserting and deleting records

You can insert new blank records or delete existing records from either a table or a form.

Choose Record | Insert (or press *Ins*) to insert a blank record *above* the selected record.

When you insert a record in a keyed table, then enter a value in it, Paradox automatically moves it to its proper position in the table. The record's proper position might not be onscreen when you enter it, so it may seem to disappear as it's posted. However, if you look at the record count on the status bar, you'll see that the record has been

added. Your view of the table doesn't change when Paradox posts the record, and the insertion point remains where it was when you pressed *Ins*.

Records inserted in non-keyed tables stay where they are inserted, regardless of the value you enter.

When working in a single-record form, inserting a record seems like inserting a blank screen. When you press *Ins* or choose Record | Insert, the record values appear blank. This is because Paradox has both inserted and moved to the new blank record. Remember Paradox always inserts blank records *above* the selected record.

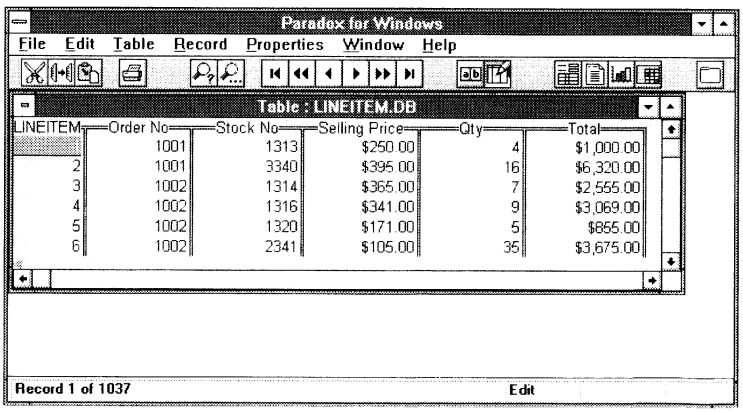
Choose Record | Delete (or press *Ctrl+Del*) to delete the selected record from the table or form.

Caution When using a Paradox table, you cannot retrieve a deleted record so be sure you want to delete the *entire record* before you choose Delete.

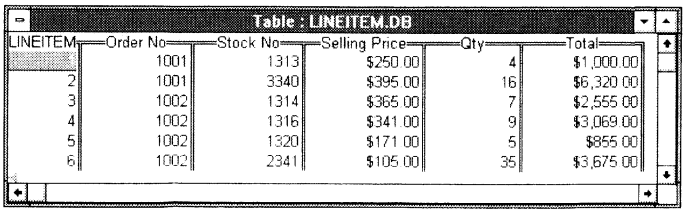
When using a dBASE table, deleting a record does not permanently remove it. You can even choose to view deleted records with the Show Deleted command, discussed in Chapter 4.

Example 5-1 Inserting and deleting records

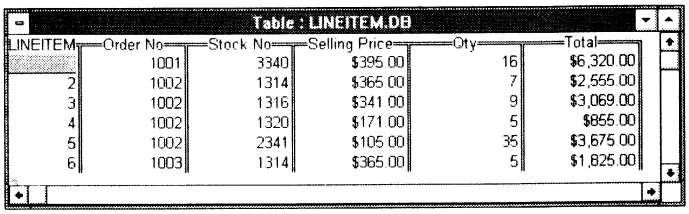
1. Open the *Lineitem* table and click the Edit Data SpeedBar button to enter Edit mode.



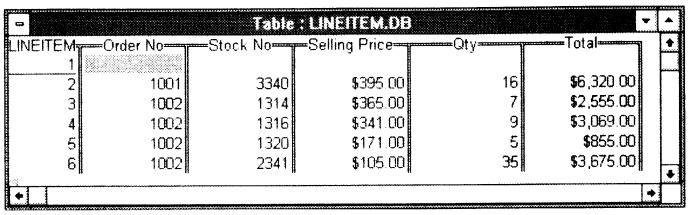
2. The first record is selected.



3. Press ***Ctrl+Del*** to delete the selected record. Paradox deletes the record from the table.



4. Press ***Ins*** to insert a blank record into the table.



5. Enter the following data:

   Order No: **1001**

   Stock No: **1313**

   Selling Price: **250**

   Qty: **4**

   Total: **1000**

6. Click the Edit Data SpeedBar button again to exit Edit mode. Paradox saves the change you make to a record when you either exit Edit mode or move to a different record.

Using Field View

Paradox uses an *overwrite mode* data-entry environment. For example, when you move to a field that contains data, Paradox highlights all the data. When you begin typing, Paradox replaces the existing data. To move the insertion point around within the field, select text, add text, or change text, you must enter Field View.

Paradox has three types of Field View:

- Field View
- Persistent Field View
- Memo View

Field View

When you enter Field View, Paradox places an insertion point within the existing contents of a field. You can then use the arrow keys to move around the field. You can enter Field View in a variety of ways:

- Move to the field and choose Table | Field View or Form | Field View.
- Move to the field and click the Field View SpeedBar button.
- Move to the field and press *F2*.
- Click twice in an unselected field. You'll place the insertion point wherever you click in the field. (If the field is already selected, you need to click only once to place the insertion point and enter Field View.)

When you're not in Field View, you can use your keyboard to move around within a table (from column to column or row to row) and within a form (from field to field or record to record) as shown in Table 5-2.

Table 5-2 Using navigation keys

Key	Action in table	Action in form
←	Left one column	Left or up one field
→	Right one column	Right or down one field
↑	Up one row	Up one field
↓	Down one row	Down one field
PgUp	Up one screen	Up one record
PgDn	Down one screen	Down one record
Home	First field of row	First field of record
End	Last field of row	Last field of record

When you enter Field View, you can combine *Alt* with the keys shown in Table 5-2 to get the same result as the key alone gives you when you're not in Field View. For example, press *Alt+Home* when you're in Field View to get the same result that pressing *Home* gives you when you're not in Field View.

Note When you're not in Field View, pressing *Alt* in combination with any of these keys doesn't change its behavior.

Additionally, there is a set of keys that works the same whether you're in Field View or not. These are shown in Table 5-3.

Table 5-3 Using Standard keys

Key	Action in table	Action in form
Ctrl+Home	First field of first record	First field of first record
Ctrl+End	Last field of last record	Last field of last record
Tab	Next field	Next field
Enter	Next field	Next field
Ctrl+Del	Delete record	Delete record
Ins	Insert record	Insert record

For a complete listing of keyboard functions, see Appendix A.

If you're in Field View and you move off the field (by clicking another field or pressing *Enter, Tab,* or *Alt* with an arrow key), Paradox exits Field View. If you want to move to another field and remain in Field View, use Persistent Field View (discussed below). If you want to stay on the selected field and exit Field View, you can use any of the same commands, SpeedBar buttons, or keystrokes you used to enter Field View.

Persistent Field View

Suppose you'd like to move from field to field without leaving Field View. Paradox provides a *Persistent Field View* that lets you do just that. Press *Ctrl+F2* to enter Persistent Field View. You'll see the word **Persist** on the status bar. You can use *Home, End,* and the arrow keys just as you do in standard Field View to move around within the field. Press *Tab, Enter,* or *Alt* with an arrow key to move from field to field. As you arrive on each field, you'll remain in Field View.

To exit Persistent Field View, press *Ctrl+F2.* You can then use the arrow keys to move between fields.

Note See Appendix A for more information on using the keyboard.

Memo View

When you're editing a memo or formatted memo field, Memo View gives you some word-processing capabilities and gives your keyboard greater functionality. For example, you can insert a line break or a tab character. Memo View is described in "Editing memos and formatted memos" later in this chapter.

Cutting, copying, and pasting data

In addition to typing values in fields, you can cut or copy data from one field and paste it into a different field or a different application. Data you cut or copy remains on the Windows Clipboard until you

change it, clear it, or exit Windows. The Clipboard provides temporary storage for data you want to move to a different location.

- Choose Edit | Cut to delete the selected field's value from the table (or form) and place it on the Clipboard.

Use Delete to remove the selected value *without* placing it on the Clipboard. Choose Edit | Delete (or press *Del*) when you want to remove the selected value from a field in a Table window.

- Choose Edit | Copy to copy the selected field's value from the table (or form) to the Clipboard.

When using a table, you can copy the values of more than one field at a time. For information on selecting multiple fields, see Chapter 4.

- Choose Edit | Paste to paste the contents of the Clipboard into the selected field. (You can paste into only one field at a time.)

Note You can paste only a valid value into a field. For example, you can't paste a graphic value into an alphanumeric field.

Copying to and pasting from files

You can copy a field's data to an external file, or you can paste a value from an external file into a field.

Copying to a file

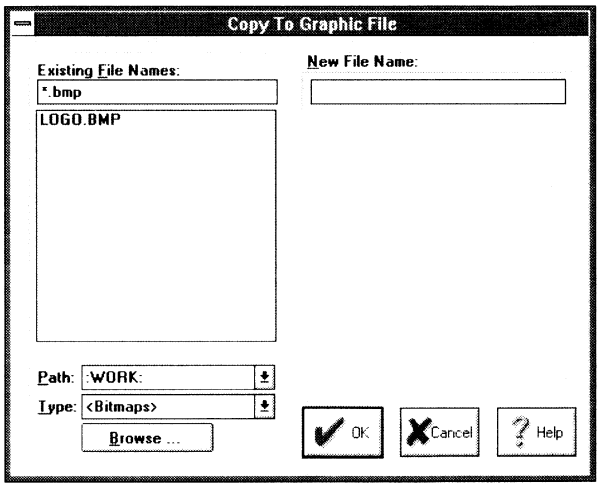
Paradox lets you copy field values to external files.

When using a table, you can copy values in graphic, binary, memo, and formatted memo fields to non-Paradox file formats without using the Export command.

When using a form, you can copy values from any field type to a non-Paradox file format without using the Export command.

For example, to copy a graphic value to a .BMP file, select the field that contains the value, and choose Edit | Copy To. You'll see the Copy To Graphic File dialog box, shown in Figure 5-2.

Figure 5-2 The Copy To Graphic File dialog box



Either choose the file name of an existing graphic file (the contents of the field will overwrite the existing contents of the file), or enter the name you want to give the file in the New File Name text box. Choose OK. Paradox places the value from the graphic field in the file you specified. The original value remains in your table or form.

Note Paradox can copy graphic files only to the .BMP file format.

When you work with a binary field in a Table window, you can use Copy To to copy binary field values to a non-Paradox file format. You'll see the Copy To File dialog box, which looks like the Copy To Graphic File dialog box shown in Figure 5-2, except the Type list shows <Files>, and the file extension you use is unrestricted.

You can copy text to a file from the Form window.

When you're using a form, you can choose Edit | Copy To to copy text strings (of any field type, including memos, numbers or dates) to a file. Paradox can copy text data to the .TXT or .PXT file formats.

You can copy memos to a file from the Table window.

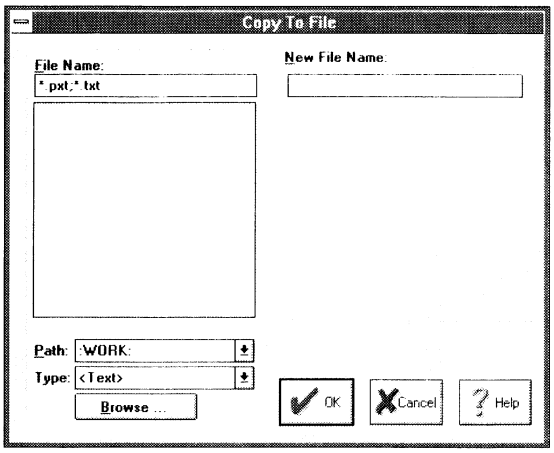
When you're using a Table window, you can copy only memo and formatted memo text to a text file, as shown in Example 5-2. When you choose Edit | Copy To you must be in Memo View.

Example 5-2 Copying a field's value to a file

To copy a memo field's value to a text file, you

1. Select the field you want.
2. Enter Memo View. (Click the Field View SpeedBar button or press ***Shift+F2***.) The entire field is selected. (Of course, you can select any part of a memo you like and copy only that part to a file.)

3. Choose Edit|Copy To. You'll see the Copy To File dialog box.



You can use the Path list to choose an aliased directory where you want to place the file, or use Browse to select a different directory

4. Do one of the following:
   - Choose the name of an existing file (the contents of the field will overwrite the existing contents of the file).
   - Create a new file by entering the name you want to give the file in the New File Name text box.
5. By default, Paradox copies the value to a file in the working directory. To save the file in a different directory, either type the full path in the New File Name text box, choose an aliased directory from the Path list, or choose Browse to choose a different directory.
6. Choose OK.

Paradox creates a new file with the name you've specified and places the contents of the selected field in it. (If you choose an existing file name, Paradox overwrites the existing file's contents.)

Pasting from a file

You can paste values from non-Paradox files into Paradox fields. When you choose Edit | Paste From (you must be in Edit mode) you'll see a Paste From dialog box.

The type of files displayed in the Paste From dialog box depend on the type of field or object you've selected. If you've selected a graphic field, Paradox opens the Paste From Graphic File dialog box with the word <Graphics> in the Type list. You can paste .BMP, .PCX, .TIF, .GIF, and .EPS files into a graphic field or object.

Note When Paradox pastes a .PCX, .TIF, .GIF, or .EPS file into a graphic field or object, Paradox first converts the graphic to the .BMP format.

If you've selected a memo or formatted memo field from a table, Paradox opens the Paste From File dialog box with the word <Text>

in the Type list. You can paste text from .PXT, .TXT, and .RTF files into memo or formatted memo fields. (If you're using a form, you can paste text into all field types except graphic and OLE.)

When you select the file you want and choose OK, Paradox places the contents of the file in the selected field or object.

Using Undo

If you edit a record and choose Edit | Undo *before* moving off the record, Paradox ignores the changes to the entire record and displays a message informing you that changes have been undone in the Desktop's status bar. Because Paradox saves edits as soon as you move off a record, you must use Undo before you leave the record.

To discard changes to a single field, you can press *Esc* before you leave the field. Paradox restores the original contents of the field.

Caution You cannot use Edit | Undo to retrieve a record you've deleted. Once you delete a record in a Paradox table, there is no way to get it back except to enter it again.

Replacing values

Paradox provides two ways to quickly change existing field values:

- Use Record | Locate | and Replace to change a field's value.
- Use Edit | Search Text to change a string within a memo field.

You can also use a CHANGETO query to replace field values. (See Chapter 6.)

Using Locate and Replace

Choose Record | Locate | and Replace to move to a particular field value and change it to a different value.

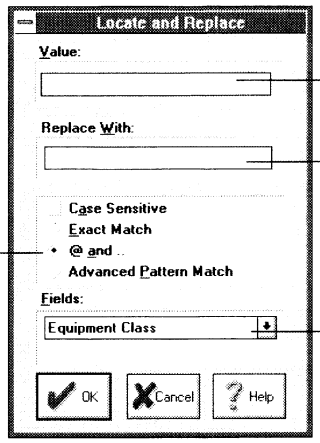
To change a field value everywhere it occurs in a table, you must repeat the Locate | and Replace command for each record. To change all occurrences of a field value, you can use a CHANGETO query.

Example 5-3 Locating and replacing values

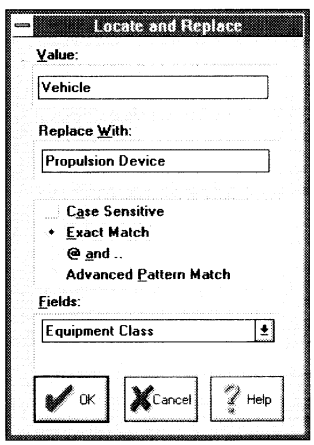
Suppose you want to change the word "Vehicle" to the phrase "Propulsion Device" in the Equipment Class field of the *Stock* table:

1. Open the *Stock* table, enter Edit mode, and move to the Equipment Class field.

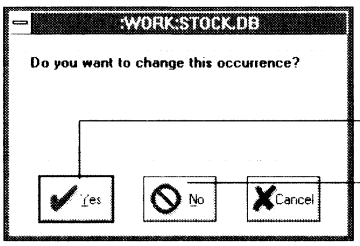
2. Choose Record | Locate | and Replace (or press ***Shift+Ctrl+Z***).
   You'll see the Locate and Replace dialog box.



3. Type **Vehicle** in the Value text box.
4. Type **Propulsion Device** in the Replace With text box.
5. Check Exact Match to match the value in the Value text box exactly, rather than to use it as a pattern.



6. Choose OK.
7. Paradox moves to the first occurrence of the value and displays a message box asking you to confirm the change.



8. Choose Cancel to end the search.

Paradox will prompt you for each change. For each record that contains a value that matches your entry in the Value text box, Paradox replaces the *entire* field with the value you entered in the Replace With text box.

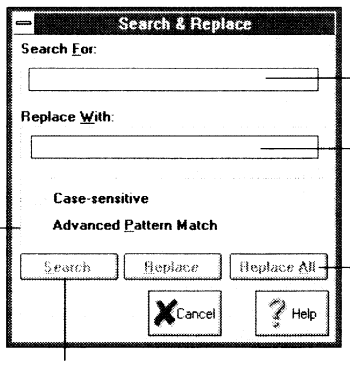
Using Search & Replace in memo fields

In memo and formatted memo fields, you can choose Edit | Search Text to search for text values and (optionally) replace them with different text. Use the Search & Replace dialog box.

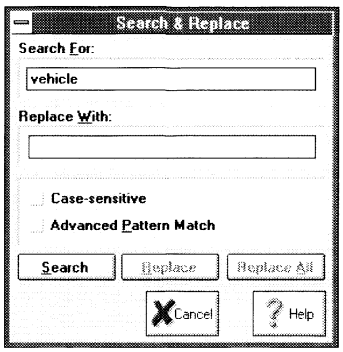
Example 5-4 Searching for text in memo fields

Suppose you want to search for the text value "vehicle" in the Catalog Description field of the first record in the *Stock* table:

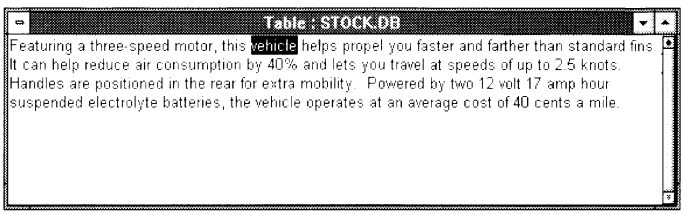
1. Open the *Stock* table, enter Edit mode and move to the Catalog Description field of the first record. Press ***Shift+F2*** to enter Memo View.
2. Choose Edit | Search Text. You'll see the Search & Replace dialog box.



3. Enter **vehicle** in the Search For text box.



4. Choose Search. Paradox finds the first matching value, highlights it, and displays the message **Match found** in the status bar.



5. Choose Search again to move to the next occurrence of the value.

   If the value doesn't exist within the text object, Paradox displays the message **No match found** in the status bar.

If you don't see the highlighted value when Paradox finds a match, it may be under the Search & Replace dialog box. You can move the dialog box by clicking its title bar and dragging it out of the way.

You use the same dialog box to replace an existing text value with another text value.

Example 5-5 Replacing text

To replace one value with another,

1. Make sure you're in Edit mode and Memo View.
2. Select the field and choose Edit|Search Text. You'll see the Search & Replace dialog box (shown in Example 5-4).
3. Enter the text you want Paradox to search for in the Search For text box.
4. Enter the replacement text in the Replace With text box.
5. Choose Search. Paradox finds and highlights the first occurrence of the value you entered in Search For.

6. Choose Replace. Paradox replaces the highlighted text with the value you entered in Replace With, then moves to the next occurrence of the value you entered in Search For.

7. Continue to choose Replace each time Paradox finds the value it is searching for. (You can choose Replace All if you want Paradox to replace every occurrence of the value at one time.)

   If Paradox finds an occurrence of the value that you *don't* want to replace, choose Search to leave it intact and move to the next occurrence.

To delete a value using the Search & Replace dialog box, leave the Replace With text box blank. When you choose Replace, Paradox deletes the value you searched for and replaces it with nothing.

Editing special data types

Some Paradox field types require special methods of data entry. For example, you must place an actual picture into a graphic field—you can't simply type a value. Likewise, certain rules and conventions control the way you can enter and edit data in OLE fields, memo fields, and formatted memo fields.

Editing memos and formatted memos

Entering data in memo and formatted memo fields is similar to entering data in alphanumeric fields. However, in memo and formatted memo fields, Paradox places no limits on the amount of data you can enter.

When you're editing a memo or formatted memo, you can use *Memo View*, which gives you some word-processing capabilities and gives your keyboard greater functionality than Field View. For example,

- In Field View, *Enter* and *Tab* move you off the field.
- In Memo View, *Enter* inserts a line break and *Tab* inserts a tab character.

Table A-6 in Appendix A contains a complete list of what you can do with the keyboard in Memo View.

How you enter Memo View to edit memos and formatted memos depends on whether you're using a table or a form.

Entering Memo View from a table

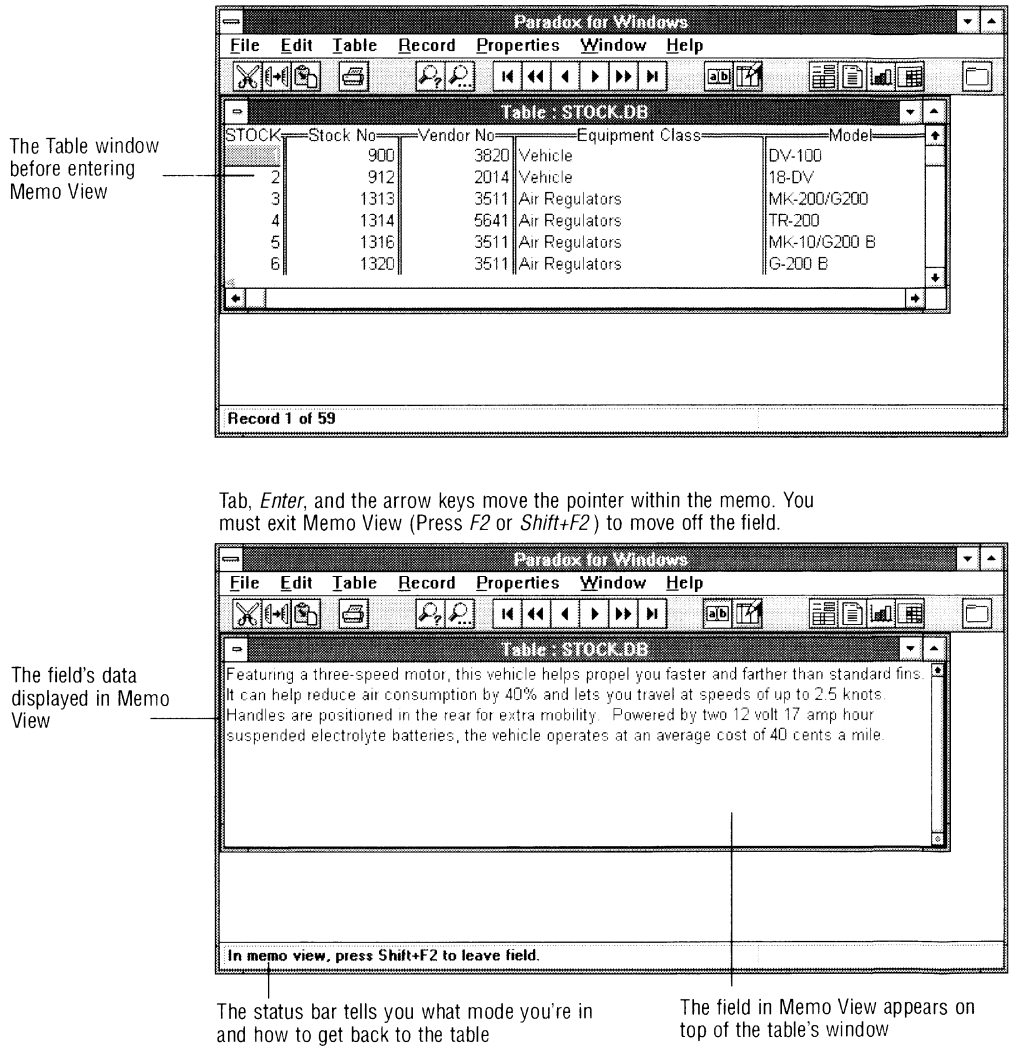
From a table, you enter Memo View by pressing *Shift+F2* or using any of the methods for entering Field View:

- Move to the field and choose Table | Field View.
- Move to the field and click the Field View SpeedBar button.

- Move to the field and press *F2*.
- Click twice in an unselected field.

When you enter Memo View from a table, Paradox fills the whole Table window with that field's value and displays only the contents of the selected field, as shown in Figure 5-3.

Figure 5-3 A memo field in a table's Memo View



Text scrolls upward if you reach the bottom of the window. Text automatically wraps at the right side of the window. Changing the size of the window changes the text wrapping.

Leaving Memo View

When you've finished editing, you must leave Memo View. You can

- Press *F2* or *Shift+F2*.
- Choose Table | Field View.
- Click the Field View SpeedBar button.
- Double-click the Control menu.
- Choose Close from the Control menu.

Note Paradox saves the data in the memo field as soon as you leave Memo View. If you want to abandon your edits, press *Esc*. Paradox cancels all changes to the memo.

When you return to the table, the amount of the memo visible depends on the column width of the memo field. You can change the column width by dragging the grid line in the table's heading area. You can change the field size only by restructuring the table.

Entering Memo View from a form

From a form, you can enter either Field View or Memo View:

- If you enter Field View (see "Entering and exiting Field View" earlier in this chapter) you can press *Enter* or *Tab* to move to a different field on the form. This method is handy if you just want to enter single paragraphs or make quick edits.
- If you enter Memo View (press *Shift+F2*) you can insert line breaks using *Enter* and tabs using *Tab*. You must exit Memo View (press *Shift+F2*) to once again use *Enter* and *Tab* to move between fields.

When entering data in a memo field using a form, you can't change the field size. To do that, you must click the Design SpeedBar button to open the Form Design window. See Chapter 12 for information about memo field properties in forms.

As you enter data, the text wraps automatically at the right side of the field object.

Note If the text doesn't wrap automatically, the Word Wrap property of the field object might be turned off. You must switch to the Form Design window, inspect the field, and turn Word Wrap on. Word Wrap is on by default.

When you reach the bottom of the text object, the text automatically scrolls up so you can see what you're typing.

From the Form Design window, you can inspect the field object and place horizontal or vertical scroll bars on the field. This way, you can keep the field small, but view all of its contents.

When you leave the field, the beginning data is displayed.

Formatting text

To format text in formatted memo fields, select the block of text you want to format and inspect (right-click) it to view its menu. To format the entire memo field you must select the entire field—Paradox formats only selected text.

Changing the line spacing

Choose Line Spacing to establish the space between the lines of text in the formatted memo field. You can choose 1 line (the default—single spacing), 1.5, 2, 2.5, or 3 lines between each line of text.

Changing font properties

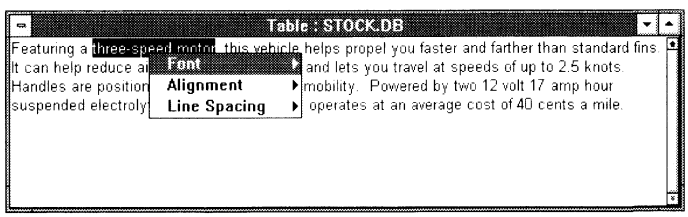
Choose Font to change the typeface, size, style, or color of text. You'll see the Font palette, from which you can change the text's typeface, size, style, or color. Changing font properties of formatted memo text is similar to changing font properties in any other field type, except that you can format selected blocks of text in the formatted memo field. Font properties are discussed in Chapter 4.

You can click the snap at the top of the Font palette to use the floating Font palette, described in Chapter 4.

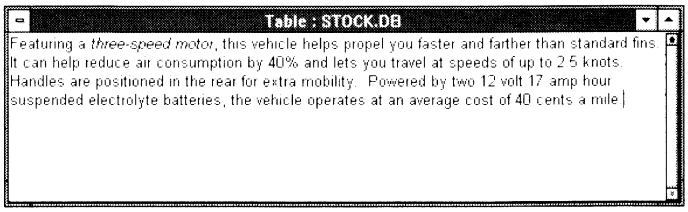
Example 5-6 Formatting memo text

Suppose you want to change the font style of a phrase in the Catalog Description field of the *Stock* table:

1. Open the *Stock* table, and enter Edit mode and Memo View on the Catalog Description field of the first record. Select the phrase "three-speed motor" in the first line of the memo. Right-click the highlighted phrase to view its menu.



2. Choose Font|Style|Italic.



Paradox changes the font property of the selected text.

Entering graphics

Data in a graphic field can be any picture, or *graphic*, that is a scanned image, line art, or graphic file created in a paint or draw application. Paradox gives you two ways to place a graphic in a field:

- Using the Cut, Copy, and Paste commands
- Using the Paste From command

You can't edit a graphic in Paradox—you must edit it in its source application.

To paste a graphic into a graphic field, you enter Edit mode and paste the graphic from the Clipboard or a file.

When you enter Field View on a graphic field, Paradox fills the whole Table window with the graphic, displaying only the graphic.

Example 5-7 Placing a graphic using Cut and Paste

To place a graphic in a graphic field, from a Windows application that supports the Clipboard,

1. Open the graphic file in its source application.
2. Select the graphic and cut or copy it to the Clipboard.
3. Open the Paradox Table or Form window you want to place the graphic in.
4. Enter Edit mode.
5. Select the graphic field you want the graphic in.
6. Choose Edit | Paste.

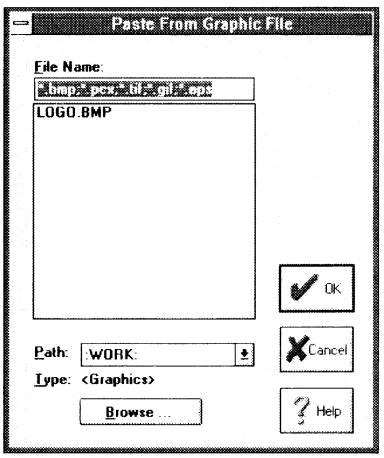
Paradox places the graphic from the Clipboard in the graphic field.

Paradox lets you place .BMP, .PCX, .TIF, .GIF, or .EPS graphic files directly into a graphic field without opening the graphic's source application. Simply use Paradox's Edit | Paste From command.

Example 5-8 Placing a graphic using Paste From

To place a graphic in a graphic field without using the Clipboard,

1. Select the graphic field you want the graphic in.
2. Enter Edit mode.
3. Choose Edit|Paste From. You'll see the Paste From Graphic File dialog box.



Use the path list or the Browse button to access files from different directories

4. Choose the graphic file you want.
5. Choose OK.

Paradox places the graphic in the graphic field.

Note When you paste a graphic into a graphic field, Paradox converts the graphic into the .BMP file format.

When you place a graphic in a table, you may not be able to see all of it. Adjust the column width and line spacing to see as much of the graphic as you want. You can enter Field View to see the whole graphic. It takes a little longer to scroll through the records of a table with graphics, so you can inspect the field and uncheck Complete Display in order to display only the selected record's graphic field value. When Complete Display is checked, all graphics are shown at all times.

If the graphic field on your form is the wrong size to display the graphic values of each record, you can change to the Form Design window to resize the field object or to inspect the field and choose Magnification | Best Fit. You can also check or uncheck its Complete Display property.

Using OLE

OLE stands for *Object Linking and Embedding*. You can use OLE fields to hold virtually any kind of data, from graphics to text to calculations. The advantage of using an OLE field is that once you place an OLE value, it maintains a link to its source application. You can always open the source application and file *from the OLE object* that you place in a Paradox table or form. Changes you make to the original OLE object are then updated in your Paradox table or form.

Entering data in OLE fields is discussed in Chapter 15.

Editing fields with validity checks

Validity checks impose restrictions on a field to ensure that the data entered in the field meets certain requirements. For example, you can define a *maximum value* validity check for a field so Paradox doesn't accept any value higher than the maximum.

When a validity check is defined, you can't post or leave a record until its requirements are met. If you enter invalid data, Paradox prevents you from moving off the record. Either correct the data or undo changes to the record before you move.

Table 5-4 describes how validity checks determine the kind of data you can enter into a field. For information on defining validity checks, see Chapter 9.

Table 5-4 Editing fields with validity checks

Type of validity check	Description
Required field	You can't move from the record until you enter a value. This ensures that important fields always have data in them for each record.
Minimum value	Paradox won't accept any value *less than* the minimum value.
Maximum value	Paradox won't accept any value *greater than* the maximum value.
Default value*	Paradox automatically enters the default value in the field when you insert a new record. To enter a value different from the default, select the field and enter the value you want. To enter a blank value, select the field and press *Backspace* or *Del*.

Type of validity check	Description
Picture	Pictures are patterns Paradox uses to format the data you enter in a field. For example, a common picture is (###)###-####. This is the pattern of most American telephone numbers. If you've defined this picture for a field, you can just enter numbers, without the parentheses or hyphen. Paradox formats the numbers correctly (according to the picture). Picture validity checks provide an editing aid (automatically formatting your data for you) as well as enforce rules that ensure the data you enter meets with the requirements you established for valid data in the field when you created the table. See Chapter 9 for information on different kinds of pictures.

* Paradox inserts default values only in new records. Moving through an existing record will not cause a default value to be inserted.

Locking records

Paradox automatically locks a record when you start editing it and removes the lock when you leave the record. A message appears in the status bar to inform you of these automatic locks.

You can also manually lock a record before you start editing it. Select the record, then choose Record | Lock (or press *F5* or *Ctrl+L*). The status bar tells you that the record is locked.

Why lock a record?

Locking is important if you use Paradox in a multiuser environment. When you lock a record, other users can view it, but can't edit or delete it.

How do record locks work with table locks?

Locking a record prevents other users from placing a read or write lock on the table. It also prevents users from performing any operations that require a read or exclusive lock.

How do you unlock a record?

Paradox automatically unlocks a record when you move off it or exit Edit mode. After you've locked a record, the Lock command changes to the Unlock command. Choose Unlock if you want to release a record for other users' access without moving off it. (You must unlock records before other users can edit or delete them.)

If you try to edit a record and discover that it has been locked by another user, you can look at the status bar to see the name of the user who has locked the record.

You can save your edits before you leave the record.

Paradox automatically saves (posts) any changes you make when you leave the record, but if you want to save your edits before you leave the record, you can choose Edit | Post/Keep Locked and move to the next field.

Sometimes Paradox moves a record to a different location when you post it. This happens if the table is keyed and the new record is not in its correct location in the table. Paradox moves the record to its correct location. When you choose Record | Post/Keep Locked, the moved record remains selected, and Paradox updates your view of the table if necessary.

Using table lookup

Table lookup helps you enter data that already exists in another table—the *lookup* table.

When you enter data in a field that has a table lookup defined, values you enter *must* exist in the first field of the lookup table. For example, you could use table lookup to specify that any Customer No value entered in the *Orders* table must be present in the Customer No field of the *Customer* table (because you don't want to create an order for a customer that doesn't exist).

See Chapter 9 for information on defining a table lookup.

Types of lookup

Paradox provides two types of table lookup:

- *Just Current Field*: The value in the current field is the only value from the lookup table that Paradox checks or fills in for you.
- *All Corresponding Fields*: Paradox checks the field on which the table lookup is defined and fills values in all fields that match fields in the lookup table. (Paradox determines if fields match by the field names.)

Whether you'll be able to view the lookup table from the table you're editing depends on the type of lookup access specified when the table lookup was defined:

- *Help and Fill*: You can view the lookup table from the table you're editing.
- *Fill No Help*: You can't view the lookup table from the table you're editing.

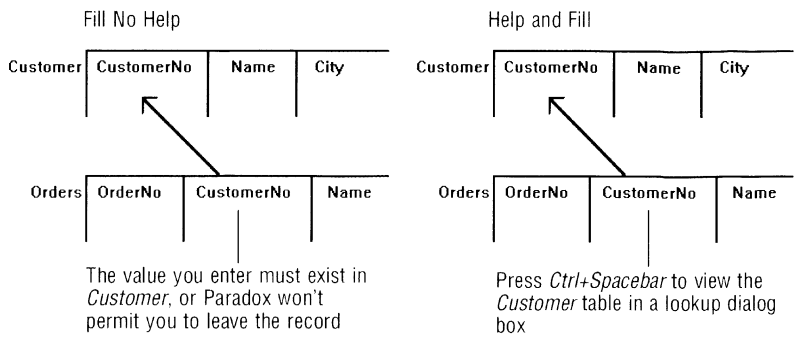
When the lookup access is Fill No Help, you can't open the lookup table automatically. You can, however, view the lookup table by opening it in its own Table window.

The following figures illustrate table lookup. The tables shown are *not* the sample tables provided with Paradox.

Just Current Field

Figure 5-4 illustrates Just Current Field lookup.

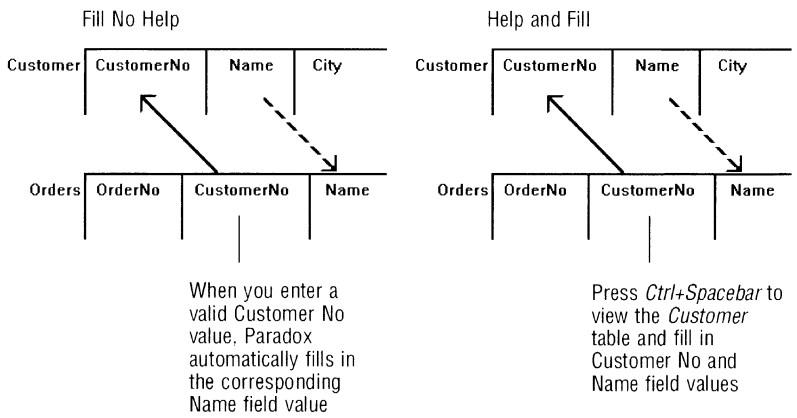
Figure 5-4 Just Current Field lookup access



All Corresponding Fields

Figure 5-5 illustrates All Corresponding Fields lookup.

Figure 5-5 All Corresponding Fields lookup access



Using Just Current Field

Suppose you're editing an *Orders* table in which the Customer No field has a table lookup defined as Just Current Field to the Customer No field of *Customer*.

When you're editing *Orders* and enter the Customer No value, you must enter a value that appears in the Customer No field of *Customer*.

If you type an invalid value (a customer number that doesn't exist in the *Customer* table), Paradox displays a message and won't let you move off the record until you enter a valid value.

Help and Fill

If the lookup access is Help and Fill, you can enter data in the Customer No field by typing it in, or you can get help finding a valid value:

1. Select the Customer No field in *Orders*. You'll see a message in the status bar informing you to press *Ctrl+Spacebar* for lookup help.
2. Press *Ctrl+Spacebar* or choose Record | Lookup Help. You'll see the lookup table (*Customer*) in a dialog box on top of the table you're editing.

   If there is already a valid value in the table you're editing, the current record marker indicates that value in the lookup table. For example, if you enter **1320**, and then press *Ctrl+Spacebar*, the current record marker is on the value 1320 in the lookup table.
3. From the lookup table, select the value you want.
4. Choose OK, and the value is filled in and the dialog box containing the lookup table disappears.

Fill No Help

If the lookup access is Fill No Help, you must enter a valid value (a customer number that exists in *Customer*). Paradox verifies that the value exists in *Customer* but does not display any message about the lookup.

Using All Corresponding Fields

Suppose you're editing an *Orders* table in which the Customer No field has a table lookup defined as All Corresponding Fields to the Customer No field of *Customer*. This *Orders* table also has a Name field that contains the customer's name.

When you're editing *Orders* and enter the Customer No value, Paradox enters it *and* all corresponding field values (such as Name) in the *Orders* table.

If you type an invalid value (a customer number that doesn't exist in the *Customer* table), Paradox displays a message and won't let you move off the record until you enter a valid value.

Help and Fill

If the lookup access is Help and Fill, you can enter data in the Customer No field by typing it in, or you can get help finding a valid value:

1. Select the Customer No field in *Orders*. You'll see a message in the status bar informing you to press *Ctrl+Spacebar* for lookup help.
2. Press *Ctrl+Spacebar* or choose Record | Lookup Help. You'll see the lookup table (*Customer*) in a dialog box on top of the table you're editing.

   If there is already a valid value in the table you're editing, the current record marker indicates that value in the lookup table. For example, if you enter **1320**, and then press *Ctrl+Spacebar*, the current record marker is on the value 1320 in the lookup table.
3. From the lookup table, select the value you want.

4. Choose OK, and Paradox enters that value *and* the correct value for the Name field in the *Orders* table. This is because the Name field of *Orders* corresponds to the Name field of *Customer*.

Fill No Help

If the lookup access is Fill No Help, you must enter a valid value (a customer number that exists in *Customer*). Paradox verifies that the value exists in *Customer* but does not display any message about the lookup.

When you enter a valid value in the Customer No field of *Orders*, Paradox enters that value *and* the correct value for the Name field in the *Orders* table. This is because the Name field of *Orders* corresponds to the Name field of *Customer*.

Using Move Help

In certain situations, you may have a record in one table that corresponds to a record in another table. This can happen

- In a referential integrity relationship, where one record in a parent table is related to one or more records in a child table
- In a multi-table form, where one record of the master table is related to one or more records in the detail table

In either of these kinds of relationships, you can use *move help* to move a dependent record from one master to a different master.

For example, suppose you've linked *Customer* and *Orders* in a one→many relationship in a form. If you select a value in Customer No in the *Orders* table, then choose Record | Move Help (or press *Ctrl+Shift+Spacebar*), you'll see the *Customer* table in a dialog box. When you choose a value from the Customer No field in this lookup table, Paradox changes the Customer No value for the selected record, moving it to a different master.

CHAPTER 6

Querying your data

In this chapter you'll learn how to ask questions about the data in your tables. You'll learn how to tell Paradox what you're looking for, and let Paradox produce the results you want.

Note The examples of this chapter use the sample tables located in the SAMPLE directory under the PDOXWIN directory (assuming you used the default PDOXWIN directory name when you installed and that you installed the sample tables). To follow these examples, make SAMPLE your working directory.

What is a query?

A *query* is a question you ask Paradox about information in your tables. It can be anything from a simple question about the information in one table, to a complex question about information in several tables.

In a query, you can specify

- Tables to ask questions about
- Fields you want to see in the answer
- Records you want to select
- Calculations (if any) you want to perform

You can also use queries to perform operations that

- Insert new records
- Delete records
- Change values
- Create new fields

And you can use queries to play "what if?" with your data:

- How much would total sales increase if sales to Oregon residents increased by 8%?
- How much would our travel costs increase if airline prices went up 10%?

How do queries work?

Paradox uses a query method called *query by example*, or *QBE*. To perform a query, give Paradox an example of the result you want, and Paradox produces the result for you. This leaves you free to concentrate on what you want to achieve, rather than on the mechanics of data manipulation.

The MAST Company is described in Getting Started.

Suppose, for example, you have a table like the one in Figure 6-1. It lists the names and addresses of a scuba equipment company's dive shop customers.

Figure 6-1 The table you are asking about

Table : CUSTOMER.DB

CUSTOMER	Customer No	Name	Street
1	1221	Kauai Dive Shoppe	4-976 Sugarloaf Hwy
2	1231	Unisco	PO Box Z-547
3	1351	Sight Diver	1 Neptune Lane
4	1354	Cayman Divers World Unlimited	PO Box 541
5	1356	Tom Sawyer Diving Centre	632-1 Third Frydenhoj
6	1380	Blue Jack Aqua Center	23-738 Paddington Lane

If you're interested only in each dive shop's name and its phone number, you can ask Paradox to show you only the Name and Phone fields.

You do this by opening a Query window and giving Paradox an example of the table you want. Figure 6-2 shows how you would enter the example.

Figure 6-2 The example you give

Check the fields you want to see in the answer

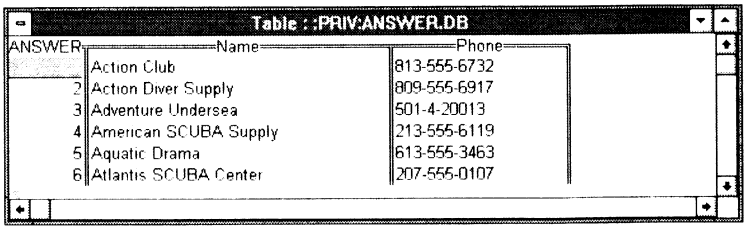
Query : <Untitled>

CUSTOMER DB	Customer No	Name	Street	City	State/Prov	Zip/Postal Code	Country	Phone
		☑						☑

The answer to this query appears in a temporary table called *Answer*. Figure 6-3 shows the *Answer* table for the sample query of Figure 6-2.

Figure 6-3 The answer you receive

The *Answer* table shows only the fields you checked in the example



As you can see, the answer follows the example you set in the query—that is, only the fields you checked appear in the *Answer* table.

The *Answer* table

Paradox overwrites *Answer* each time you perform a query and deletes it when you exit the program. Thus, if you want to save a particular *Answer* table, you must rename it. You can rename an *Answer* table after you've run the query, or you can give it a new name before, when you set up the query.

Renaming the Answer table

❒ After setting up the query and *before* running it,

1. Choose Properties | Answer Table | Options from the Query window's menu (or click the Answer Table Properties SpeedBar button from the Query window's SpeedBar).
2. In the Answer Name text box of the Answer Table Properties dialog box, replace the file name ANSWER.DB with the new name you want (still with the .DB extension—or .DBF for a dBASE file format table—and following DOS file-naming rules).
3. Choose OK.

❒ After running a query and creating an *Answer* table, you can either

1. Choose Table | Rename if the *Answer* table is still open on the Desktop and in the active window.
2. Enter the new file name in the Rename dialog box.
3. Choose OK.

Or,

1. Choose File | Utilities | Rename.
2. Select :PRIV:ANSWER.DB from the Tables list in the Table Rename dialog box. Paradox places :PRIV:ANSWER in the Table text box.
3. In the New Name text box, enter the new file name you want.

4. Choose OK.

Paradox saves Answer by default in your private directory.

Paradox places all temporary tables, including *Answer*, in your private directory. If you're sharing a Paradox LAN license on a network server and you haven't specified a private directory, Paradox uses your Windows temporary directory for your temporary objects, including the *Answer* table.

Example 6-1 A typical query

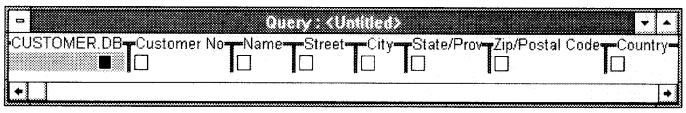
Suppose you want a list of customer names and phone numbers.

Prerequisite Start Paradox and make PDOXWIN\SAMPLE your working directory. (The commands, tools, and methods you'll use in this example are explained in detail later in this chapter.)

Steps

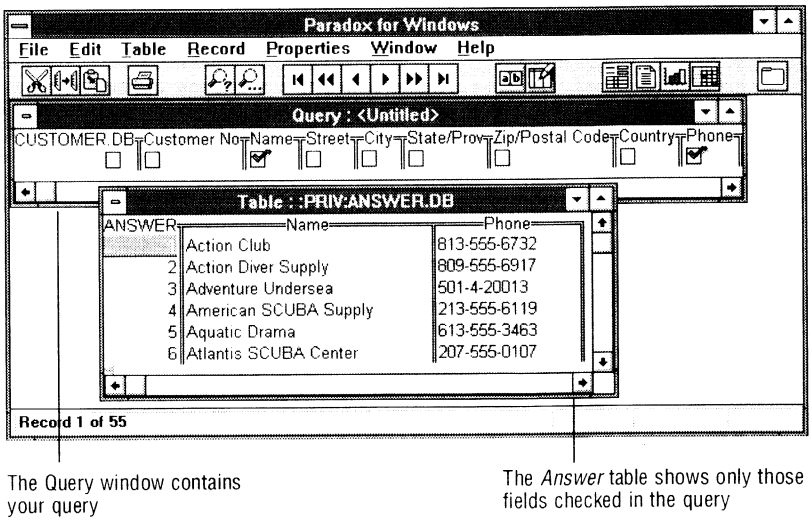
1. Choose File|New|Query. You'll see the Select File dialog box (discussed in Chapter 3).
2. From the Select File dialog box, select CUSTOMER.DB and choose OK (or double-click CUSTOMER.DB). Paradox opens a Query window with a *query image* of the *Customer* table in it.

   Paradox places the query image at the top of the Query window. You can use the scroll bar to see the fields you need, or drag column headings to move columns.



3. Click the check box in the Name field or press *F6* in the Name field. Paradox places a checkmark in the check box.
4. Use the scroll bar at the bottom of the query image to move to the right until you see the Phone field.
5. Click the check box in the Phone field or press *F6* in the Phone field. Paradox places a checkmark in the check box.
6. Click the Run Query SpeedBar button or choose Query|Run.

When Paradox finishes calculating the result of the query, it displays the *Answer* table on the Desktop on top of the Query window.



Using the Query window

Create a new query by choosing File | New | Query. An empty Query window opens on the Desktop, and the Select File dialog box appears on top of it. At this point, you have several options:

The Select File dialog box

- Choose Cancel to close the Select File dialog box and the Query window.
- Choose one or more tables to query from the list of tables available in the current working directory. (Double-click single files; *Ctrl*+click files that aren't sequential; *Shift*+click files that are sequential.)
- Click the Path drop-down arrow to change the current directory from the working directory (:WORK:) to the private (:PRIV:) directory or any other aliases you've set up. See Chapter 3 for a description of aliases.
- Choose Browse to open the Browser. You can use the Browser to choose the directory that contains the tables you want, or to choose a specific table.
- Type the name of a table you want to query in the File Name text box. If the table you want to query isn't in the current directory, type the drive and full path where the table is located before the table name.
- Choose file types other than tables from the Type list.

When you choose a file type different from the list of files in the Select File dialog box changes from tables (.DB and .DBF) to the file type you chose (.QBE for queries, .FSL for forms, and .RSL or .RDL for reports). You can only select one form, report, or query file from the Select File dialog box, whereas you can select more than one table file. Also, when you change the file type to forms, reports, or queries, you can then specify a file name matching that type in the File Name text box.

After you specify the file(s) you want and choose OK, the Select File dialog box closes, and Paradox inserts into the Query window query images of all objects represented in the files you chose. These rules govern the placement of query images in the Query window:

- You can't place more than one query image of a particular table in the Query window.
- When you choose more than one table file (.DB or .DBF) at a time from the Select File dialog box, Paradox inserts query images of the tables into the Query window in the same order the files appear (alphabetically) in the Select File dialog box.
- If a form, report, or query file represents more than one table (for example, when any of these objects consist of a multi-table relationship), then Paradox inserts query images of master tables first, then those of detail tables.
- If you've inserted query images into the Query window and then choose to add more (by choosing Query | Add Table or by clicking the Add Table SpeedBar button), you will only be able to select from table files (.DB or .DBF) in the Select File dialog box, not from form, report, or query files.

Querying dBASE tables

You can query dBASE tables the same way as Paradox tables in Paradox's Query window. When choosing from table file types in the Select File dialog box, you see all .DB (Paradox tables) and .DBF (dBASE tables) files available in the current directory. If you select a .DBF file to query, Paradox inserts a query image of that dBASE table in the Query window just as it would insert a query image of a Paradox table.

Ways in which dBASE field types differ from Paradox field types prevent you from using some Paradox query operators in some dBASE field types. Tables throughout this chapter and Chapter 7 show which Paradox query operators you can use in each Paradox and dBASE field type.

Linked multi-table objects

If you choose a query, form, or report that represents a multi-table linked relationship, Paradox inserts into the Query window query

images of all tables in the relationship and automatically links the images according to the way the tables are linked in the relationship. It links the images by inserting example elements in their common, linking fields. See "Using example elements" later in this chapter.

Password-protected objects

If you choose an object from the Select File dialog box that is protected with a password, Paradox asks you for the password when you choose OK in the Select File dialog box. After you supply it and choose OK, Paradox places the appropriate query image(s) in the Query window.

You can clear the password from the current Paradox session by choosing File | Utilities | Passwords; however, Paradox won't let you run a query until you reissue the password.

The query image

The query image is structured just like the table it represents and is like a table in Edit mode. The query image has the same fields, in the same order, as the table it represents. Only the table's data is missing. If you've made any changes to the table's properties (for example, changed the column order or the way heading text is displayed), the query image doesn't reflect them. However, you can change the column order of the query image.

You type data into and navigate through the fields of a query image the same as you would in a table in Edit mode. You can insert and delete the lines of a query image as you would records of a table.

Figure 6-4 shows a Query window with one query image.

Figure 6-4 The Query window

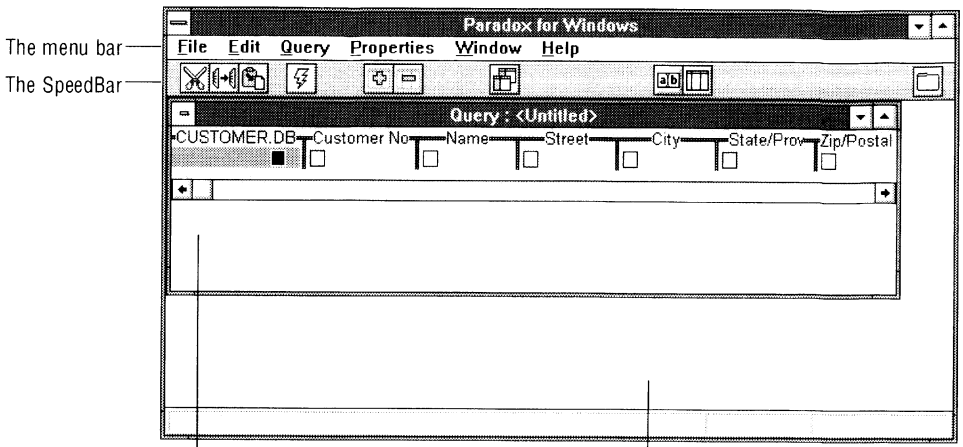


Table 6-1 User interface options in a query image

Action	Mouse interaction	Keypress
Join tables with corresponding example elements	Join Tables Speedbar button	*F5*, and type in example elements
Place checkmark in field check box	Click check box	*F6* in field
Place check plus in field check box	Click and hold in check box to produce check menu; choose check plus	*Shift+F6* in field until check plus appears
Place check descending in field check box	Click and hold in check box to produce check menu; choose check descending	*Shift+F6* in field until check descending appears
Place GroupBy check in field check box	Click and hold in check box to produce check menu; choose GroupBy check	*Shift+F6* in field until GroupBy check appears
Display menu of query operations in leftmost query image column	Click and hold in leftmost column under the table name	*Spacebar* in leftmost column under the table name

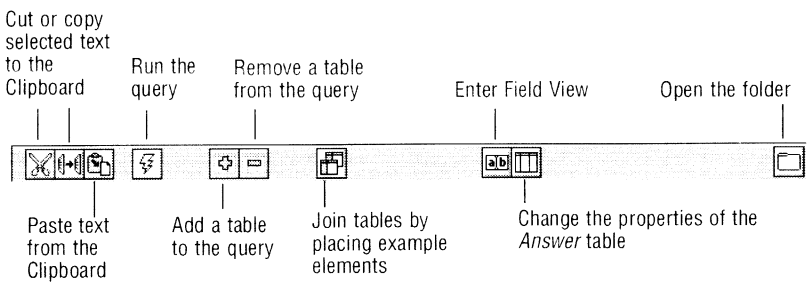
Action	Mouse interaction	Keypress
Select menu choice from menu of query operations in leftmost query image column	N/A	Type first letter of menu choice in leftmost column
Delete current selection condition(s) you're in process of typing in a field in order to start over	N/A	*Esc* in field
Delete all checks and conditions in a single line query or delete entire second or greater line in a multi-line query	N/A	*Ctrl+Del* in any field of line to be cleared or deleted

The Query window's SpeedBar

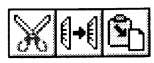
The SpeedBar in the Query window provides shortcuts to common menu commands, as well as an automatic method of placing example elements. Example elements are explained later in this chapter.

Figure 6-5 shows what each button on the Query window's SpeedBar does.

Figure 6-5 The Query window's SpeedBar



Cutting, copying, and pasting



Later in this chapter you'll learn how to retrieve specific data from your tables by typing selection conditions in the fields of query images. With the Cut, Copy, and Paste commands on the Edit menu and the Cut, Copy, and Paste SpeedBar buttons, you can cut or copy data from one field of a query image to paste into different fields.

- Choose Edit | Cut (or click the Cut SpeedBar button) to delete the selected text from the field and place it on the Windows Clipboard.

- Choose Edit | Copy (or click the Copy SpeedBar button) to copy the selected text from the field to the Windows Clipboard.
- Choose Edit | Paste (or click the Paste SpeedBar button) to paste the contents of the Windows Clipboard into the selected field.

Using Paste Link

To establish a link in a query with data from another Windows application using Dynamic Data Exchange (DDE), choose Edit | Paste Link. See Chapter 15 for complete details and an example. Chapter 15 also explains the Query | Wait for DDE menu choice on the Query menu.

Deleting

In addition to the Cut command (and the Cut SpeedBar button), Paradox provides the Delete command on the Edit menu. Edit | Delete removes selected text *without* placing it on the Windows Clipboard.

Running the query

Choose Query | Run, press *F8*, or click the Run Query SpeedBar button to run the query. If a problem with the query occurs, Paradox displays an error message, prompting you to correct the problem.

Adding tables

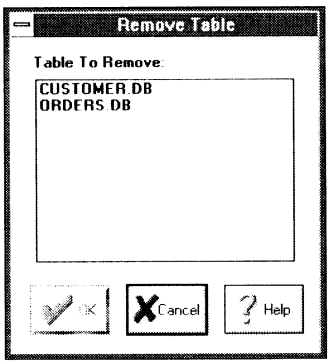
To add more table query images to a query, choose Query | Add Table (or click the Add Table SpeedBar button). The Select File dialog box appears again. Once you have at least one query image in the Query window, you can only choose table files (not form, report, or query files) in the Select File dialog box. Choose the table(s) you want to add to the query and choose OK.

Removing tables

Suppose you've added the wrong query image to the Query window, or you've completed one query and want to ask another question about another table. You don't need to open a new Query window—Paradox lets you remove unwanted query images.

Choose Query | Remove Table (or click the Remove Table SpeedBar button) to remove a table's query image from the Query window. You'll see the Remove Table dialog box, as Figure 6-6 shows.

Figure 6-6 The Remove Table dialog box



The Remove Table dialog box displays all table query images currently in the Query window. Choose the table(s) whose query image(s) you want to remove and choose OK. (Double-click single files; *Ctrl*+click files that aren't sequential; *Shift*+click files that are sequential.)

Joining tables

To ask a question whose answer requires data from more than one table, you must place query images of all necessary tables in the Query window and link, or *join*, the images by their common fields. You join query images by placing matching example elements in corresponding common fields.

Later in this chapter you'll learn how to place example elements both manually and automatically. The Join Tables SpeedBar button is the tool for one method of placing example elements automatically.

Field View

When you want to edit a selection condition or conditions you've typed into a query image field, you can either backspace to delete characters from the end, or you can enter Field View to edit within the field. To enter Field View, choose Query | Field View (or press *F2*, or click the Field View SpeedBar button) when the insertion point is in the field you want to edit. You can also use the mouse to place the insertion point anywhere within the selection condition or conditions of the field you want to edit and thus enter Field View.

Changing the *Answer* table

Unless you change it, the structure of the *Answer* table closely reflects that of the query example: the leftmost field checked in the first query image becomes the leftmost field of the *Answer* table, the next leftmost field checked in the first query image becomes the second field of the *Answer* table, and so on through the checked fields of all the query images.

If the *Answer* table contains fields with duplicate field names from two or more tables, Paradox names the first field by its exact field name and numbers the duplicates, calling them *name_1*, *name_2*, and so on.

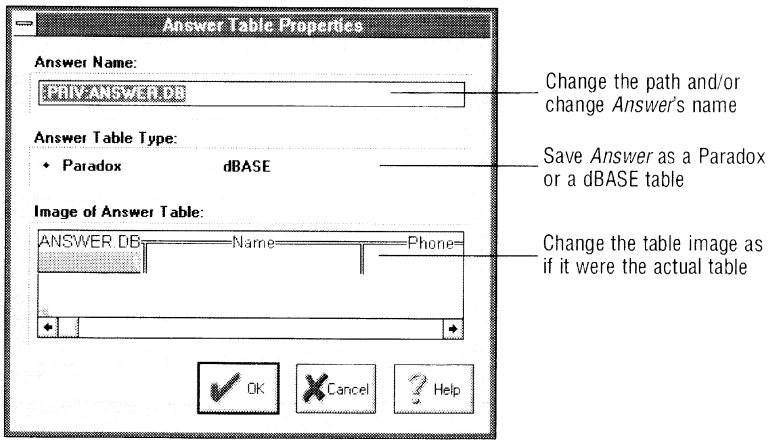
Paradox places new calculated fields at the end of the *Answer* table and names them according to the calculation. You can rename *Answer* table fields, including calculated fields, with the AS operator. See "Renaming Answer fields with the AS operator" and "Calculating with queries" later in this chapter for details and examples.

Changing the properties of Answer

Paradox lets you change several properties of the *Answer* table *before* you run the query. Choose Properties | Answer Table | Options (or click the Answer Table Properties SpeedBar button). The Answer Table Properties dialog box appears, shown in Figure 6-7.

Note You must complete all work in the Query window *before* changing the *Answer* table's properties. A good rule of thumb is to change *Answer* table properties just before you run the query.

Figure 6-7 The Answer Table Properties dialog box



You have several options in the Answer Table Properties dialog box. You can

- Change the location of *Answer* by typing in the Name text box a new drive and/or full path in place of your private directory (the default location). When you save *Answer* to a different directory, Paradox doesn't delete *Answer* when you exit the program.

Caution If you create and save *Answer* to a directory location that already contains an *Answer* table, Paradox overwrites the existing table with no warning.

- Create a new name for the *Answer* table before running the query. Type the new name in place of ANSWER.DB in the Answer Name text box. When you give *Answer* a new name, Paradox doesn't delete it when you exit the program.

Caution If you give *Answer* the same name as an existing table in the directory to which you save it, Paradox overwrites the existing table with no warning.

- Change *Answer*'s file type to either Paradox or dBASE by clicking the file type you want. (Paradox file type is the default.)
- Change the order, or arrangement, of *Answer*'s fields by manipulating them in the *Answer* table image in the bottom portion of the Answer Table Properties dialog box. Treat this image of the *Answer* table just as if it were a table in its own window. (See Chapter 4 for more information on setting table properties.) You can move or inspect columns in this image just as you would in the table itself. The only difference is that you can do it *before* you run the query and thus *before* Paradox creates the actual table.

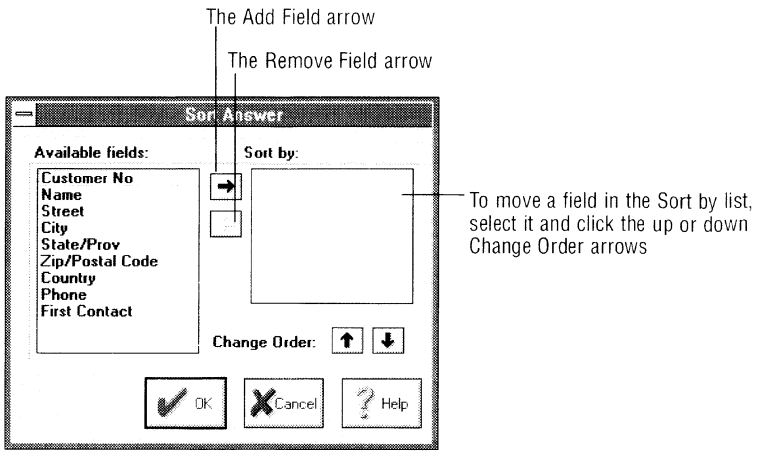
When you finish setting the *Answer* table properties you want, choose OK to return to the Query window. When you run the query, the resulting table reflects all the properties you specified.

Paradox saves the *Answer* table properties you specify when you save the query.

Sorting the Answer table

You can specify how to sort the *Answer* table before you run the query. Choose Properties | Answer Table | Sort to specify the sort order. The Sort Answer dialog box appears, as Figure 6-8 shows.

Figure 6-8 The Sort Answer dialog box



Use the Add Field arrow to move selected fields from the Available fields list to the Sort by list. Add the fields in the order in which you want the *Answer* table sorted. To remove a field from the Sort by list, select it and click the Remove Field arrow. To change the order of the fields in the Sort by list, select a field and use the Change Order arrows to move it up or down in the list.

When you choose OK, you tell Paradox to sort the *Answer* table according to the Sort by list when you run the query.

Table 6-22 at the end of this chapter summarizes the commands you can use in the Query window.

Table 6-2 User interface alternatives to Query menu choices

Action	Menu choice	Mouse interaction	Keypress
Cut selected text to the Clipboard	Edit|Cut	Cut SpeedBar button	*Shift+Del*
Copy selected text to the Clipboard	Edit|Copy	Copy SpeedBar button	*Ctrl+Ins*
Paste text from Clipboard	Edit|Paste	Paste SpeedBar button	*Shift+Ins*
Delete selected text	Edit|Delete		*Del*
Run the query	Query|Run	Run SpeedBar button	*F8*
Add a table to the Query window	Query|Add Table	Add Table SpeedBar button	

Action	Menu choice	Mouse interaction	Keypress
Remove a table from the Query window	Query|Remove Table	Remove Table SpeedBar button	
Enter Field View	Query|Field View	Field View SpeedBar button or click within selection condition(s)	*F2*
Change *Answer* table properties	Properties|Answer Table	Answer Table Properties SpeedBar button	
Open the Folder	File|Open|Folder	Folder SpeedBar button	

Saving or restoring query options

You can specify certain query options that affect all queries you run and that last between Paradox sessions:

- Query restart options
- The display of multiple query images in the Query window

These options exist on the Properties menu as Restart Options, Tile Tables, and Cascade Tables. Above these choices on the Properties menu is the choice Query Options. When you choose Query Options, another menu appears with the choices Save as Default and Restore Default.

When you choose Save as Default, Paradox stores the Restart Options choice you last chose and either Tile Tables or Cascade Tables, whichever you last chose. These defaults are then in place between Paradox sessions and apply to all queries you run.

When you choose Restore Default, Paradox restores the last defaults you saved with Save as Default. Thus, if you change your restart option and table display option and decide you don't want to keep those changes, you can go back to the saved defaults.

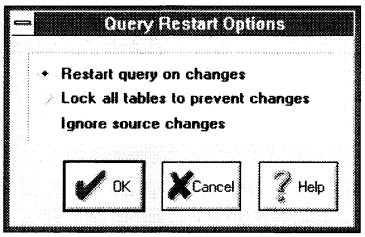
Specifying restart options

When using Paradox on a network, multiple users can make changes concurrently to a shared table in a shared data directory. As one of these multiple users, you can specify whether you want your *Answer* table to reflect changes other users make to the source table(s) of your query that they make *while the query is running*.

When you first install Paradox, it's set to restart a query, if it detects another user changing the source table(s) while it's running the query. To specify how Paradox should run your queries, choose

Properties | Restart Options. The Query Restart Options dialog box appears with the current default selected.

Figure 6-9 The Query Restart Options dialog box



- Choose *Restart query on changes* to make Paradox restart the query when it detects—while running the query—another user making a change to the source table(s).
- Choose *Lock all tables to prevent changes* to lock all tables in your query, thus preventing any other users from making changes to them while Paradox runs the query. Paradox releases the locks when it finishes running the query. (If someone else is already using the table(s) you want to lock and query, Paradox can't place your locks and run the query.)
- Choose *Ignore source changes* to allow other users to make changes to the source table(s) while Paradox runs your query *and* to prevent Paradox from restarting the query if they do.

The restart option you choose affects all queries you run and remains in place between Paradox sessions, if you choose Properties | Query Options | Save as Default.

Displaying multiple query images in the Query window

You can choose how to display multiple query images in the Query window:

- Choose Properties | Tile Tables to tile multiple query images.
- Choose Properties | Cascade Tables to cascade multiple query images.

The option you choose affects all Query windows you open and the query images you place in them, and the option remains in place between Paradox sessions, if you choose Properties | Query Options | Save as Default.

Saving a query

To save a query for later use, choose File | Save or File | Save As. If you close the Query window without saving, Paradox prompts you to save the query.

When you save a query, it becomes an object like any other Paradox object. You can open and minimize it on the Desktop and display it in the Folder window. You can also build forms and reports directly from queries, rather than from the *Answer* tables they generate. See Chapter 10 for information on using queries in design documents.

Creating a query

The way you create a query depends on the results you want. You can select fields, select records based on conditions, perform calculations, link multiple tables, and change the data in your tables. First, you need to be aware of some rules.

Specifying numbers in queries

When you type a number into a numeric field (Paradox number, short number, or currency field and dBASE number or float number field) of a query image,

- Don't type dollar signs.
- Don't type parentheses to signify a negative value.
- Don't type thousand separators (a comma in U.S. convention and a period in international convention) when specifying a pattern match with the .. or @ wildcard operators.

On the other hand,

- Do type decimal separators (a period in U.S. convention and a comma in international convention).
- Do type the minus symbol to signify a negative value.
- Optionally, do type thousand separators when specifying an *exact match* numeric selection condition.

Paradox determines when a comma or a period is a thousand or a decimal separator, first based on whether you have U.S. or international number convention set, and second, based on the symbol's position and context. Ambiguity arises when a comma could be Paradox's AND operator, which is a comma, and when a period could be part of Paradox's .. wildcard operator, which is two periods in a row. (You'll learn about the .. wildcard operator and the AND (,) operator later in this chapter.)

If a comma's or period's meaning isn't clear, then you must help Paradox understand the symbol's meaning with double quotation marks or spaces. A comma's or period's meaning will not be clear as a thousand separator if you're specifying a pattern match with the .. or @ wildcard operators; thus, don't type thousand separators when specifying a numeric pattern with .. or @.

If you have the U.S. number format set,

- Paradox interprets a single period in the numeric field as a decimal separator.
- Paradox interprets the first two periods in a row as the .. wildcard operator. Thus, if Paradox encounters three periods in a row in the numeric field, it interprets the first two as the .. wildcard operator and the third as the decimal separator. To make Paradox interpret the first period in this situation as the decimal separator, you must enclose it in double quotation marks. See Figure 6-19 later in this chapter for an example of this rule.
- Paradox interprets a comma in a numeric field as a thousand separator if you're specifying an exact match and if the comma is in the proper position within the exact match to be a thousand separator. To make Paradox interpret a comma as the AND operator where this meaning might not be clear, type a space or any other non-numeric character that isn't the @ wildcard operator or part of the .. wildcard operator (such as a comparison operator) after the AND comma. See Figure 6-24 later in this chapter for an example.

If you have the international number format set,

- Paradox interprets the first comma in a numeric field within a number as the decimal separator.
- Paradox interprets a comma followed by a space or any other non-numeric character that isn't the @ wildcard operator or part of the .. wildcard operator (such as a comparison operator) as the AND operator in a numeric field.
- Paradox interprets a single period in a numeric field as a thousand separator if you're specifying an exact match and if the period's in the proper position within a numeric selection condition to be one.

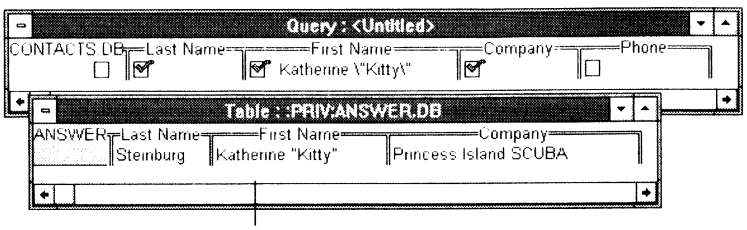
Using quotation marks

If you want to enter an alphanumeric value that contains a reserved Paradox symbol or word, enclose the reserved value in double quotation marks (" "). Paradox then recognizes the quoted characters as a literal value instead of acting on the special meaning they otherwise have. For the complete list of Paradox reserved words and symbols, refer to Table 6-22 at the end of this chapter.

You don't need to use quotation marks to enclose blank spaces between words in a value. You do need them for all other symbols that have special meaning in Paradox, including periods, asterisks, and so on.

If the value itself contains quotation marks, precede each literal quotation mark with a backslash (\). Figure 6-10 shows such a query.

Figure 6-10 An alphanumeric selection condition containing quotation marks



The *Answer* table contains all *Contacts* table records whose First Name values are *Katherine "Kitty"*

If the value you want to specify contains a backslash, precede that backslash with another backslash (\\), just as you precede literal quotation marks with a backslash.

Selecting fields

When building a query, you need to tell Paradox what fields of the table to include in the *Answer* table. To display a field in *Answer*, place a checkmark in the field's check box. You can place a checkmark in these ways:

- Click the field's check box.
- Select the field and press *F6*.

Different checks mean different things.

In addition to the regular checkmark, Paradox has these kinds of checks:

- Check plus
- Check descending
- GroupBy check

Each of the different types of checks has a special meaning, which the following sections describe. To place any kind of check, you can

- Click and hold the field's check box to display the check menu, then choose the type of check you want from the menu.

- Select the field and press *Shift+F6* repeatedly until the type of check you want is displayed.

Removing checks

To remove any check once you've placed it, either click the check box or press *F6* in the field.

The checkmark

If you want the *Answer* table to include only unique values for the checked field, use the checkmark. When you use the checkmark, Paradox displays unique values sorted in A to Z order, or *ascending order*. Example 6-2 shows how to use the checkmark.

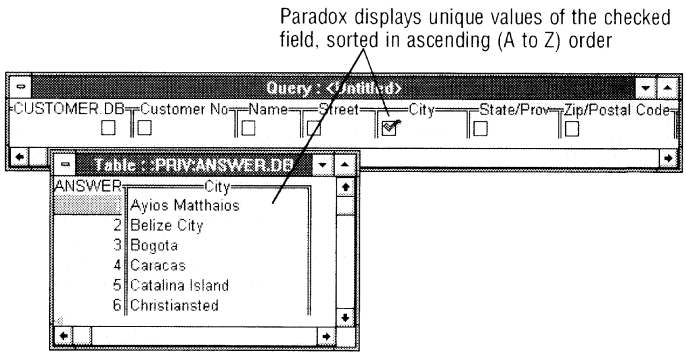
Example 6-2 Using the checkmark

Suppose you want to see just the values in the City field of the *Customer* table, in alphabetical order.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

1. Position the pointer anywhere in the one line or row of the CUSTOMER.DB query image, press *Ctrl+Del* to clear all existing criteria in that line—in this case, the checkmarks in the Name and Phone fields.
2. Place a checkmark in the City field by clicking its check box or by pressing *F6* in the field.
3. Click the Run Query SpeedBar button or choose Query|Run.



The check plus

If you want to display *all* values in a field, including duplicates, use the check plus. When you use check plus, the values from the checked field appear in the *Answer* table in the same, or *natural*, order they appear in the queried table; they aren't sorted, which they are when you use the checkmark. When you use check plus in any field of the query image, it overrides any checkmarks or check descendings you might have placed in any other field. This is because Paradox can't *both* not sort and include duplicates *and* sort and exclude duplicates.

Note Although you can place checkmarks and check descendings in BLOB fields, Paradox treats them essentially as check pluses in these fields, in the sense that it can't distinguish unique from duplicate values in these field types nor sort them.

Example 6-3 shows the same query as Example 6-2, but this time using check plus.

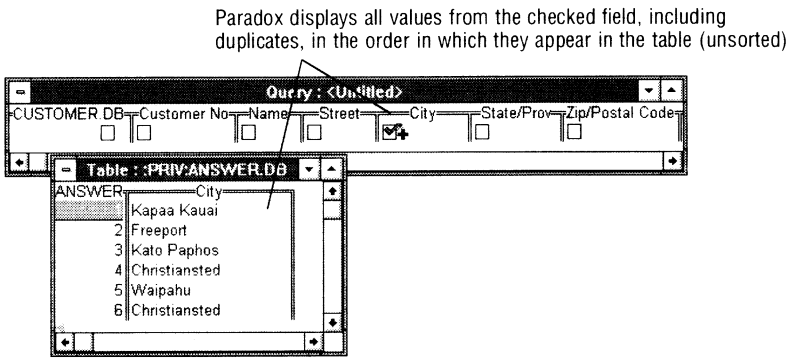
Example 6-3 Using check plus

Suppose you want to see all values in the City field of the *Customer* table, including duplicates.

Prerequisite The Query window with the CUSTOMER.DB query image from Example 6-2.

Steps

1. Place a check plus in the City field:
   - Click and hold the check box to produce its menu and choose the check plus, *or*
   - Press ***Shift+F6*** in the field until you get a check plus.
2. Click the Run Query SpeedBar button or choose Query|Run.



The check descending

If you want to see the values of a field sorted in *descending order* (Z to A), use check descending. Example 6-4 shows the same query again as in Example 6-2 and Example 6-3, but this time using check descending.

Example 6-4 Using check descending

Suppose you want to see the values in the City field of the *Customer* table, in reverse alphabetical order.

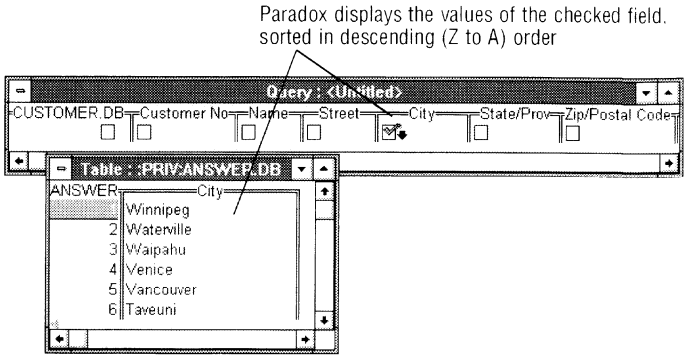
Prerequisite The Query window with the CUSTOMER.DB query image from Example 6-3.

Steps

1. Place a check descending in the City field:
   - Click and hold the check box to produce its menu and choose the check descending, *or*

- Press *Shift+F6* in the field until you get a check descending.

2. Click the Run Query SpeedBar button or choose Query|Run.



The GroupBy check

Use the GroupBy check to specify a group of records to use in a SET query. Use GroupBy when you want to group by a field but not display its values in *Answer*. Chapter 7 discusses GroupBy and SET queries.

Selecting all fields

If you want all the fields from a table included in the *Answer* table, place the appropriate check in the check box under the table's title in the query image (the leftmost field of the query image). The check you choose doesn't appear under the table's title, but in all the query image's fields. Example 6-5 demonstrates.

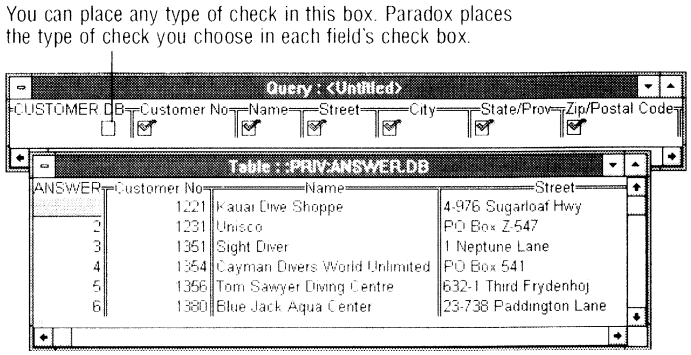
Example 6-5 Checking all fields of a query image

Suppose you want to produce an *Answer* table with all values in all fields of the *Customer* table.

Prerequisite The Query window with the CUSTOMER.DB query image from Example 6-4.

Steps

1. Place checkmarks in all the CUSTOMER.DB query image's fields:
   - Click the check box under the query image's name, CUSTOMER.DB (the leftmost field), *or*
   - Press *F6* in the query image's leftmost field, (under CUSTOMER.DB).
2. Click the Run Query SpeedBar button or choose Query|Run.



Renaming *Answer* fields with the AS operator

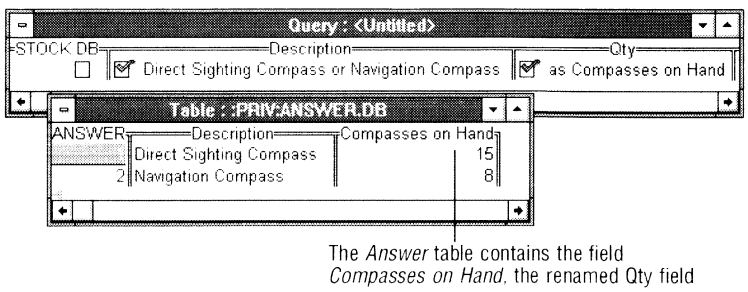
When you check a field in a query, Paradox displays it in the *Answer* table with the same name that it has in the original table. If the *Answer* table contains two or more fields that have the same name, Paradox numbers the duplicates *name_1*, *name_2*, and so on.

Later in this chapter you'll learn about the CALC operator. When you use the CALC operator, Paradox creates a new field in the *Answer* table that contains the results of a calculation you specify after CALC. Paradox automatically places the new calculated field at the end of the *Answer* table and names the field according to the calculation.

If you want to change a field name in the *Answer* table, giving it a name you specify rather than the one Paradox specifies automatically, use the AS operator. Type the query condition (if any) in the existing field you want to rename, then type **as** followed by the new field name you want to give it. To specify a name for a calculated field, follow the CALC expression with the AS operator and the new name.

Figure 6-11 shows a query using the AS operator.

Figure 6-11 Renaming an *Answer* table field with the AS operator



Note The AS operator changes field names only in the *Answer* table. It doesn't change field names in the table(s) you query.

Table 6-3 Paradox field types allowing checks and the AS operator

Operator	A	N	$	D	S	M	F	B	G	O
check-mark	√	√	√	√	√	√*	√*	√*	√*	√*
check plus	√	√	√	√	√	√	√	√	√	√
check descending	√	√	√	√	√	√*	√*	√*	√*	√*
GroupBy check	√	√	√	√	√					
AS	√	√	√	√	√	√	√	√	√	√

* While you can check Paradox BLOB fields with checkmarks and check descendings, Paradox will essentially treat these two kinds of checks as check pluses in these field types, in the sense that it can't distinguish unique from duplicate values in these field types nor sort them.

Table 6-4 dBASE field types allowing checks and the AS operator

Operator	C	F	N	D	L	M
check-mark	√	√	√	√	√	√*
check plus	√	√	√	√	√	√
check descending	√	√	√	√	√	√*
GroupBy check	√	√	√	√	√	
AS	√	√	√	√	√	√

* While you can check dBASE memo fields with checkmarks and check descendings, Paradox will treat these two kinds of checks as check pluses in this field type, in the sense that it can't distinguish unique from duplicate values in this field type nor sort them.

Selecting records

In most cases, you want to see only records that meet certain conditions. You specify the conditions you want records to meet by

typing the conditions in the query image's fields. The selection conditions represent field values that should be present in the records you want to see.

Exact matches

If you want to see records with a specific value in a field, type the value you're looking for in the appropriate field of the query image of the table. Example 6-6 illustrates how to specify an exact match.

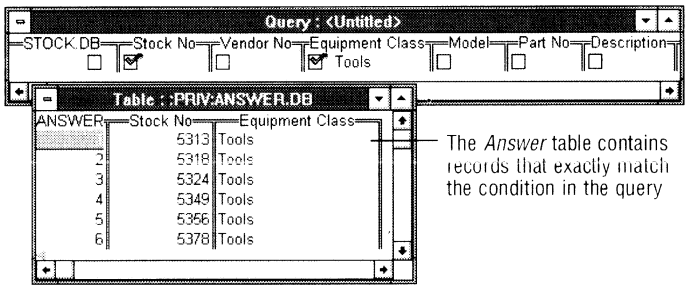
Example 6-6 Matching an exact value

Suppose you want to see all stock in the sample *Stock* table with the equipment classification *Tools*.

Prerequisite An open Query window with a blank STOCK.DB query image.

Steps

1. Place checkmarks in the Stock No and Equipment Class fields to make these fields appear in the *Answer* table.
2. Type **Tools** in the Equipment Class field. Be sure to type a capital **T**.
3. Click the Run Query SpeedBar button or choose Query|Run.

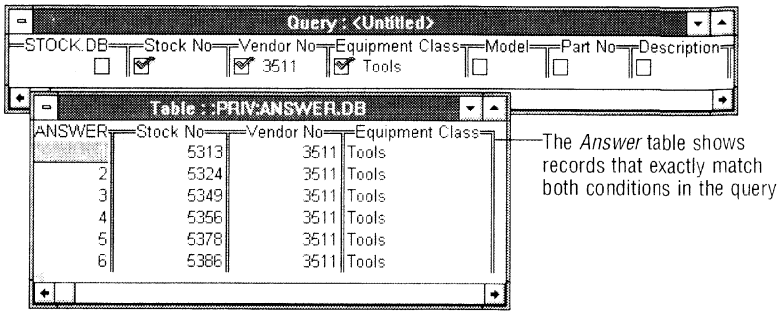


Note Exact matches display field values that are exactly the same—in spelling and case—as the selection condition you type in the query image. If you were to replace the word *Tools* with the word *Tool* or *tools* in Example 6-6, the query would not retrieve any of the records with the value *Tools* in the Equipment Class field.

You can't specify an exact match in a BLOB field.

You can match several values in several fields at the same time, with the exception of BLOB fields. (You must use the .. wildcard operator to specify selection conditions in memo and formatted memo fields; see "Matching a pattern" later in this chapter.) Type all of the values you want to see—exactly as they appear in the table—in the appropriate fields of the query image. Figure 6-12 shows such a query.

Figure 6-12 Matching more than one exact value



The LIKE operator

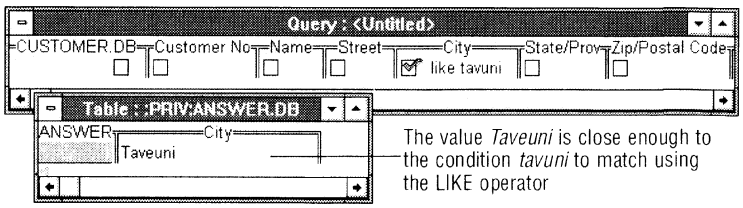
The LIKE operator is particularly useful for finding alphanumeric values that contain typographical errors or alternate spellings, such as *Cafilornia* for *California* or *grey* for *gray*.

To use the LIKE operator, type **like** in front of the value you want. When you use the LIKE operator, you don't have to worry about the case of any of the letters of the value you type after LIKE. As with all of Paradox's operators, you also don't have to worry about the case of the LIKE operator itself.

Figure 6-13 shows how to use LIKE to find alphanumeric values that are very similar.

Note You can't use the LIKE operator in a BLOB field or with any pattern match using the .. or @ wildcard operators. See "Matching a pattern" later in this chapter for details about the wildcard operators.

Figure 6-13 Using the LIKE operator



You need to remember two general rules when using LIKE:

- The first character of the example you type must match the value you're looking for (although the case doesn't matter). For example, **like Kalifornia** doesn't match *California* but **like california** does.

- If your example includes half to two-thirds or more of the characters in a value, you will probably get a match: **like lon, like ldn, like lnd,** and **like loo** all match *London*; **like lo** and **like ln** do not.

If your query isn't giving you the results you expect, try using LIKE to see if the problem is a simple spelling or capitalization error in an alphanumeric field.

The NOT operator

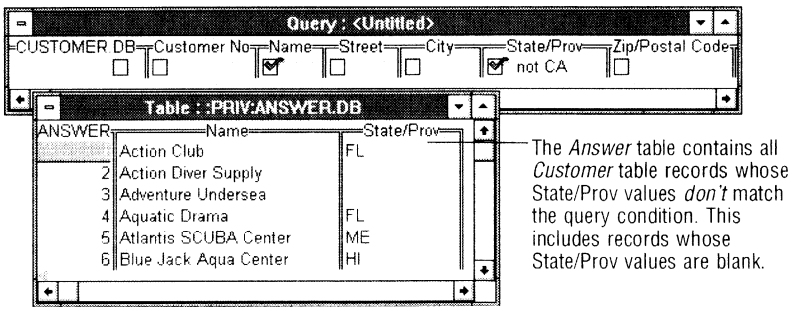
Sometimes you might want to select records that do *not* have a certain value in a specified field. To do so, use the NOT operator. Type **not** before the selection condition describing the value you don't want to see.

NOT can precede exact values, ranges, wildcards patterns, or other operators. (You'll learn about ranges and wildcard patterns later in this chapter.) In fact, you can precede any valid selection condition with NOT to reverse the example.

If the selection condition you specify after the NOT operator is an exact match condition, you must type the condition exactly as the matching value appears in the table, with respect to case and spelling. As with all of Paradox's operators, the case of the NOT operator doesn't matter.

Figure 6-14 shows a query using the NOT operator.

Figure 6-14 Using the NOT operator

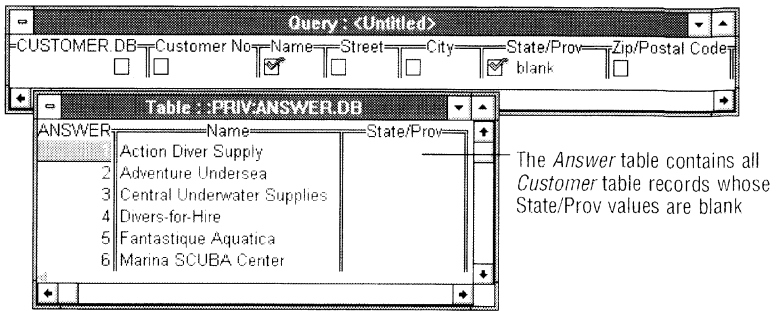


The BLANK operator

Use the BLANK operator to find records with no value in a specified field. In some cases, the absence of a value is in itself a useful piece of information. In other cases, you might want to find records with a blank field so you can fill in information that wasn't available when the record was originally entered.

To use the BLANK operator, type **blank** in the appropriate field. The *Answer* table displays only those records with no value in that field. Figure 6-15 shows a BLANK query.

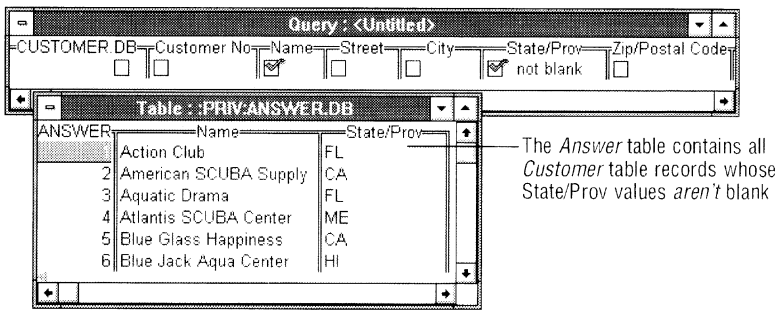
Figure 6-15 Using the BLANK operator



Combining NOT with BLANK

You can combine NOT with BLANK to find all records that have *any* non-blank value in the specified field. Figure 6-16 shows this kind of query.

Figure 6-16 Using the NOT operator with the BLANK operator



Matching a pattern

Paradox provides two *wildcard operators* that you can use to match patterns of characters. Although the LIKE operator is useful for finding inexact matches in alphanumeric fields, wildcard operators give you more flexibility.

Note Special guidelines apply when you use wildcard operators with dates and numbers. See "Using wildcards with dates" later in this chapter and "Specifying numbers in queries" earlier in this chapter.

Matching a single character with the @ wildcard operator

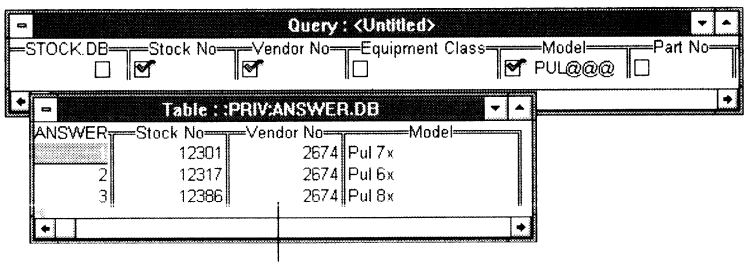
The @ wildcard operator matches any single character (letter or number). You can use any number of @ characters to specify a pattern. When you know how many characters are in the pattern you're looking for, you can use that number of @ wildcard operators instead of using the .. wildcard operator.

As when using the LIKE operator, any combination of uppercase and lowercase letters you use with the @ wildcard operator will produce the same result.

Note You can't use the @ wildcard operator by itself to specify a pattern in a memo or formatted memo field. You can use it to represent single characters in a memo or formatted memo field, but you must also use the .. wildcard operator to retrieve memo field values.

Figure 6-17 shows a query using the @ wildcard operator.

Figure 6-17 Using the @ wildcard operator



The *Answer* table contains all *Stock* table records whose Model values begin with *PUL* (in any combination of upper and lowercase), followed by any *three* (no more, no less) characters. (The space after PUL is one of the three characters.)

If you had used the .. wildcard operator in this case (for example, **Pul..**), the *Answer* table could have given you anything from *Pulse* to *Pullman*.

Table 6-5 shows what you can expect using the @ wildcard operator in a variety of ways.

Table 6-5 The @ wildcard operator

Pattern	Matches
m@@e	Mike, more, made
wom@n	woman, women
S@@@@	Smith, Smyth, scent
19@2	1932, 1952, 1992

Matching a series of characters with the .. wildcard operator

The .. wildcard operator matches any series of any number of characters, including blank spaces. As when using the LIKE and @ operators, any combination of uppercase and lowercase letters you use with the .. wildcard operator will produce the same result.

Example 6-7 demonstrates the use of the .. wildcard operator.

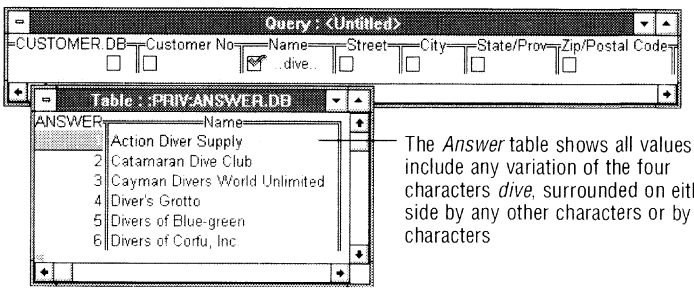
Example 6-7 Using the .. wildcard operator

Suppose you want to find customer shops with the word *Dive* in their names. If you used the LIKE operator and typed **like dive** in the Name field of the *Customer* table, you would only get dive shops whose names *started* with the word *Dive* and for whom *Dive* represented at least half of the letters of the entire name value. You want to find shops whose names have any occurrence of *Dive*.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

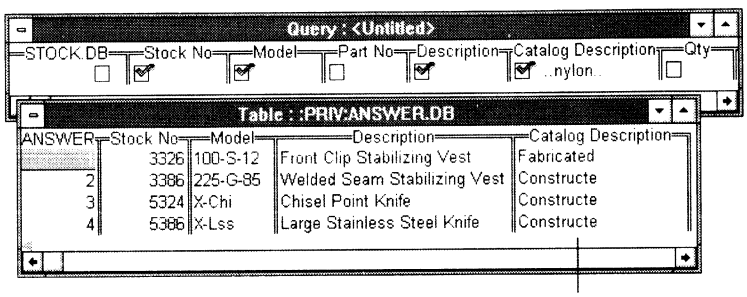
1. Place a checkmark in the Name field.
2. Type **..dive..** in the Name field.
3. Run the query.



To retrieve values from a memo or formatted memo field, you must use the .. wildcard operator to specify a pattern selection condition. (Typing an exact match in a memo or formatted memo field means typing the entire memo value; to prevent this unnecessary effort, Paradox doesn't allow it.) You can also use the @ wildcard operator to specify a pattern match in a memo or formatted memo field, but you must use it in combination with the .. wildcard operator.

Figure 6-18 shows a query specifying a pattern match with the .. wildcard operator in a memo field.

Figure 6-18 Using the .. wildcard operator in a memo



The *Answer* table contains all *Stock* table records whose Catalog Description values contain any occurrence of the word *nylon*, in any combination of uppercase and lowercase letters. (Catalog Description is a memo field, so you must enter Field View to see the word *nylon*.)

Table 6-6 shows what you can expect using the .. wildcard operator in a variety of ways.

Table 6-6 The .. wildcard operator

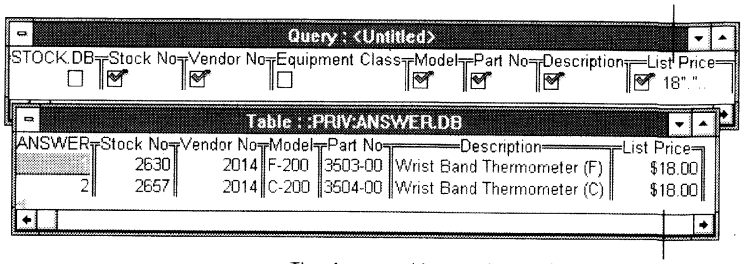
Pattern	Matches
G..	Grant, gigantic, Georgia
g..t	Grant, gross weight
..T	hat, Elm st
..e..s	Thomas Edward Willis, roses
7..5	7485, 70005
6/../71	6/01/71, 6/30/71

Using wildcards with numbers

"Specifying numbers in queries" earlier in this chapter contains rules regarding the use of the .. wildcard operator to specify a pattern in a numeric field. Figure 6-19 shows a query that uses the .. wildcard operator and the decimal separator (U.S. convention) in a numeric field.

Figure 6-19 Using the .. wildcard operator in a numeric pattern

The period decimal separator is within the quotation marks to distinquish it from the .. wildcard operator. (The 18 can also be within the quotation marks if you want.)



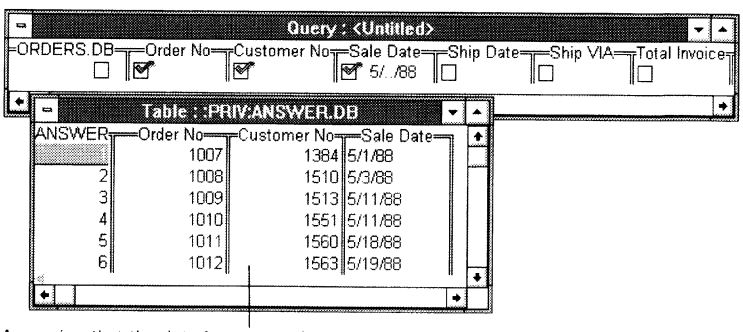
The *Answer* table contains all *Stock* table records whose List Price values are $18 and any number of cents

Using wildcards with dates

When specifying an exact match for a date value, you can use any date format that Paradox supports, including custom formats. However, when you use a wildcard to find a date, the pattern you define with the wildcard operator must reflect the date format you have set in both the ODAPI Configuration Utility and the WIN.INI file. (The ODAPI Configuration Utility and WIN.INI date settings must match.) See Chapter 4 for information about available date formats.

Figure 6-20 shows a query using the .. wildcard operator to specify a date pattern in a date field.

Figure 6-20 Using the .. wildcard operator in a date field



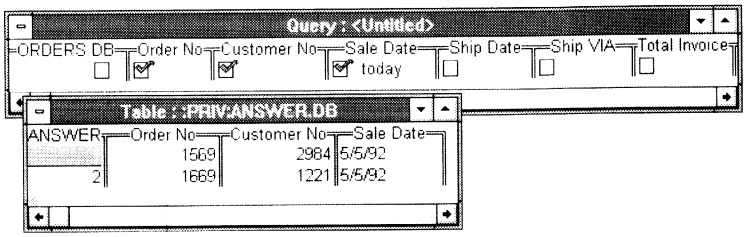
Assuming that the date format you have set in both the ODAPI Configuration Utility and your WIN.INI is m/d/yy, the *Answer* table contains all *Orders* table records whose Sale Date values are in the month of May, 1988. (You must specify the pattern in the date format you have set.)

The TODAY operator

In date fields, the TODAY operator always stands for today's date. For TODAY to work correctly, you must have your computer's calendar set to the correct date.

Figure 6-21 shows a query demonstrating one possible use of the TODAY operator.

Figure 6-21 Using the TODAY operator



The *Answer* table contains all *Orders* table records whose Sale Date values are whatever day is *today*. When this query was run, *today* was May 5, 1992. You can save this query, and run it at the end of each day to see a list of all orders that were placed just that day.

TODAY is especially useful with Paradox's arithmetic operators. See "Using arithmetic expressions" later in this chapter for details.

Table 6-7 Paradox field types allowing exact and inexact matches

Operator	A	N	$	D	S	M	F	B	G	O
Exact match	√	√	√	√	√					
LIKE	√	√*	√*	√*	√*					
NOT	√	√	√	√	√	√	√	√	√	√
BLANK	√	√	√	√	√	√	√	√	√	√
..	√	√**	√	√	√	√	√			
@	√	√**	√	√	√	√***	√***			
TODAY				√						

* While you can use LIKE in Paradox numeric and date fields, you'll get better results using the wildcard operators .. and @ to specify a numeric or date pattern.

** Paradox considers only significant digits in Paradox number fields when you use wildcard operators. For example, @@@.@@ matches 400.70, because the last 0 isn't significant. By contrast, @@@.@@ doesn't match 400.70 for the same reason.

*** You can use the @ wildcard operator in Paradox memo and formatted memo fields, as long as you also use the .. wildcard operator.

Table 6-8 dBASE field types allowing exact and inexact matches

Operator	C	F	N	D	L	M
Exact match	√	√	√	√	√[1]	
LIKE	√	√[2]	√[2]	√[2]	√[3]	
NOT	√	√	√	√	√	√
BLANK	√	√	√	√	√	√
..	√	√[4]	√[4]	√		√
@	√	√	√	√		√[5]
TODAY				√		

1 Exact matches of a dBASE logical value include uppercase or lowercase T and F and any combination of uppercase and lowercase letters of the entire words True and False. See note 3 below.

2 While you can use LIKE in dBASE numeric and date fields, you'll get better results using the wildcard operators .. and @ to specify a numeric or date pattern.

3 Using LIKE in a dBASE logical field is superfluous, since it works only with the first letter or with the whole word and not with any other partial expression of the two possible values, such as *LIKE Tr* or *LIKE Fal*.

4 A dBASE numeric field might have trailing 0s to the right of the decimal place that you might not be aware of, because you can format the display of the field to show you fewer numbers to the right of the decimal place than you can actually type in. To increase your chances of a successful match, add the .. wildcard operator to the end of a numeric pattern, even if you're trying to match last digits. For example, ...95.. will match all numeric values ending in .95, regardless of the number of decimal places you've defined for the field; on the other hand, ...95 might not always match, especially if you aren't displaying all of the decimal places you've defined for the field.

5 You can use the @ wildcard operator in dBASE memo fields, as long as you also use the .. wildcard operator.

Specifying AND conditions

When you enter selection conditions in separate fields *on the same line* of a query image, all conditions on that line must be met by a record in the table for the query to retrieve that record. This type of operation is called a *logical and*, and means that all conditions must be met.

You can also express a *logical and* in a single field—that is, enter more than one condition in a field and require that they all be met—by separating the conditions with commas.

The comma acts as an AND operator, telling Paradox that *both* (or *all*) conditions must be met for a match to occur. Because a value in a single field can't be two or more different values at the same time, the AND conditions you'll be specifying in a single field will be any kind

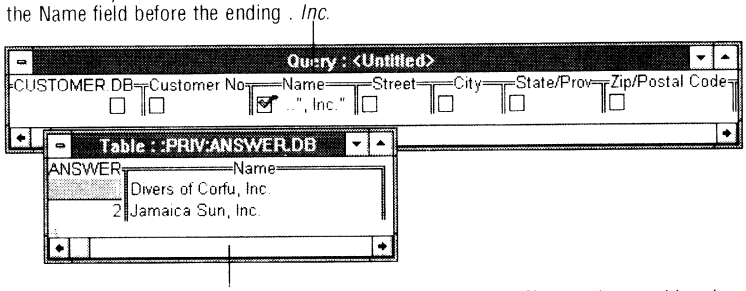
except exact match conditions—for example, two or more types of patterns.

Distinguishing literal commas in alphanumeric values from the AND operator

"Using quotation marks" earlier in this chapter explains the need to use quotation marks around reserved symbols and words in alphanumeric and both memo field types when you don't want Paradox to act on the reserved symbols' or words' special meaning. Figure 6-22 demonstrates this rule with regard to the reserved AND (,) operator.

Figure 6-22 Specifying an alphanumeric value containing a comma

Type , **Inc.** exactly as it appears in the Name field in the table, because Paradox interprets whatever is inside quotation marks exactly, as a literal string. The quotation marks thus prevent Paradox from interpreting the comma as the AND operator. The .. wildcard operator causes Paradox to retrieve records with any sequence of letters in the Name field before the ending . *Inc.*



The *Answer* table contains all *Customer* table records whose Name values end in . *Inc.*

Matching a range

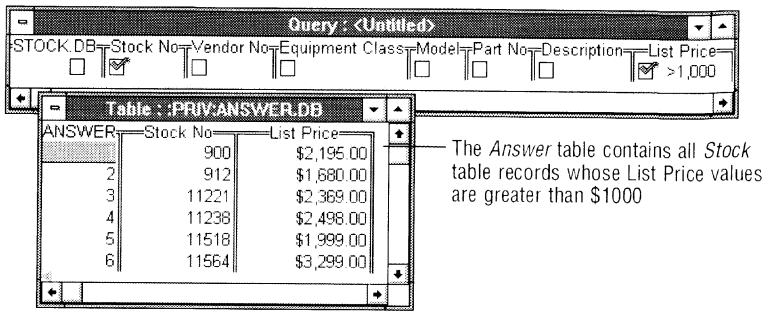
The AND operator is often one of the key components to specifying a *range* of values in a single field. The other key component is a *comparison operator* (sometimes called a *range operator*).

Table 6-9 Comparison operators

Operator	Meaning
=	Equal to (optional)
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

To use a comparison operator, type it in front of the value you're using to define the range. Figure 6-23 shows a query using a comparison operator.

Figure 6-23 Using a comparison operator



You can combine comparison operators to construct a limited range of values. Separate all comparison conditions with a comma. (If you're specifying a limited range of values in a numeric field, you must type a space after the comma to distinguish it as the AND operator if its meaning might otherwise be ambiguous to Paradox. See "Specifying numbers in queries" earlier in this chapter for details.)

Figure 6-24 shows how to combine comparison operators.

Figure 6-24 Combining comparison operators to specify a limited range

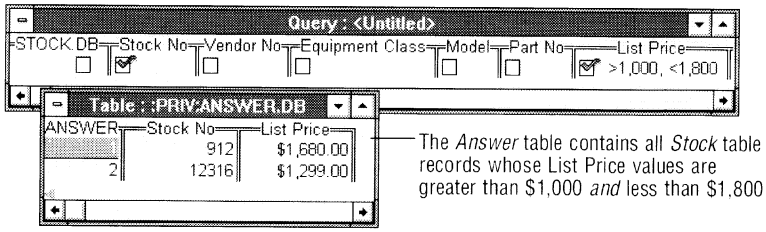


Table 6-10 Paradox field types allowing comparison operators

Operator	A	N	$	D	S	M	F	B	G	O
= (optional*)	√	√	√	√	√	√	√	√	√	√
>	√	√	√	√	√					
<	√	√	√	√	√					
>=**	√	√	√	√	√					
<=**	√	√	√	√	√					

* = is always implied when no other comparison operator is used.

** Paradox expects <= or >=, whereas dBASE IV allows any of these combinations: <=, >=, =<, and =>.

Table 6-11 dBASE field types allowing comparison operators

Operator	C	F	N	D	L	M
= (optional*)	√	√	√	√	√	√
>	√	√	√	√	√	
<	√	√	√	√	√	
>=**	√	√	√	√	√	
<=**	√	√	√	√	√	

* = is always implied when no other comparison operator is used.

** Paradox expects <= or >=, whereas dBASE IV allows any of these combinations: <=, >=, =<, and =>.

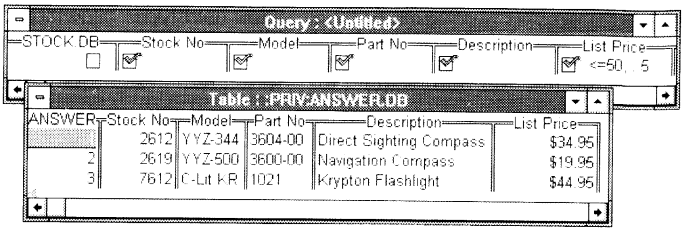
Example 6-8 Specifying a limited range of values

Suppose you want to see list prices from the *Stock* table that are less than or equal to $50.00 *and* that end with the number 5. (Suppose that a list price ending in 5 cents indicates that the item is on sale.)

Prerequisite An open Query window with a blank STOCK.DB query image.

Steps

1. Place checkmarks in the Stock No, Model, Part No, Description, and List Price fields.
2. Type **<=50, ..5** in the List Price field.
3. Run the query.



The *Answer* table contains all *Stock* table records whose List Price values are less than or equal to $50.00 and end with 5 cents.

Specifying OR conditions

In addition to *logical and* operations, Paradox lets you express *logical or* operations, that is, operations that match a value if it meets *either* of two (or *any* of several) conditions. To express an OR condition in a single field, use the OR operator; to express an OR condition between different fields, use separate lines of the query image.

Specifying OR conditions in the same field

Example 6-9 shows how to use the OR operator to meet either of two conditions in the same field.

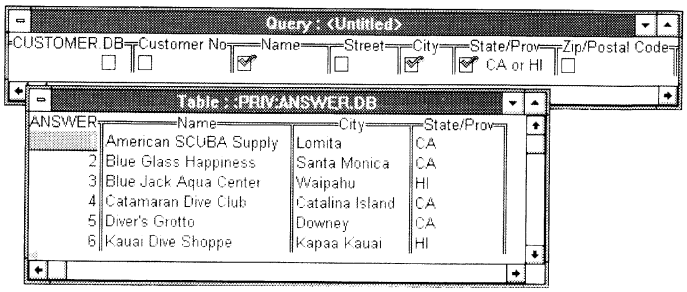
Example 6-9 Using the OR operator to specify OR conditions in a single field

Suppose you want to see a list of dive shops that are in *either* California *or* Hawaii.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

1. Place checkmarks in the Name, City, and State/Prov fields.
2. Type **CA or HI** in the State/Prov field. (You must type **CA** and **HI** exactly as they appear in the table.)
3. Run the query.



The *Answer* table contains all *Customer* table records whose State/Prov values are either *CA* or *HI*.

Specifying OR conditions in different fields

You can also specify OR criteria for different fields. You perform this kind of OR operation by putting the selection criteria on different lines of the query image. You don't use the OR operator for this kind of query.

To display fields in the *Answer* table with this kind of query, you must check the check boxes in the same field on each line, and not check any other fields that are not part of the condition.

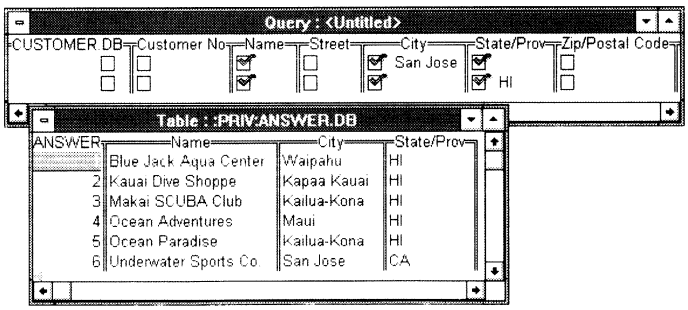
Example 6-10 Using different lines to specify OR conditions in different fields

Suppose you want to see a list of all dive shops from the *Customer* table that are in *either* the city of San Jose, California, *or* in the state of Hawaii.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

1. Place checkmarks in the Name, City, and State/Prov fields.
2. Type **San Jose** in the City field.
3. Press ↓ to create a second line in the query image.
4. Place checkmarks in the same fields on the second line that have checkmarks on the first line: Name, City, and State/Prov.
5. On the second line of the query image, type **HI** in the State/Prov field.
6. Run the query.



The *Answer* table contains all *Customer* table records whose City values are *San Jose* or whose State/Prov values are *HI*. (As we've set up this query, if you happened to have dive shops in San Jose, Costa Rica, those would have turned up, too!)

Example 6-11 Specifying OR conditions in a multi-table query

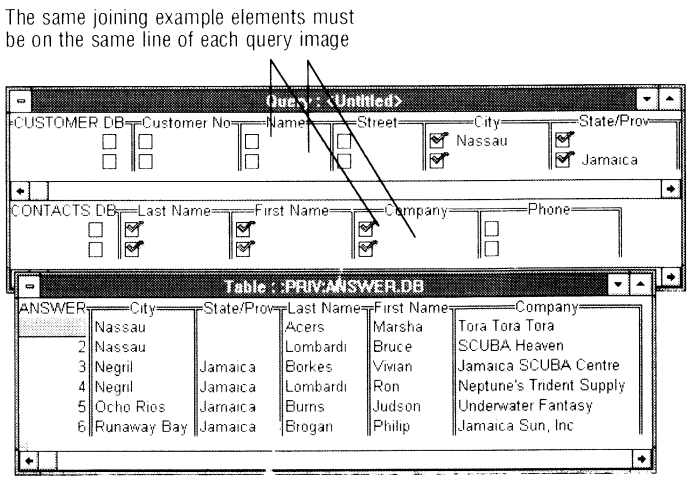
You'll learn later in this chapter how to perform several different kinds of multi-table queries. This example demonstrates how to specify OR conditions in different fields and join two tables. The important thing to avoid is putting example elements in the wrong place and accidentally specifying a self-join.

Suppose you want to see a list of all dive shops from the *Customer* table that are in *either* the city of Nassau, The Bahamas, *or* in the province of Jamaica. However, you also want to see whether you have contacts at those dive shops. You'll have to join the *Customer* table to the *Contacts* table to get this information.

Prerequisite An open Query window with a blank CUSTOMER.DB and CONTACTS.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Name field of the CUSTOMER.DB query image and the Company field of the CONTACTS.DB query image.
2. In the CUSTOMER.DB query image, place checkmarks in the City and State/Prov fields.
3. In the City field of the CUSTOMER.DB query image, type **Nassau**.
4. Press ↓ to create a second line in the CUSTOMER.DB query image.
5. Place checkmarks in the same fields on the second line of CUSTOMER.DB that have checkmarks on the first line: City and State/Prov.
6. On the second line of CUSTOMER.DB, type **Jamaica** in the State/Prov field.
7. In the CONTACTS.DB query image, place checkmarks in the Last Name, First Name, and Company fields.
8. Press ↓ to create a second line in the CONTACTS.DB query image.
9. Place checkmarks in the same fields on the second line of CONTACTS.DB that have checkmarks on the first line: Last Name, First Name, and Company.
10. Use the Join Tables SpeedBar button again to place corresponding example elements on the second line of the Name field in the CUSTOMER.DB query image and the second line of the Company field in the CONTACTS.DB query image.
11. Run the query.



Combining AND and OR conditions

Just as you can combine different types of OR operations in a single query, you can also combine AND and OR operations in a single query.

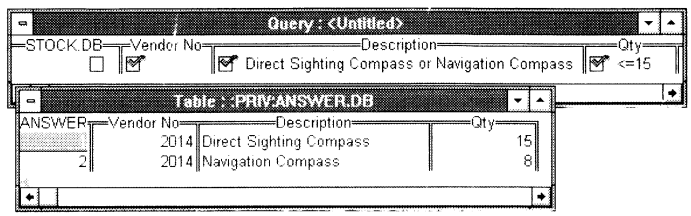
Example 6-12 Specifying AND and OR conditions

Suppose you want to learn from the *Stock* table if you have 15 or fewer Direct Sighting Compasses and 15 or fewer Navigation Compasses in stock. You also want to see which vendors supply these items.

Prerequisite An open Query window with a blank STOCK.DB query image.

Steps

1. Place checkmarks in the Vendor No, Description, and Qty fields.
2. Type **Direct Sighting Compass or Navigation Compass** in the Description field.
3. Type **<=15** in the Qty field.
4. Run the query.



The *Answer* table contains all *Stock* table records whose Description values are *either* Direct Sighting Compass *or* Navigation Compass *and* whose Qty values are less than or equal to 15.

Table 6-12 Paradox field types allowing AND (,) and OR operators

Operator	A	N	$	D	S	M	F	B	G	O
AND (,)	√	√	√	√	√	√*	√*	√*	√*	√*
OR	√	√	√	√	√	√*	√*	√*	√*	√*

* You can use the , and OR operators in the Paradox BLOB field types, as long as you use these operators with valid selection conditions for these field types. Valid selection conditions in memo and formatted memo fields include patterns using the .. wildcard operator; patterns using the .. wildcard operator prefaced with NOT; BLANK; and NOT BLANK. Valid selection conditions in binary, graphic, and OLE fields include BLANK and NOT BLANK. All of these selection conditions are valid with the , operator. Only BLANK and NOT BLANK are valid with the OR operator, but the selection criterion BLANK OR NOT BLANK isn't particularly useful.

Table 6-13 dBASE field types allowing AND (,) and OR operators

Operator	C	F	N	D	L	M
AND (,)	√	√	√	√	√	√*
OR	√	√	√	√	√	√*

* You can use the , and OR operators in the dBASE memo field type, as long as you use them with valid selection conditions for this field type. Valid selection conditions include patterns using the .. wildcard operator; patterns using the .. wildcard operator prefaced with NOT; BLANK; and NOT BLANK. All of these selection conditions are valid with the , operator. Only BLANK and NOT BLANK are valid with the OR operator, but the selection criteria BLANK OR NOT BLANK isn't particularly useful.

Using example elements

An *example element* is used in queries to represent a particular value in a table. In single-table queries, you can use example elements with reserved words and arithmetic operators to perform calculations with the values in a particular field. In multi-table queries, you use example elements to join tables by common fields. You can use example elements in every field type except the BLOB fields.

You can use whatever characters make sense to you to form example elements, keeping the following restrictions in mind. Example elements

- Can contain any alphabetic character (A to Z) or numeric digit (0 to 9)

- Can't contain spaces
- Shouldn't be a reserved symbol or word

You can create your own example elements, or let Paradox do it for you. If you're using a color monitor, Paradox displays example elements in a different color text from regular text. If you're using a monochrome monitor, Paradox displays example elements in highlighted text.

Placing example elements manually

Press F5 to place example elements manually.

When using an example element in a single field in a single-table query, you can place the example element manually and give it a name that is meaningful to you.

To create your own example element,

1. Select the field you want.
2. Press *F5*.
3. Type the characters you want to use.

As soon as you press *Spacebar* or type a character that can't be used in an example element, such as a comma, dash, or underscore, Paradox assumes you've completed the example element. Subsequent characters you type appear in regular color (or, if you're using a monochrome monitor, unhighlighted) text. Paradox also assumes you've completed an example element when you move to another field, line, or query image.

Using an example element to represent a value

You can use an example element in a selection condition when the value you want to use is stored in a table. The example element stands for whatever value Paradox *retrieves*.

Example 6-13 Using an example element to represent a value

Suppose you want to know what dive shops are located in the same city as the VIP Divers Club. Rather than ask what city that is, *then* ask what cities match it (a two-query process), you can find the value *and* all matching values in one step.

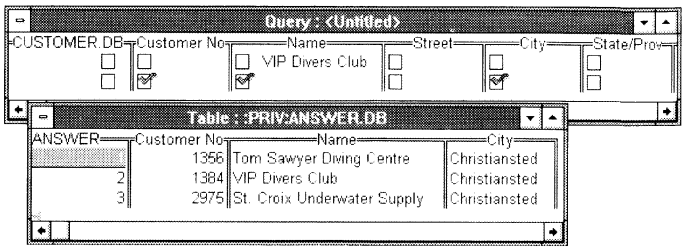
Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

1. In the Name field, type **VIP Divers Club**.
2. In the City field, press *F5* and type **city** as the example element to represent the city where VIP Divers Club is located.
3. Press ↓ to create a second line in the query image.
4. On the second line of the query image, place checkmarks in the Customer No, Name, and City fields.

5. In the City field on the second line, press *F5* and type **city** again to retrieve all records whose City values are the same as the City value for VIP Divers Club.

6. Run the query.



The first line of the query retrieves VIP Divers Club's record from *Customer*. The value in VIP Divers Club's City field is represented by the example element. The same example element is used in the second line to retrieve all the records with a matching value in their City fields.

Using an example element in a range

You can use example elements in queries to retrieve records that match a range of values, as Example 6-14 demonstrates.

Example 6-14 Using an example element in a range

Suppose you want to see the stock items that cost more than an Air Regulator model G-200 B, item number 1320.

Prerequisite An open Query window with a blank STOCK.DB query image.

Steps

1. In the Stock No field, type **1320**.

2. In the List Price field, press *F5* and type **cost** as the example element to represent the list price of stock item number 1320.

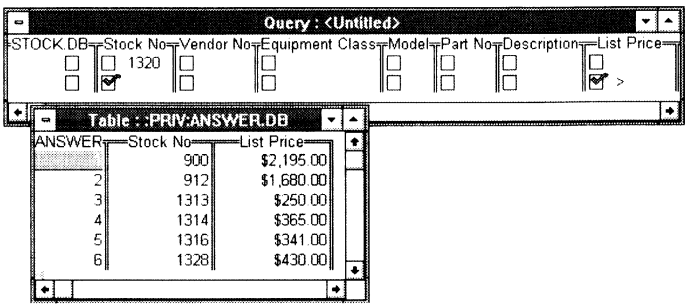
3. Press ↓ to create a second line in the query image.

4. On the second line of the query image, place checkmarks in the Stock No and List Price fields.

5. On the second line of the List Price field, type **>**.

6. Press *F5* again and type **cost** again. The statement > *cost* specifies items whose list prices are greater than the list price of item number 1320. (A space between the > and *cost* isn't necessary but makes the expression more visually apparent.)

7. Run the query.



The first line of this query retrieves item number 1320's record from *Stock*. The cost of item 1320 is represented by the example element *cost*. The same example element is used in the second line to retrieve all records with a cost greater than that of item 1320.

Using an example element in a date expression

You can use an example element in a date expression. Example 6-15 uses an example element, an arithmetic expression and the < arithmetic operator.

Example 6-15 Using an example element in a date expression

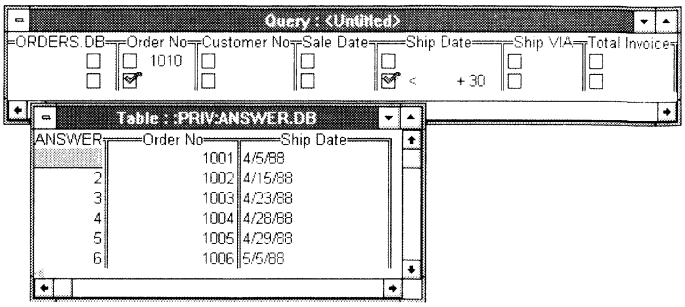
Suppose you want to list all orders that were shipped less than 30 days after order number 1010.

Prerequisite An open Query window with a blank ORDERS.DB query image.

Steps

1. In the Order No field, type **1010**.
2. In the Ship Date field, press *F5* and type **date** as the example element to represent the shipping date of order number 1010.
3. Press ↓ to create a second line in the query image.
4. On the second line of the query image, place checkmarks in the Order No and Ship Date fields.
5. On the second line of the Ship Date field, type **<**, press *F5* and type **date** again.
6. Type a space, thus completing the example, and type **+ 30**.

   The statement *< date + 30* specifies orders whose shipping dates are no later than the 30 days after the shipping date of order number 1010. (Spaces between the <, the example element *date*, the +, and the constant *30* aren't necessary but make the expression more visually apparent. Typing the + right after date also completes the example element, just as typing a space does.)
7. Run the query.



Using LIKE or NOT with an example element

You can use example elements with the LIKE and NOT operators. Example 6-16 demonstrates the use of example elements with both operators.

Example 6-16 Using LIKE and NOT with an example element

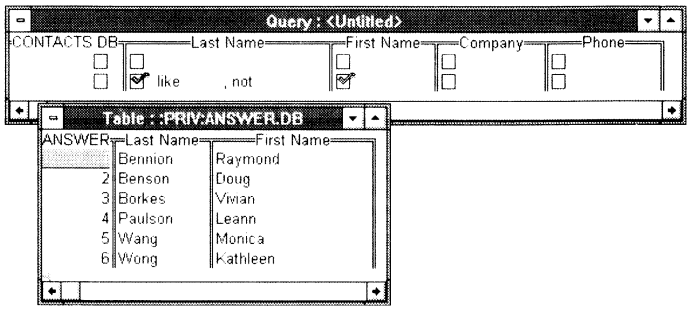
Suppose you want to find contacts who have been entered more than once in the *Contacts* table with slightly different last name spellings. You could use LIKE to look for alternative-spelling duplicates of each name, one at a time, as you learned to do earlier in this chapter, or you could use LIKE and NOT with example elements to find all alternative-spelling duplicates at once.

Prerequisite An open Query window with a blank CONTACTS.DB query image.

Steps

1. In the Last Name field, press *F5* and type **name** as the example element to represent the last names of all contacts in this field.
2. Press ↓ to create a second line in the query image.
3. On the second line of the query image, place checkmarks in the Last Name and First Name fields.
4. On the second line of the Last Name field, type **like** and a space.
5. Press *F5* and type **name** again.
6. Type a comma, thus completing the example element, and type **not** and a space.
7. Press *F5* and type **name** again.

   The statement *like name, not name* specifies last names that are like one another and at the same time not exactly one another—just names that have in common at least half of the same letters in the same sequence. (The spaces on either side of the comma aren't necessary but make the expression more visually apparent.)
8. Run the query.



Using example elements to query more than one table

You can join up to 24 tables in a single query. (See "Adding tables" earlier in this chapter for information about adding more tables to the Query window.)

Asking questions of several tables is similar to asking questions of one table, except you must link the query images with example elements. You link several tables in a query through their common fields. These are fields in each table that contain the same kind of information. For example, *Customers* and *Orders* both have a field containing customer identification numbers called Customer No. Because the information in both fields is compatible (the field name is irrelevant), you can link these two tables on that field.

Using the SpeedBar to place example elements

Although you can use the manual method of placing example elements to link two or more tables, the most efficient way to place example elements for this purpose is with the Join Tables SpeedBar button.

When you click the Join Tables SpeedBar button, an **EG** appears to the lower right of the pointer when you move the pointer to a query image in the Query window. This indicates that you're in example mode.

Click the Join Tables SpeedBar button again to end example mode.

Move the pointer to the field in which you want to place an example element and click. An example element appears automatically in that field. Next, move the pointer to the corresponding field of the other query image you want to join the first one to and click. The same example element appears in that field, and the **EG** near the pointer disappears, indicating you're no longer in example mode. The first automatic example element is **EG01**, the next is **EG02**, the next is **EG03**, and so on.

Place an example element in the common fields of each set of two tables you want to link. The fields must be compatible field types (not necessarily the exact same field type—numeric and currency

fields are interchangeable, as are memo and formatted memo) and must contain corresponding data for the join to work.

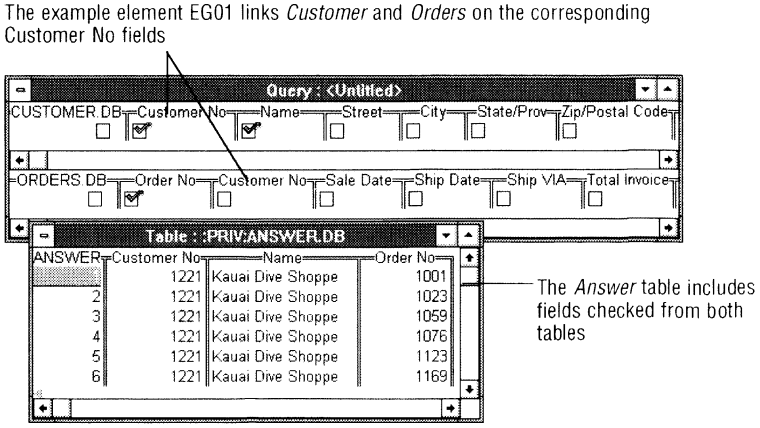
Example 6-17 Placing example elements with the SpeedBar

Suppose you want to see which dive shops have placed orders. The *Orders* table, however, only shows the Customer ID number and not the dive shop's name. The Customer table contains the dive shop names. Therefore, you want to link *Customer* and *Orders* on their common Customer No fields to retrieve orders-placed information from *Orders* and the names of the dive shops that have placed orders from *Customer*.

Prerequisite An open Query window with blank CUSTOMER.DB and ORDERS.DB query images.

Steps

1. In the CUSTOMER.DB query image, place checkmarks in the Customer No and Name fields.
2. In the ORDERS.DB query image, place a checkmark in the Order No field. (If you place a checkmark in the Customer No field of ORDERS.DB, then both the Customer No field of *Customer* and the Customer No field of *Orders* will appear in the *Answer* table. Paradox will name the field from *Orders* (the second query image) Customer No_1. Both fields will have the same values.)
3. Click the Join Tables SpeedBar button. Paradox is now in example mode, as the EG that appears to the lower right of the pointer indicates.
4. In the CUSTOMER.DB query image, click the Customer No field. A different color or highlighted EG01 appears in that field.
5. In the ORDERS.DB query image, click the Customer No field. A different color or highlighted EG01 appears in that field, too.
6. Run the query.



Using multi-table documents to place example elements

Paradox gives you a way to link tables in a query automatically using an existing linked multi-table query, form, or report. (See Chapter 10 for information on linking tables in multi-table design documents.) If you've already set up table relationships in a multi-table form, multi-table report, or multi-table query, you can use that form, report, or query as the basis of a new query. You can also use a saved multi-table query as the basis for similar multi-table queries using the same tables. Example 6-18 demonstrates using an existing multi-table form.

Example 6-18 Using a multi-table form to link tables in a query

Suppose you've already set up a multi-table form that expresses the link (by the common Customer No field) between the *Customer* table and the *Orders* table and the link (by the common Order No field) between the *Orders* table and the *Lineitem* table. The sample tables come with such a form, called SUMMARY.FSL.

Prerequisite An empty Query window.

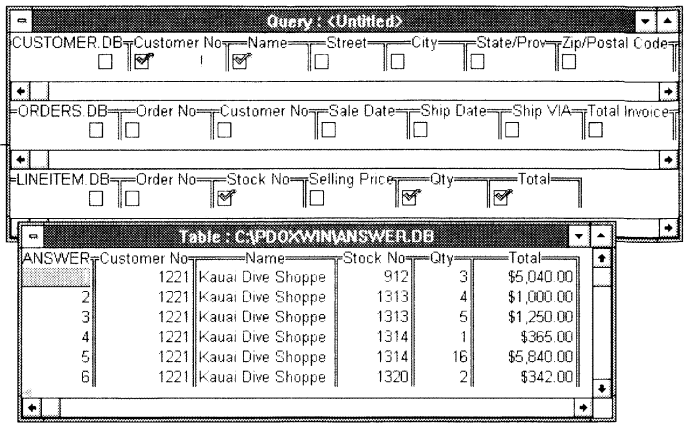
Steps

1. In the Select File dialog box, choose Forms from the Type drop-down list. Paradox replaces the list of tables in the Select File dialog box with a list of available forms.
2. From the list of forms now in the Select File dialog box, select SUMMARY.FSL. Paradox adds the *Customer*, *Orders*, and *Lineitem* tables to the Query window and joins them the same way they're joined in the *Summary* form by placing corresponding example elements in the common Customer No fields and in the common Order No fields of the tables.

   Paradox also automatically checks the first main linking field, Customer No of CUSTOMER.DB. Paradox recognizes it as the main linking field, because it's the primary key of the parent table, *Customer*.

   Paradox also automatically places the ! inclusion operator after the example element in the Customer No field of CUSTOMER.DB, because the relationship between the *Customer*, *Orders*, and *Lineitem* tables in the *Summary* form is an outer join relationship. You'll learn about the ! inclusion operator and outer joins in Chapter 7.
3. In the CUSTOMER.DB query image, place a checkmark in the Name field.
4. In the LINEITEM.DB query image, place checkmarks in the Stock No, Qty, and Total fields.
5. Run the query.

Orders links *Customer* and *Lineitem* but contributes no fields to *Answer*



This query shows you all customers, what and how much stock they've purchased, and the total amount of their purchase by stock number. It's also an example of a query involving a table, ORDERS.DB, for linking purposes only, because ORDERS.DB contributes no fields to the *Answer* table but is necessary to link CUSTOMER.DB and LINEITEM.DB.

Using example elements with selection conditions

When you use example elements to link tables, you can add as many selection conditions as you want. You can place conditions in any query image. The only requirement of a multi-table query is that all tables in the Query window be linked by example elements to each other.

Example 6-19 shows the use of example elements to link several tables with several conditions.

Example 6-19 Using selection conditions and example elements

Suppose you want to know which dive shops outside of California have placed orders for items from $500.00 to $1,500.00 in selling price and have had these items shipped via Federal Express or Emery.

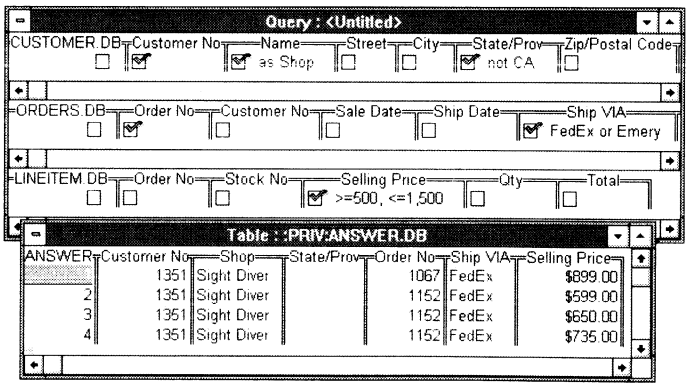
Prerequisite The Query window containing the linked CUSTOMER.DB, ORDERS.DB, and LINEITEM.DB query images from Example 6-18.

Steps

1. Remove the ! inclusion operator after the example element in the Customer No field of CUSTOMER.DB.
2. In the Name field of the CUSTOMER.DB query image, type **as Shop** to rename that field *Shop* in the *Answer* table.
3. Place a checkmark in the State/Prov field of the CUSTOMER.DB query image.
4. In the State/Prov field of the CUSTOMER.DB query image, type **not CA** to retrieve only dive shops outside California.

5. Place a checkmark in the Order No field of the ORDERS.DB query image.
6. Place a checkmark in the Ship VIA field of the ORDERS.DB query image.
7. In the Ship VIA field, type **FedEx or Emery** to retrieve only orders shipped via *either* Federal Express *or* Emery.
8. In the LINEITEM.DB query image, remove the checkmarks in the Stock No, Qty, and Total fields.
9. In the LINEITEM.DB query image, place a checkmark in the Selling Price field. (If you place a checkmark in the Order No field, then both the Order No field of *Orders* and the Order No field of *Lineitem* will appear in the *Answer* table. Paradox will name the field from *Lineitem*, the third query image, Order No_1. Both fields will have the same values.)
10. In the Selling Price field of the LINEITEM.DB query image, type **>=500, <=1,500** to retrieve only line items whose selling prices are greater than or equal to $500.00 *and* less than or equal to $1,500.00. (You must type the space after the AND (,) operator. See "Specifying numbers in queries" earlier in this chapter for details.)
11. Run the query.

Two example elements link the three tables. This query also uses the AND (,), OR, NOT, and AS operators.



Asking questions about multiple tables is similar to asking questions about a single table. You can use the OR operator when you want to set alternative conditions in the same field. Do this as if you were working with a single table.

As you would with single-table queries, you define more than one set of OR conditions in different fields of a multi-table query by entering the conditions on separate lines of query images.

Note You can't use the OR operator with example elements. The statement **Qty or Price**, where Qty and Price are example elements, is not a logical question and returns an error message. This is because an

example element stands for all the values in the field. You can't tell Paradox that either Qty or Price can represent all the values in the field.

Using arithmetic expressions

Use arithmetic operators to create arithmetic expressions with field values. Table 6-14 lists Paradox's arithmetic operators.

Table 6-14 Arithmetic operators

Operator	Meaning
+	Addition (or alphanumeric string concatenation)
–	Subtraction
*	Multiplication
/	Division
( )	Group expressions

You can use any of the arithmetic operators in the numeric fields—Paradox number, short number, and currency and dBASE number and floating number fields. You can use the addition (+) operator in alphanumeric fields to combine or concatenate alphanumeric values. You can use arithmetic operators with date values to do the following kinds of date arithmetic:

- Add a number of days to a date
- Subtract a number of days from a date
- Subtract a date from a date, resulting in a number of days

Tables 6-15 and 6-16 show which arithmetic operators can be used in each Paradox and dBASE field type, respectively, and Table 6-17 shows some examples of date arithmetic using the TODAY operator.

Table 6-15 Paradox field types allowing arithmetic operators

Operator	A	N	$	D	S	M	F	B	G	O
+	√	√	√	√	√					
–		√	√	√	√					
*		√	√		√					
/		√	√		√					
( )	√	√	√	√	√					

Table 6-16 dBASE field types allowing arithmetic operators

Operator	C	F	N	D	L	M
+	√	√	√	√		
–		√	√	√		
*		√	√			
/		√	√			
( )	√	√	√	√		

Table 6-17 Date arithmetic using the TODAY operator

Expression	Meaning
<TODAY	Find dates earlier than today's date.
<TODAY - 90	Find dates earlier than 90 days ago.
TODAY + 30	Find dates 30 days ahead of today's date.

Arithmetic operators are especially useful with the CALC operator and example elements. (See the next section for details.)

Calculating with queries

In addition to asking questions about the values in your tables, you can perform calculations with field values using the CALC reserved word. Using CALC, you can

- Construct and evaluate mathematical expressions
- Combine values from two or more fields, from a single table or from different tables
- Combine field values with constants
- Create a new field with a constant value

When you use CALC in a query, the *Answer* table generated by that query contains an additional field (at the end of the *Answer* table, by default) for the calculated result.

Use the AS operator to rename calculated fields.

Paradox gives the new field of the *Answer* table a name based on the calculation. You can give the calculated field another name by using the AS operator.

You can specify selection conditions to define the records whose field values you want to perform calculations on, and you can use

example elements to represent the field values. You can type the CALC expression itself in any field of the query image.

Note You don't need to check the field in which you enter the CALC statement, because the CALC operator always causes Paradox to create a new field in the *Answer* table.

Calculating new numeric values

When using CALC with arithmetic operators, you can use

- Constants (like *154* or *7/12/91*)
- Example elements (like *Qty*)
- Arithmetic operators (+, -, *, /, and ( ))

Rules of precedence

Use parentheses ( ) to combine and group operations and to indicate which calculations should be performed first (this is called *precedence*). In expressions without parentheses, Paradox performs multiplication and division before addition and subtraction. It calculates operations with equal precedence from left to right.

Example 6-20 demonstrates a CALC query using numeric values.

Example 6-20 Calculating new numeric values with the CALC operator

Suppose in the *Stock* table you want to multiply the values of the Quantity (Qty) field by the values in the List Price field to obtain total costs of the stock you have on hand.

Prerequisite An open Query window with a blank STOCK.DB query image.

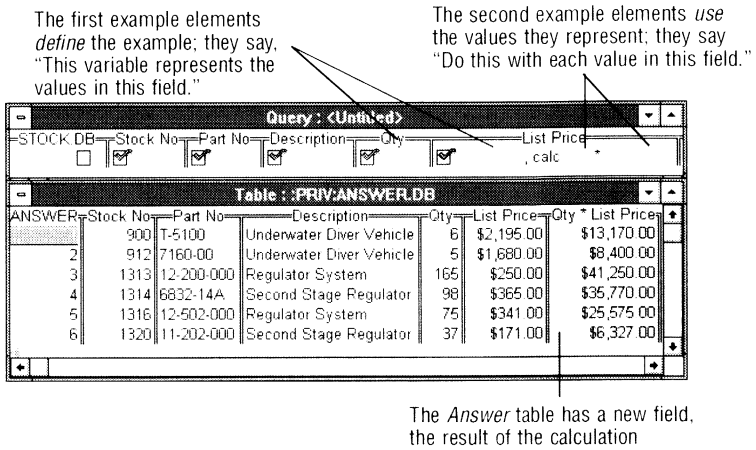
Steps

1. Place checkmarks in the Stock No, Part No, Description, Qty, and List Price fields.
2. In the Qty field, press *F5* and type **Qty** as the example element to represent the quantities of all stock items in this field.
3. In the List Price field, press *F5* and type **ListPrice** as the example element to represent the list prices of all stock items in this field.

Now that you've defined the field values you want to work with by placing example elements in the List Price and Qty fields, you can type the CALC expression using these example elements in any field of the query image. To make the calculation more evident (and because you're also already in this field), put the expression in the List Price field.

4. After the example element *ListPrice*, type a comma to end example mode and to separate the example element condition from the CALC expression condition.
5. Type **calc** and a space.
6. Press *F5* and type **Qty**, a space (ending example mode), *, and another space. (The spaces make the expression more visually apparent.)

7. Press *F5* again and type **ListPrice**.
8. Run the query.



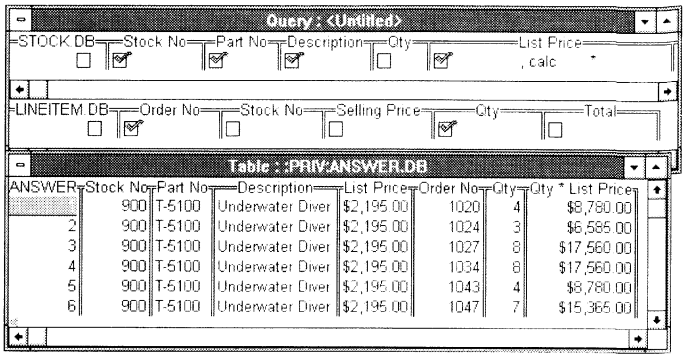
Example 6-21 Calculating with numeric values from different tables

Suppose you want to derive a total dollar amount of all currently on-order items based on List Price (in STOCK.DB) rather than on Selling Price (in LINEITEM.DB). You need to multiply the list price of all items by the quantity of that item ordered. The quantity of items ordered is derived by linking the *Stock* and *Lineitem* tables, and the list prices for all items are in the *Stock* table.

Prerequisite The Query window containing the STOCK.DB query image from Example 6-20.

Steps

1. Add LINEITEM.DB to the Query window.
2. Remove the checkmark and the *Qty* example element in the Qty field of the STOCK.DB query image.
3. Place checkmarks in the Order No and Qty fields of the LINEITEM.DB query image.
4. In the Qty field of the LINEITEM.DB query image (NOT the Qty field of the STOCK.DB query image), press *F5* and type the example element *Qty*.
5. Use the Join Tables SpeedBar button to place corresponding example elements in the Stock No fields of the STOCK.DB and LINEITEM.DB query images.
6. Run the query.



Using CALC to combine alphanumeric values

You can combine (*concatenate*) alphanumeric values (not BLOBs) with constants using CALC and the + operator. For example, you can combine values from several alphanumeric fields into a single alphanumeric field.

Example 6-22 Concatenating alphanumeric values with the CALC operator

Suppose you want to combine the City, State, and Zip fields of the *Customer* table into one field in another table called *Address*.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

1. Place a checkmark in the Name field.
2. In the City field, press *F5* and type **City** as the example element to represent each of the values of this field in turn.
3. In the State/Prov field, press *F5* and type **StateProv** as the example element to represent each of the values of this field in turn.
4. In the Zip/Postal Code field, press *F5* and type **Zip** as the example element to represent each of the values of this field in turn.

Now that you've defined the field values you want to work with by placing example elements in the City, State/Prov, and Zip/Postal Code fields, you can type the CALC expression using these example elements in any field of the query image.

5. In the Country field, type **calc** and a space.
6. Press *F5* and type **City**.
7. Type **+", "+**. (Within the quotation marks, type a space after the comma.)
8. Press *F5* again and type **StateProv**.
9. Type **+" "+**. (Type one or two spaces between the quotation marks.)
10. Press *F5* again and type **Zip**.

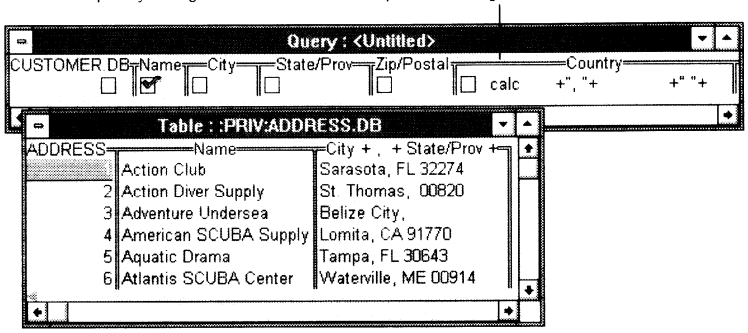
11. Click the Answer Table Properties SpeedBar button or choose Properties| Answer Table|Options.

12. In the Answer Table Properties dialog box, replace ANSWER.DB with **ADDRESS.DB** in the Answer Name text box and choose OK. This will save the answer to the query in a new table called *Address* instead of in a temporary *Answer* table.

13. Run the query.

When Paradox finishes the query, it displays the new *Address* table on the Desktop.

You set up the example elements, + operators, and commas (within quotes) in the order you want them to appear in the *Answer* table, which we've renamed *Address* in this example by using the Answer Table Properties dialog box



The dive shops located outside the U.S. didn't quite fit the City-State-Zip format. You can work on this query to incorporate the Country field with those addresses.

Creating a new *Answer* field with a constant value

You can create a new *Answer* table field that contains a constant value—numeric, date, or alphanumeric—rather than the result of a calculation. When creating a numeric or date constant, type **calc**, a space, and the constant numeric or date value in any field of the query image. When creating an alphanumeric constant, type **calc**, a space, quotation marks, the alphanumeric constant—with respect for case—and end with quotation marks.

Paradox names the new field in *Answer* the same name as the constant value. (You can rename the new field in *Answer* by using the AS operator.) If the new field is alphanumeric, it has as many character spaces as necessary to hold the constant value.

You can create a new blank field—meaning a blank value is the constant—by typing **calc blank**. In this case, you *must* type the CALC expression in the field type that you want the resulting new *Answer* field to be—number, short number, currency, date, or alphanumeric.

Example 6-23 demonstrates one use of creating a field with a constant alphanumeric value.

Example 6-23 Creating a new *Answer* table field containing a constant

Suppose you need to call all of your dive shop customer contacts to conduct a survey of customer satisfaction. You want a way to keep track of the contacts you have yet to call so that you don't call anyone twice by mistake.

You can create a new table from the *Contacts* table called *Calls*. You want to combine the Last Name and First Name fields of *Contacts* in the *Calls* table, and you want to create a new field in *Calls* with the alphanumeric constant *Not called yet*.

Prerequisite An open Query window with a blank CONTACTS.DB query image.

Steps

1. Place checkmarks in the Company and Phone fields of the CONTACTS.DB query image.
2. In the Last Name field, press ***F5*** and type the example element *LastName*.
3. In the First Name field, press ***F5*** and type the example element *FirstName*.
4. In any field of the query image, type the calc expression **calc *LastName* + ", " + *FirstName***, where *LastName* and *FirstName* are example elements, and rename the field in the *Answer* table *People to call* by following the calc expression with **as People to call**.

   You must type the CALC expression and AS operator condition in the same field. If you type them in either the Last Name or First Name fields, which already have example elements in them, you must separate the example element from the CALC expression and AS operator condition with a comma.
5. In any field of the query image, type the CALC expression **calc "Not called yet"**. This will create a new alphanumeric field in *Answer* named *Not called yet* and insert the value *Not called yet* in that field for all records. The field type will be A14, 14 being the number of character spaces necessary to hold the value *Not called yet*. (Again, if you type the CALC expression in a field that already contains one or more of the other conditions, separate this CALC expression from those conditions with a comma.)
6. Choose Properties|Answer Table|Options (or click the Answer Table Properties SpeedBar button).
7. In the Answer Table Properties dialog box, replace ANSWER.DB with **CALLS.DB** in the Answer Name text box and choose OK.
8. Run the query.

When Paradox finishes the query, it displays the new *Calls* table on the Desktop.

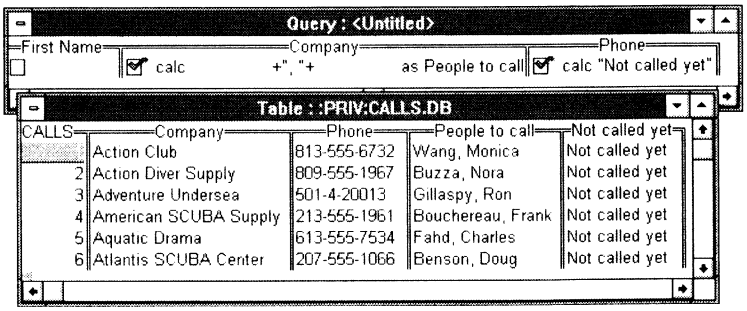


Table 6-18 Paradox field types allowing example elements and calculations

Operation	A	N	$	D	S	M	F	B	G	O
Example elements	√	√	√	√	√					
Calculations with field values using CALC	√*	√	√	√**	√					

* You can only concatenate values into one alphanumeric field using the + arithmetic operator with CALC.

** You can only add and subtract date values to derive a new date field using the + and = arithmetic operators, respectively, with CALC.

Table 6-19 dBASE field types allowing example elements and calculations

Operation	C	F	N	D	L	M
Example elements	√	√	√	√	√	
Calculations with field values using CALC	√*	√	√	√**		

* You can only concatenate values into one character field using the + arithmetic operator with CALC.

** You can only add and subtract date values to derive a new date field using the + and = arithmetic operators, respectively, with CALC.

Changing tables with queries

Paradox reserves some words for special purposes in QBE:

- *INSERT*: Insert records into a table
- *DELETE:* Remove records from a table
- *CHANGETO*: Change specific values in a table

Using INSERT

Use an INSERT query to insert records from one or more sources into a single *target table*. INSERT queries let you map which values from your source(s) to insert into fields of your target table. You can insert records from one table type to another—from dBASE to Paradox tables.

To perform an INSERT query, follow these steps:

1. Add the source and target tables to the Query window. (If the target table is new, you must create it before you can add it to the Query window.)
2. Link the tables using example elements.
3. For each source table, specify any selection conditions for field values.
4. In the target table, place the word Insert in the leftmost column (under the table name) by doing any of the following in that column:
   - Click and hold and choose Insert from the menu of query operations that appears.
   - Press *Spacebar* and choose Insert from the menu of query operations that appears.
   - Type **i**.

   Don't check any of the fields on the same line as the INSERT operator, or you'll get an error.
5. Run the query.

Paradox inserts the records from the source into the target table for every field you specified.

Note Fields you leave blank (with no example element) in the target table receive no values from the source table(s). You can't put example elements in Paradox BLOB fields nor in dBASE memo fields, so you can't insert these types of values into these types of fields. The source table isn't affected by the INSERT query.

The Inserted table

An INSERT query produces a temporary table called *Inserted.* As with *Answer,* Paradox saves *Inserted* to your private directory, overwrites it each time you run an INSERT query, and deletes it when you exit the

program. You can use File | Utilities | Rename to save *Inserted* under a different name.

You can produce an *Answer* table in addition to the *Inserted* table, if you check fields on a separate line of the target query image. If you also supply selection conditions on that line, the records in the *Answer* table will reflect those conditions, as you might expect. However, such an *Answer* table isn't particularly valuable, since it doesn't contain any information that has to do with the INSERT operation. See "Operation order in a query involving multiple operations" later in this chapter for more information.

You can use the *Inserted* table, along with Delete, to undo an insertion. See the next section, "Using DELETE."

The Errins table

If you try to insert records into a target table that violate the referential integrity of the target table or that violate validity checks established for that table (except picture validity checks), Paradox won't perform the insertions and will instead place the offending new records into a temporary table called *Errins*. A violation of referential integrity would occur if you tried to insert into a child table a record with a key field value that doesn't exist in the parent table. (Paradox still creates the *Inserted* table, which contains all of the records you *intended* to insert. Those that actually were inserted, and thus didn't violate the target table's referential integrity or validity checks, don't appear in *Errins*.)

Example 6-24 An INSERT query

Suppose you find out you can get a cheaper phone rate for international calls if you switch to a different long distance service. Before you switch long distance companies, however, you want to see just how many customer dive shops are located outside the U.S.

This example demonstrates an INSERT query that places all international customers in a new *Phoncall* table. You can get the results of this particular INSERT query much faster by doing a check plus query, placing check pluses in the Name and Phone fields of CUSTOMER.DB and saving the *Answer* table as *Phoncall*. A check plus query isn't always a more efficient alternative to an INSERT query, however, so this example provides the framework for more complex ones.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

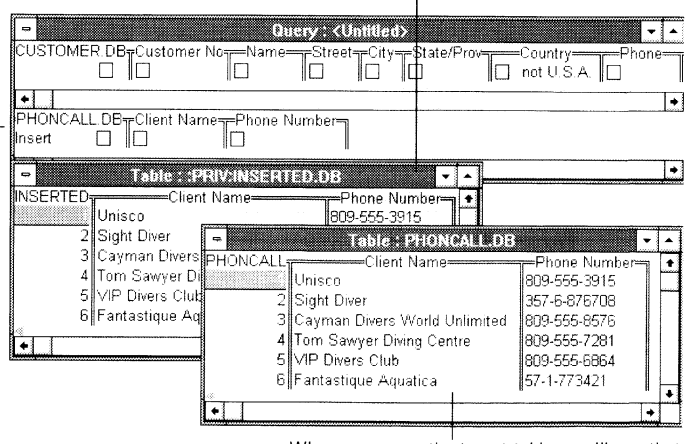
1. Create the new *Phoncall* table (by choosing File|New|Table) with two alphanumeric fields, Client Name and Phone Number. Make the Client Name field A30, the same number of characters as the Name field in the *Customer* table. Make the Phone Number field A15, the same number of characters as the Phone field in the *Customer* table.

You can create the fields of *Phoncall* quickly by borrowing its structure from *Customer*. You can then delete the fields you don't need and change the names of the ones you do.

2. Add a PHONCALL.DB query image to the Query window.
3. In the Name field of CUSTOMER.DB, press ***F5*** and type **name** as the example element to represent all the values of this field.
4. In the Country field of CUSTOMER.DB, type **not U.S.A.** to insert into *Phoncall* only those dive shops not in the U.S.
5. In the Phone field of CUSTOMER.DB, press ***F5*** and type **phone** as the example element to represent all the values of this field.
6. In the PHONCALL.DB query image, type **i** in the leftmost column, or click and hold under the table name and choose Insert from the menu of query operations. (You can also produce this menu by pressing ***Spacebar***.)
7. In the Client Name field of the PHONCALL.DB query image, press ***F5*** and type **name**.
8. In the Phone Number field of the PHONCALL.DB query image, press ***F5*** and type **phone**.
9. Run the query. When Paradox finishes the query, it displays the *Inserted* table on the Desktop.
10. Choose File|Open|Table and, from the Select File dialog box, select PHONCALL.DB. Because *Phoncall* was empty before this operation, its records should exactly match the records in the *Inserted* table.

The result of an INSERT query, besides a changed target table, is an *Inserted* table. It contains all records that were inserted from the source to the target table.

Don't check fields on the same line as the Insert operator in the target table of an INSERT query, or you'll get an error. If you check fields on a separate line of the target table or fields in the source table, you'll get an *Answer* table.



When you open the target table, you'll see that the appropriate records have been inserted

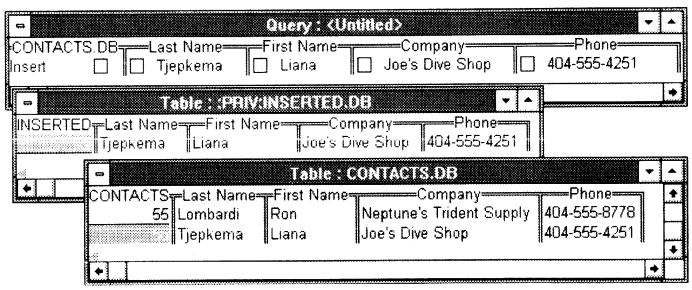
Example 6-25 Inserting literals with an INSERT query

Suppose you want to insert a record of literals into the *Contacts* table using an INSERT query.

Prerequisite An open Query window with blank CONTACTS.DB table.

Steps

1. Choose Insert from the menu of query operations in the leftmost column of the CONTACTS.DB query image.
2. In the Last Name field, type **Tjepkema**.
3. In the First Name field, type **Liana**.
4. In the Company field, type **Joe's Dive Shop**.
5. In the Phone field, type **404-555-4251**.
6. Run the query. When Paradox finishes the query, it displays the *Inserted* table.
7. Choose File|Open|Table and, from the Select File dialog box, select CONTACTS.DB. Scroll to the end of *Contacts* to see the record you inserted.



Using DELETE

Use a DELETE query to remove selected records from a table. DELETE queries are appropriate when the records you want to delete have something in common that you can specify in one or more selection conditions.

A DELETE query removes only records, not specific field values within records. (See "Using CHANGETO" later in this chapter for information on changing or removing specific field values.)

To perform a DELETE query, follow these steps:

1. Add to the Query window the table from which you want to delete records and the table(s), if any, you want to join to the target table and use to define deletion criteria.

2. Place the word Delete in the leftmost column (under the table name) of the table whose records you want to delete by doing any of the following in that column:

   - Click and hold and choose Delete from the menu of query operations
   - Press *Spacebar* and choose Delete from the menu of query operations
   - Type **d**.

   Don't check any of the fields on the same line of the query image as the DELETE operator, or you'll get an error.

3. Enter any selection condition to select the records to be deleted. You can enter selection conditions in several fields of the same query image or in fields of tables linked by example elements.

Caution If you don't enter any selection conditions, Paradox deletes all the records from the table.

4. Run the query.

Paradox deletes from the table all records that meet the selection conditions.

The Deleted table

A DELETE query produces a temporary table called *Deleted*, which contains only the deleted records. Paradox saves *Deleted* to your private directory, overwrites it each time you run a DELETE query, and deletes it when you exit the program. You can use File | Utilities | Rename to save *Deleted* under a different name.

You can produce an *Answer* table in addition to the *Deleted* table, if you check fields on a separate line of the query image. If you also supply selection conditions on that line, the records in the *Answer* table will reflect those conditions, as you might expect. However, such an *Answer* table isn't particularly valuable, since it doesn't contain any information that has to do with the DELETE operation. See "Operation order in a query involving multiple operations" later in this chapter for more information.

You can use *Deleted*, along with Insert, to undo a deletion. Use *Deleted* as the source table and insert *Deleted*'s records back into the table from which they were deleted. If you're reinserting records you deleted from an unkeyed table, the records are inserted at the end of the table and thus won't necessarily be in their original order.

You can also reinsert the deleted records in *Deleted* into the original table with File | Utilities | Add. Apart from these two methods, you have no other way of recovering records deleted from a Paradox table. (With a dBASE table, you can view the table, enter Edit mode,

and choose Record | Show Deleted, then undelete each deleted record one at a time using Record | Undelete.)

The Errdel table

If you try to delete records whose absence would represent a violation of referential integrity, Paradox won't perform the deletions and will instead place copies of these records in a temporary table called *Errdel*. A violation of referential integrity would occur if you tried to delete from a parent table a record with dependent matching child records in a child table or tables. If you were to delete the parent record, the dependent matching child records would then be orphan records. (Paradox still creates the *Deleted* table, which contains all of the records you *intended* to delete. Those that actually were deleted, and thus didn't violate referential integrity, don't appear in *Errdel*.)

Example 6-26 A DELETE query

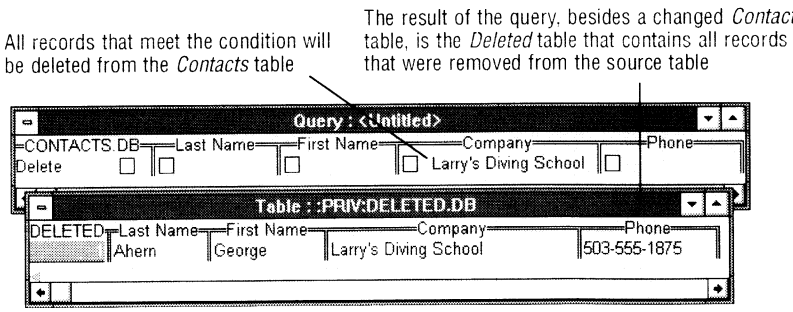
Suppose Larry's Diving School has gone out of business and you want to remove this dive shop from the *Contacts* table.

Prerequisite An open Query window with a blank CONTACTS.DB query image.

Steps

1. In the leftmost column, type **d**, or choose Delete from the menu of query operations.
2. In the Company field, type **Larry's Diving School**.
3. Run the query.

When Paradox finishes the query, it displays the *Deleted* table on the Desktop. To undo this query, do the next example.



Example 6-27 Undoing a DELETE query with an INSERT query

Suppose you change your mind and decide after you've deleted the contact for Larry's Diving School (which you did in Example 6-26) that you want to keep George Ahern as a contact for potential dive shop customers.

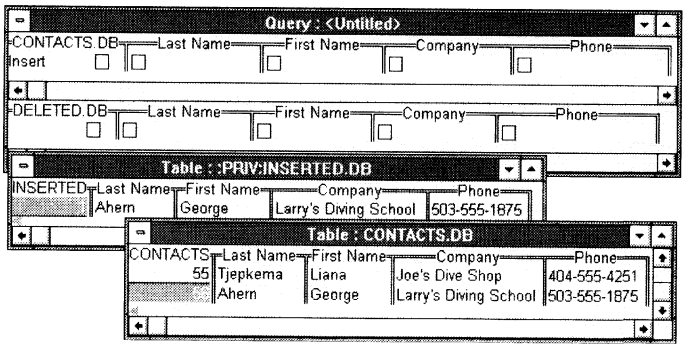
The easiest way to undo the deletion in this case would be to use File|Utilities|Add, adding the deleted record in *Deleted* back into *Contacts*. This example just shows you another way to undo. The method you use will

depend on how complex the deletion you're trying to undo. (With any method, you should make copies of the tables at each stage—just in case you make a mistake in the recovery process and have to undo it.)

Prerequisite Do Example 6-26 and return to the Query window containing the CONTACTS.DB query image.

Steps

1. Clear the existing conditions in the CONTACTS.DB query image by pressing ***Ctrl+Del*** in any field of the image.
2. Add the DELETED.DB query image to the Query window.
3. Use the Join Tables SpeedBar button to place corresponding example elements in each pair of matching fields in the CONTACTS.DB and DELETED.DB query images.
4. In the leftmost column of the CONTACTS.DB query image, type **i**, or choose Insert from the menu of query operations.
5. Run the query.
6. Choose File|Open|Table and, from the Select File dialog box, select CONTACTS.DB. George Ahern's record is back in *Contacts*, at the very end.



Using CHANGETO

CHANGETO lets you change specific field values in a table based on conditions you specify in a query. CHANGETO provides you with a kind of global search-and-replace capability. It is particularly useful when you want to change many values that have something in common in a similar way.

To change values in a field,

1. Type the value you want to change in the field of the query image the value occurs in.
2. After the value you want to change, type a comma.

3. After the comma, type **changeto** and a space. (As with all of Paradox's operators, the case—upper or lower—of the CHANGETO operator doesn't matter.)
4. After **changeto** and the space, type the new value you want to change the current value to. You can also type selection conditions in other fields to specify further which records to change.

   The CHANGETO operator must be on the same line in the query image as any selection conditions. Don't check any of the fields on this line of the query image, or you'll get an error.
5. Run the query.

The Changed table

CHANGETO produces a temporary table called *Changed*, which contains a copy of the records you changed as they existed *before* you changed them. Paradox saves *Changed* to your private directory, overwrites it each time you run a CHANGETO query, and deletes it when you exit the program. You can use File | Utilities | Rename to save *Changed* under a different name.

You can produce an *Answer* table in addition to the *Changed* table, if you check fields on a separate line of the query image. If you also supply selection conditions on that line, the records in the *Answer* table will reflect those conditions, as you might expect. However, such an *Answer* table isn't particularly valuable, since it doesn't contain any information that has to do with the CHANGETO operation. See "Operation order in a query involving multiple operations" later in this chapter for more information.

Use *Changed* to verify that the correct records have been changed. If you changed records you didn't mean to change, you can delete the changed records from the queried table and reinsert the original records back into the table from *Changed*. To do this,

1. Run a DELETE query on the table whose records you accidentally changed, using the new field value(s)—the ones you changed *to*—as a selection condition(s). This gets rid of the incorrect records.
2. Insert *Changed*'s records back into the original table, using *Changed* as the source table and the original table as the target table, in an INSERT query. This should restore the queried table back to its original state. (If you're reinserting records into an unkeyed table, Paradox inserts them at the end of the table. Thus, they won't necessarily be in the same order they were originally in before you deleted them.)

The Errchng table

If you try to change key field values (primary or secondary) with a CHANGETO query that would violate referential integrity, Paradox

won't perform the changes and will instead place copies of the records with the key field values you tried to change in a temporary table called *Errchng*. A violation of referential integrity would occur if you tried to change dependent key field values in a child table to values that don't exist in the parent table. (Paradox still creates the *Changed* table, which contains all of the records you *intended* to change. Those that actually were changed, and thus didn't involve changes to key fields that violate referential integrity, don't appear in *Errchng*.)

Example 6-28 A CHANGETO query

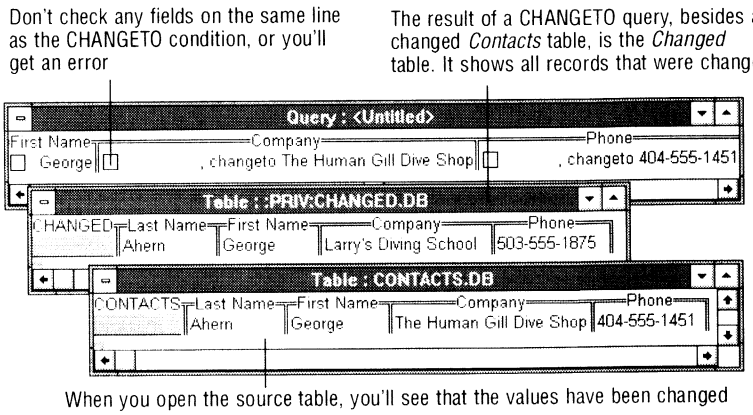
Suppose you learn that George Ahern, the previous contact for the now out-of-business Larry's Diving School, has gotten a job at The Human Gill Dive Shop in Savannah, Georgia. You want to contact George so that you can perhaps gain his new employer as one of your customers. You also need to change the company and phone number information about George in the *Contacts* table.

Prerequisite An open Query window with a blank CONTACTS.DB query image.

Steps

1. In the Last Name field, type **Ahern**.
2. In the First Name field, type **George**.
3. In the Company field, press *F5* and type **company** as the example element to represent George's current company.
4. Still in the Company field, type a comma and then **changeto**, a space, and **The Human Gill Dive Shop**.
5. In the Phone field, press *F5* and type **phone** as the example element to represent George's current phone number.
6. Still in the phone field, type a comma and then **changeto**, a space, and **404-555-1451**, George's new phone number at The Human Gill Dive Shop.
7. Run the query. When Paradox finishes the query, it displays the *Changed* table on the Desktop.
8. Open the *Contacts* table.

To undo this example, do the next example.



Example 6-29 Undoing a CHANGETO query with Delete and Insert

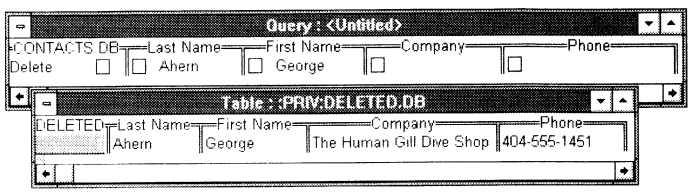
Suppose after you change George Ahern's record in the *Contacts* table (which you did in Example 6-28) that you learn George is quite the unique contact. His original company, Larry's Diving School is not going to go out of business after all and wants him back. George's record needs to be changed back.

In this particular case, the easiest way to change them back is to do the exact same CHANGETO query as Example 6-28, only reversing it—making the CHANGETO condition in the Company field *Larry's Diving School* and making the CHANGETO condition in the Phone field George's original phone number. However, if your CHANGETO query had involved many more changes, you could reverse them by doing a DELETE and then an INSERT query.

Prerequisite Do Example 6-28 and return to the Query window containing the CONTACTS.DB query image.

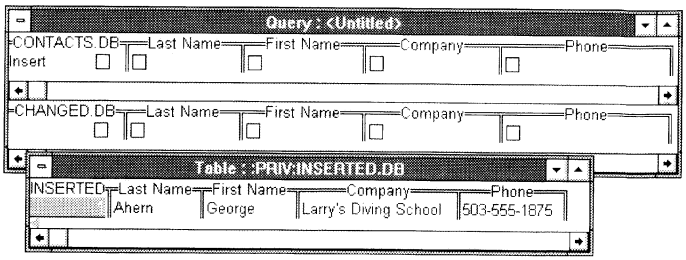
Steps

1. Remove the CHANGETO conditions in the Company and Phone fields, leaving **Ahern** in the Last Name field and **George** in the First Name field.
2. In the leftmost column, type **d**, or choose Delete from the menu of query operations.
3. Run the query.



4. Return to the Query window and add CHANGED.DB to it.
5. Delete George's record by pressing *Ctrl+Del*.

6. Use the Join Tables SpeedBar button to place corresponding example elements in each pair of matching fields in the CONTACTS.DB and the CHANGED.DB query images.
7. In the leftmost column of the CONTACTS.DB query image, type **i**, or replace *Delete* with *Insert* from the menu of query operations.
8. Run the query.



George's original record is now back in the *Contacts* table.

Using CHANGETO with example elements

You can use a CHANGETO query with example elements to perform a calculation on values in a field and change the original values to the new calculated values in the same field. (If you perform calculations using the CALC operator, Paradox creates a new field to hold the results in the *Answer* table and leaves the original values unchanged.)

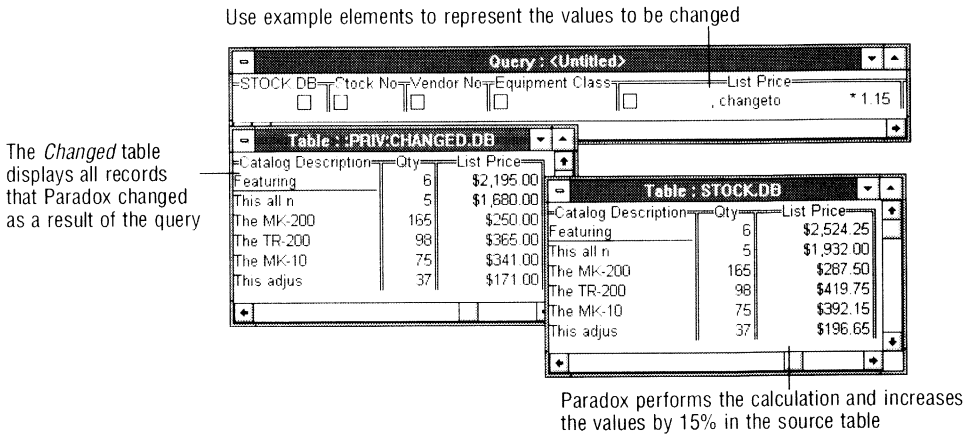
Example 6-30 Using CHANGETO to calculate and change values

Suppose you want to increase the list price of all stock items by 15%.

Prerequisite An open Query window with a blank STOCK.DB query image.

Steps

1. In the List Price field, press *F5* and type **ListPrice**.
2. Type a comma to end example mode and then type **changeto** and a space.
3. Press *F5* again and type **ListPrice** again.
4. Type a space to end example mode and type *** 1.15**.
5. Run the query.
6. Open the *Stock* table.



Performing a multi-table CHANGETO query

You can perform a CHANGETO query to change the records in one table to match the records in another table using referential integrity, as Example 6-31 demonstrates. See Chapter 9 for information on defining referential integrity.

Example 6-31 Using CHANGETO to match records of another table

Suppose you create a table, *Addcorex*, in which to enter address corrections for your customer dive shops. You create the table with referential integrity to the *Customer* table, based on the primary key field Customer No. After you enter correct addresses in the *Addcorex* table, you want to change the old and incorrect addresses in the *Customer* table to the addresses in the *Addcorex* table.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

Steps

1. Create the new *Addcorex* table (by choosing File|New|Table). Name the first field Customer No and make it a number field and key. (See Chapter 9 for information about defining a key.) Next, put in the same alphanumeric address fields, with the same number of characters, that are in the *Customer* table: Street, City, State/Prov, Zip/Postal Code, and Country.

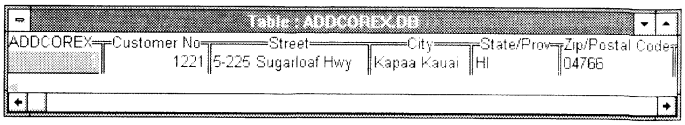
   

   You can create the fields of *Addcorex* quickly by borrowing its structure from *Customer*. You can then delete the fields you don't need.

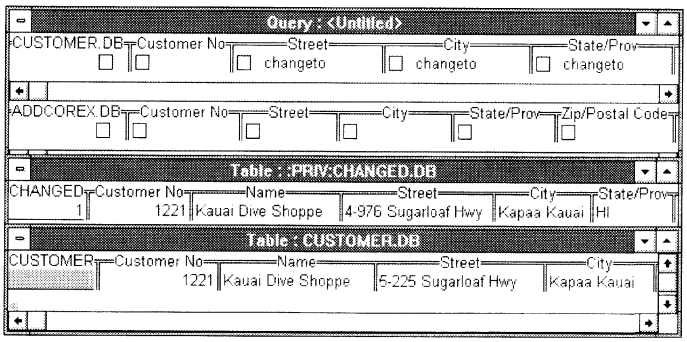
   To make the referential integrity between *Customer* and *Addcorex* as accurate as possible, set up a validity check on the Customer No field of *Addcorex* to make table lookup to the *Customer* table's Customer No field possible. Don't let anyone enter a customer identification number in *Addcorex*'s Customer No field that doesn't exist in *Customer*'s Customer No field.

2. After saving the new *Addcorex* table, enter some test data into it. For example, enter one new address for a dive shop located in the U.S. Suppose the only change is the street number. You can undo this example

when you're done by doing a DELETE and then an INSERT query, as Example 6-29 demonstrates.



3. Add ADDCOREX.DB to the query window.
4. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of both query images.
5. Use the Join Tables SpeedBar button to place corresponding example elements in each corresponding address field (Street, City, State/Prov, Zip/Postal Code, and Country) of the CUSTOMER.DB and ADDCOREX.DB query images.
6. In the Street, City, State/Prov, Zip/Postal Code, and Country fields of the CUSTOMER.DB query image, type **changeto** and a space in front of each example element.
7. Run the query.
8. Open the *Customer* table to verify that the address of the customer in *Addcorex* has been changed.



Operation order in a query involving multiple operations

You can perform multiple table-changing operations in a single query. If you have more than one query image in a Query window, the only basic requirement for the query to work is that all tables be linked with example elements.

You can, for example, perform a single query that deletes records from one table, inserts records into another table, and changes values in yet another table. You can also do a query that does an INSERT, DELETE, and CHANGETO operation in a single table.

If you want to perform such multi-operation queries, you need to be aware of the order in which Paradox performs operations:

1. Paradox first retrieves records based on all selection conditions.
2. It next performs any INSERTs specified, in the order Paradox finds them—that is, Paradox looks in the first query image first, then the second, and so on.
3. Next, Paradox performs any CHANGETOs specified, in the order it finds them.
4. Next, it performs any DELETEs specified, in the order it finds them.
5. Finally, Paradox displays the temporary tables that result, including an *Answer* table, if you checked any fields.

Because Paradox performs all DELETEs after it performs all INSERTs, you can design a query that undoes itself, first inserting records and then deleting them from the same table. While such a query isn't particularly useful, you can design quite intricate queries that save you from having to perform multiple, sequential queries. The more operations you design into a single query, however, the harder it becomes for you to undo what the query does.

Table 6-20 Paradox field types allowing INSERT, DELETE, and CHANGETO

Operation	A	N	$	D	S	M	F	B	G	O
INSERT	√	√	√	√	√					
DELETE	√	√	√	√	√					
CHANGETO	√	√	√	√	√					

Table 6-21 dBASE field types allowing INSERT, DELETE, and CHANGETO

Operation	C	F	N	D	L	M
INSERT	√	√	√	√	√	
DELETE	√	√	√	√	√	
CHANGETO	√	√	√	√	√	

List of query operators

Table 6-22 lists all Paradox query operators. Summary and set comparison operators are discussed in Chapter 7.

Table 6-22 Query operators

Category	Operator	Meaning
Reserved symbols	✓	Display unique field values in *Answer*
	✓+	Display field values including duplicates in *Answer*
	✓↓	Display unique field values in descending order
	✓G	Specify a group for set operations
Reserved words	CALC	Calculate a new field and display results in *Answer*
	INSERT	Insert records with specified values and create a temporary table
	DELETE	Remove records with specified values and create a temporary table
	CHANGETO	Change specified values in fields and create a temporary table
	SET	Define specific records as a set for comparisons
Arithmetic operators	+	Addition or alphanumeric string concatenation
	–	Subtraction
	*	Multiplication
	/	Division
	( )	Group operators in a query expression
Comparison operators	=	Equal to (optional)
	>	Greater than
	<	Less than
	>=	Greater than or equal to
	<=	Less than or equal to
Wildcard operators	..	Any series of characters
	@	Any single character
Special operators	LIKE	Similar to
	NOT	Does not match
	BLANK	No value
	TODAY	Today's date
	OR	Specify OR conditions in a field
	,	Specify AND conditions in a field
	AS	Specify the name of a field in *Answer*
	!	Include record in *Answer* even if not matched in joined table
Summary operators	AVERAGE	Average of values in a field

Category	Operator	Meaning
	COUNT	Number of values in a field
	MAX	Highest value in a field
	MIN	Lowest value in a field
	SUM	Total of all values in a field
	ALL	Calculate summary based on all values in a group, including duplicates
	UNIQUE	Calculate summary based on unique values in a group
Set comparison operators	ONLY	Display records that match only members of the defined set
	NO	Display records that match no members of the defined set
	EVERY	Display records that match every member of the defined set
	EXACTLY	Display records that match all members of the defined set and no others

CHAPTER 7

Advanced queries

Chapter 6 discusses queries about individual records in a table. This chapter discusses advanced queries that Paradox can perform. You'll learn how to specify groups of records and define sets of records in queries. You'll also learn how to construct an *inclusive* link between tables.

Performing queries on groups of records

You can use Paradox to ask questions about groups of records taken together. You can

- Select records based on characteristics of a group, such as items that appear in two or more orders
- Calculate statistics on groups of records, such as the average invoice total of orders placed in each state
- Compare characteristics of a group with other records, such as which customers have placed more orders than any Hawaii customer

These questions all consider more than one record at a time. No individual record can answer them—you have to look at the group of records together.

Using summary operators

A *summary operator* performs an operation on a group of records that you define by checking a field or fields. You specify which records to group with selection conditions. Paradox has five summary operators:

- AVERAGE averages the values in a group.
- COUNT counts the number of values in a group.
- MAX finds the maximum value of a group.
- MIN finds the minimum value of a group.

- SUM totals the values in a group.

See Tables 7-1 and 7-3 for a list of the summary operators you can use in each Paradox and dBASE field type.

Using summary operator modifiers

All of the summary operators except COUNT perform their operation on all of the values in a group by default. COUNT counts only unique values in a group by default. To change the default behavior, apply one of the summary operator modifiers:

- ALL considers all values in a group, including duplicates. You must use ALL with COUNT, in the format COUNT ALL, to make COUNT count all values in a group, including duplicates.
- UNIQUE considers only unique values in a group. You must use UNIQUE with all summary operators except COUNT to make them perform their operation on unique values in a group instead of on all values.

See Tables 7-2 and 7-4 for a list of the summary operator modifiers you can use in each Paradox and dBASE field type.

Selecting records based on group definitions

Use summary operators and checks to define groups of data. Checks (checkmarks, check pluses, and check descendings) that appear on the same line as a summary operator serve two functions:

- They divide the records into groups based on the values in the checked field.
- They include the checked field in the *Answer* table (their usual function).

As with Paradox's other reserved word operators, the case (upper or lower) in which you type any of the summary operators or summary operator modifiers doesn't matter.

Selecting records based on a group count

Use the COUNT summary operator to count unique values in each group. Example 7-1 demonstrates this kind of query.

Example 7-1 Counting records in a group

Suppose you want to know which countries have three or more of your dive shop customers.

Prerequisite An open Query window with a blank CUSTOMER.DB query image.

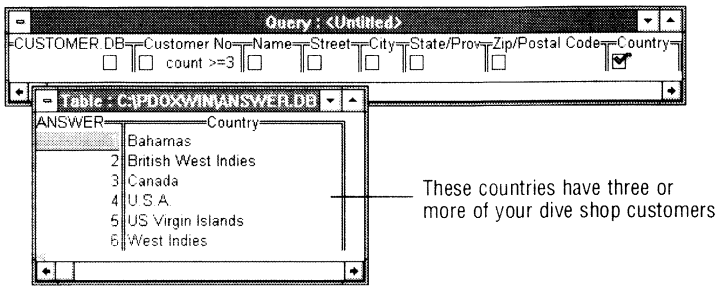
Steps

1. Place a checkmark in the Country field. The checkmark in the Country field groups the records by country and includes the Country field in the *Answer* table.

2. Type **count >=3** in the Customer No field. The expression **count >=3** tells Paradox to count all the different customer numbers for each group (country) and to select groups for which the count is three or more.

   Customer is a keyed table, and Customer No is the primary key, so you know that all customer numbers are unique. The COUNT operator counts unique values by default. If you want to count all values, including duplicates, use COUNT ALL. See "Counting unique values" and "Counting all values" later in this chapter.

3. Run the query.



Selecting records based on a group sum

Use the SUM summary operator to sum values within each group. Example 7-2 demonstrates this kind of query.

Example 7-2 Summing records in a group

Suppose you want to know which customers have placed orders for which they owe $5,000 or more.

Prerequisite An open Query window with blank CUSTOMER.DB and ORDERS.DB query images.

Steps

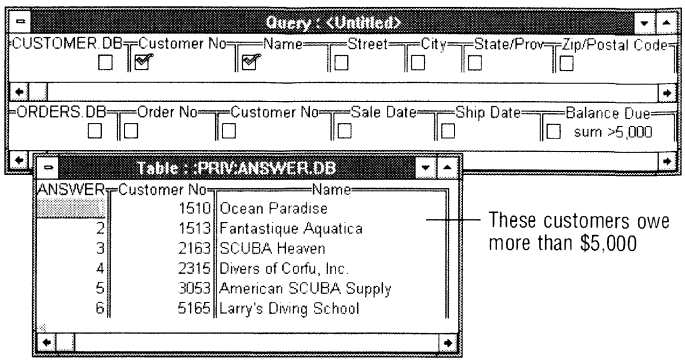
1. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of both query images.

2. Place checkmarks in the Customer No and Name fields of the CUSTOMER.DB query image. The checkmark in Customer No groups the records by customer and includes this field in the *Answer* table. The checkmark in Name also groups records by customer and includes this field in the *Answer* table.

   The checkmark in Name doesn't form a different group from the checkmark in Customer No, because there's a one-to-one correspondence between Customer No and Name; both checkmarks form the same group. See "Grouping on more than one field" later in this chapter.

3. Type **sum >5,000** in the Balance Due field of the ORDERS.DB query image. The expression **sum >5,000** sums the balance due for each group (customer) and selects those with balances greater than $5,000.

4. Run the query.



Selecting records based on a group average

Use the AVERAGE summary operator to average the values in each group. Example 7-3 demonstrates this kind of query.

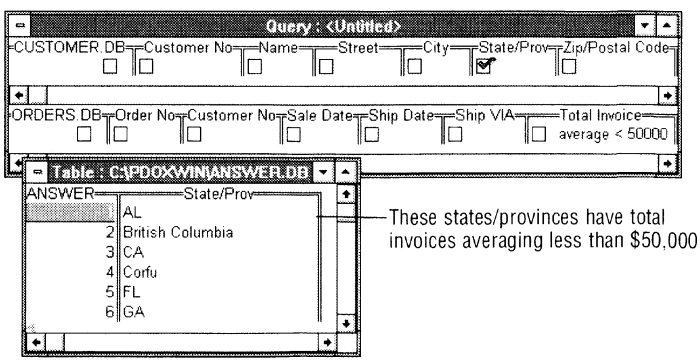
Example 7-3 Averaging records in a group

Suppose you want to know the states in which the average invoice total is less than $50,000.

Prerequisite An open Query window with blank CUSTOMER.DB and ORDERS.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of both query images.
2. Place a checkmark in the State/Prov field of the CUSTOMER.DB query image to group the table's records by State/Prov values and include this field in the *Answer* table.
3. Type **average <50000** in the Total Invoice field of the ORDERS.DB query image. The expression **average <50000** averages the invoices for each group (state/province) and selects those groups with less than $50,000.
4. Run the query.



Selecting records based on a group maximum or minimum

Use the MAX summary operator to find the maximum value in a group. Use the MIN summary operator to find the minimum value in a group. Example 7-4 demonstrates a query using the MAX summary operator. You can do the same query with the MIN summary operator to retrieve the minimum value from the same group.

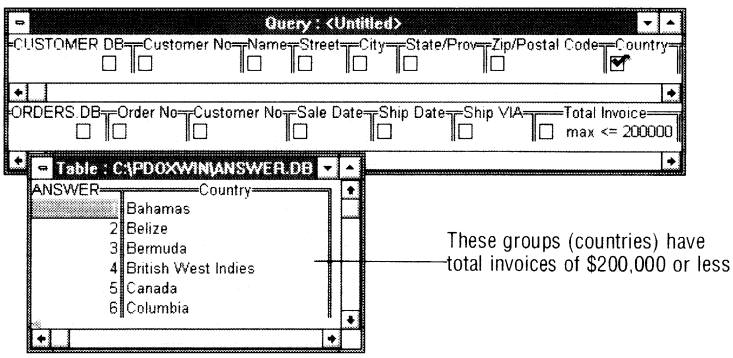
Example 7-4 Finding the maximum value in a group

Suppose you want to know the countries in which the highest total invoice is $200,000 or less.

Prerequisite An open Query window with blank CUSTOMER.DB and ORDERS.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of both query images.
2. Place a checkmark in the Country field of the CUSTOMER.DB query image to group the table's records by Country values and include this field in the *Answer* table.
3. Type **max <=200000** in the Total Invoice field of the ORDERS.DB query image. The expression **max <=200000** finds the total invoice for each group (country) and selects those with $200,000 or less.
4. Run the query.



The MAX operator defines the maximum value for selection. You can use the MIN operator just as you use the MAX operator to define the *minimum* value for selection.

Calculating with groups of records

In addition to calculating new fields for each record, as Chapter 6 discusses, you can also calculate statistics (like total and average) for groups of records. For example, you can ask

- How many of each stock item have been ordered?
- What is the total amount of sales for each customer?

- How many customers live in each country or state?
- What are the highest and lowest priced stock items?

Use summary operators with the CALC operator to count, summarize, average, and find the minimum or maximum values in the fields of your tables. To do this, type **calc** and the appropriate summary operator in the field you want calculated.

Use the AS operator to rename calculated summary fields.

Like all CALC queries, those using groups also create a new field in the *Answer* table. Paradox automatically names the new *Answer* table field according to the group calculation. You can rename the new field by using the AS operator.

Example 7-5 demonstrates a query using CALC SUM.

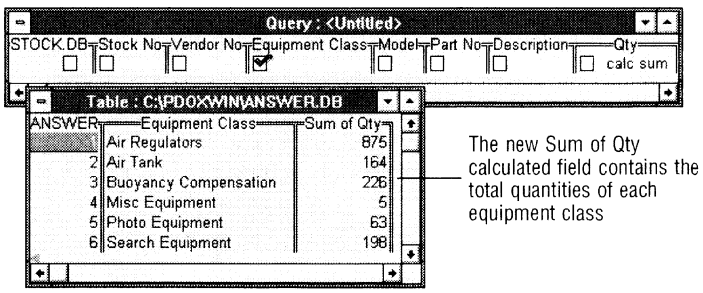
Example 7-5 A CALC SUM query

Suppose you want to know how many of each class of items you have in stock.

Prerequisite An open Query window with a blank STOCK.DB query image.

Steps

1. Place a checkmark in the Equipment Class field to group the table's records by equipment classification and include this field in the *Answer* table.
2. Type **calc sum** in the Qty field to calculate the sum of the values in this field.
3. Run the query.



Grouping by more than one field

You can group by more than one field. To do this, place checks in all fields by which you want to group the table's records. Example 7-6 demonstrates a query grouping by more than one field.

Note Example 7-2 demonstrates a query grouping by more than one field. However, in that circumstance, a one-to-one correlation exists between the two fields (Customer No and Name) by which the query is grouping. Thus, the two separate groups (the group of customer numbers and the group of names) are actually the same group.

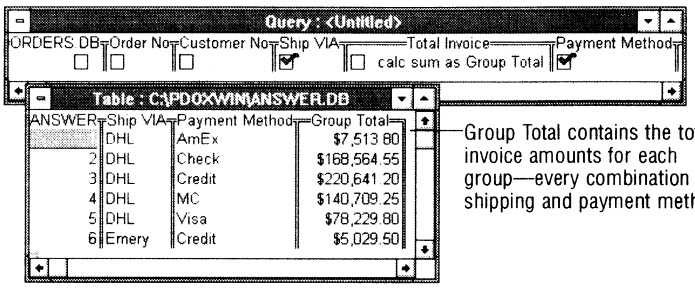
Example 7-6 Grouping by more than one field

Suppose you're interested in a relationship between a payment method and a preferred shipment method. You can group by both the Payment Method and Ship VIA fields of the *Orders* table.

Prerequisite An open Query window with a blank ORDERS.DB query image.

Steps

1. Place checkmarks in the Payment Method and Ship VIA fields to group the table's records by the values in *both* fields and include these fields in the *Answer* table.
2. Type **calc sum as Group Total** in the Total Invoice field to calculate the sum of the values in this field for each group and rename the new calculated field of the *Answer* table *Group Total* instead of *Sum of Total Invoice*.
3. Run the query.



Performing a group calculation on the entire table

You've already seen how checking a field defines and forms the group of a group query. If you don't check any fields, Paradox performs the summary operation or summary calculation on all the records in the table—the whole table is the group. Example 7-7 demonstrates this kind of query.

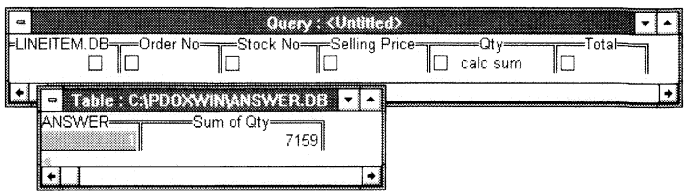
Example 7-7 Querying the whole table as a group

Suppose you want to know the total number of items ordered, regardless of who ordered them or what they are or cost.

Prerequisite An open Query window with a blank LINEITEM.DB query image.

Steps

1. Type **calc sum** in the Qty field to calculate the total number of items ever ordered.
2. Run the query.



No field is checked, so the group is the whole *Lineitem* table, and the only field in the *Answer* table is the Sum of Qty field (the result of the CALC SUM operation).

Displaying summary values without grouping by them

To display values from a field for which you specify a summary operation without grouping by that field, use the CALC operator in that field with the summary operator you used to specify the operation. The CALC operator causes Paradox to create a new calculated field in the *Answer* table, and this new field will contain the values meeting the summary condition. Example 7-8 demonstrates how to do this.

Example 7-8 Displaying summary values

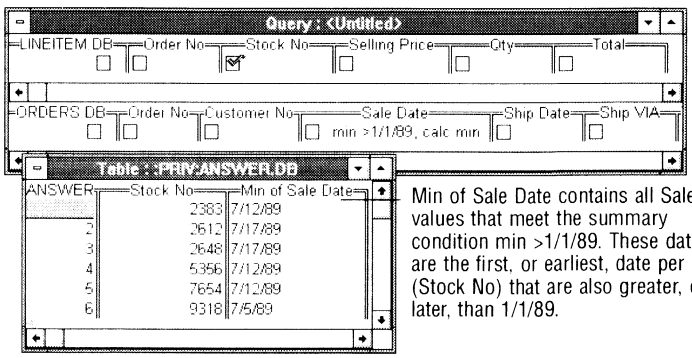
Suppose you want to know which items were sold for the first time after June 1, 1990, and you want to display the dates on which these items were ordered.

Prerequisite An open Query window with blank LINEITEM.DB and ORDERS.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Order No fields of both query images.
2. Place a checkmark in the Stock No field of the LINEITEM.DB query image to group the table's records by Stock No values and include this field in the *Answer* table.
3. Type **min >6/1/90, calc min** in the Sale Date field of the ORDERS.DB query image.

   Placing a checkmark in the Sale Date field would cause Paradox to attempt to group records by that field, as well as by the LINEITEM.DB Stock No field, so you can't use a checkmark to display the sale dates. Instead, the **calc min** causes Paradox to create a new calculated field, Min of Sale Date, which contains sale dates meeting the summary condition **min >6/1/90**, while preserving the correct grouping.
4. Run the query.



Counting unique values

By default, the CALC COUNT operator counts only unique values. However, in the Paradox BLOB field types and the dBASE field type of memo, Paradox can't distinguish unique values. Therefore, in these field types, CALC COUNT counts all values, even if you specify the UNIQUE operator.

Example 7-9 demonstrates CALC COUNT in a number field.

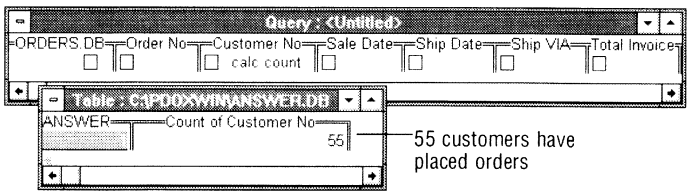
Example 7-9 A CALC COUNT query

Suppose you want to know how many customers have placed orders with your firm.

Prerequisite An open Query window with a blank ORDERS.DB query image.

Steps

1. Type **calc count** in the Customer No field.
2. Run the query.



No field is checked, so the whole *Orders* table is the group, and the only field in the *Answer* table is the Count of Customer No field (the result of the CALC COUNT operation).

Counting all values

To include duplicates in a COUNT operation, simply type **all** after the CALC COUNT operator. Paradox then counts all values, regardless of duplication. Example 7-10 demonstrates a CALC COUNT ALL query.

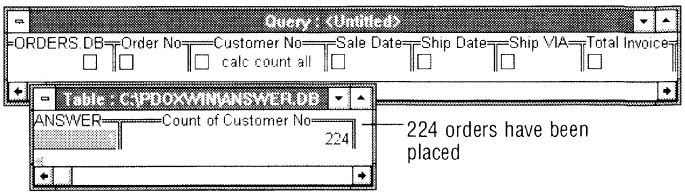
Example 7-10 A CALC COUNT ALL query

One way of finding out how many orders have been placed is to do a CALC COUNT ALL in the Customer No field of the *Orders* table. Thus, instead of learning how many *unique* customers have placed orders, you'll learn the total number of orders placed.

Prerequisite An open Query window with blank ORDERS.DB query image.

Steps

1. Type **calc count all** in the Customer No field.
2. Run the query.



No field is checked, so the whole *Orders* table is the group, and the only field in the *Answer* table is the Count of Customer No field (the result of the CALC COUNT ALL operation).

Table 7-1 Paradox field types allowing summary operators

Operator	A	N	$	D	S	M	F	B	G	O
AVERAGE		√	√		√					
COUNT	√	√	√	√	√					
MAX	√	√	√	√	√					
MIN	√	√	√	√	√					
SUM		√	√		√					

Table 7-2 Paradox field types allowing summary operator modifiers

Operator	A	N	$	D	S	M	F	B	G	O
ALL	√	√	√	√	√					
UNIQUE	√	√	√	√	√					

Table 7-3 dBASE field types allowing summary operators

Operator	C	F	N	D	L	M
AVERAGE		√	√			
COUNT	√	√	√	√	√	
MAX	√	√	√	√	√	
MIN	√	√	√	√	√	
SUM		√	√			

Table 7-4 dBASE field types allowing summary operator modifiers

Operator	C	F	N	D	L	M
ALL	√	√	√	√	√	
UNIQUE	√	√	√	√	√	

Using the ONLY operator

ONLY isn't a summary operator since you can't perform calculations with it. However, it works the same way as summary operators in that it selects groups whose records all contain the same value and no others. Example 7-11 demonstrates an ONLY query.

Example 7-11 Using ONLY

Suppose you want to find customers who have ordered only small instruments.

Prerequisite An open Query window with blank ORDERS.DB, LINEITEM.DB, and STOCK.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Order No fields of the ORDERS.DB and LINEITEM.DB query images.
2. Use the Join Tables SpeedBar button to place corresponding example elements in the Stock No fields of the LINEITEM.DB and STOCK.DB query images.
3. Place a checkmark in the Customer No field of the ORDERS.DB query image to group the table's records by customer number and include this field in the *Answer* table.
4. Type **only Small Instruments** in the Equipment Class field of the STOCK.DB query image to select all customers who have ordered small instruments and nothing else.

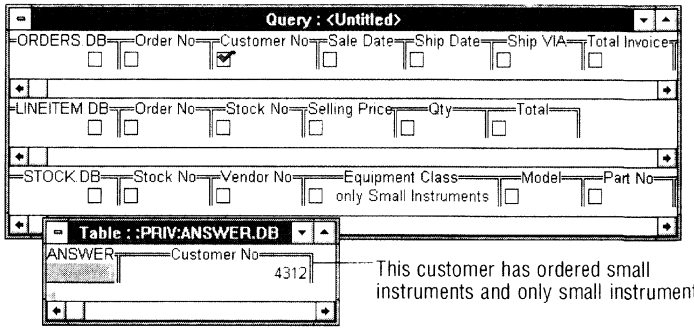


Table 7-5 Paradox field types allowing the ONLY operator

Operator	A	N	$	D	S	M	F	B	G	O
ONLY	√	√	√	√	√					

Table 7-6 dBASE field types allowing the ONLY operator

Operator	C	F	N	D	L	M
ONLY	√	√	√	√	√	

Using sets

In general, a set is a collection of objects. In Paradox, a *set* is a specific group of records about which you intend to ask further questions.

The records of the *Orders* table make up the set of all orders placed by customers. From this table, you can formulate subsets of orders for different classes of equipment, such as tools, vehicles, and so on. For example, you can use the SET operator to define sets of orders that

- Are for only small instruments
- Have no items over $50 in price
- Are for every vehicle
- Are for exactly all vehicles and no other equipment class item

The following figures illustrate these sets.

Figure 7-1 Step 1: Define the set

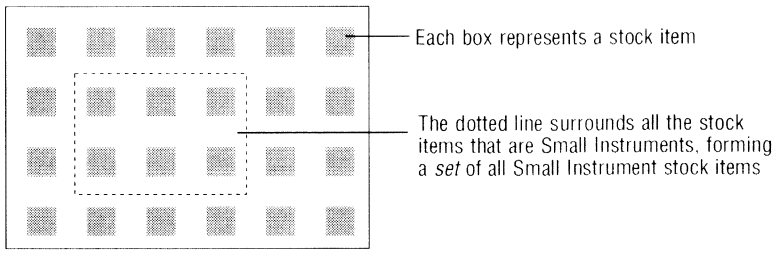


Figure 7-2 Step 2: Define groups to be compared to the set

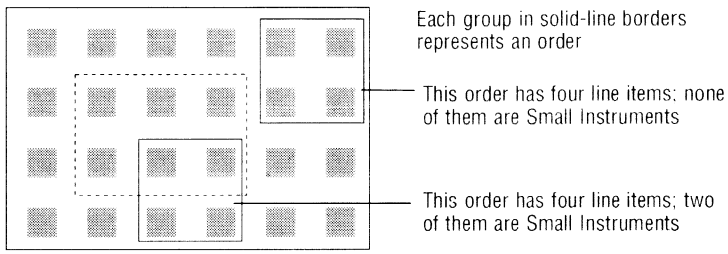
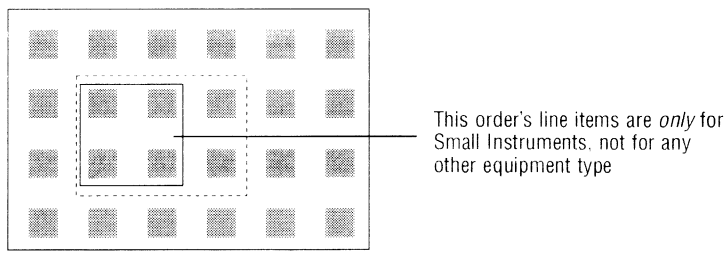
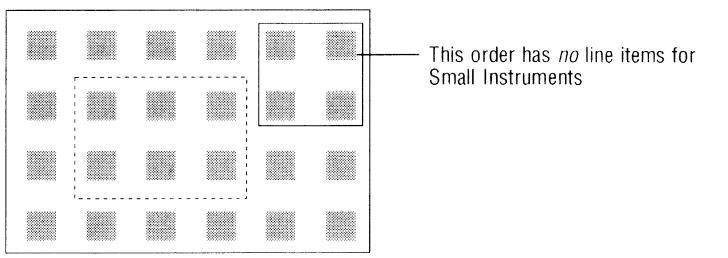
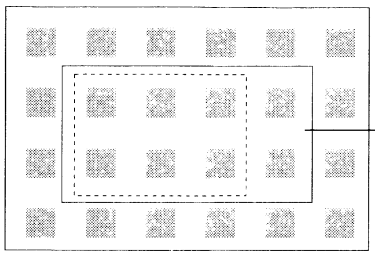


Figure 7-3 Step 3: Select special groups

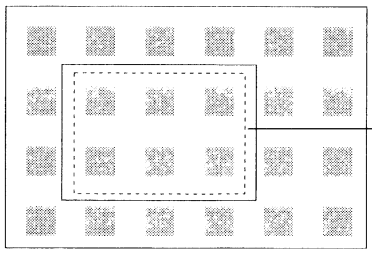
There are four special relationships possible between the set and a group







This order's line items include *every* Small Instrument, as well as other stock items



This order is for *exactly* the same stock items as are in the Small Instruments set

Once you've defined a set in a query, you can compare it to other records or groups of records. Use the set comparison operators ONLY, NO, EVERY, and EXACTLY.

When should I use a SET query?

You can use a SET query to answer a question that might otherwise take two or more queries. Use a SET query when you need to ask questions about the characteristics of a group, rather than about individual records.

Creating a SET query

Every SET query consists of the following components:

- One or more lines that define a set
- One or more lines, all of which define other records that meet certain comparisons to the set
- Optionally, one or more lines that display related information

Defining a set

Defining a set of records in a query is like selecting the records to be included in the *Answer* table. You can, in fact, think of a set definition as a query within a query.

To define a set, follow these general steps:

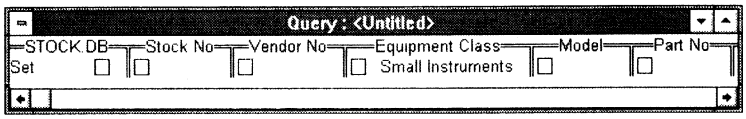
1. In the query image(s), enter selection conditions that define the records to be included in the set. If the records are in more than one table, use example elements to link the tables.

2. Choose Set from the menu of query operations in the leftmost field of all query lines that define the set.
3. Where you would ordinarily put checkmarks to select fields, substitute example elements instead. This is necessary because lines that are part of the set definition can't contain checkmarks or summary operators.

   When you go on to compare and retrieve records, you'll use these same example elements to link the comparison lines to the set definition.

Figure 7-4 Defining the set

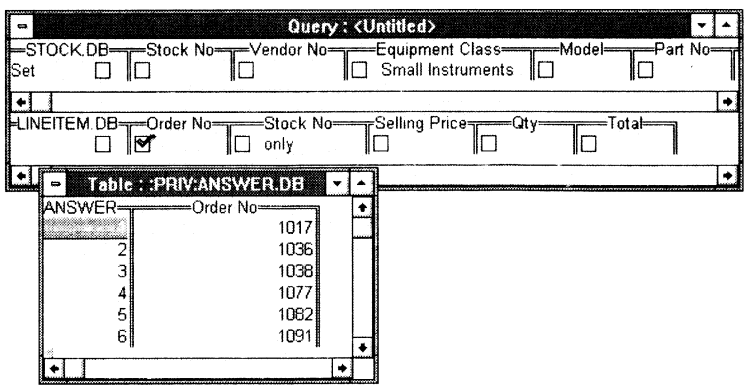
The single line of this query defines the set of stock items that are Small Instruments, but it isn't a complete query. You still need to compare the set to another factor.



Specifying which groups to compare to the set

You can add the *Lineitem* table to the query of Figure 7-4 and check the Order No field to display the group of order numbers containing records that meet the conditions of the set. Then, typing the set comparison operator ONLY, followed by the example element *item*, in the Stock No field of *Lineitem* completes the SET query. The query then looks like Figure 7-5.

Figure 7-5 A SET query



The query of Figure 7-5 does several things:

- Defines the set of stock items that are of the equipment class Small Instruments

- Groups the records in the *Lineitem* table by order number
- Displays the Order No field of *Lineitem* in the *Answer* table
- Compares the group of line items of each order number to the set of stock items that are small instruments, selecting those orders whose line items are *only* small instrument stock items

The *Answer* table shows those order numbers whose line items are *only* of the equipment class Small Instruments.

You can use the NO, EVERY, and EXACTLY set comparison operators the same way you use ONLY.

Using the GroupBy check

Sometimes you might want to group records by the values in a field without including those values in the *Answer* table. To do so, choose the GroupBy check from the menu of checks for the field. You can use the GroupBy check only with SET queries. You'll see examples of the use of the GroupBy check in the following sections. Tables 6-3 and 6-4 in Chapter 6 show which field types allow the GroupBy check.

Using the ONLY set comparison operator

When you use the ONLY set comparison operator, you ask Paradox to display only the members of the set you specify. Example 7-12 demonstrates another SET query almost like the one in Figure 7-5, except it includes the *Orders* table. Both queries produce the same *Answer* table. The difference between the two is where you define the group of order numbers.

Orders is a parent table to *Lineitem*, and the two tables are linked by their Order No fields, so *Lineitem* shouldn't have any order numbers that don't exist in *Orders*. If records with order numbers that don't exist in *Orders* were present in *Lineitem*, those records would be *orphans*—you'd have line items for nonexistent orders. If those orphan records were in *Lineitem*, their order numbers would have appeared in the query of Figure 7-5 but not in the query of Example 7-12.

Example 7-12 Using the ONLY set comparison operator

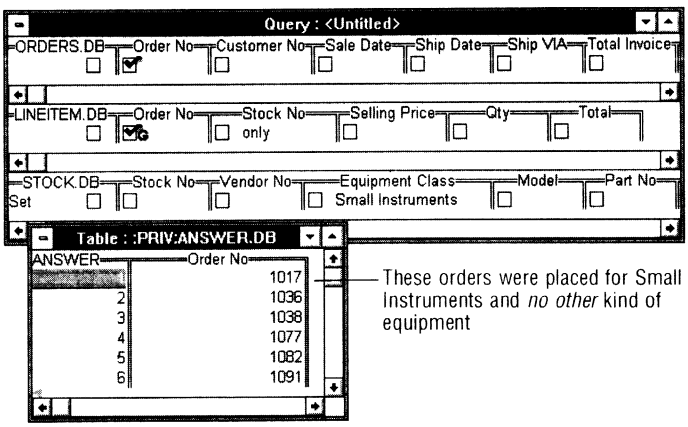
Suppose you want to see orders placed for the Small Instruments equipment class and *no other* class of equipment.

Prerequisite An open Query window with blank LINEITEM.DB, ORDERS.DB, and STOCK.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Order No fields of the LINEITEM.DB and ORDERS.DB query images.

2. Use the Join Tables SpeedBar button to place corresponding example elements in the Stock No fields of the LINEITEM.DB and STOCK.DB query images.
3. In the leftmost column of the STOCK.DB query image, type **s**, or choose Set from the menu of query operations.
4. In the Equipment Class field of the STOCK.DB query image, type **Small Instruments** to define the set of stock items that are small instruments.
5. Place a checkmark in the Order No field of the ORDERS.DB query image to group by the values of this field and display the field in the *Answer* table.
6. Place a GroupBy check in the Order No field of the LINEITEM.DB query image to group by the values of this field but not display this field in the *Answer* table.
7. Type **only** before the example element in the Stock No field of the LINEITEM.DB query image to cause Paradox to select orders placed for only Small Instrument stock numbers. (If you were to do this query without the ONLY set operator and without SET in the leftmost column of STOCK.DB, you would get orders placed for Small Instruments in combination with any other equipment class items.)
8. Run the query.



Using the NO set comparison operator

When you use the NO set comparison operator, you ask Paradox to display the groups in which no record matches any record of the set you specify. Example 7-13 demonstrates a NO query.

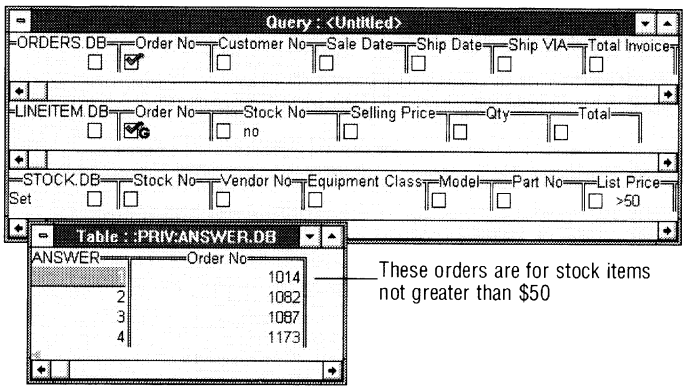
Example 7-13 Using the NO set comparison operator

Suppose you want to find which orders are for no items over $50 in price. The NO SET query asks to see all records *outside* the set you specify.

Prerequisite Do Example 7-12.

Steps

1. Return to the Query window containing the linked query images of Example 7-12.
2. Remove the *Small Instruments* selection condition in the Equipment Class field of the STOCK.DB query image.
3. In the List Price field of the STOCK.DB query image, type **>50** to define the set of stock items over $50 in price.
4. Replace the *only* in front of the example element in the Stock No field of the LINEITEM.DB query image with **no** to cause Paradox to select orders placed for items *not* greater than $50.
5. Run the query.



Using the EVERY set comparison operator

When you use the EVERY set comparison operator, you create a set and ask to see groups containing records that match every item in the set. Example 7-14 demonstrates an EVERY query.

Example 7-14 Using the EVERY set comparison operator

Suppose you want to see all orders placed for every item in the Vehicle equipment class.

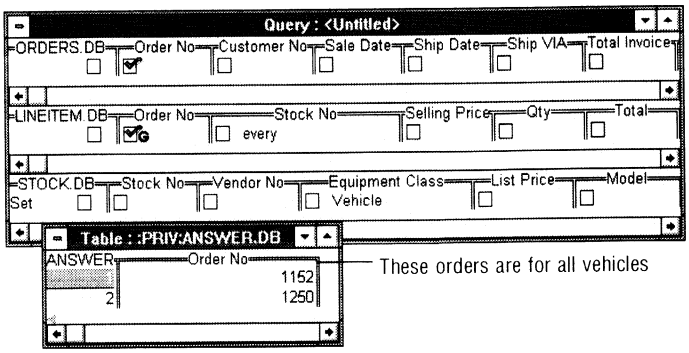
Prerequisite Do Example 7-13.

Steps

1. Return to the Query window containing the linked query images of Example 7-13.
2. Remove the *>50* selection condition in the List Price field of the STOCK.DB query image.
3. In the Equipment Class field of the STOCK.DB query image, type **Vehicle** to define the set of stock items that are vehicles.

4. Replace the *no* in front of the example element in the Stock No field of the LINEITEM.DB query image with **every** to cause Paradox to select orders placed for all Vehicles.

5. Run the query.



Using the EXACTLY set comparison operator

When you use the EXACTLY set comparison operator, you create a set and ask to see groups containing records that match *every* item of the set and *only* items of the set. Example 7-15 demonstrates an EXACTLY SET query.

Example 7-15 Using the EXACTLY set comparison operator

Suppose the Sight Diver dive shop calls you and wants to change an order they just placed, order number 1363. This order is for one of the vehicles and an air regulator. Instead of the air regulator, the Sight Diver shop wants the other vehicle. You need to change this order in the *Lineitem* table. After you do, you decide to query for other orders that might have been placed for every vehicle and only vehicles.

Prerequisite Edit the *Lineitem* table, changing the record for the air regulator, Stock No 1390, in order number 1363 to the following:

Field	Old value	New value
Stock No	1390	912
Selling Price	170.00	1680.00
Qty	8	1
Total	1360.00	1680.00

Do Example 7-14.

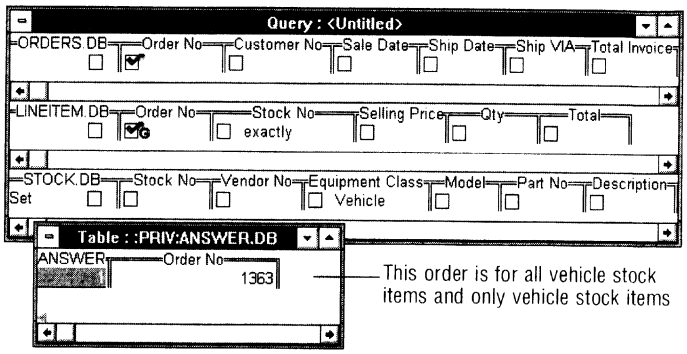
Steps

1. Return to the Query window containing the linked query images of Example 7-14.

2. Leave the selection condition *Vehicle* in the Equipment Class field of the STOCK.DB query image.

3. Replace the *every* in front of the example element in the Stock No field of the LINEITEM.DB query image with **exactly** to cause Paradox to select orders placed for *all* stock items that are vehicles and *no other* stock items.

4. Run the query.



5. When you're finished running the query, suppose that the Sight Diver shop called you back with another change of heart. They want eight air regulators after all and not the other vehicle. Edit the *Lineitem* table again to change the record for the 912 vehicle of order number 1363 back to the original 1390 air regulator values; use the *Old value* column of the table in this example.

SET queries involving more than one set

The SET queries you've seen so far have involved retrieving records based on a comparison to one set. The next example shows how to retrieve records based on comparisons involving two sets.

Example 7-16 A SET query using two sets

Suppose you want to tie customers to the orders you've been learning about from the previous examples of SET queries. Specifically, you're interested in customers who have ordered *only* small instruments and *no other* equipment class.

Prerequisite An open Query window with blank CUSTOMER.DB, ORDERS.DB, LINEITEM.DB, and STOCK.DB query images, in that order. (You must add them to the Query window one at a time.)

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of CUSTOMER.DB and ORDERS.DB, in the Order No fields of ORDERS.DB and LINEITEM.DB, and in the Stock No fields of LINEITEM.DB and STOCK.DB.

2. Define the set of Small Instruments stock items in the *Stock* table by choosing Set from the menu of query operations in the leftmost field of STOCK.DB and by typing **Small Instruments** in the Equipment Class field.

3. Retrieve the records from *Lineitem* that meet the stock item set conditions and *only* those set conditions by typing **only** in front of the example

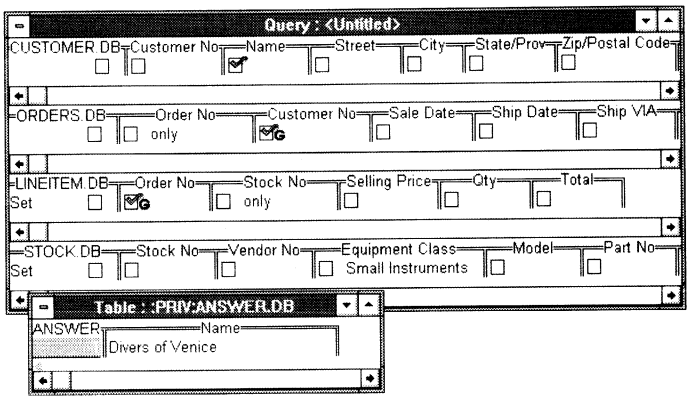
element in the Stock No field of LINEITEM.DB and by placing a GroupBy check in the Order No field of LINEITEM.DB.

4. Define the line items that meet the *only Small Instruments* set as a set itself by choosing Set from the menu of query operations in the leftmost field of LINEITEM.DB.

5. Retrieve the records from *Orders* that meet the line item set conditions and only those set conditions by typing **only** in front of the example element in the Order No field of ORDERS.DB and by placing a GroupBy check in the Customer No field of ORDERS.DB.

6. Retrieve the customers from *Customer* who have placed the orders that meet the set conditions and *only* those set conditions by placing a checkmark in the Name field of CUSTOMER.DB.

7. Run the query.



Using summary operators in SET queries

So far you've seen how to compare groups of records to a defined set. You can also compare groups of records to summary values derived from a set. To do this, you define the set as usual. In the line of the query that selects the records to compare to the set, however, use a summary operator instead of a set comparison operator. You can place the summary operator in an arithmetic expression.

Example 7-17 Comparing records to an average

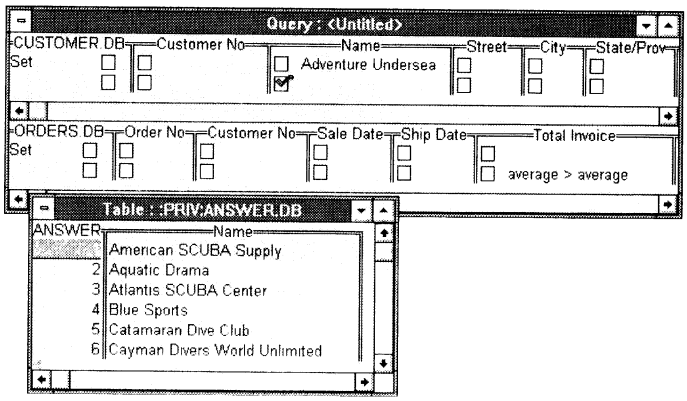
Suppose you want to know which dive shops' total invoice averages are more than the total invoice average for a particular dive shop, specifically the Adventure Undersea dive shop.

Prerequisite An open Query window with blank CUSTOMER.DB and ORDERS.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of both query images.

2. Choose Set from the menu of query operations in the leftmost fields of both query images.
3. In the CUSTOMER.DB query image, type **Adventure Undersea** in the Name field to define the set of dive shops that consists of just Adventure Undersea.
4. In the CUSTOMER.DB query image, add a second line. Then, in the second line of the Customer No field, press *F5* and type **customer** as an example element representing each customer number value.
5. In the second line of CUSTOMER.DB, place a checkmark in the Name field.
6. In the Total Invoice field of the ORDERS.DB query image, press *F5* and type **total** as an example element representing the set of the single invoice total for the Adventure Undersea dive shop.
7. In the ORDERS.DB query image, add a second line. Then, in the second line of the Customer No field, press *F5* and type **customer** as an example element representing each customer number value.
8. In the second line of the Total Invoice field in the ORDERS.DB query image, type **average > average**, and then press *F5* and type **total** to select only those dive shops whose total invoice averages are greater than the total invoice average for Adventure Undersea.
9. Run the query.



Using inclusive links

In the previous sections of this chapter, you've seen several examples of queries that use example elements to link tables together. These queries have retrieved all the records in one table that match records

in another table. This type of query represents an *exclusive link* and is sometimes called an *inner join.*

When you want an *Answer* table that includes those records that *don't* match records in the table to which they're linked, use the Paradox inclusion operator (!). This type of query represents an *inclusive link* and is sometimes called an *outer join.*

You add the ! operator to an example element in a query to retrieve all of the records in that table, whether they match records in another table or not. You can also add selection conditions to define the set of master records included in the answer. In this section, you'll see how to

- Use multiple inclusion (!) operators to retrieve all the records from more than one table
- Use ! in a query containing an arithmetic expression
- Use both inclusive and exclusive links in the same query

Linking to all records in a table

Example 7-18 demonstrates an inclusive link query.

Example 7-18 Using the inclusion (!) operator

Suppose you want to find out if the *Customer* table contains customers who have never placed an order. If you link *Customer* and *Orders* by placing an example element in both Customer No fields, then check the fields you want to see in the *Answer* table, you'll see only those customer records that match one or more records in *Orders.*

If, however, you add the inclusion (!) operator after the example element in the Customer No field of *Customer,* you'll see *all* customer records, including those of customers who have never placed an order.

Prerequisite An open Query window with blank CUSTOMER.DB and ORDERS.DB query images.

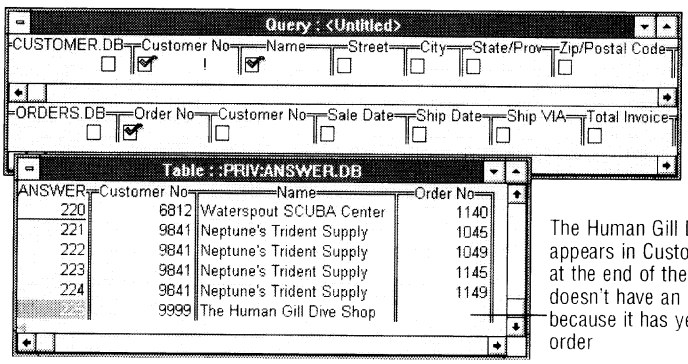
Steps

1. Open the *Customer* table (by choosing File|Open|Table) and add a new record to the end of it (by scrolling to the end and pressing ***F9*** to edit and pressing ↓ to append a blank record). Add a record for a new dive shop customer, using the data in the following table:

Field name	Data
Customer No	9999
Name	The Human Gill Dive Shop
Street	1225 E. River St.
City	Savannah
State/Prov	GA
Zip/Postal Code	30541
Country	U.S.A.

Field name	Data
Phone	404-555-1451
First Contact	5/31/92

2. After adding the new record for The Human Gill Dive Shop to the *Customer* table, press ***F9*** again to end Edit mode and close the table.
3. Use the Join Tables SpeedBar button to place corresponding example elements in the Customer No fields of both the CUSTOMER.DB and ORDERS.DB query images.
4. Type **!** after the example element in the Customer No field of the CUSTOMER.DB query image to include all customers from the *Customer* table in the *Answer* table, even if they don't have a matching record in the *Orders* table.
5. Place checkmarks in the Customer No and Name fields of the CUSTOMER.DB query image.
6. Place a checkmark in the Order No field of the ORDERS.DB query image.
7. Run the query and scroll to the end of the *Answer* table.



The Human Gill Dive Shop appears in Customer No order at the end of the table and doesn't have an order number because it has yet to place an order

Using the inclusion operator in a query that performs a calculation

You can use inclusion operators in a query that performs a calculation.

Example 7-19 Using the inclusion operator to perform a calculation

Suppose you're concerned about orders you can't fill with your current inventory. More specifically, you want a list of all orders, highlighting those for quantities that exceed one quarter of the quantities in stock.

Prerequisite An open Query window with blank ORDERS.DB, LINEITEM.DB, and STOCK.DB query images, in that order. (You must add them to the Query window one at a time.)

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Order No fields of the ORDERS.DB and LINEITEM.DB query images.

2. Use the Join Tables SpeedBar button to place corresponding example elements in the Stock No fields of the LINEITEM.DB and STOCK.DB query images.

3. Type **!** after the example element in the Order No field of the ORDERS.DB query image to see all order numbers.

4. Place checkmarks in the Stock No and Qty fields of the LINEITEM.DB query image.

5. In the Qty field of the LINEITEM.DB query image, press *F5* and type **qty** as the example element representing all the values, in turn, of the *Lineitem* table's Qty field.

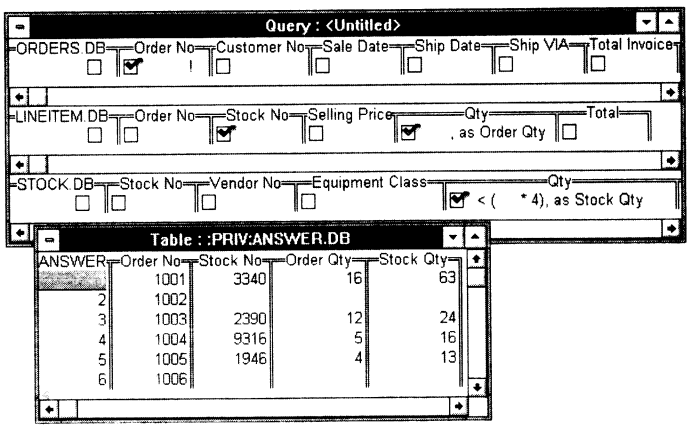
6. Still in the Qty field of the LINEITEM.DB query image, type **, as Order Qty** after the *qty* example element.

7. Place a checkmark in the Qty field of the STOCK.DB query image.

8. In the Qty field of the STOCK.DB query image, type **< (**.

9. Still in the Qty field of STOCK.DB, press *F5* and type **qty** and a space. Then type *** 4), as Stock Qty**.

10. Run the query.



The ! operator in *Orders* ensures that the Order No field contains all orders. The *qty* example element is used in the expression *qty * 4* to multiply each stock item quantity value in the Qty field of the *Lineitem* table (representing the order quantity of each stock item) by four. The < comparison operator then looks for actual stock quantities less than this amount, thus retrieving records of orders that exceed one quarter of the inventory.

Retrieving records from one table that aren't in another table

You can use an inclusive link with the COUNT summary operator and check pluses to retrieve records from one table that aren't in another table.

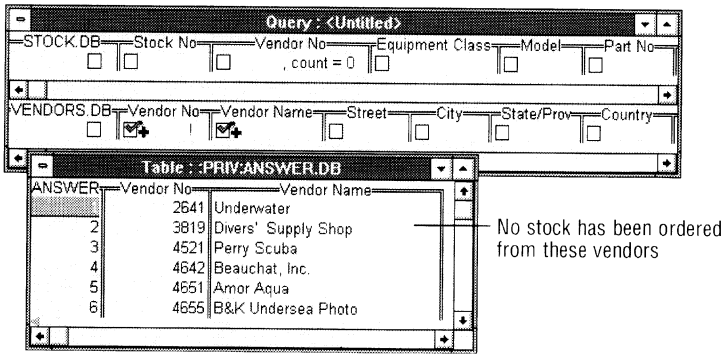
Example 7-20 Retrieving records from one table that aren't in another table

Suppose you want to know which vendors you have in the *Vendors* table from whom you have yet to buy any stock. That means you want to know which vendors are in the *Vendors* table that aren't in the *Stock* table.

Prerequisite An open Query window with blank STOCK.DB and VENDORS.DB query images.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Vendor No fields of both query images.
2. Type **!** after the example element in the Vendor No field of VENDORS.DB.
3. Place check pluses in the Vendor No and Vendor Name fields of VENDORS.DB to retrieve all records, including duplicates.
4. After the example element in the Vendor No field of STOCK.DB, type a comma and a space and then **count = 0**.
5. Run the query.



Using both inclusive and exclusive links in a query

Example 7-19 demonstrates a query containing both an inclusive and exclusive link. Example 7-21 demonstrates another, more complicated query containing both inclusive and exclusive links.

Example 7-21 Using both inclusive and exclusive links in a query

Suppose you have recently agreed with your vendors not to sell items to customer dive shops in the same state as the vendor. You can determine how current orders would be affected by these new agreements by summing their total dollar values.

Prerequisite An open Query window with blank VENDORS.DB, STOCK.DB, LINEITEM.DB, ORDERS.DB, and CUSTOMER.DB query images, in that order.

Steps

1. Use the Join Tables SpeedBar button to place corresponding example elements in the Vendor No fields of VENDORS.DB and STOCK.DB, in the Stock No fields of STOCK.DB and LINEITEM.DB, in the Order No fields of LINEITEM.DB and ORDERS.DB, and in the Customer No fields of ORDERS.DB and CUSTOMER.DB.

2. Type **!** after the example element in the Vendor No field of VENDORS.DB and place a checkmark in it to see all vendor numbers, whether you've ordered stock from them or not.

3. Place a checkmark in the State/Prov field of VENDORS.DB and press *F5* and type **state** as the example element representing each State/Prov value in the *Vendors* table.

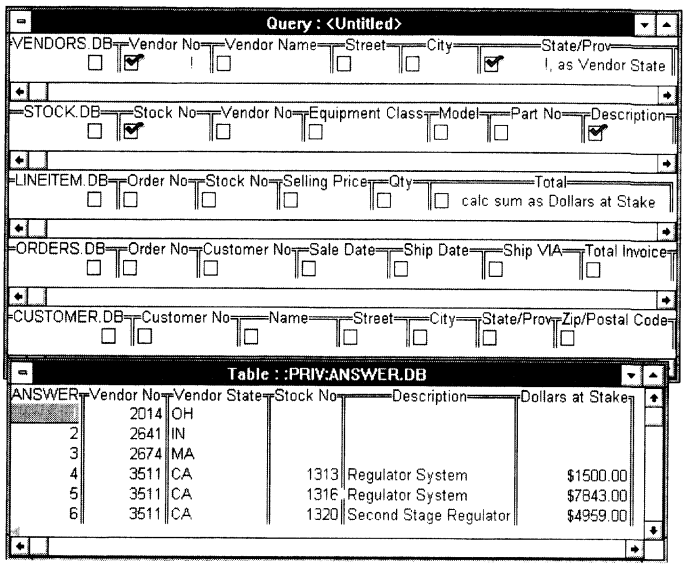
4. Still in the State/Prov field, type **!** after the *state* example element to see all vendor states and then type **, as Vendor State** to rename the field in the *Answer* table.

5. Place checkmarks in the Stock No and Description fields of STOCK.DB to see these fields in the *Answer* table.

6. In the Total field of LINEITEM.DB, type **calc sum as Dollars at Stake** to generate a new calculated field in the *Answer* table. This new field contains summary values of the total order cost for each stock item ordered by each customer located in the same state as a vendor selling that stock item.

7. In the State/Prov field of the CUSTOMER.DB query image, press *F5* and type **state** as the example element representing each customer's state.

8. Run the query.



The *Answer* table contains

- All vendors, whether or not you've ordered stock from them
- The states that those vendors are located in, and that are, by extension, the same states dive shop customers are located in who have ordered stock from you, which you, in turn, could have purchased from a vendor in the same state (Vendor State—inclusively linked with State/Prov in CUSTOMER.DB)
- All stock items that have been ordered (Stock No and Description—if blank, you haven't ordered stock from that vendor)
- The sum of total orders for each stock number for which a customer could have purchased the same stock item from a vendor selling it in the same state (Dollars at Stake)

Rules for linking tables

You can't use an inclusive and an exclusive link in two linked lines.

For any two linked lines in a query, you can use either an inclusive link (!) or an exclusive link to associate them, but you can't use both. This is because an inclusive link includes all the records from the master table, while an exclusive link includes only records whose values in the linked fields match each other. If you use both kinds, Paradox has no way to decide which link to process first. The resulting *Answer* table would be different depending on the sequence.

You won't violate this rule if you remember that you can use ! with any given example element only once per line and twice per query. In

other words, you can use only one type of link to associate any two lines in a query.

You can use an inclusive and an exclusive link in the same query.

You can use both exclusive and inclusive links in the same query, as long as they don't both involve the same pair of lines. When you have both types of link in one query, they are processed in order from least to most inclusive:

1. Exclusive links, which don't retrieve records that aren't matched by records in another table, are processed first.
2. Asymmetrical inclusive links (with both master and lookup tables), which retrieve all of the records from the master table but only the matched records from the lookup table(s), are processed next.
3. Symmetrical inclusive links (with only master tables), which include all records from both tables, are processed last.

By processing exclusive links before inclusive links, Paradox guarantees consistent results to its queries. If you want Paradox to process the links in some other order, you must break your question into separate queries.

Table 7-7 Paradox field types allowing set operators and the ! operator

Operator	A	N	$	D	S	M	F	B	G	O
ONLY	√	√	√	√	√					
NO	√	√	√	√	√					
EVERY	√	√	√	√	√					
EXACTLY	√	√	√	√	√					
!	√	√	√	√	√					

Table 7-8 dBASE field types allowing set operators and the ! operator

Operator	C	F	N	D	L	M
ONLY	√	√	√	√	√	
NO	√	√	√	√	√	
EVERY	√	√	√	√	√	
EXACTLY	√	√	√	√	√	
!	√	√	√	√	√	

CHAPTER 8

Using object utilities

Common file operations are available within Paradox from the Utilities menu. Using utilities, you can copy, rename, or delete any Paradox object.

Utilities also provide specialized operations for your tables. You can

- Add records from one table to another
- Subtract records that exist in one table from another table
- Empty all records from a table
- Import data from different file formats
- Export Paradox data to different file formats
- Open or clear passwords
- Get information about a table's structure
- Restructure a table (see Chapter 9 for information on restructuring tables)
- Sort a table (see Chapter 4 for information on sorting tables)

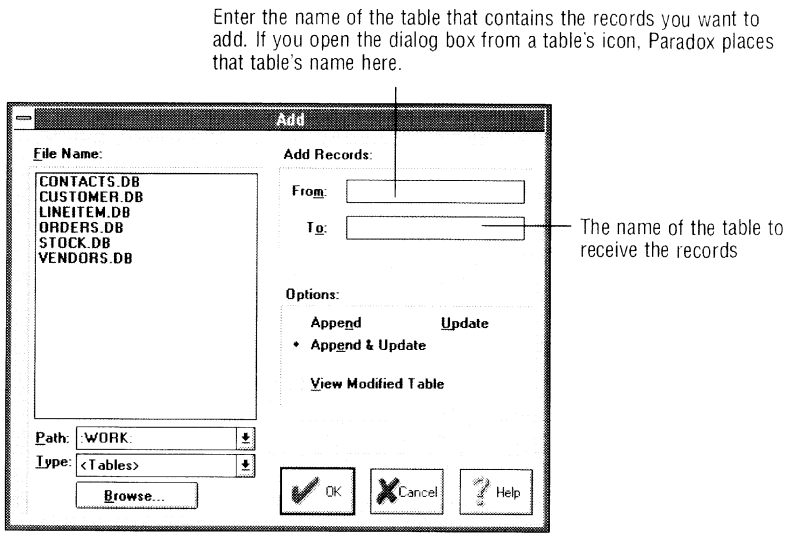
You can also access an object's utilities by inspecting its icon in either the Folder window or the Browser.

Adding records to a different table

Use the Add utility to add the records in one table to another table.

Choose File | Utilities | Add (or inspect the icon of the table you want to add records from and choose Add). You'll see the Add dialog box, shown in Figure 8-1.

Figure 8-1 The Add dialog box



All tables in the working and private directories are shown in the File Name list. Use the Path list or Browse button to choose a table from a different directory. You can perform an Add operation across directories.

1. Position the insertion point in the From text box, then choose the table you want to add records from. (If you opened the Add dialog box by inspecting a table's icon, Paradox enters the table's name here for you.)
2. Position the insertion point in the To text box, then choose the table you want to add records to.
3. Choose the Append or Update option you want. (These options are discussed later in this section.)
4. Check View Modified Table if you want to open the table you added records to when the Add operation is complete.
5. Choose OK.

The two tables you use in the Add operation must have *compatible* (though not necessarily identical) field types in the same order.

For fields to be compatible, Paradox must be able to change from the existing field type to the new field type in a Restructure operation. For example, number and currency field types are compatible, but number and graphic fields are not. For a complete chart of compatible Paradox field types, see Table 9-7 in Chapter 9. For a

complete chart of restructure-compatible dBASE field types, see Table 9-9 in Chapter 9.

When performing an Add operation, keep these rules in mind:

- You can add records from one table type to another only if the tables have a compatible structure. This means compatible field types in the same order.
- The table you add the records to can have more fields than the source table, as long as the first fields of the table you add the records to are compatible with all fields of the source (compatible field types in the same order). Paradox places null values in the extra fields.
- The source table can have more fields than the table you add the records to, as long as the fields of the table you add the records to are compatible with the first fields of the source (compatible field types in the same order). Paradox ignores the extra fields.

Adding records to a different table type

When you add records from one table type to another, you must consider whether the field types in the table you add records to are compatible with the field types in the table you add records from. Table 8-1 shows which field types are compatible when you add from a Paradox table to a dBASE table. Table 8-2 shows which field types are compatible when you add from a dBASE table to a Paradox table.

Table 8-1 Adding from a Paradox table to a dBASE table

	dBASE C	dBASE F	dBASE N	dBASE D	dBASE L	dBASE M
Paradox A	√	P	P	P	P	√
Paradox N	√	√	√		P	
Paradox $	√	√	√			
Paradox D	√			√		
Paradox S	√	√	√		P	
Paradox M						√
Paradox F						√
Paradox B						√
Paradox G						√
Paradox O						√

√ indicates that the field types are compatible.
P indicates that the field types are somewhat compatible, but conversion can result in a *Problems* table.

Paradox to dBASE BLOB field conversions

When you add data from a Paradox formatted memo to a dBASE memo, Paradox removes all formatting and converts the data to straight text.

When you add data from a Paradox graphic, OLE, or binary field to a dBASE memo, the dBASE table can accept the data, but can't display it.

Table 8-2 Adding from a dBASE table to a Paradox table

	A	N	$	D	S	M	F	B	G	O
dBASE C	√	P	P	P	P					
dBASE F	√	P	P		P					
dBASE N	√	P	P		P					
dBASE D	√			√						
dBASE L	√									
dBASE M						√	√	√	√	√

√ indicates that the field types are compatible.
P indicates that the field types are somewhat compatible, but conversion can result in a *Problems* table.

dBASE to Paradox BLOB field conversions

You can add data from a dBASE memo field type to a Paradox memo, formatted memo, graphic, OLE, or binary field type. This is because dBASE memo fields are capable of storing any type of data. However, you must be sure that you add the appropriate data to the appropriate Paradox field type. For example, if your dBASE memo contains graphic images, it is valid for you to add them to the graphic field type. Paradox can display the result. It isn't valid for you to add graphics to a formatted memo. Paradox cannot display the results of an invalid additon.

Paradox doesn't interpret the data in the dBASE memo before the addition, so you must be sure that the data contained in the dBASE field is compatible with the new Paradox field type.

Adding records to keyed tables

If the table you add the records to is keyed, the added records must conform to the rules of the key. Paradox places records that don't conform in the temporary *Keyviol* table in your private directory. The source table is never changed during an Add operation—it doesn't matter if it's keyed or not.

Append and Update options

In the Add dialog box, you can use the Options area to either add new records, update existing records, or both.

- *Append*: adds new records without affecting any existing records.

- If the target table is keyed, Paradox adds records in their proper position in the table. Paradox places records that violate the key in the temporary *Keyviol* table in your private directory. (You can edit these records to conform to the key, then use Add again to place them in the table.)
- If the target table isn't keyed, Paradox places the added records at the end of existing records.

- *Update*: updates records that already exist in the table you're adding records to. Any records in the source table that don't match an existing record aren't added.

  When you choose Update, the records of the source table overwrite matching records in the table you're adding records to. Paradox places the records that are overwritten in the temporary *Changed* table in your private directory.

Note The table you add records to *must* be keyed to use Update.

- *Append & Update*: both adds new records (following the rules just stated) and updates existing records (following the rules just stated).

Note The table you add records to *must* be keyed to use Append & Update.

Adding on a network

When you use Add, Paradox needs to acquire a read lock on the source table and a write lock on the table you add the records to. This means other users can't

- Change the contents or structure of either table
- Perform any operation that requires a write or exclusive lock on either table

If another user has locked a record or placed a write or exclusive lock on either table, you must wait until the lock is removed before using Add.

Because dBASE tables don't use read locks, when you use Add on dBASE tables, Paradox places write locks on both tables.

Subtracting records

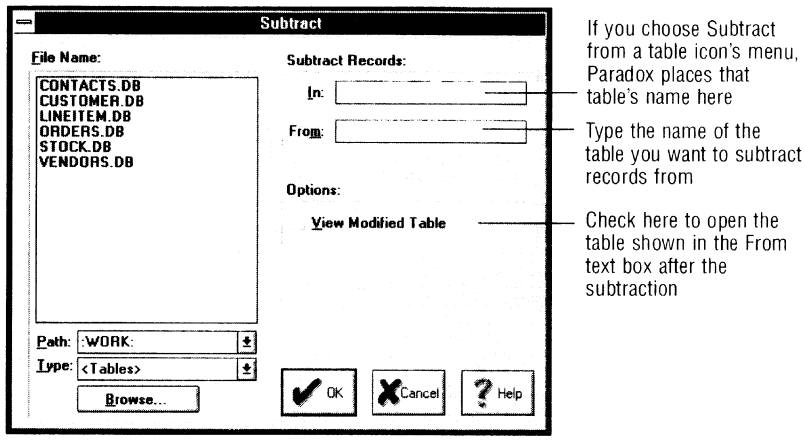
Use the Subtract utility to remove records that exist in one table from a different table (called the subtraction table). You can subtract records only from a keyed table.

Because the table you subtract records from must be keyed, and dBASE does not support Paradox keys, you cannot subtract records from a dBASE table. Instead, use a DELETE query (see Chapter 6).

During a subtract operation, Paradox removes any record that contains a value in its key field that exactly matches the corresponding field of a record in the subtraction table.

To subtract a table, choose File | Utilities | Subtract (or inspect a table's icon in the Folder window or the Browser and choose Subtract from its menu). Paradox opens the Subtract dialog box, shown in Figure 8-2.

Figure 8-2 The Subtract dialog box



To subtract the records in one table from another table, use the Subtract Records panel and

1. Enter the name of the table that contains the records you want to subtract in the In text box.
2. Enter the name of the table you want the records subtracted from in the From text box.
3. Choose OK. Paradox prompts you to confirm the deletion of records from the table you entered in the From text box. Choose Yes to subtract the records or No to cancel the operation.

If you choose Yes, Paradox compares the two tables and subtracts matching records.

Follow these rules when subtracting tables:

- The two tables you use in the Subtract operation must have compatible structures. This means compatible fields in the same

field order. (For a complete chart of compatible Paradox field types, see Table 9-7 in Chapter 9. For a complete chart of restructure-compatible dBASE field types, see Table 9-9 in Chapter 9.)

- If the table you subtract from is the parent table in a referential integrity relationship, the Subtract operation is not allowed.

Using Subtract on a network

When you use Subtract, Paradox must acquire a read lock on the table that contains the records you're subtracting, and a write lock on the table you're subtracting records from. This means other users can't

- Change the contents or structure of either table
- Perform any operation that requires a write or exclusive lock on either table

If another user has locked a record or placed a write or exclusive lock on either table, you must wait until the lock is removed before using Subtract.

Copying objects

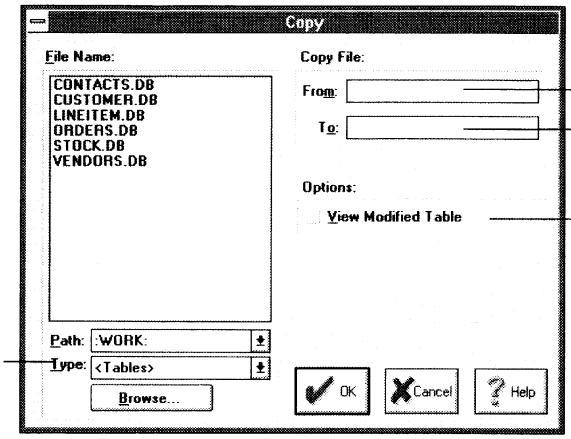
You can copy tables, forms, reports, queries, scripts, or libraries from within Paradox.

When you copy a table, Paradox copies both its structure and the data contained in it.

Always use the Paradox Copy utility to copy tables. Using the DOS COPY command or the Windows File Manager may not copy all related files that make up a table (for example, the files containing table's primary index, secondary indexes, validity checks, or BLOB data). The Paradox Copy utility, however, copies all files correctly.

To copy an object, either choose File | Utilities | Copy, (Paradox opens the Copy dialog box shown in Figure 8-3), or inspect the object's icon in the Folder window or the Browser and choose Copy from its menu (Paradox opens the Copy dialog box shown in Example 8-1).

Figure 8-3 The Copy dialog box



All tables in your working and private directories are shown in the File Name list. Use the Type drop-down list to display other object types in the File Name list.

You can use the Path drop-down list or the Browse button to access files in different directories.

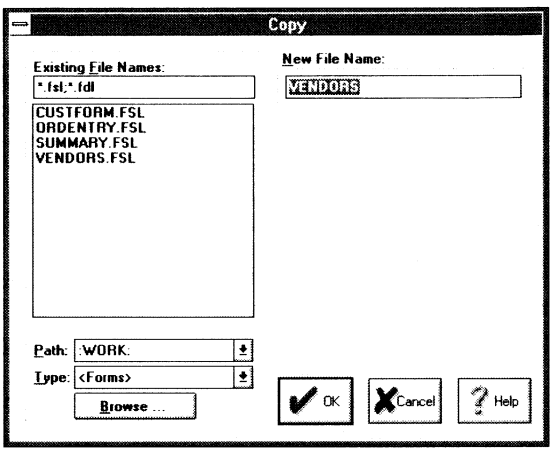
When you copy a table, Paradox also copies the table's

- Key (primary index)
- Secondary index(es) (except .NDX files on dBASE tables)
- Validity checks (See "Copying referential integrity" later in this section.)
- Table properties (as you've set them in the Table window)

Example 8-1 Copying a form from the Folder window

To make a copy of the *Vendors* form,

1. With your working directory set to SAMPLE, open the Folder window.
2. Inspect the VENDORS.FSL icon. Choose Copy. Paradox opens the Copy dialog box.



3. The name VENDORS appears in the New File Name text box. Replace this with NEWVEND.
4. Choose OK. Paradox creates a copy of the form and names it NEWVEND.FSL.

Copying on a network

When you copy a table, Paradox must acquire a read lock on the original table and an exclusive lock on the copy. This means

- No user can change the contents or the structure of the table you're copying during the Copy operation.
- If you copy to an existing table, there can be no locks open on that table.

If there is a record lock, write lock or exclusive lock on the table you're copying, you won't be able to make the copy until the lock is removed.

Copying referential integrity

When you define referential integrity (see Chapter 9), you create a relationship between two tables.

- If you copy the *parent* table, Paradox doesn't copy the referential integrity.

- If you copy the *child* table, Paradox copies the referential integrity. This means the copied table must meet the requirements of the referential integrity. To delete the referential integrity, you must restructure the table.
- Both tables in the referential integrity relationship must be in the same directory. When you copy the child table to a different directory you break the referential integrity link.

Copying to a different table type

You can copy a Paradox table to a dBASE table, or a dBASE table to a Paradox table, by entering the file extension you want in the New Table Name text box (.DB for Paradox and .DBF for dBASE). For example, if you want to copy the Paradox *Customer* table to a dBASE *Customer* table, enter **customer.db** in the From text box, and **customer.dbf** in the To text box of the Copy File panel.

Paradox automatically changes field types when you change table types. Table 8-3 shows what to expect when you copy from a Paradox table to a dBASE table.

Table 8-3 Copying from a Paradox to a dBASE table

From Paradox type	To dBASE type	Side effects
Alphanumeric	Character	
Number	Number	Assigns size (20) and dec. (4)
Currency	Number	Assigns size (20) and dec. (4)
Short number	Number	Assigns size (6) and dec. (0)
Date	Date	
Memo	Memo	
Formatted memo	Memo	Formatting is lost
Graphic	Memo	Data cannot be displayed
OLE	Memo	Data cannot be displayed
Binary	Memo	Data cannot be displayed

Note If the new dBASE table contains no production index (.MDX file), no float number field type, and no memo field type, Paradox creates dBASE III+ table. Otherwise, Paradox creates a dBASE IV table.

Table 8-4 shows what to expect when you copy from a dBASE table to a Paradox table.

Table 8-4 Copying from a dBASE to a Paradox table

From dBASE type	To Paradox type	Side effects
Character	Alphanumeric	
Float number	Number	Removes size
Number	Number	Removes size
Logical	Alphanumeric	Adds size (1) and keeps first character
Date	Date	
Memo	Memo	Adds size (1)*

* Paradox assumes the data in the dBASE memo is in text form. If the memo contains a different type of data, you should use the Add utility and add the memo to the appropriate Paradox BLOB field type.

Deleting objects

You can delete tables, forms, reports, queries, scripts, or libraries from within Paradox.

Always use the Paradox Delete utility to delete tables. Using the DOS DELETE command or the Windows File Manager may not delete all related files that make up a table (for example, the files containing table's primary index, secondary indexes, validity checks, referential integrity, or BLOB data). The Paradox Delete utility, however, deletes all files correctly.

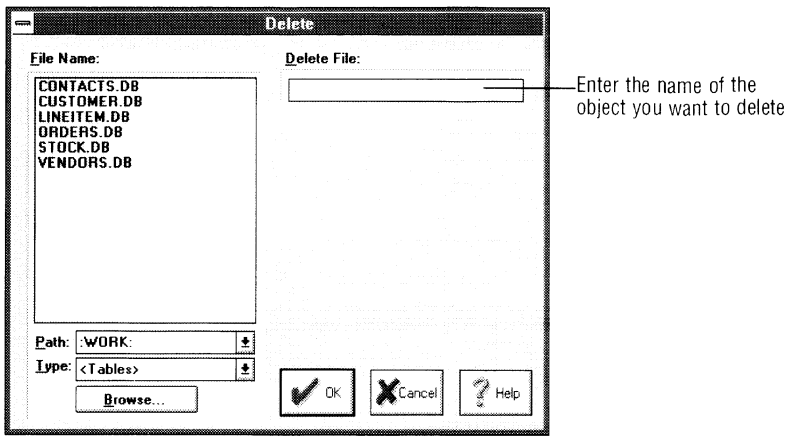
To delete an object, either choose File | Utilities | Delete, or inspect the object's icon in the Folder window or the Browser and choose Delete from its menu.

If you choose Delete from an object icon's menu, Paradox opens a dialog box that asks you to confirm the deletion. Choose Yes to delete the object or No to cancel the operation.

If you choose File | Utilities | Delete, Paradox opens the Delete dialog box, shown in Figure 8-4.

To delete a table, you must first close all windows (including forms, reports, and queries) that display or refer to the table's data

Figure 8-4 The Delete dialog box



All tables in your working and private directories are shown in the File Name list. Use the Type drop-down list to display other object types in the File Name list.

You can use the Path drop-down list or the Browse button to access files in different directories.

Enter the name of the object you want to delete in the Delete File text box. Choose OK to delete it. Paradox displays a message asking you to confirm the deletion. Choose Yes to delete the object or No to cancel the operation.

Note You cannot delete a table that is identified as the parent in a referential integrity relationship. You must first either delete the referential integrity (from the child table), empty the child table, or delete the child table.

Caution Be careful when deleting objects. You can't undo a deletion. Be sure that a table isn't used in any forms, reports, or queries before you delete it. Forms, reports, or queries that depend on the table are *not* deleted when the table is deleted.

Using Delete on a network

When you use Delete to delete a table, Paradox must acquire an exclusive lock on the table. This means

- No user can access the table in any way.
- If there is a lock of any type open on the table, you must wait until it's released before you can use the Delete utility.

Emptying tables

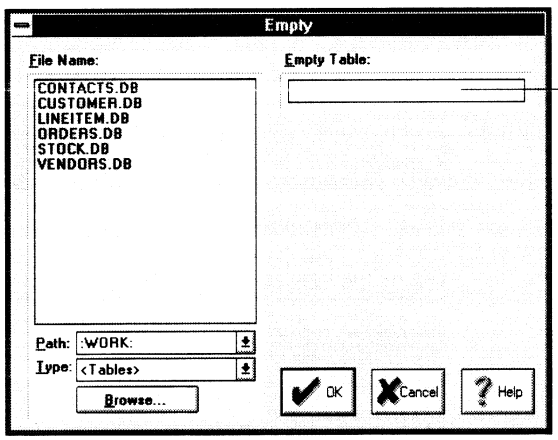
Use the Empty utility to remove all records from a table, leaving the table's structure (including all keys, indexes, validity checks, and so on) intact.

To empty a table, you can

- Choose File | Utilities | Empty. Paradox opens the Empty dialog box, shown in Figure 8-5.
- Inspect the table's icon in the Folder window or the Browser and choose Empty from its menu. Paradox opens the Empty dialog box and places the inspected table's name in the Empty Table text box.
- Open the table in a Table window and choose Table | Empty. Paradox opens a dialog box that asks you to confirm the Empty operation. Choose Yes to remove all records from the table or No to cancel the operation.

Figure 8-5 The Empty dialog box

To empty a table using this dialog box, you must first close all windows (including forms, reports, and queries) that display or refer to the table's data



All tables in your working and private directories are shown in the File Name list. You can use the Path drop-down list or the Browse button to access files in different directories.

Enter the name of the table you want to empty in the Empty Table text box. When you choose OK, Paradox displays a message asking you to confirm the Empty operation. Choose Yes to remove all records from the table or No to cancel the operation.

Note You cannot empty a table that is identified as the parent in a referential integrity relationship. You must first either delete the referential integrity (from the child table) or delete the child table.

Using Empty on a network

When you use Empty, Paradox must acquire an exclusive lock on the table. This means

- No user can access the table in any way.
- If there is a lock of any type open on the table, you must wait until it's released before you can use the Empty utility.

Renaming objects

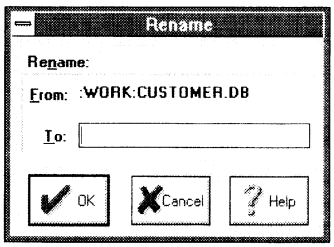
You can rename tables, forms, reports, queries, scripts, or libraries from within Paradox.

Always use the Paradox Rename utility to rename tables. Using the DOS RENAME command or the Windows File Manager may not rename all related files that make up a table (for example, the files containing table's primary index, secondary indexes, validity checks, or BLOB data). The Paradox Rename utility, however, renames all files correctly.

To rename an object, you can

- Open a table in a Table window and choose Table | Rename. Paradox opens the dialog box shown in Figure 8-6. The dialog box shows the table's existing name and provides a text box for you to enter a new name.

Figure 8-6 Choosing Table | Rename

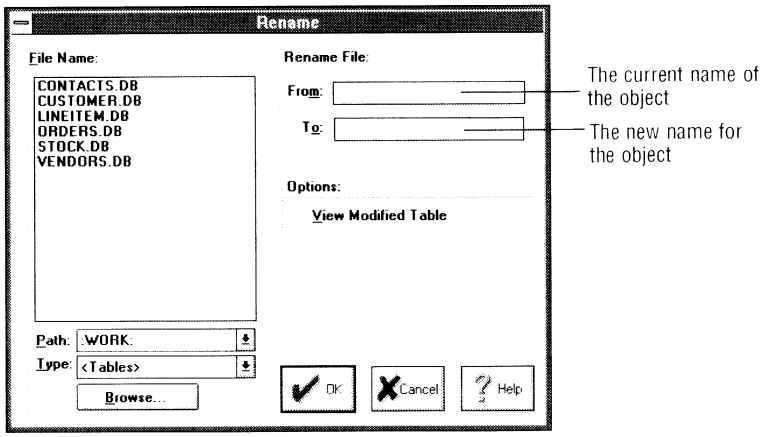


- Choose File | Utilities | Rename. Paradox opens the Rename dialog box shown in Figure 8-7.
- Inspect the object's icon in the Folder window or the Browser and choose Rename from its menu. Paradox opens the Rename dialog

box shown in Figure 8-7 and places the object's name in the From text box of the Rename File panel.

Figure 8-7 The Rename dialog box

To rename a table using this dialog box, you must first close all windows (including forms, reports, and queries) that display the table's data



All tables in your working and private directories are shown in the File Name list. Use the Type drop-down list to display other object types in the File Name list.

You can use the Path drop-down list or the Browse button to access files in different directories.

Enter the object's existing name in the From text box and the new name in the To text box of the Rename File panel. Choose OK to rename the object.

Follow these rules when renaming tables:

- You cannot rename a table to change its type. A Paradox table must be renamed as a Paradox table, and a dBASE table must be renamed as a dBASE table.

  You can copy a table to change its type. See "Copying to a different table type" earlier in this chapter.

- You cannot rename a table that is identified as the parent table in a referential integrity relationship.

- When renaming a table, you can type a full path when you type the table's new name. This both renames the table and moves it to a new location. You can't move other objects (forms, reports, and so on) by renaming them.

Note Be careful when renaming tables. Once renamed, a table can't be found by associated documents. Forms, reports, or queries that refer to a table under one name won't be bound to the table under its new

name. The next time you open an unbound object, Paradox asks you to supply the name of the table to which you'd like it to be bound.

Using Rename on a network

When you use Rename, Paradox must acquire an exclusive lock on the table. This means

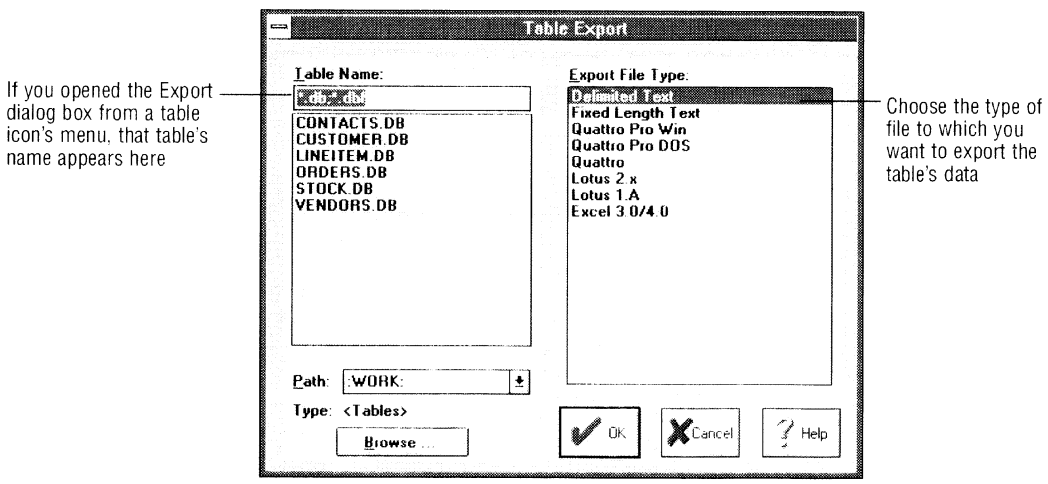
- No user can access the table in any way.
- If there is a lock of any type open on the table, you must wait until it's released before you can use the Rename utility.

Exporting data

You can export data from Paradox tables to different file formats. Using the Export utility, you can transfer data easily between Paradox and other applications. You can export data only to *new* files, not to existing ones.

To export data from your table, choose File | Utilities | Export or inspect a table's icon in the Folder window or Browser and choose Export from its menu. Paradox opens the Table Export dialog box, shown in Figure 8-8.

Figure 8-8 The Table Export dialog box



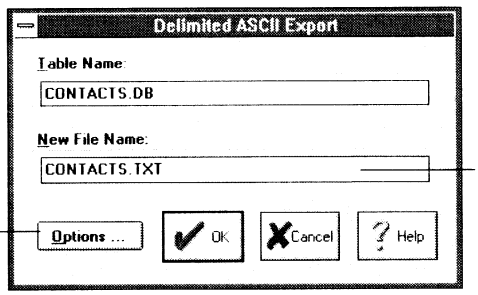
Paradox supports exporting data to any of the file formats shown in the Export File Type list.

Exporting to delimited text

Choose Delimited Text to export a table to an ASCII file in which the table's field values determine the length of the line.

In the Table Export dialog box, choose the table that contains the data you want to export and choose Delimited Text from the Export File Type list. Choose OK. Paradox opens the Delimited ASCII Export dialog box, shown in Figure 8-9.

Figure 8-9 The Delimited ASCII Export dialog box



The *Contacts* table is being exported to the file CONTACTS.TXT. By default, the new file will be placed in your working directory

You can change the directory location or name of the resulting exported text file

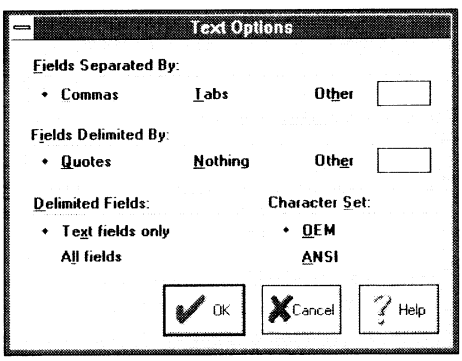
Choose to control how the data will be displayed in the new text file

Delimited ASCII Export options

By default, in the exported file field values are separated by commas, and nonnumeric values are enclosed in double quotation marks (" "). Each record is separated by a carriage return and a linefeed character.

If you want the exported file to display field values differently, choose Options in the Delimited ASCII Export dialog box. Paradox opens the Text Options dialog box, shown in Figure 8-10.

Figure 8-10 The Text Options dialog box



- Use the Fields Separated By panel to choose the character that separates field values in the exported file. You can choose commas, tabs, or choose Other, then enter the character you want to use in the Other text box.

- Use the Fields Delimited By panel to choose the characters that surround values in the exported file. You can choose quotation marks, or choose Nothing if you don't want any characters to enclose the values. If you want to use a different character, choose Other, then enter the character you want in the Other text box.
- Use the Delimited Fields panel to choose whether you want to surround data from *all* field types or only from *text* field types (alphanumeric or character) with quotation marks (or the character you specify in the Fields Delimited By panel).

Note Paradox cannot export memo (Paradox or dBASE), formatted memo, graphic, OLE, or binary field types to delimited text.

- Use the Character Set panel to choose either the OEM or ANSI character set. See Chapter 1 in *Getting Started* for information about character sets.

Choose the options you want and choose OK to return to the Delimited ASCII Export dialog box. Choose OK to export the data.

The result of exporting the *Contacts* table is shown in Figure 8-11.

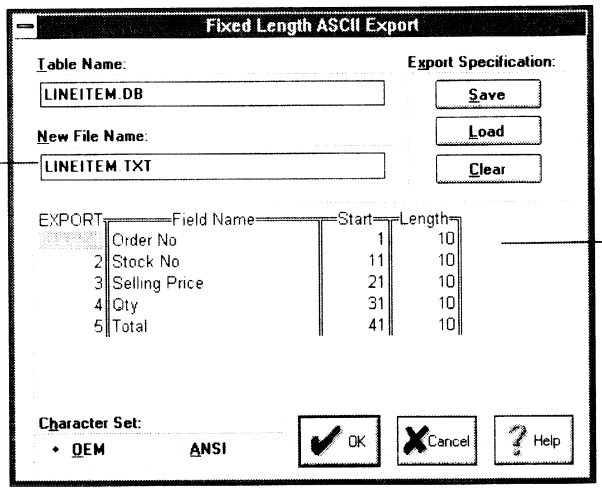
Figure 8-11 The result of exporting to delimited text

Exporting to fixed length text

You can export a table to an ASCII file in which fields of each record are the same length.

In the Table Export dialog box, choose the table you want to export and choose Fixed Length Text from the Export File Type panel. When you choose OK, Paradox opens the Fixed Length ASCII Export dialog box, shown in Figure 8-12.

Figure 8-12 The Fixed Length ASCII Export dialog box



You can change the directory location or name of the resulting exported text file

Use the table to specify the column length you want each field to have in the exported file

When you export to a fixed length text file, Paradox creates the temporary EXPORT.DB table in your private directory. Paradox uses this table as the specification for the layout of the exported file.

In the Fixed Length ASCII Export dialog box, use the *Export* table to define the column length you want each field to have in the exported file. For each field name, enter a Start position (the column in the exported file where you want the field value to begin) and a Length (how many characters you want the field value to display).

You can use the Export Specification panel to work with the *Export* table. You can

- Choose Save to save the *Export* table settings you specify. (Although the *Export* table is deleted when you exit Paradox or change your private directory, Paradox saves the table's settings permanently.)
- Choose Load to load the settings from a previously saved *Export* table.
- Choose Clear to clear the settings displayed in the *Export* table.

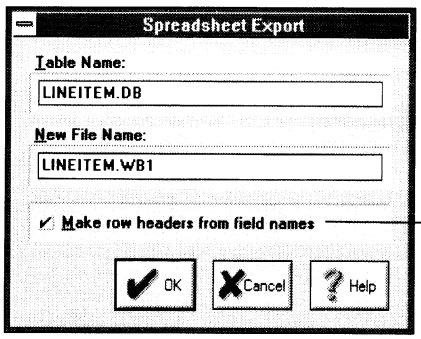
Exporting to a spreadsheet

You can export a table's data to a variety of spreadsheet applications.

In the Table Export dialog box, choose the table you want to export and choose the spreadsheet file format you want from the Export File Type panel.

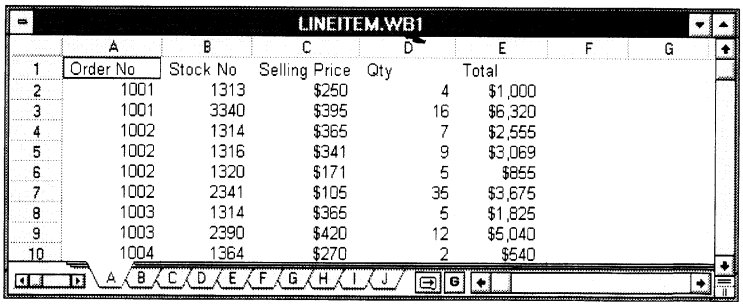
When you choose OK, Paradox opens the Spreadsheet Export dialog box. Figure 8-13 shows the *Lineitem* table being exported to a Quattro Pro for Windows spreadsheet.

Figure 8-13 The Spreadsheet Export dialog box



The result of this export is shown in Figure 8-14.

Figure 8-14 The result of exporting to Quattro Pro for Windows



	A	B	C	D	E	F	G
1	Order No	Stock No	Selling Price	Qty	Total		
2	1001	1313	$250	4	$1,000		
3	1001	3340	$395	16	$6,320		
4	1002	1314	$365	7	$2,555		
5	1002	1316	$341	9	$3,069		
6	1002	1320	$171	5	$855		
7	1002	2341	$105	35	$3,675		
8	1003	1314	$365	5	$1,825		
9	1003	2390	$420	12	$5,040		
10	1004	1364	$270	2	$540		

When you choose a spreadsheet format from the Export File Type panel, Paradox places the appropriate file extension in the New File Name text box of the Spreadsheet Export dialog box. Table 8-5 shows what file extension Paradox uses for each spreadsheet application.

Table 8-5 Spreadsheet file extensions

Choose this format	To use this extension
Quattro Pro Win	.WB1
Quattro Pro DOS	.WQ1
Quattro	.WKQ
Lotus 2.x	.WK1
Lotus1.A	.WKS

Choose this format	To use this extension
Excel 3.0/4.0	.XLS

When you export data to a spreadsheet, Paradox converts each record to a row and each field to a column. If a value is wider than the column display width, the full value is converted but partially hidden.

If a date in the original table is beyond the range of the allowable dates in the spreadsheet, the date is exported as the value ERROR.

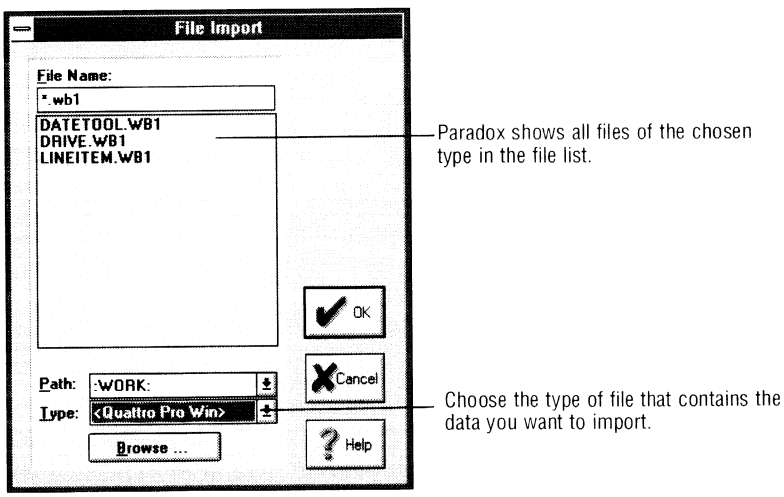
Importing data

Choose Import to import the data from a different file format to a Paradox table. Using Import you can transfer data easily between Paradox and other applications.

You can import only data files, not applications or forms. Data files from other applications can be imported only into *new* tables, not into existing ones.

To import data, choose File | Utilities | Import. Paradox opens the File Import dialog box, shown in Figure 8-15.

Figure 8-15 The File Import dialog box



Paradox lets you import data from the following file formats:

- Delimited text
- Fixed length text

- Quattro Pro for Windows
- Quattro Pro (DOS)
- Quattro
- Lotus 2.x and 1.A
- Excel 3.0/4.0

Use the Type drop-down list to choose the file format you want to import the data from. All files of that format in the working directory appear in the file list.

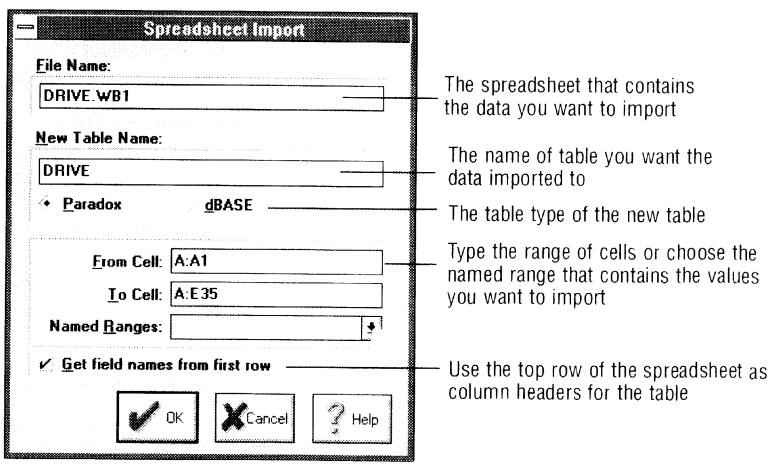
If the file you want to import is not located in the working directory, you can enter the file name (including the full path) in the File Name text box. Or you can use the Path list or the Browse button to choose a different directory.

Choose the source file you want and choose OK. What you see depends on the type of file you chose to import data from.

Importing from spreadsheets

If you choose to import data from any of the supported spreadsheet formats, you'll see the Spreadsheet Import dialog box, shown in Figure 8-16.

Figure 8-16 The Spreadsheet Import dialog box



Determining field types

When you import data from a spreadsheet, Paradox automatically assigns a field type to each column of data. Table 8-6 shows how Paradox determines a field's type.

Table 8-6 Spreadsheet field type conversions

Spreadsheet value	Paradox field type	dBASE field type
Labels	Alphanumeric	Character
Numbers (integers)	Short number	Float number (5,0)
Numbers (with decimal places)	Numeric	Float number (20,4)
Numbers (formatted as currency)	Currency	Float number (20,4)
Numbers (formatted as dates)	Date	Date

These rules determine which category a column falls into:

- Any column that contains a label (text) cell is converted to an alphanumeric field (or character field if you import to a dBASE table).
- A column containing both dates and numbers is converted to an alphanumeric field (or character field if you import to a dBASE table).
- A column containing only values that are formatted as currency is converted to a currency field in a Paradox table.
- A column containing both currency and number values is converted to a number field.

As a result of these conversion rules, Paradox often imports numbers in unedited spreadsheets as alphanumeric fields. For example, spreadsheet columns often have rows of hyphens separating sections of numbers. Since only an alphanumeric field can contain both the numbers and hyphens, the column is converted to an alphanumeric field even though it contains mostly numbers.

In Paradox, you can select only a specific block in the spreadsheet to import. In the Spreadsheet Import dialog box, enter the range you want in the From Cell and To Cell text boxes, or choose a named range of cells from the Named Ranges list. (Named ranges are available only if you create them in the source spreadsheet.)

To avoid conversion problems, edit the spreadsheet before importing it. This eliminates any ambiguities. Follow these steps:

1. Remove extraneous entries (such as hyphens, asterisks, and exclamation points).
2. Make sure each column contains only one kind of data and uses only one formatting option.

3. Place column titles in the top row of the selected range, because Paradox uses the first row that contains text to generate field names. (If there are no column titles on the spreadsheet, uncheck the Get field names from first row check box in the Spreadsheet Import dialog box.)

If the table doesn't have the format you want after you import it, you can restructure it in Paradox.

Determining field names

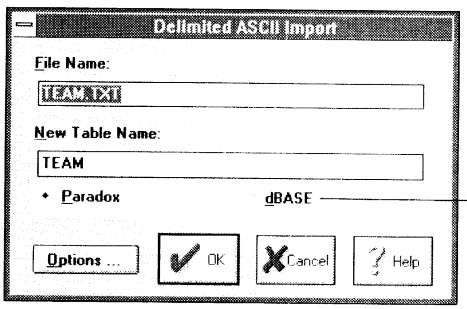
Paradox uses the first row of imported data that contains text to determine field names. If Paradox can't determine a field name from the imported file, it generates new field names beginning with the name FIELD001. Additional new field names are numbered (FIELD002, FIELD003, and so on).

If more than one field seems to have the same name, Paradox numbers the duplicate fields (for example, Customer1 and Customer2).

Importing delimited text

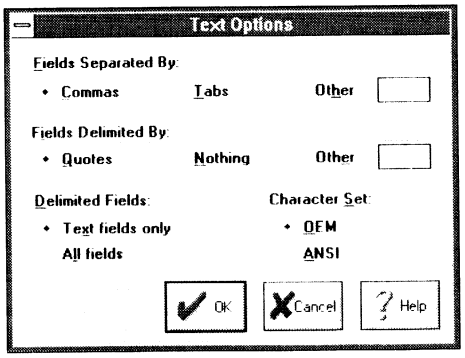
If you want to import data from a delimited text file, choose the file you want in the File Import dialog box, and choose <Delimited Text> from the Type drop-down list. Paradox opens the Delimited ASCII Import dialog box, shown in Figure 8-17.

Figure 8-17 The Delimited ASCII Import dialog box



By default, Paradox expects the fields in the ASCII file to be separated by commas, with quotation marks surrounding each text field. You can tell Paradox how to interpret the file by choosing Options in the Delimited ASCII Import dialog box. Paradox opens the Text Options dialog box, shown in Figure 8-18.

Figure 8-18 The Text Options dialog box



- Use the Fields Separated By panel to identify the character that separates field values in the source file.
- Use the Fields Delimited By panel to identify the characters that surround values in the source file.
- Use the Delimited Fields panel to choose whether you want to delimit all possible fields from the source file or only text fields with quotation marks (or the character you specify in the Fields Delimited By panel).
- Use the Character Set panel to choose either the OEM or ANSI character set. See Chapter 1 in *Getting Started* for information about character sets.

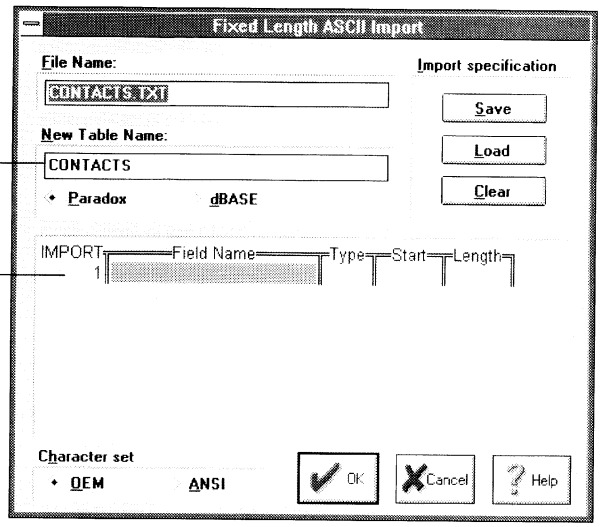
When you import a delimited text file, Paradox scans the file to determine the number of fields and the field types the file contains. Paradox then creates a new table, using the name you entered in the New Table Name text box of the Delimited ASCII Import dialog box, and imports the data into it.

Paradox trims strings longer than 255 characters. It stores these as alphanumeric 255 fields.

Importing fixed length text

When you choose <Fixed Length Text> from the Type drop-down list in the File Import dialog box, Paradox opens the Fixed Length ASCII Import dialog box, shown in Figure 8-19.

Figure 8-19 The Fixed Length ASCII Import dialog box



Enter the name you want the new table to have in the New Table Name text box.

Choose whether the new table is created as a Paradox or a dBASE table.

When you import a fixed length text file, Paradox creates the temporary IMPORT.DB table in your private directory. In the Fixed Length ASCII Import dialog box, use the *Import* table to define the field names and types of the fields in the new table. For each field name, enter a Start position (the column where you want the field value to begin) and a Length (the field size).

You can use the Import Specification panel to work with the *Import* table. You can

- Choose Save to save the *Import* table settings you specify. (Although the *Import* table is deleted when you exit Paradox or change your private directory, Paradox saves the table's settings permanently.)
- Choose Load to load the settings from a previously saved *Import* table.
- Choose Clear to clear the settings displayed in the *Import* table.

When you finish specifying the structure of the new table, choose OK. Paradox imports the data from the source to the new table you named in the New Table Name text box of the Fixed Length ASCII Import dialog box.

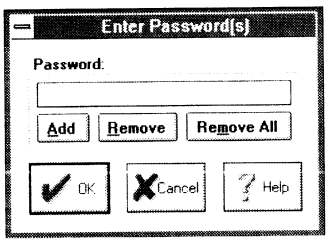
Using passwords

You can define passwords for your tables from the Create Table or Restructure Table dialog boxes (see Chapter 9). When you try to open a password-protected table, Paradox prompts you for the password. You must enter the password to open the table.

Suppose you close the table, then attempt to open it again. If you haven't exited Paradox, you'll be allowed to open the table *without* giving the password another time. Paradox stores the fact that you've accessed the table once and assumes you're allowed to open the table again. Paradox releases all passwords when you exit the program.

If you want to release a password *without* exiting Paradox, choose File | Utilities | Passwords. You'll see the Enter Password(s) dialog box, shown in Figure 8-20.

Figure 8-20 The Enter Password(s) dialog box



You don't create passwords from this dialog box; you allow or remove access to a password-protected table.

Enter the password you want to release from Paradox's memory in the Password text box. Asterisks (*) represent the characters you type. Choose Remove to remove this password from Paradox's memory. You'll be required to give the password the next time you open the table.

You can choose Remove All to remove all passwords from Paradox's memory. This means *any* table you've opened using a password, then closed, will again be protected. (Tables that are still open are not affected.)

You can enter a password once to access several protected tables.

If you've assigned the same password to several tables, you can use the Enter Password(s) dialog box to give Paradox the password once to access all applicable tables. Type the password and choose Add or OK (or press *Enter*).

Getting table information

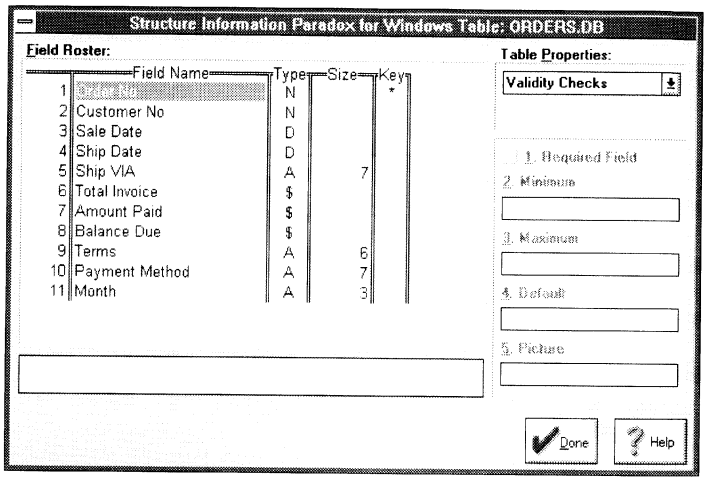
Paradox provides an easy way to get information about a table.

You can either choose File | Utilities | Info Structure or inspect a table's icon in the Folder window or the Browser and choose Info Structure from its menu.

Paradox opens the Structure Information dialog box, which shows the table's structure, as well as any key, validity check, index, table lookup, or referential integrity information.

Note You can't make changes to the table's structure from the Structure Information dialog box; you must choose Restructure for that. Restructuring tables is discussed in Chapter 9.

Figure 8-21 The Structure Information dialog box



Use the Table Properties drop-down list to view information about the table.

- *Validity Checks* shows each field's defined validity checks. Move through the fields in the Field Roster to see each one's validity checks.
- *Table Lookup* shows any tables that this table uses as a lookup table.
- *Secondary Indexes* shows all the table's secondary indexes.
- *Referential Integrity* shows whether this table refers to a parent table for valid data.
- *Table Language* shows the table's language driver.
- *Dependent Tables* shows any table that this table recognizes as a child in a referential integrity relationship.

If you choose Info Structure for a dBASE table, the Table Properties list shows only the table's indexes.

Choose Done to close the Structure Information dialog box when you're finished viewing the table's structure.

PART III

Creating new objects

In this part you'll learn how to create tables and how to create forms and reports to display data.

- Chapter 9, "Creating and restructuring tables," shows how to create tables using Paradox. You'll see how to structure the fields and table properties to give you exactly the functionality you need.
- Chapter 10, "Creating design documents," introduces you to the basics of creating forms and reports.
- Chapter 11, "Design tools and techniques," discusses the aspects of form and report design that are common to both types of documents.
- Chapter 12, "Designing forms," shows you how to work with objects in the Form Design window to create exactly the form you want.
- Chapter 13, "Designing reports," shows you how to work with objects in the Report Design window to create the printed output you need.
- Chapter 14, "Using crosstabs and graphs," discusses how to take advantage of Paradox's most powerful analytical tools, the crosstab and the graph, in your design documents.

CHAPTER 9

Creating and restructuring tables

Tables are Paradox's building blocks—everything you do in Paradox affects or is affected by tables. This is true even if you do your data entry and editing in a form.

This chapter discusses how to create and restructure both Paradox and dBASE tables. You'll learn how to define field names, types, and sizes.

If you need information on how to manipulate table objects or change table properties, see Chapter 4. If you need information on using tables to enter or edit data, see Chapter 5.

Creating tables

Planning is the first step in creating a table. You need to decide what you want the table to contain and how you want to lay it out. When you plan a table, keep these thoughts in mind:

- *Avoid repeating fields.* This allows for more flexible data maintenance and more straightforward querying. This is where designing a database table differs from designing a spreadsheet.

  If you ever want to see your data in a spreadsheet-like format, you can create a *crosstab* of your table's data. (See Chapter 14 for information on creating crosstabs.)

- *Be complete.* Try to include fields for all the information you think you'll need, but don't clutter the table with information you don't need. If you discover later that you need another field, you can add it then.

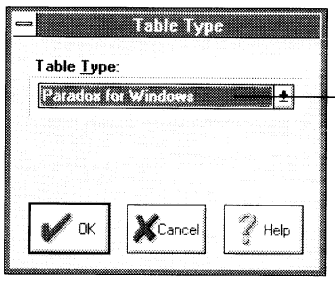
- *Use small tables.* If you have a great deal of information to organize, it's generally better to put it in several small, related tables rather than in one all-encompassing table.

- *Keep your tables familiar.* It's often best to create tables that correspond to the kinds of objects–like forms and files–you already use.
- *Avoid redundancy.* Beyond the common fields necessary for linking tables, don't duplicate information in different tables.
- *Consider what you need.* Because you can easily create either Paradox tables or dBASE tables, weigh the advantages of each. For example, dBASE offers the logical field type while Paradox offers formatted memo, graphic, and OLE field types. Determine what your needs are before you choose a table type.

Choosing a table type

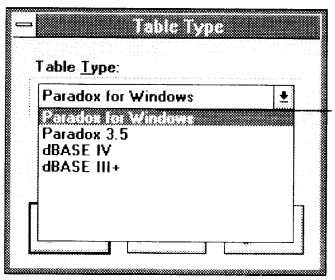
To create a new table, choose File | New | Table, or right-click the Open Table SpeedBar button and choose New. Paradox displays the Table Type dialog box, shown in Figure 9-1.

Figure 9-1 The Table Type dialog box



Paradox supports several Paradox and dBASE file formats. To choose a table type different from Paradox for Windows, click the drop-down arrow and choose the type you want from the list.

Figure 9-2 Table types



Creating a Paradox table

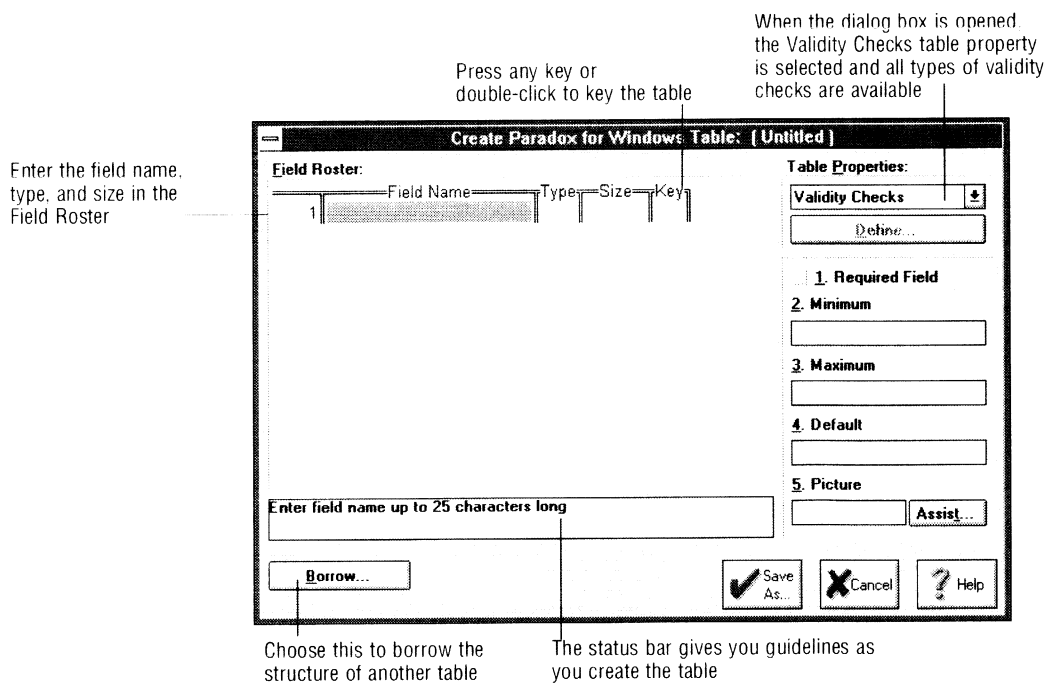
When you choose the Paradox for Windows table type from the Table Type dialog box, you'll see the Create Table dialog box shown in Figure 9-3. Use this to

- Name the fields of the table
- Specify field types and sizes

Additionally, you can

- Specify a key for the table
- Define validity checks for individual fields
- Specify a table language
- Assign secondary indexes to the table
- Establish a table lookup to another table
- Define referential integrity with another table
- Specify password security for the table or individual fields

Figure 9-3 The Create Table dialog box



Example 9-1 Creating a simple Paradox table

Suppose you want to create a simple, unkeyed table.

1. Type the name of the first field in the Field Name column of the Field Roster. Rules about field names are discussed later in this section.
2. Move to the Type column.

   You can move among the columns of the Field Roster by pressing ***Tab***, ***Shift+Tab***, or ***Enter***, or by using the arrow keys or the mouse. Paradox automatically skips over any columns that are not required.
3. Press ***Spacebar*** or right-click the Type column to display a list of field types. Type the symbol for the field type you want. Field types are discussed later in this section.
4. Move to the Size column and type an appropriate field size (if a size is required). Refer to Table 9-1 for information on field sizes.
5. Press ↓. Repeat the above steps until you've specified as many fields as you want.
6. Choose Save As to name and save the table.

Defining fields

Use the Field Roster to define the fields of the new table. You can use the mouse, arrow keys, ***Enter***, ***Tab***, or ***Shift+Tab*** to move among the columns. (***Shift+Tab*** moves backwards.) As you move, a status message at the bottom of the dialog box prompts you for valid entries. A vertical scroll bar appears in the Field Roster if there are more fields than Paradox can display.

Field names

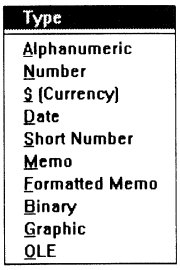
Type field names in the Field Name column of the Field Roster. The following list gives you some rules for naming fields.

- The maximum length of a field name is 25 characters.
- A field name can't start with a blank space (unless it's enclosed in quotation marks), but it can contain blank spaces.
- Each field name in a table must be unique. (You can't have two identical field names.) You can't make a name unique by
  - Adding a blank space at the end of the name
  - Changing the capitalization of the name
- A field name shouldn't contain these characters:
  - Square brackets [ ], curly braces { }, or parentheses ( )
  - The combination –>
  - # by itself (you can combine # with other characters, as in the field name Phone #)

Paradox field types and sizes

A field's type determines the kind of data you can enter in it.

To specify a field type, position the insertion point in the Type column of the field list, and use one of these methods:



- Right-click or press *Spacebar* in the type column to display a menu of types. Choose the type you want.
- Type the appropriate symbol (refer to Table 9-1 for type symbols).

The following table lists each field type's symbol and size constraints, if any. Field types are discussed in detail in Chapter 2.

Table 9-1 Paradox field types

Field type	Symbol	Size values
Alphanumeric	A	1–255 (required)
Number	N	None
Short number	S	None
Currency	$	None
Date	D	None
Memo*	M	1–240 (required, see Memo Note)
Formatted memo*	F	0–240 (optional, see Memo Note)
Graphic*	G	0–240 (optional)
OLE*	O	0–240 (optional)
Binary*	B	0–240 (optional)

* Memo, formatted memo, graphic, OLE, and binary fields are referred to as binary large object fields (BLOB fields). BLOB fields are not available in Paradox 3.5 tables.

Memo note

Memo and formatted memo fields can be virtually any length. The size value you specify in the Create Table dialog box refers to the amount of the memo Paradox stores in the table. This can be from 1 to 240 characters. The whole memo is stored outside the table. For example, if you assign a size value of 45 to the field, Paradox stores the first 45 characters in the table. It stores the whole memo field in another file (with the extension .MB) and retrieves it as you scroll through the records of the table.

If all your memos are smaller than a given size (for example, 200 characters), you can save space and time by setting the memo field size to be equal to or larger than this given size. You'll still have an .MB file, but Paradox won't have to access it to display the field's data.

Inserting fields

To insert a field between two existing fields in the Field Roster, select the field you want to be below the new row, and press *Ins*. Paradox opens a blank row above the selected field.

Deleting fields

To delete a field from the Field Roster, select it and press *Ctrl+Del*. Paradox deletes the entire row.

Note You must delete any blank row in the Field Roster before saving the table's structure.

Keys in Paradox tables

This section describes keys and applies only to Paradox tables.

A table's key establishes the primary index and sort order for the table. A key also requires each value in the field(s) that defines the key to be unique. For example, if the Customer No field is identified as the key of *Customer*, each value in the Customer No field must be unique. Likewise, if the Order# and Stock# fields are identified as the key of *Lineitem*, the field values (taken as an ordered group) must be unique. This guards against duplication of data within the table.

Keys are required for linking tables and for using Paradox's data integrity features. See Chapter 2 for general information about keys, composite keys, and indexes.

Defining keys

Remember these rules when defining keys:

- A table can have only one key. This key can be made up of one or more fields.
- A table's key must be the first field in the Field Roster.
- If you identify more than one field as keyed, you create a *composite* key. These fields, taken as a group, must be unique for each record of the table. The composite key must begin on the first field in the Field Roster.

You can always move a field to a different position in the Field Roster to create the field arrangement you want. See "Changing the order of fields" later in this chapter.

To create a key, move to the Key column in the Field Roster and double-click (or press any key). The key field indicator (*) appears. Paradox keys the table on the selected field.

Removing keys

To remove a key from a field or group of fields, move to the Key column in the Field Roster and double-click (or press any key). Paradox removes the key, and the key field indicator (*) disappears.

If you remove a key that is located above other keyed fields, you must rearrange the files so that the roster begins with the keyed fields.

Borrowing an existing table structure

Sometimes you might want to create a new table that is similar (or identical) in structure to an existing table. You can borrow the structure from the existing table and change it to meet your needs.

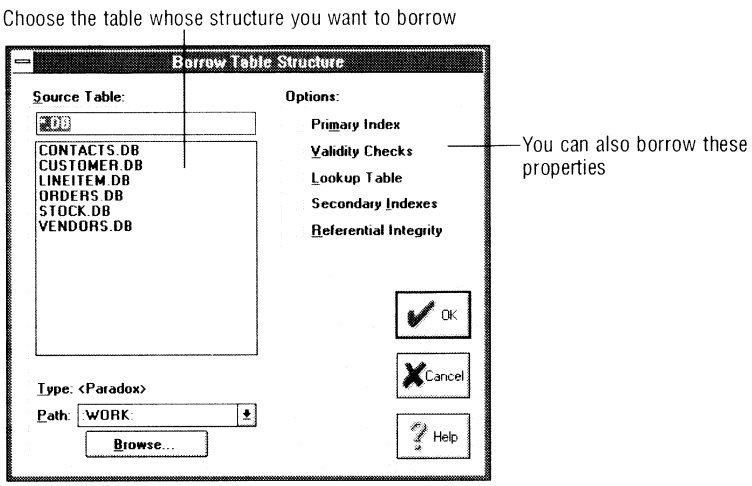
Note You can choose Borrow only when the Field Roster is blank.

Example 9-2 Borrowing an existing table's structure

To borrow the structure of an existing table,

Borrow...

1. Choose Borrow from the Create Table dialog box. You'll see the Borrow Table Structure dialog box.



2. Choose the table whose structure you want to borrow.
3. Choose the options (if any) you want to borrow along with the table.
4. Choose OK to return to the Create Table dialog box. The borrowed table's structure appears in the Field Roster.

Borrow options

In addition to borrowing the structure of a table, you can also borrow its primary or secondary indexes, its validity check definitions, its referential integrity, its table lookup definitions, or any combination of these options. Use the Options panel to check the definitions you want to borrow with the table.

Note If you borrow a table's key (the Primary Index option) you must make sure that the keyed field is the first field in the new table's Field Roster.

Editing a field name

You can change a field name after you've typed it. Position the insertion point anywhere in the field name. Either double-click the field name or press *F2* to position the insertion point within existing text. Press *Backspace* to delete the characters to the left of the insertion point, or *Del* to delete the character to the right of the insertion point.

To replace an entire field name, select the name you want. The entire field is highlighted. Begin typing to replace the old name with the new one.

Changing the order of fields

To change the field order in the table, click the row number of the field. A line appears above or below the field (depending on which direction you drag the field). Drag the field to its new location. The line indicates where Paradox will insert the field when you release the mouse button.

Note The field or fields that make up a key or composite key must occur first in the table's structure.

Specifying validity checks

Validity checks are rules that govern the values you can enter in a field. This section describes validity checks and applies only to Paradox tables.

Paradox's five types of validity checks are listed in Table 9-2. Each of them is further described later in this chapter.

Table 9-2 Paradox validity checks

Validity check	Meaning
Required Field	Every record in the table must have a value in this field.
Minimum	The values entered in this field must be equal to or greater than the minimum you specify here.
Maximum	The values entered in this field must be less than or equal to the maximum you specify here.
Default	The value you specify here is automatically entered in this field. You can replace it with another value.
Picture	You specify a character string that acts as a template for the values that can be entered in this field. The values entered in this field are automatically formatted according to this picture.

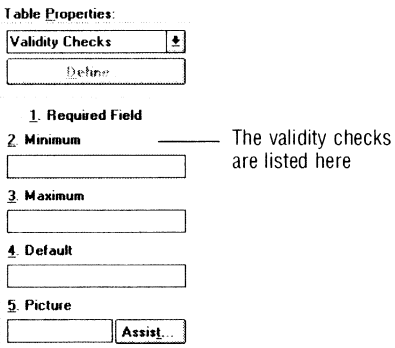
Defining the valid value

To place a validity check on a field, first select the field in the Field Roster. The field must have a name, type, and size (if size is required for the field type). Choose Validity Checks from the Table Properties list. All possible validity checks appear in the Create Table dialog box. Type values as necessary to specify the type of validity check you want on the field. You can have any combination of validity checks on a field.

Example 9-3 Specifying a Default validity check

Suppose you want the default value in the State/Prov field of the *Customer* table to be CA. To specify this default validity check,

1. Choose Validity Checks from the Table Properties list.



2. Select the State/Prov field in the Field Roster.
3. Type **CA** in the Default text box.

When you insert a new record in the table, Paradox automatically enters the value CA in the State/Prov field. (You can move to the field and edit the value if you want.)

When you save the table, Paradox saves validity checks in a file with the table's name and the .VAL file extension.

Viewing a field's validity checks

Paradox displays each field's existing validity checks whenever you select the field in the Field Roster. For example, if you've specified a default value for the State/Prov field, select State/Prov in the Field Roster to view its validity checks.

You can always view the validity checks on a table from the Structure Information dialog box. Choose File | Utilities | Info Structure from the Desktop, or inspect a table's icon in the Browser or Folder window and choose Info Structure, or you can choose Table | Info Structure from a table's window.

Clearing a validity check

You can remove validity checks using either the Create Table or the Restructure Table dialog boxes. (The Restructure Table dialog box is discussed later in this chapter.)

Clearing a validity check doesn't change any data that exists in the field. It simply removes validity restrictions on future data you enter.

Example 9-4 Removing a validity check

To remove a field's validity check,

1. Select the field in the Field Roster.
2. Remove the value from the validity check's text box. (To clear the Required Field validity check, uncheck its check box.)

Required fields

A required field *must* contain data before you can move off the record. To identify a field as required, select it in the Field Roster and check the Required Field check box.

Example 9-5 Creating a required validity check

If you want the Customer No field of the *Customer* table to be required,

1. Select Customer No in the Field Roster.
2. Check Required Field.

Once the required field is specified, if you enter a record in the *Customer* table that doesn't have a value in the Customer No field, Paradox informs you that the validity check has failed. You can't move off the record or leave Edit mode until you've entered a value in the required Customer No field.

You can place a required validity check on any field type, including BLOB fields.

Minimum and maximum values

Use a minimum validity check to define the minimum allowable value for a field. Use a maximum validity check to define the maximum allowable value for a field.

Example 9-6 Defining minimum and maximum validity checks

Suppose you want the minimum quantity possible in the Qty field of the *Lineitem* table to be one, and the maximum quantity possible to be 100.

1. Choose Validity Checks from the Table Properties list (if it isn't already displayed).
2. Select the Qty field in the Field Roster.
3. Type **1** in the Minimum text box.
4. Type **100** in the Maximum text box.

When you enter data in *Lineitem's* Qty field, Paradox won't accept a value outside the range of 1 to 100.

When you define a numeric minimum or maximum, you must use the number format currently selected in the Windows Control Panel. During data entry, however, you can use any format and the validity check still works.

You can use minimum and maximum validity checks only for alphanumeric, number, short number, currency, and date field types.

Default values

Paradox automatically enters the value you define as a field's default in each record of the table as soon as you insert the record. For example, if most of your customers are located in the United States, you can define US as the default value for the Country field in *Customers*. When you insert a new record, it appears with the value US already in the country field. An example of creating a default validity check is shown in Example 9-3.

You can override the default value by moving to the field and typing a different value. You can remove the default value and leave the field blank if you want (unless it also has a required validity check).

When you enter numeric values as a default, you must use the number format currently selected in the Windows Control Panel.

You can use default value validity checks only for alphanumeric, number, short number, currency, and date field types.

Picture patterns

A picture acts as a template that formats the value you enter in a field. For example, if you specify the picture (###)###-### (a common template for U.S. phone numbers) and enter the value **4085551234**, Paradox formats the value into (408)555-1234.

Table 9-3 shows the characters you can use in a picture and their meanings.

Table 9-3 Picture pattern characters

Character	Stands for
#	Any numeric digit
?	Any letter (case-insensitive)
&	Any letter (convert to uppercase)
@	Any character (case-insensitive)
!	Any character (convert to uppercase)
;	The next character is literal, not a special picture-string character
*	The next character can be repeated any number of times. Or, specify how many occurrences of the next letter to require.
[ ]	Characters inside brackets are optional
{ }	Characters inside braces are grouped
,	Alternative values

If you use any printable (visible) character in a picture string different from those listed in Table 9-3, Paradox treats it as a constant. When you enter a value in a field that has a picture validity check, and you

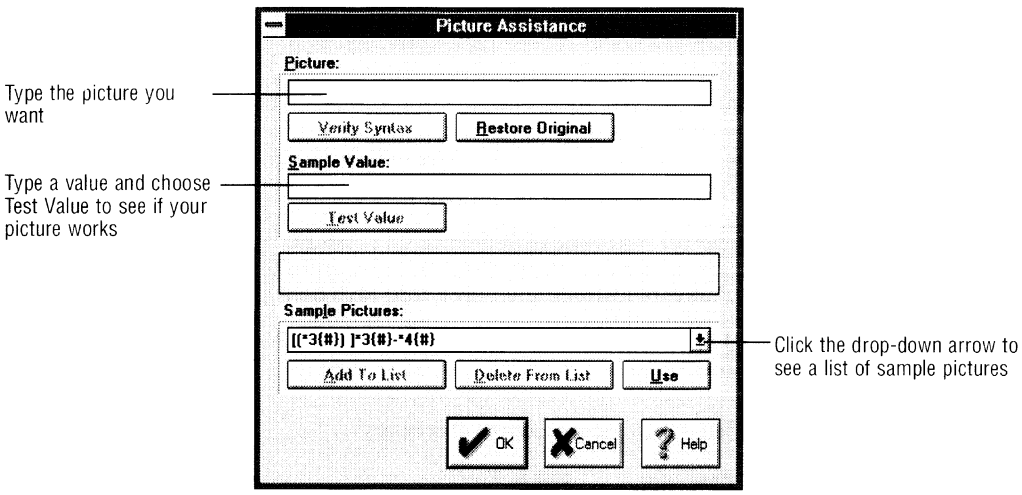
come to a point at which a constant is specified, Paradox automatically enters the constant. For example, if you create the picture (408)###-#### and then type **5551234** in the field, Paradox inserts (408)555-1234 in the table.

To specify a picture for a field, either type the picture pattern you want in the Picture text box or choose Assist.

Getting assistance with pictures

When you choose Assist in the Create Table or Restructure Table dialog box, you'll see the Picture Assistance dialog box, shown in Figure 9-4.

Figure 9-4 The Picture Assistance dialog box



When you use the Picture Assistance dialog box, you can

- Type a custom picture pattern in the Picture text box.
- Choose Verify Syntax to test the picture you type in the Picture text box.
- Choose Restore Original to undo any changes you've made to the contents of the Picture text box.
- Type a value in the Sample Value text box and choose Test Value to verify that the picture in the Picture text box works correctly.
- Click the Sample Pictures drop-down arrow to view the sample pictures provided by Paradox. Paradox displays an explanation of the picture in the panel above the Sample Pictures drop-down list.
- Choose Add To List to place the contents of the Picture text box on the Sample Pictures drop-down list.

- Choose Delete From List to remove the selected picture from the Sample Pictures drop-down list.
- Choose Use to copy the selected sample picture to the Pictures text box, where you can modify it.

You can get assistance with pictures you create or with standard pictures Paradox provides.

Example 9-7 Specifying your own picture

To enter your own picture,

1. Use characters and the symbols shown in Table 9-3 to type the picture you want in the Picture text box.
2. Choose Verify Syntax to ensure that Paradox can interpret the picture.
3. If the syntax is correct, you'll see a message displayed in the message area of the Picture Assistance dialog box confirming that the picture is correct.
4. Choose OK to use the picture and close the dialog box.

Example 9-8 Using a sample picture

Paradox provides several standard pictures, available from the Picture Assistance dialog box. To use one of these,

1. Choose a picture from the Sample Pictures drop-down list. You'll see an explanation of the picture in the message area of the dialog box. For example, if you choose the picture 5#[-4#], you'll see a message telling you that this picture is for either a 5-digit or a 9-digit US zip code.
2. Choose Use to copy the sample to the Picture text box.

   If you want, you can modify the standard template when it's in the Picture text box. If you make a mistake, choose Restore Original to return to the standard template you copied to the Picture text box.
3. When the picture you want is in the Picture text box, choose OK.

Note If you create a picture validity check when restructuring a table that contains data, Paradox does not reformat existing data to match the picture.

Creating table lookup

This section describes table lookup and applies only to Paradox tables.

Table lookup helps you enter data in one table that already exists in another table—the *lookup* table. Table lookup lets you

- Require that the values you enter into a field exist in the first field of another table

- Refer to another table to look up the acceptable values for a field
- Automatically copy values in the lookup table to the table you are editing

What is the difference between table lookup and referential integrity?

Table lookup is primarily a data entry tool. Unlike referential integrity, it doesn't track or control changes you make to the lookup table. Table lookup ensures that data is copied accurately from one table to another; referential integrity ensures that the ties between data in separate tables cannot be broken. Referential integrity is discussed later in this chapter.

Why use table lookup?

The major advantage of table lookup is its ability to automatically enter correct values in your table. Table lookup is also valuable when you need to use Paradox 3.5 tables, because referential integrity is unavailable to them.

For information on using table lookup to enter data, see Chapter 5.

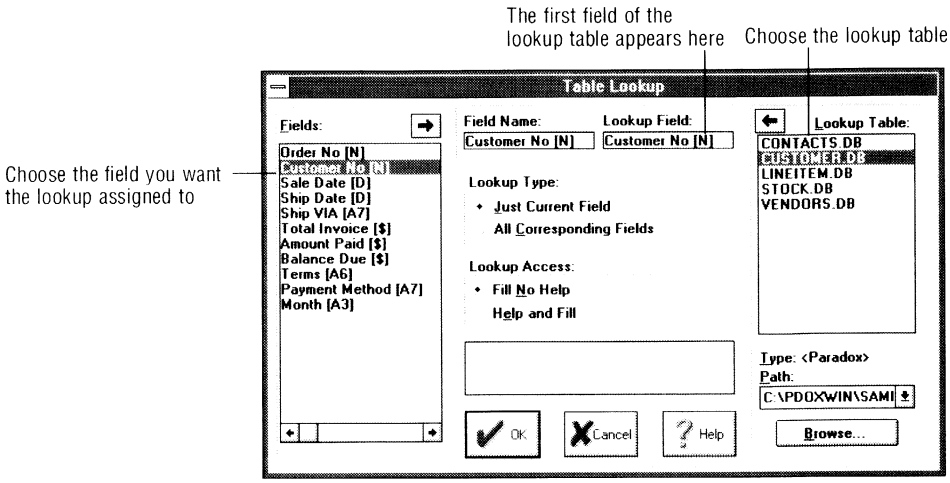
Keep these rules in mind when setting up a lookup table:

- The lookup table contains data you want to copy to another table.
- The data you want to access in the lookup table must be in its first field.
- The field that you're assigning the table lookup to must be the same field type as the first field of the lookup table.
- For best performance, the lookup table should be keyed. See "Keys in Paradox tables" earlier in this chapter.

Example 9-9 Defining a table lookup

To specify a lookup table for a field,

1. Choose Table Lookup from the Table Properties list. The Define button becomes available, and all existing table lookups are listed below it.
2. Choose Define to open the Table Lookup dialog box.



3. Choose the lookup table from the Lookup Table list. (All tables in the working directory are shown.) The first field of the table you choose appears in the Lookup Field text box.
4. From the Fields list, choose the field that will look to the lookup table. Paradox places it in the Field Name text box.
5. Choose the lookup options you want.
6. Choose OK to close the Table Lookup dialog box. The name of the lookup table appears below the Define button in the Create Table (or Restructure Table) dialog box.

Note You can use a table lookup across different directories. Use the Path drop-down list or the Browse button.

Lookup options

Paradox provides two types of table lookup:

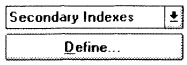
- *Just Current Field*: The value in the current field is the only value from the lookup table that Paradox checks or fills in for you.
- *All Corresponding Fields*: Paradox checks the field on which the table lookup is defined and fills values in all fields that match fields in the lookup table. Corresponding fields must have *identical field names* and compatible field types in both tables.

Paradox provides two options for access to the lookup table. These determine whether you can view the lookup table when editing.

- *Help and Fill*: You can view the lookup table from the table you're editing.
- *Fill No Help*: You can't view the lookup table from the table you're editing.

When the lookup access is Fill No Help, you can't open the lookup table automatically. You can, however, view the lookup table by opening it in its own Table window.

Defining secondary indexes



You can assign a secondary index to a field or group of fields to

- Locate values in the specified fields
- Provide a second view order for the table
- Link tables

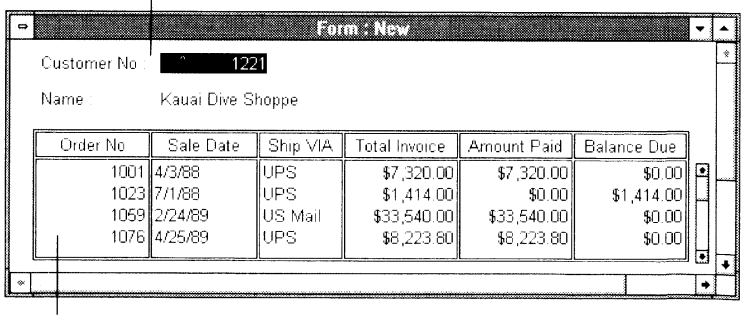
To view the records of a keyed table in a different order, you *must* use a secondary index. Only a secondary index can temporarily override the primary sort order established by a table's key.

An example of the use of a secondary index is to link the *Customer* and *Orders* tables so you can see the orders that each customer has placed. The *Orders* table has a secondary index identified on its Customer No field. This means Paradox can quickly find all the records with a given Customer No value. When you link the tables, Paradox identifies each Customer No value in *Customer*, then finds and displays all matching Customer No values in *Orders*. Using this linked relationship, you can create a form that lists each customer's orders, like the one shown in Figure 9-5.

Figure 9-5 A linked table relationship

These fields are from the *Customer* table. They indicate which customer's orders are displayed.

In this multi-table form, the *Customer* and *Orders* tables are linked by their Customer No fields. As you scroll through *Customer* records, Paradox displays each customer's orders.



These fields are from the *Orders* table. Paradox displays only records that match the current Customer No value.

For more information on using secondary indexes to link tables in design documents, see Chapter 10.

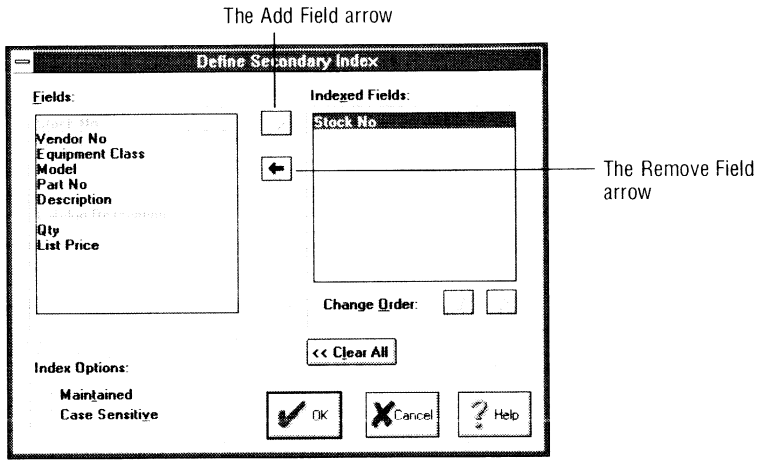
A table can have more than one secondary index. You can also create composite secondary indexes by combining two or more fields. You can create up to 16 composite secondary indexes, and as many single-field indexes as there are fields in a table.

Note You can't create a secondary index on a memo, formatted memo, binary, OLE, or graphic field.

Example 9-10 Creating a secondary index

To create a secondary index for a table,

1. Choose Secondary Index from the Table Properties list of the Create Table (or Restructure Table) dialog box. The Define button becomes available and any existing secondary indexes are displayed.
2. Choose Define to open the Define Secondary Index dialog box.



   The Fields list displays the fields you can use as a secondary index. BLOB fields are dimmed.
3. Double-click the field on which you want to create the secondary index (or select it, and then choose the Add Field arrow or press ***Alt+A***). Paradox moves the field to the Indexed Fields list.
4. Check any options you want. Index options are discussed later in this section.
5. Choose OK to create a secondary index on the field and close the dialog box.

Paradox automatically names indexes you create on a single field with the field's name and lists them in the box below the Define button in the Create Table (or Restructure Table) dialog box. To create another secondary index, choose Define again.

The Maintained option

If you check the Maintained check box in the Define Secondary Index dialog box, Paradox maintains the secondary index automatically. This means every time the table is changed, the index is updated. This speeds up certain operations like queries. Also, you can link

Paradox tables in form and report data models only on maintained indexes.

If you don't check Maintained, Paradox updates the index only when you use it (for example, when you run a query). The operation that uses the secondary index takes slightly longer using a non-maintained index, because Paradox must first update the index to recognize values that you've added, deleted, or changed, and then perform the requested operation.

Note You can create a maintained secondary index only on a keyed table. This option is dimmed if the table does not have a key specified.

The Case Sensitive option

If you check the Case Sensitive check box in the Define Secondary Index dialog box, Paradox recognizes the case (capitalization) of words as it sorts them.

Table 9-4 shows how Paradox sorts values differently when you choose Case Sensitive.

Note Some language drivers do not support a case-insensitive index.

Table 9-4 The effects of the Case Sensitive option when sorting

Case Sensitive	Case Insensitive
Abcd	aaaa
aBcd	Abcd*
aaaa	aBcd*

* The values Abcd and aBcd are considered duplicates in a case-insensitive index. They appear in the order in which they were entered in the table.

Capitalizing a value doesn't make it unique in a case-insensitive index.

Paradox automatically names single-field, case-sensitive indexes with the field's name. You must name a case-insensitive index when you save it. This enables you to create two indexes on the same field, one case sensitive and one case insensitive.

Composite secondary indexes

This section applies only to Paradox for Windows tables.

You can create a composite secondary index by adding more than one field to the Indexed Fields list. Open the Define Secondary Index dialog box and add the fields you want to use in the index to the Indexed Fields list. To add a field, double-click it (or choose it in the Fields list, then choose the Add Field arrow or press *Alt+A*). Paradox adds the field below the selected field in the Indexed Fields list.

Paradox creates the composite index in the order that the fields appear in the Indexed Fields list. When you use this index, Paradox sorts the table by the top field first, then by the next, and so on.

You can change the order of the fields to change the sort order of the index. To move a field in the Indexed Fields list, select the field and use the Change Order arrows to move it up or down. These arrows become available when two or more fields are in the Indexed Fields list.

To remove one field from the Indexed Fields list, select it and choose the Remove Field arrow (or press *Alt+R*). To remove *all* fields from the Indexed Fields list, choose Clear All (or press *Alt+L*).

You must name composite secondary indexes.

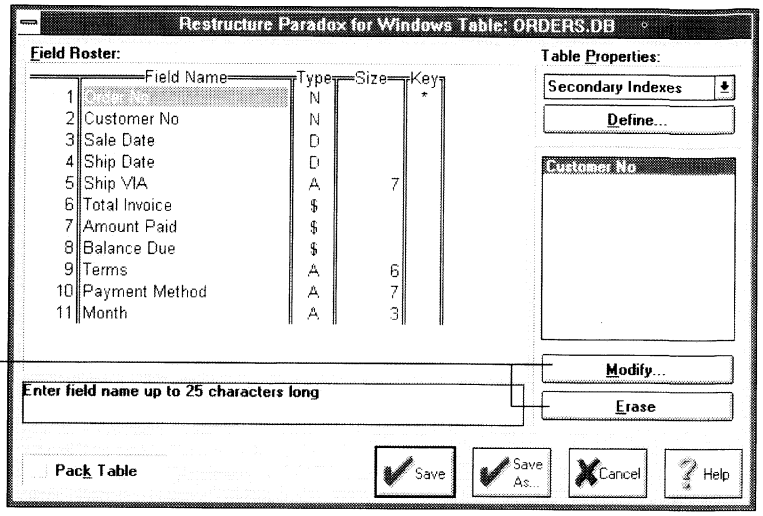
Choose OK to create and name a composite secondary index. You'll see the Save Index As dialog box. Paradox automatically names single-field, case-sensitive indexes with the field's name. For composite indexes or case-insensitive indexes, type the name you want in the Index Name text box. A secondary index name can be up to 25 characters and include any printable character.

When you choose OK from the Save Index As dialog box, both it and the Define Secondary Index dialog box close and the name appears in the list of secondary indexes in the Create Table (or Restructure Table) dialog box. Paradox warns you when you might overwrite an existing index.

Modifying secondary indexes

To change a secondary index definition, select it from the list of secondary indexes in the Create Table (or Restructure Table) dialog box and choose Modify. The Define Secondary Index dialog box opens with the selected index specification filled in. Make the changes you want and choose OK.

Figure 9-6 Changing a secondary index



Use these buttons to Modify or Erase existing Secondary Indexes

Erasing secondary indexes

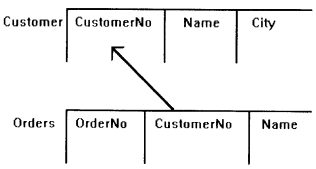
If you want to remove a secondary index definition, select its name from the list of secondary indexes in the Create Table (or Restructure Table) dialog box and choose Erase. Paradox deletes the index.

Defining referential integrity

This section applies only to Paradox tables.

Referential integrity means that a field or group of fields in one table (the "child" table) must refer to the key of another table (the "parent" table). Paradox accepts only those values that exist in the parent table's key as valid values for the specified field(s) of the child table.

Figure 9-7 Referential integrity



Paradox prohibits you from entering a value in the *Orders* Customer No field that doesn't match an existing value in the *Customer* Customer No field

You can establish referential integrity only between like fields that contain matching values. For example, you can establish referential integrity between *Customer* and *Orders* on their Customer No fields. Likewise, you can establish referential integrity between *Orders* and *Lineitem* on their Order No fields. In both cases, the values contained in the referential integrity fields are the same. (The field names don't matter as long as the field types and sizes are identical.)

Note You can establish referential integrity only between tables in the same directory.

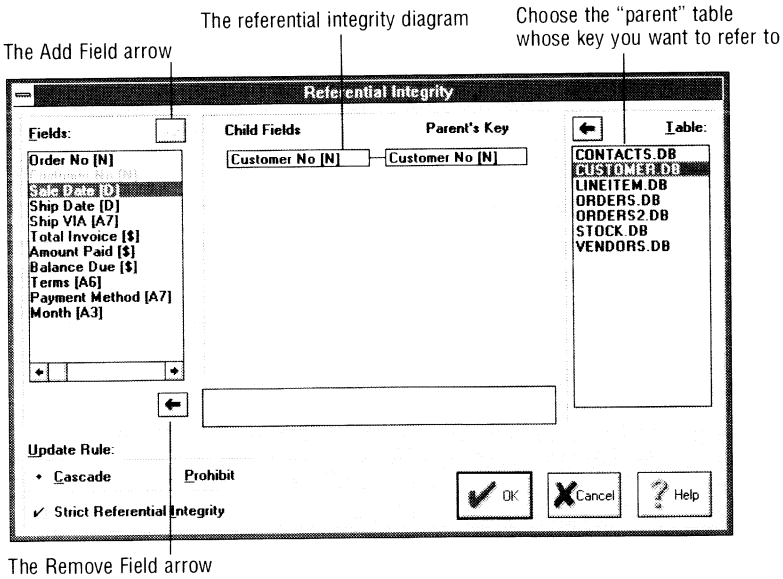
Using referential integrity, Paradox checks the validity of a value before accepting it in the referential integrity table. If you establish referential integrity between *Customer* and *Orders* on their Customer No fields, then enter a value in the Customer No field of *Orders*, Paradox searches the Customer No field of *Customer* and

- Accepts the value in *Orders* if it exists in *Customer*
- Rejects the value in *Orders* if it doesn't exist in *Customer*

Note If you define referential integrity on a table that already contains data, Paradox places existing records that don't meet the requirement into the temporary *Keyviol* table in your private directory.

To define a referential integrity relationship,

1. In the Create Table or Restructure Table dialog box, choose Referential Integrity from the Table Properties list. The Define button becomes available.
2. Choose Define to open the Referential Integrity dialog box.



Paradox displays all tables in the working directory in the Table list.

3. Choose the parent table from the Table list. The table's key field appears in the Parent's Key area of the referential integrity diagram.

Note If the parent table you choose isn't keyed, or if there is a problem with the key, a message appears on the status bar.

The Fields list displays all the fields from the child table. (BLOB fields are dimmed in the Fields list. You cannot create referential integrity on BLOB fields.)

4. Double-click the child table's field in the Fields list (or *Tab* to it and click the Add Field arrow or press *Alt+A*). The field name appears in the Child Fields area of the referential integrity diagram.

   If you choose a field that isn't of the identical type as the parent's key field, Paradox displays a message on the status bar, and doesn't add the field to the diagram.

   If you make a mistake and add the wrong field, click the Remove Field arrow or press *Alt+R*.

5. Choose the update rule you want. (See "Update Rule options" in the next section.)

6. Choose whether you want to enforce strict referential integrity. (See "Using strict referential integrity" later in this section.)

7. Choose OK to name and save the referential integrity relationship.

You can establish referential integrity with a composite key. If the parent table has a composite key, add fields from the Fields list to match one, some, or all of the parent's key fields.

Update Rule options

Paradox provides two update rules for tables that use referential integrity. You must use one of these rules when you define referential integrity.

- *Cascade*: Any change you make to the value in the key of the parent table is automatically made in the child table. Cascade is Paradox's default update rule.

Note To cascade an update across tables, Paradox must place a lock on the parent record and all of its child records. If the lock is denied (because another user has already placed a lock), Paradox can't perform the cascaded update.

- *Prohibit*: You *cannot* change a value in the parent's key if there are records that match the value in the child table. For example, if the value 1356 exists in the Customer No field of *Orders*, Paradox prohibits you from changing that value in the Customer No field of *Customer*. (You can change it in *Customer* only if you first delete or change all records in *Orders* that contain it). If, however, the value *doesn't* exist in any records of the child table, Paradox permits the change in the parent table.

Using strict referential integrity

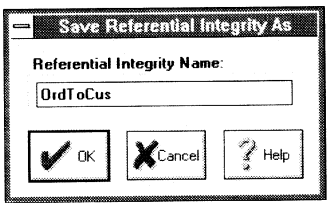
Paradox for Windows is the first version of Paradox to fully enforce referential integrity. The Strict Referential Integrity option lets you control how previous versions of Paradox access a table on which you've defined referential integrity.

Suppose you use a previous version of Paradox to open a Paradox for Windows table that uses referential integrity. You could add data that violates the referential integrity, because the version of Paradox you're using doesn't recognize the referential integrity. To prevent previous versions of Paradox from opening the table, check the Strict Referential Integrity check box in the Referential Integrity dialog box.

Saving the referential integrity relationship

When you've established the referential integrity you want, choose OK to name and save it. You'll see the Save Referential Integrity As dialog box, shown in Figure 9-8.

Figure 9-8 The Save Referential Integrity As dialog box



Type the name you want to give the referential integrity relationship. Referential integrity names can be up to 31 printable characters and require no file extension. When you choose OK, the Referential Integrity dialog box is closed, and the referential integrity name appears in the list area below the Define button in the Create Table (or Restructure Table) dialog box.

Note Paradox saves referential integrity definitions in a file with the table's name and the .VAL file extension when you save the table's structure.

Paradox creates an index on the referential integrity fields.

When you save the referential integrity, Paradox checks to see if there is an index on the referential integrity field(s). If there isn't an index, Paradox creates one for you, giving it the name of the field (if it's a single-field definition) or the name you gave the referential integrity (if it's a multiple-field definition). You'll see the index appear in the list of secondary indexes when you choose Secondary Indexes from the Table Properties list in the Create Table (or Restructure Table) dialog box. If you delete the referential integrity, Paradox does *not* automatically delete this index. You must delete it manually.

Changing or deleting referential integrity

You can choose any referential integrity name from the list of named referential integrity relationships in the Create Table (or Restructure Table) dialog box to either modify or erase it.

- Choose Modify to open the Referential Integrity dialog box with the selected referential integrity relationship filled in. Paradox must obtain locks on all tables involved in the referential integrity when you modify it. You can change
  - The name of the referential integrity (save the referential integrity with a different name)
  - The update rule
  - The Strict Referential Integrity setting
- Choose Erase to delete the selected referential integrity relationship.

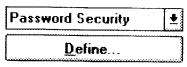
Creating self-referential integrity

You can create referential integrity on a table so that one field refers to the table's key field. For example, suppose you have a table that lists employees. The key field of this table is Employee ID. There is also a Supervisor field. The supervisors are also employees. You can create referential integrity to make sure that the value you enter in Supervisor is also a value in Employee ID.

When you create self-referential integrity, you must use the Prohibit update rule.

Note You can't create a circular reference. That is, you can't create referential integrity in which a field refers to itself.

Establishing password security



This section applies only to Paradox tables.

It's important to ensure that the table you create is protected from access by unauthorized users. Not only can you establish a password for the table as a whole, you can also assign specific types of rights to the table or individual fields.

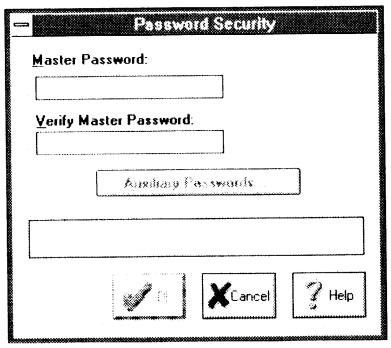
Once you specify password security, only those users who know the password can access the table. This includes you, so don't forget your password!

Whenever a user tries to access a password-protected table, Paradox prompts them to supply the password (if they haven't already done so).

Example 9-11 Assigning a master password to a table

To create a master password for the table,

1. Choose Password Security from the Table Properties list. The Define button becomes available.
2. Choose Define to display the Password Security dialog box.



3. Type the password you want in the Master Password text box. You'll see asterisks (*) representing the characters you type. A password can be from 1 to 31 characters long and can contain spaces.

4. Type the same password in the Verify Master Password text box. Again, you'll see asterisks in place of the characters you type.

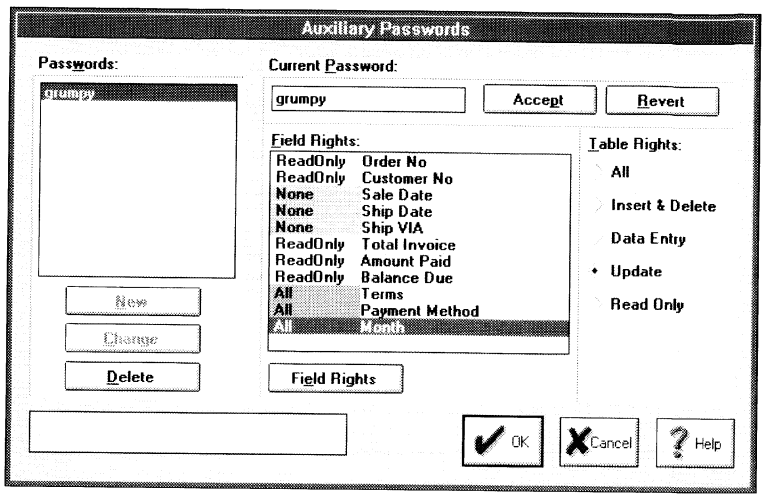
5. If the two passwords aren't identical (including capitalization), you'll see an error message prompting you to enter either one of them again.

6. Choose OK to close the dialog box and return to the Create Table dialog box.

Paradox saves the password when you choose OK from either the Password Security or the Auxiliary Passwords dialog boxes.

If you want more specific security, you can choose Auxiliary Passwords from the Password Security dialog box. You'll see the Auxiliary Passwords dialog box, shown in Figure 9-9.

Figure 9-9 The Auxiliary Passwords dialog box



Use this dialog box to assign specific table and field rights to specific auxiliary passwords.

Note You can return to the Password Security dialog box and change the table's master password by choosing Cancel or pressing *Esc.* If you do, any auxiliary passwords you've specified are lost.

Table rights

The master password provides all rights to the table and its fields. Using auxiliary passwords, you can be more selective and specific about the kind of table operations each user can perform.

- *All:* Gives a user all rights to any function of the table, including the ability to restructure or delete it. The only operation prohibited is a change to the master password.
- *Insert & Delete:* Gives a user the right to insert or delete records or empty the table, but not to delete the table.
- *Data Entry:* Gives a user the right to insert records in the table, but not to delete records, restructure, or empty the table.
- *Update:* Gives a user the right to view the table and change non-key fields, but not to insert or delete records or change key fields.
- *Read Only:* Gives the user the right to view the table, but not to change it in any way.

Field rights

In addition to specifying rights for the table as a whole, you can assign rights to individual fields. The default right in the Field Rights

list is All. To choose another option, double-click the field (or choose the Field Rights button).

Double-click once to choose Read Only. Double-click again to choose None. If you double-click again, the field right is reset to All.

- Choose All to give the user all rights to the data in that field (within the limits of the table rights you specify).
- Choose Read Only to give the user the right to view—but not to change—the data in that field.
- Choose None to prevent the user from viewing or changing the data in that field. Paradox hides the values in the field.

Table 9-5 shows how you can combine table rights and field rights.

Table 9-5 Auxiliary password field and table rights

	Field rights		
Table rights	All	Read Only	None
All	√		
Insert & Delete	√		
Data Entry	√	√	√
Update	√	√	√
Read Only	√	√	√

Example 9-12 Assigning auxiliary passwords

To specify an auxiliary password,

1. Type the password in the Current Password text box.
2. Choose the level of table rights for the password from the Table Rights panel.
3. Assign the field rights (All, Read Only, or None) for the password.
4. Choose Add to place the password in the Passwords list.
5. Repeat the process to specify as many auxiliary passwords as you need.
6. Choose OK to save the auxiliary passwords and close the dialog box. (This also saves the master password.)

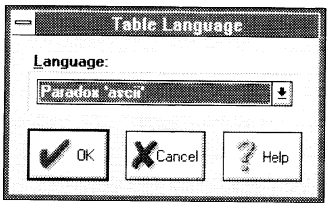
Remove a password by selecting it in the Passwords list and choosing Delete. Change the rights of a password by selecting it from the Passwords list and choosing Change. Make the changes you want, then choose Accept to save them, or choose Revert to return the password to the list unchanged.

Choosing a table language

A table's language driver determines the table's sort order and available character set. You choose a default language driver for Paradox and dBASE tables from the Configuration Utility. (See Chapter 14 in *Getting Started* for information about using the Configuration Utility.)

You can override the default table language when you create a new table by choosing Table Language from the Table Properties drop-down list. Choose Modify to change the default table language. You'll see the Table Language dialog box, shown in Figure 9-10.

Figure 9-10 The Table Language dialog box



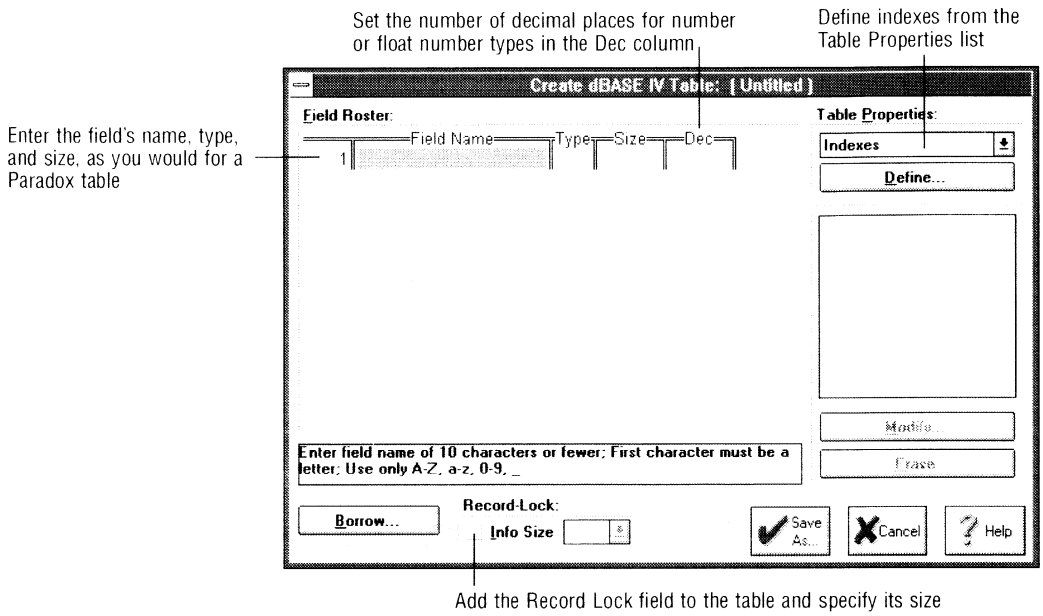
Choose a different language from the Language drop-down list. Different language drivers and their features are discussed in Chapter 16 in *Getting Started.*

Creating a dBASE table

When you choose to create a dBASE table from the Table Type dialog box, you'll see the Create Table dialog box shown in Figure 9-11. Use this to

- Name the fields of the table
- Specify field types and sizes
- Create indexes on fields or index expressions

Figure 9-11 The Create Table dialog box for a dBASE table



Note Before you create a dBASE table, you should consider the fact that many of the features described in "Creating a Paradox table" earlier in this chapter—such as validity checks, referential integrity, and table lookup—don't apply to dBASE tables. While there are some advantages to the dBASE type—such as the availability of the logical field type—there are also limitations.

Defining fields

Use the Field Roster to define the fields of the new table. You can use the mouse, arrow keys, *Enter*, *Tab*, or *Shift+Tab* to move among the columns. As you move, a status message at the bottom of the dialog box prompts you for valid entries. A vertical scroll bar appears in the Field Roster if you enter more fields than can be displayed in the Field Roster.

Field names

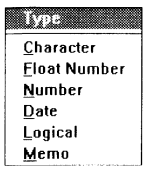
Type field names in the Field Name column of the Field Roster. The following list gives you some rules for naming fields.

- Field names can contain up to a combined total of 10 letters, digits, and underscores.
- The first character of a field name must be a letter.
- Punctuation marks, blank spaces, and other special characters are not allowed.

- Each field name in a table must be unique. (You can't make a name unique by adding a blank space at the end of the name.)

dBASE field types and sizes

A field's type determines the kind of data you can enter in it. Available field types differ depending on the type of table you're creating.



To specify a dBASE field type, position the insertion point in the Type column of the Field Roster, and use one of these methods:

- Type the appropriate symbol (refer to Table 9-6 for type symbols).
- Right-click to display a menu of type symbols. Click the symbol you want.
- Press *Spacebar* to display a menu of type symbols. Type the symbol you want, or click it.

dBASE field types are discussed in detail in Chapter 2. Table 9-6 lists each field type's symbol and size constraints, if any.

Table 9-6 dBASE field types and sizes

Field type	Symbol	Size values
Float number*	F	1–20, see Number Note
Number	N	1–20, see Number Note
Date	D	8, entered by Paradox (not displayed)
Logical	L	1, entered by Paradox (not displayed)
Memo	M	None required

* The float number type is available only in dBASE IV tables.

Number note Use the Dec column in the Field Roster to set the number of decimal places in a number or float number field ranging from zero to the specified field size minus two.

Inserting fields

To insert a field between two existing fields, select the field you want to be below the new row, and press *Ins*. Paradox opens a blank row above the selected field.

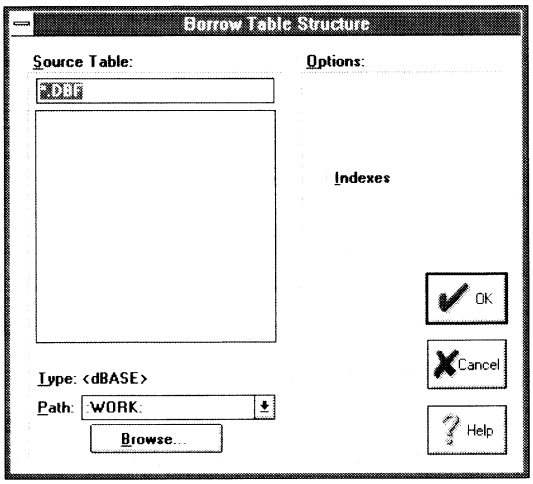
Deleting fields

To delete a field from the Field Roster, select it and press *Ctrl+Del*. Paradox deletes the entire row.

Borrowing an existing dBASE table structure

To borrow an existing dBASE table's structure, choose Borrow. You'll see the Borrow Table Structure dialog box. When you borrow a dBASE table, the only available option is Indexes, as shown in Figure 9-12.

Figure 9-12 The Borrow Table Structure dialog box for a dBASE table



Choose the table whose structure you want to borrow, and check Indexes if you want to borrow the table's index definitions as well. When you choose Borrow, Paradox closes the Borrow Table Structure dialog box, and places the borrowed table's structure in the Field Roster of the table you're creating.

Note You can borrow a table's structure only if the Field Roster in your new table is empty.

Editing a field name

If, after you've entered a field name, you decide to change it, position the insertion point anywhere in the field name. Either double-click the field name or press *F2* to position the insertion point within text. Press *Backspace* to delete the characters to the left of the insertion point, or *Del* to delete characters to the right of the insertion point.

To replace an entire field name, move to the name you want. The entire field is highlighted. Begin typing to replace the old name with the new one.

Creating the Record Lock field on a dBASE table

In a multiuser environment, each user can place record locks on a shared table. For example, if user JSMITH is editing record number 12 of *Stock*, user MBROWN cannot access that record until it's unlocked. This prohibits one user from unintentionally overwriting another user's work.

Record locks work whether or not you see them. A dBASE table gives you the Record Lock option to show you information about a locked record. If you check Record Lock in the Create Table dialog box,

Paradox adds a hidden field to the table. This Record Lock field shows you when a record was locked, and by whom.

Note Although Paradox adds the Record Lock field to the table, you won't see it when you view the table. You'll see a particular record's Record Lock field only if you're locked out of that record. In that case, Paradox displays information from the Record Lock field automatically. (You also have access to the Record Lock field from the dBASE programming language.)

The information you'll see when you encounter a locked field depends on the Info Size you specify. The Record Lock field can be from 8 to 24 characters. The default is 16.

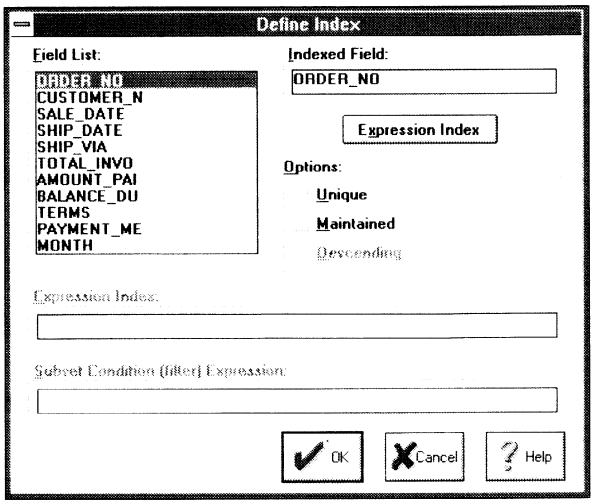
- The first two characters tell whether the record has been changed.
- The next three characters tell the time the lock was placed.
- The next three characters tell the date the lock was placed.
- The remaining 16 characters are optional. They tell the name of the user who placed the lock.

The default size of 16 displays the changed status of the record, the time and date of the lock, and the first 8 characters of the name of the user who placed the lock.

Indexing dBASE tables

You create an index on a dBASE table from the Create Table or Restructure Table dialog boxes. Choose Define to display the Define Index dialog box. (This dialog box is different for dBASE tables than for Paradox tables.) Figure 9-13 shows the dBASE Define Index dialog box.

Figure 9-13 The Define Index dialog box for a dBASE table



Choose the field you want to create the index on from the Field List. It then appears in the Indexed Field text box. Choose the options you want by checking the appropriate check boxes.

Unique dBASE indexes

When you check the Unique check box in the Define Index dialog box, you specify that each value in the index must be unique. When Paradox creates a unique index on a dBASE table, it includes the first of any duplicate values, and ignores the rest. This means duplicate values can exist in the table. They just aren't in the index.

It's a good idea to use unique indexes on fields that should have unique values. You can then use Paradox's data modeling in forms and reports just as you would with Paradox tables. Paradox can treat a unique, maintained dBASE index like a Paradox primary key.

Maintained and non-maintained dBASE indexes

A maintained index is updated whenever you update the table. dBASE maintained indexes are available only for dBASE IV tables. Paradox saves a maintained index as part of an .MDX file and gives the .MDX file the same name as the table. This is your production index. It's a good idea to use production indexes when working in Paradox.

When you save a maintained index, Paradox asks you for a tag name (see "Saving the index" later in this section). The .MDX file can contain several maintained index specifications.

Non-maintained indexes are assigned the .NDX file extension. You cannot have a production .NDX file. A non-maintained index is not automatically updated by Paradox when the table's data changes.

You must use the Order/Range dialog box (discussed in Chapter 4) to open a non-maintained index each time you update the table. You can have only one non-maintained index open on a table. You cannot restructure a non-maintained index. You cannot delete a non-maintained index from within Paradox.

Caution When you use a non-maintained index on a dBASE table, performing an add, subtract, or empty operation invalidates the index. If you perform a sort on a table without first opening the non-maintained index, the sort operation invalidates the index.

Descending dBASE indexes

If you check the Descending check box in the Define Index dialog box, Paradox creates the index in descending order (Z to A). If you check Descending and attempt to link to another table that uses an ascending (A to Z) index, you won't be able to perform the link.

Creating an expression index

An expression index is an index you express using any formula that results in a value (as opposed to an index on a single field). For example, you could create an expression index such as FirstName + LastName, where both FirstName and LastName are field names.

Note All fields included in an expression index must be of compatible field types.

To create an expression index, choose Expression Index. The button name changes to Index Field and the insertion point is placed in the Expression Index text box. Type the expression you want. Choose Index Field to return to the field list.

When you're creating an expression index, you don't have to type the field names. Position the insertion point in the text box and click the field in the Field List. Paradox automatically copies the field name to the text box.

Creating a subset condition

A subset condition (sometimes called a filter) is an expression that evaluates to true or false. This means Paradox creates an index that points only to values that meet the requirements of the filter. For example, if you create the subset condition State=CA, you tell Paradox to create an index on only those values in the State field that match the value CA.

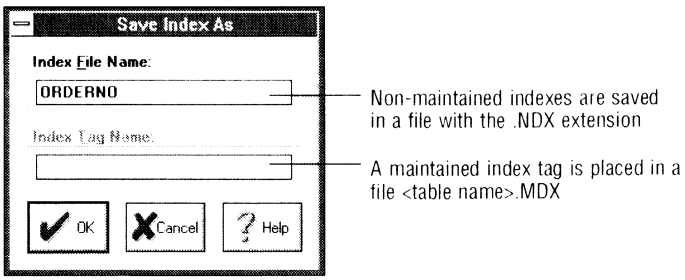
Type a subset condition in the Subset Condition (filter) Expression text box. You enter subset conditions the same way you enter expression indexes, described earlier in this section.

Note You can create a subset condition on either an indexed field or an expression index.

Saving the index

Choose OK to save the index. You'll see the Save Index As dialog box, as shown in Figure 9-14.

Figure 9-14 The Save Index As dialog box for dBASE tables



If you've specified a non-maintained index, the Index File Name text box is available.

- If you've specified a single-field index, Paradox uses the field's name as the file name and automatically gives this type of index the .NDX extension. You can change the file name, but you must use the .NDX extension.
- If you've specified a non-maintained expression index, you must specify a file name of no more than eight characters. Paradox gives this type of index the .NDX extension.

If you've specified a maintained index on either a field or an expression, the Index Tag Name text box is available. Type the name you want to give the index. This name appears in the Create Table (or Restructure Table) dialog box below the Define button.

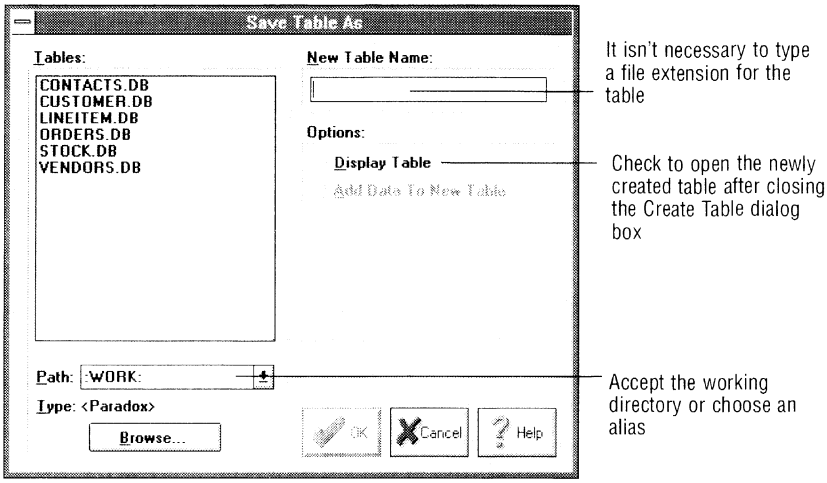
Paradox creates a file using the table's name and the .MDX extension to store all maintained index tags.

Saving the new table

When you finish specifying your table's structure, choose Save to create the table and close the Create Table dialog box. If you've failed to complete any necessary steps or have entered conflicting or invalid specifications, Paradox prompts you to correct the problem(s).

When you choose Save, Paradox displays the Save Table As dialog box.

Figure 9-15 The Save Table As dialog box



Type the table's name in the New Table Name text box. You don't need to type an extension, Paradox recognizes the type of file you want based on the table type you chose in the Table Type dialog box.

Unless you specify otherwise, Paradox saves the table to the working directory. Use the Path drop-down list if you want to save the table to an aliased directory. If you want to save the table to a directory that isn't available from the Path drop-down list, type the full path you want, with the table name, in the New Table Name text box.

If you check the Display Table check box, Paradox opens the new table when the Create Table dialog box is closed.

Restructuring Paradox tables

If, sometime after creating a table, you need to change its structure, you can restructure it. Restructuring a table is very much like creating it for the first time.

If you want only to rename a table (not restructure it), you should use File | Utilities | Rename.

You can restructure a table several ways:

- From the Browser or Folder window, right-click a table's icon and choose Restructure from its menu.
- From the Table window, choose Table | Restructure.

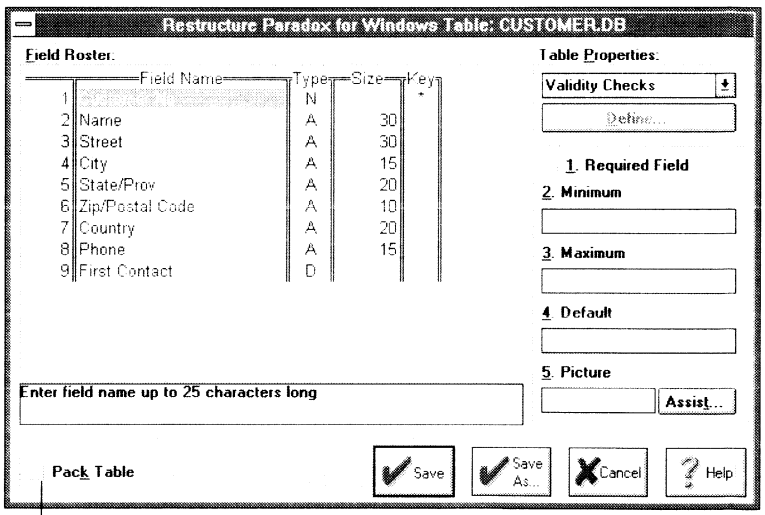
- From the Desktop, choose File | Utilities | Restructure, then choose the table you want.

Any of these methods opens the Restructure Table dialog box, with the table's existing type and structure specified.

Note Restructuring sometimes results in the creation of temporary tables, such as a *Problems* table, that Paradox uses to store records that are incompatible with the table as you've restructured it. Paradox numbers these temporary tables consecutively (up to 99) and stores them in your private directory. For example, if you restructure twice, and both operations cause data loss, Paradox creates both a *Problems* and a *Problem1* table.

The following figure shows the *Customer* table in the Restructure Table dialog box.

Figure 9-16 The Restructure Table dialog box

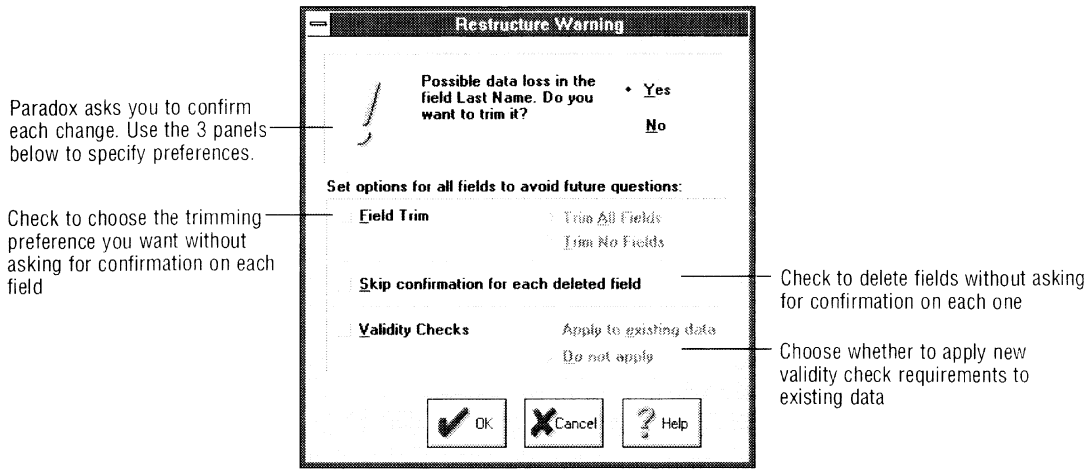


Some restructure operations automatically pack your table. You can check Pack Table and choose OK when you want to be sure Paradox packs the table.

General rules of restructuring

When you restructure a table, you often make changes that could result in a loss of data. Changes such as shortening field sizes, creating validity checks, or changing field types can cause existing data to become invalid. Whenever this is the case, Paradox opens the Restructure Warning dialog box (shown in Figure 9-17), upon leaving the Restructure Table dialog box.

Figure 9-17 The Restructure Warning dialog box



The main ways in which restructuring a table differs from creating a table are listed below:

- You can't change a table's type. For example, you can't change a Paradox table to a dBASE table. (You can copy a table to a different type; see Chapter 8 for details.)
- If you restructure a table that was created in a previous version of Paradox in such a way that Paradox must convert it to a Paradox for Windows table, the Restructure Warning dialog box warns you of the conversion and asks you to confirm it.
- If you add a primary key to a table that was previously unkeyed or had different keys, you may cause *key violations*. This means that there may be data already entered into the table that violates the rules established by the new key. Paradox moves the records with the key violations to a special temporary table called *Keyviol*, located in your private directory.

Note If there is already a *Keyviol* table, Paradox adds a number to the new temporary table, so it may appear as *Keyviol1* or *Keyviol2*. Paradox can create up to 100 temporary tables of the same name. (The first is not numbered and the last is number 99.)

Paradox deletes key-violating records from your table. You can change the records in *Keyviol* so they comply with the key requirements, and then add them back to your original table using File | Utilities | Add.

- If you change a field's type, and Paradox can't convert some of the data in the field to the new type, Paradox prompts you to confirm the change. If you do, Paradox moves the records

containing data that could not be converted into a special temporary table called *Problems*.

You can change the records in *Problems* so they comply with the new structure of the table, and then add them back into the table using File | Utilities | Add.

- If you decrease a field's size, Paradox prompts you to trim existing data in the Restructure Warning dialog box. If you choose not to trim data, Paradox moves the records containing data that doesn't fit in the new field size to the *Problems* table.
- If you add or change a validity check, you have the option of enforcing the new validity check on existing data (make this choice from the Restructure Warning dialog box). If you choose to enforce the new validity check on existing data, and any data that doesn't comply with it, Paradox places the non-compliant data in the *Keyviol* table. You can change the records in *Keyviol* and then add them back to the table using File | Utilities | Add.
- If you add a new field that has a default validity check on it, and choose to enforce the validity check on existing data, Paradox creates the new field and places the default value in each record of the table. If you define a default validity check on an existing field that contains data, Paradox does not overwrite the existing data with the new default value.
- If you change a table's language driver when restructuring a table, you risk losing any special characters that may exist in the table.

Shortening a field

When you shorten a field that already has data in it, you may lose some data. When this is the case, Paradox displays the Restructure Warning dialog box (see Figure 9-17), which lets you choose whether to trim existing data, or to save records that contain data too long for the new field size in the *Problems* table.

Adding fields to an existing table

Adding fields during the restructuring of an existing table is exactly like adding fields to a new table specification. See "Defining fields," earlier in this chapter.

When you add fields to an existing table, Paradox does not automatically add those fields to any forms, reports, or queries associated with the table. If you want the new fields added to associated design documents, you must explicitly add them.

Deleting fields from an existing table

Deleting fields from an existing table is similar to deleting fields from the field specification of a new table. (See "Deleting fields," earlier in this chapter.) However, there are two important differences:

- Deleting a field usually results in a loss of data (unless the field is empty). Paradox displays a dialog box warning you of the loss and asking you to confirm the deletion.
- If a field you delete from a table appears in any design documents (like forms or reports), the field object in the design document loses its definition. The next time you open the document you must either redefine or delete the field object.

Editing a field name in an existing table

To change the name of a field, select the field name, position the insertion point in the field (click it or press *F2*), and use standard text-editing techniques to make the change.

To replace the old name completely, select the field and type the new name, overwriting the old.

If you edit a field name in an existing table, and that field appears on any associated design documents, Paradox attempts to reconcile the change the next time you open the design document.

Converting a non-keyed field to a keyed field

When you convert a field from non-keyed to keyed, remember that keyed fields must be consecutive and start with the first field in the Field Roster. (You can move a field if necessary; see "Changing the order of fields" earlier in this chapter.)

Changing field types in Paradox tables

Changing the field type of a field in an existing table is mechanically identical to specifying the field type when you create the table. You overwrite the existing field type symbol with a new one.

However, changing the field type of a field in an existing table could result in the loss or corruption of data. When that's the case, Paradox prompts you to confirm the change. Field type changes have other consequences as well. These consequences are illustrated in Table 9-7.

Table 9-7 Changing field types in Paradox tables

	To A	To N	To $	To D	To S	To M	To F	To B	To G	To O
From A	√	P	P	P	P	√				
From N	√	√	√		P					
From $	√	√	√		√					
From D	√			√						
From S	√	√	√		√					
From M	√					√	√	√		
From F						√	√	√		
From B								√		
From G								√	√	
From O								√		√

√ means Paradox allows the conversion, but may trim data. If Paradox must trim data, you'll see the Restructure Warning dialog box, which asks you to confirm the conversion.

P means the conversion is allowed, but might generate the *Problems* table.

Note Table 9-7 shows compatible field types. This definition of compatiblity applies to other table operations (such as Add, Subtract, Copy, and Query) as well as Restructure.

Alphanumeric field conversions

The result of converting another field type to an alphanumeric field varies. All formatting and other definitions associated with the other field type are lost.

When you convert a field of another type to an alphanumeric field, you must specify a length for the field. If some data already in the field contains more characters than the newly specified length of the alphanumeric field, you can trim the data or move records containing such data to the *Problems* table.

Note If you convert an alphanumeric field to a date, number, short number, or currency field, or a date, number, short number, or currency field to an alphanumeric field, make sure the settings in your Windows Control Panel and your ODAPI.CFG match. Refer to Chapter 14 in *Getting Started* for details.

Number, currency, and short number field conversions

You can convert among number, currency, and short number field types without data loss, except in the case where a number or currency value is too large for a short number field or includes decimals. In that case, you can either trim the values or move records containing those values to the *Problems* table.

Date field conversions

The following table shows which kinds of alphanumeric strings can be converted to dates.

Table 9-8 Converting strings to dates

Strings that can be converted	Strings that cannot be converted
7/04/1776	July 4, 1776
3/30/91	The 30th of March, 1991
25-Dec-1066	Christmas day, 1066
11-Nov-18	Armistice Day
1.01.2000	New Year's Day, the year 2000
13.06.80	Herb's 29th birthday

Note If you customize your date format using the Configuration Utility, date values are converted according to your customized settings.

Restructuring tables that are linked by referential integrity

When restructuring the parent table in a referential integrity relationship, you may be prohibited from performing certain restructure operations.

To see if the table you're restructuring is the parent in a referential integrity relationship, choose Dependent Tables from the Table Properties drop-down list in the Restructure Table dialog box. Paradox lists all child tables that depend on the table you're restructuring.

The basic rule to remember when restructuring a parent table is that *you cannot perform any operation that causes records to be removed from the table.* If you remove records from the parent table, you risk orphaning records in the child table. This is in violation of the rules of referential integrity. Each record in the child table *must* have a valid parent record.

Follow these guidelines as you restructure tables that are linked by referential integrity:

- If you resize any field in the parent table, you must choose to trim data that doesn't fit in the new field size, rather than save such data in the *Problems* table.
- You cannot change the parent table's key definition or the child table's foreign key definition in such a way that will cause records to be saved in the *Keyviol* table.
- You can change field names, but not types or sizes, of fields that are part of the referential integrity definition.
- You can add a validity check to either table, but you must choose not to enforce it on existing data. (Use the Restructure Warning dialog box to make this choice.) The exception to this rule is the creation of a default validity check on a new field in the table.

- To make a parent table the child of another table, that table and all its existing child tables must be empty. For example, if *Orders* is the parent table of *Stock*, you cannot make *Orders* the child of *Customer* unless both *Orders* and *Stock* are empty.
- When working with tables that contain data, if you link more than two tables by referential integrity you must create the first link to the table that has no parent. For example, to define referential integrity among the *Customer*, *Orders*, *Lineitem*, and *Stock* tables, you must

  1. First create the link from *Orders* to *Customer*.
  2. Then create the link from *Lineitem* to *Orders*.
  3. Then create the link from *Stock* to *Lineitem*.

- To create a cyclic referential integrity relationship (as in "Table A refers to Table B, which refers to Table C, which refers back to Table A") all the tables must be empty.

Restructuring dBASE tables

You restructure a dBASE table the same way you do a Paradox table. Either choose File | Utilities | Restructure, inspect a table's icon in the Browser or Folder window and choose Restructure, or choose Table | Restructure from an open Table window.

Note If you restructure a dBASE III+ table in such a way that Paradox must convert it to a dBASE IV table, the Restructure Warning dialog box warns you of the conversion and asks you to confirm it.

Packing a table

If you've deleted records from a dBASE table (you can see if there are any deleted records present by choosing Table | Show Deleted in a Table window), you may want to remove them permanently from your disk. Paradox lets you permanently remove the records from the table when you restructure it. This is called *packing* the table.

From the Restructure Table dialog box, check the Pack Table check box. When you choose Save, Paradox removes the records from the table permanently. If you choose Save As, Paradox removes the records from the new table you create as a result of the restructure, and leaves the records in the original table.

Changing dBASE field types

Table 9-9 shows the consequences of changing field types of dBASE fields.

Table 9-9 Changing field types in dBASE tables

	To C	To F	To N	To D	To L	To M
From C	√	P	P	P	√	√
From F	√	√	√		√	
From N	√	√	√		√	
From D	√			√		
From L	√	√	√		√	
From M	√					√

√ means Paradox allows the conversion, but may trim data. If Paradox must trim data, you'll see the Restructure Warning dialog box, which asks you to confirm the conversion.
P means the conversion is allowed, but might generate the *Problems* table.

Note Table 9-9 shows compatible field types. This definition of compatibility applies to other table operations (such as Add, Subtract, Copy, and Query) as well as Restructure.

Number to character

You can convert data in number or float number fields to text in a character field with no loss of data (if the character field is wide enough). However, you won't be able to perform calculations on numeric data stored in a character field.

Character to number or float number

You can convert a character field to a number or float number field with the following results:

- If the data in the character field is numeric (digits), Paradox converts it to a number or float number field with no data loss.
- If the data in the character field is a mixture of text and digits—*beginning with digits*—Paradox converts the digits to a number or float number format and deletes all text.
- If the data in the character field is a mixture of text and digits—*beginning with text*—Paradox assigns the value zero to the number or float number field.

Logical to character

Paradox converts logical values to either T or F text values. Only one character is displayed regardless of the size of the character field.

Character to logical

Paradox converts the characters T, t, Y, and y to logical true, and *all other values* to logical false.

Date to character

You can convert a date value to a text value. The text value will be eight characters in the format specified by the Configuration Utility.

Character to date

You can convert a text value to a date value following the conventions listed in Table 9-8.

Saving the restructured table

When you finish restructuring the table and want to save it, you have two options:

- *Save:* Overwrites the old structure with the new structure. At this point, Paradox warns you of potential data losses based on the changes you've made.
- *Save As:* Creates a new table with the structure as you have specified it. Paradox leaves the original table intact. Check the Add Data To New Table check box in the Save Table As dialog box if you want to place data from the original table into the new table you're saving.

Caution

If you use Save As and type an existing table's name, Paradox overwrites the existing table with the new table. Paradox displays a dialog box that warns of the possible overwrite and asks for confirmation.

When the Restructure Table dialog box closes, Paradox opens the restructured table as well as any *Keyviol, Problems,* or other temporary tables created as a result of the restructure.

CHAPTER 10

Creating design documents

Forms and reports are called *design documents* in Paradox. Design documents can be either printed or used for onscreen display.

This chapter discusses laying the foundation for design documents. You'll learn how to

- Choose the table (or tables) that contains the data you want to use
- Define the relationships between tables in a multi-table design document
- Specify the fields you want to display in the design
- Choose an initial design layout for the document

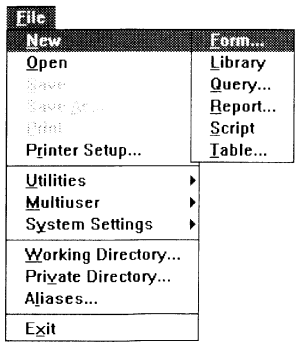
The first step you take when creating a new design document is to decide which type of design document you need.

Use Paradox forms to display data from your tables, along with a wide variety of graphic objects and formatting options. Forms are designed primarily for onscreen use and are invaluable for simplifying data-entry tasks.

Use Paradox reports to produce well-organized summaries of data. Reports give you the ability to group data in meaningful ways and to design the printed output to look the way you want it.

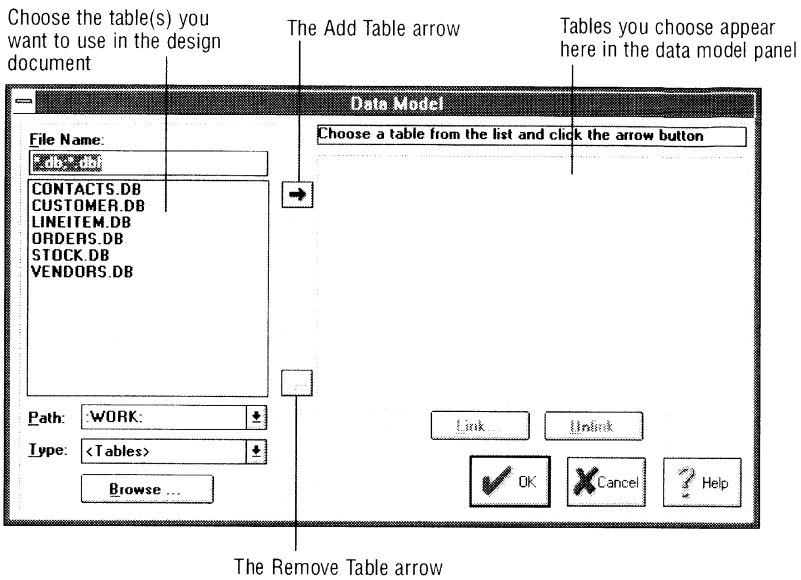
Creating a data model

A *data model* is the graphical representation of the relationships between tables you use in the design document. It provides a simple way of telling Paradox which tables you want to display and work with in the document you create, and how these tables work together.



When you create a new design document, you begin with the data model. Choose File | New and then choose the type of document (Form or Report) you want. Paradox displays the Data Model dialog box, shown in Figure 10-1. Whether you want to create a form or report, you must start in this dialog box.

Figure 10-1 The Data Model dialog box



When you choose a table from the File Name list and place it in the data model panel, you tell Paradox you want to use the fields from that table in your design.

You can build a design document directly from a query object.

If you click the Type drop-down arrow, you'll see your choices are <Tables> and <Queries>. Choose <Queries> to create a design document using the result of a saved query. See "Creating documents from queries" later in this chapter.

Creating a blank design

Although in most cases you'll want to associate the document with an existing table, Paradox makes it easy for you to create a blank document. If you don't choose a table in the Data Model dialog box, and choose OK, Paradox creates a design document that is not bound to any table's data.

If you don't bind your document to a table when you first create the document, it's easy to do so later. Click the Data Model SpeedBar button from a design window to display the Data Model dialog box and add any tables you want to the document's data model.

Creating a single-table data model

Single-table designs use the data from only one table. This is an easy type of design to model. Some of the features available in the Data Model dialog box apply only when you create multi-table designs. You can ignore them when working with only one table.

Example 10-1 Creating a single-table data model using the mouse

Using the mouse to create a single-table data model, you

1. Click the table you want from the File Name list.

   The table's name appears in a recessed area in the data model panel (see Figure 10-2).

2. Choose OK.

   Paradox closes the Data Model dialog box.

If you prefer to use the keyboard, you can type the name of the table you want to use in the File Name text box and press *Enter*.

You can also use the File Name list with the keyboard as described in Example 10-2.

Example 10-2 Creating a single-table data model using the keyboard

Using the keyboard to create a single-table data model, you

1. Press *Tab* to move to the File Name list.
2. Press ↑ or ↓ to select the table you want.

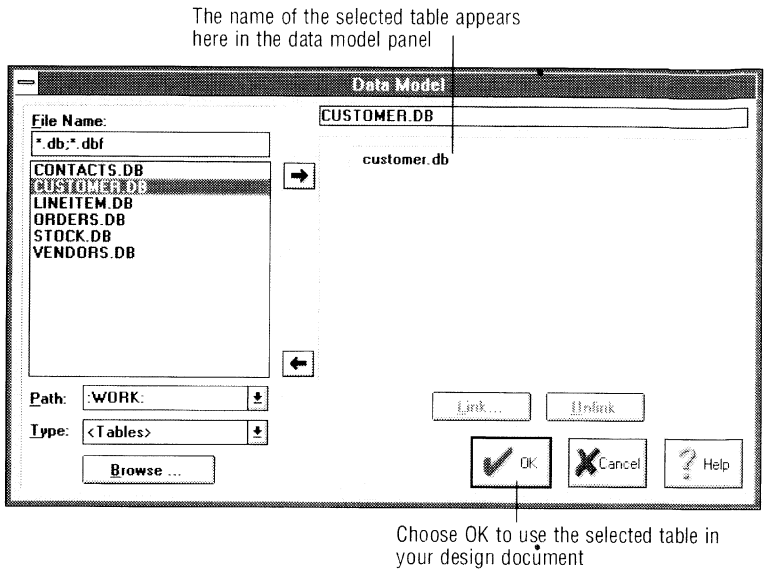
   As you move through the tables in the list, the name of the table in the data model panel changes.

3. When you've selected the table you want, press *Enter*.

Paradox closes the Data Model dialog box.

Figure 10-2 shows the Data Model dialog box with the *Customer* table chosen as the table on which to base a new form.

Figure 10-2 Placing a table in the data model panel

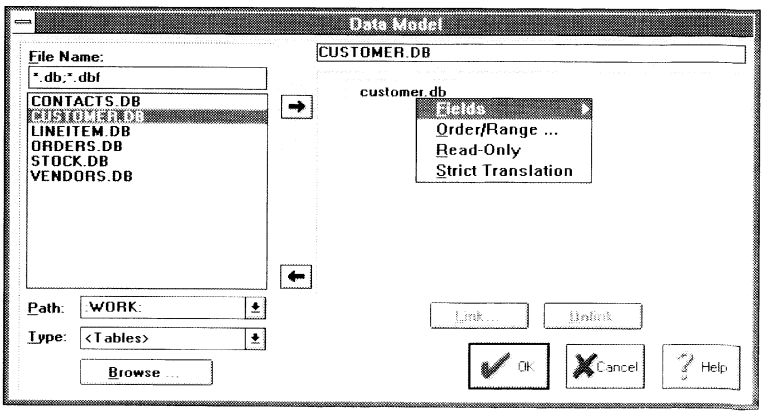


Inspecting tables in the data model

Once you've placed a table in the data model panel, you can inspect it. You can either right-click it or you can *Tab* to the data model panel, use the arrow keys to select it, and press *F6*. You'll see a menu, shown in Figure 10-3.

Note Figure 10-3 shows the menu you'll see when you are creating a form. If you're creating a report, you'll see a menu of the table's field names, types, and sizes.

Figure 10-3 Inspecting a table in the data model



- Choose Fields to see a list of the table's field names, types, and sizes.
- Choose Order/Range to open the Order/Range dialog box, discussed in Chapter 4.
- Choose Read-Only to protect the table from being edited in the form you create. You can still edit the table in other forms or in its Table window.
- Choose Strict Translation to limit your character set to those characters easily translated from one language driver to another. See Chapter 16 in *Getting Started* for information on character set issues.

Creating a multi-table data model

Paradox lets you create design documents that use data contained in more than one table. These are called multi-table designs.

When you define the data model of a multi-table design, you

- Identify the tables you want to use (add them to the data model panel)
- Define the relationship between the tables (link them)

Note You can always return to the Data Model dialog box from the design window (by clicking the Data Model SpeedBar button or using the Data Model command). You can add or remove tables and change links at any point in designing your document.

Adding tables to the data model

You must place all the tables you want available for use in the document within the data model panel of the Data Model dialog box.

Either double-click a table from the File Name list, or click it and then click the Add Table arrow, shown in Figure 10-1. Repeat the process until all the tables you want are in the data model panel.

If you prefer to use the keyboard, press *Tab* to move to the File Name list, then use the arrow keys to select the table you want. Press *Alt+A* to add the table to the data model panel. Repeat the process until all the tables you want are in the data model panel.

If you plan to use many tables in your design, you might prefer to link as you add them, rather than adding them all and then linking. This lets you avoid scrolling the data model panel to view all the tables you want to link. See "Creating a link" later in this section.

Removing tables from the data model

Remove a table from the data model panel by selecting it and choosing the Remove Table arrow (shown in Figure 10-1) or pressing *Alt+D*.

Note If you link two or more tables together (see "Creating a link" later in this section), you won't be able to remove them from the data model panel. You must select a linked table and choose Unlink to break the link before you can remove the table.

Understanding links

To understand how tables are linked in design documents, you must first understand how Paradox sorts and locates data according to the indexes you specify.

For information on keys, indexes, and setting up your database so you can link tables, see Chapter 9.

Tables can be linked only on common fields.

Tables you want to link must have a common field. The field name doesn't have to be the same in both tables, but the field type and size must match.

For example, suppose you are creating a data model that uses the *Customer* and *Orders* tables. The *Orders* table's Customer No field contains values that match values in the *Customer* table. It's easier and more efficient to keep order and customer information in separate tables; otherwise you need to enter customer information (addresses, phone numbers) every time you enter an order. But sometimes you need to see data from both tables at once. That's when you need to link the two tables.

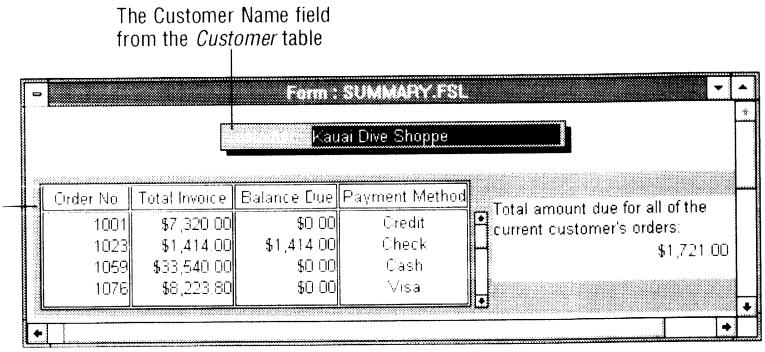
When you link *Customer* and *Orders*, Paradox looks at each value in the Customer No field of *Customer* and finds matching values in the Customer No field of *Orders*. An index lets Paradox find the matching values in *Orders*.

Paradox uses an index to remember where values are. When you specify a secondary index on a field (see Chapter 9), Paradox looks at each value in the field and creates a file that notes each value's location in the table. This makes it easy and fast for Paradox to find whatever value you ask for.

When you link two tables, you ask Paradox to evaluate a value in the *master* table (the table you're linking *from*), and find all matching values in the *detail* table (the table you're linking *to*). This means the detail table *must be indexed* on the field you use in the link. The detail table can have either a primary index (key) or secondary index on the link field.

The example of the *Customer* to *Orders* link is illustrated in Figure 10-4.

Figure 10-4 Linked data in a multi-table form



As you move through the records of the *Customer* table, the linked detail records from the *Orders* table are updated to show the orders for the current *Customer* record

In this form you can see that each record of the master table (*Customer*) has one or more corresponding records in the detail table (*Orders*).

Types of links

You can create *single-valued relationships*, also called one-to-one (1→1) or many-to-one (M→1) links, or *multi-valued relationships*, also called one-to-many (1→M) links.

Single-valued relationships

A single-valued relationship exists between tables if, for every record in one table, *no records* or *only one* record from another table is related to it. For example, the relationship between *Lineitem* and *Stock* is single-valued. Each line item ordered (each unique value in *Lineitem*) is one item of stock (a unique value in *Stock*).

In a many-to-one relationship, many records in the master table are related to one value in the detail table. For example, the *Lineitems* table lists specific items that a customer orders. Several items can be ordered at the same time, so many *Lineitem* records can point to the same *Orders* value.

Multi-valued relationships

A multi-valued relationship exists between tables if, for every record in one table, *no records, one record,* or *more than one record* from another table is related to it. For example, one customer (one record in the *Customer* table) may have placed no orders, one order, or many orders (records in the *Orders* table). This means that each record in the *Customer* table can have many records in the *Orders* table that match it. This is a one-to-many relationship.

Creating a link

This section describes using the Define Link dialog box to link two Paradox tables. For information on linking two dBASE tables, see "Linking dBASE tables" later in this chapter.

Once you've placed the tables you want to link in the data model panel, you must create the link between them.

Note You cannot create a link on a memo, formatted memo, graphic, OLE, or binary field type.

Referential integrity makes the link for you.

If you've established referential integrity between the two tables you're linking (see Chapter 9 for information about referential integrity), Paradox automatically links them according to the referential integrity specification.

The following examples show how to create a link using the mouse. See Appendix A for information on using the Data Model dialog box and Define Link dialog box with the keyboard.

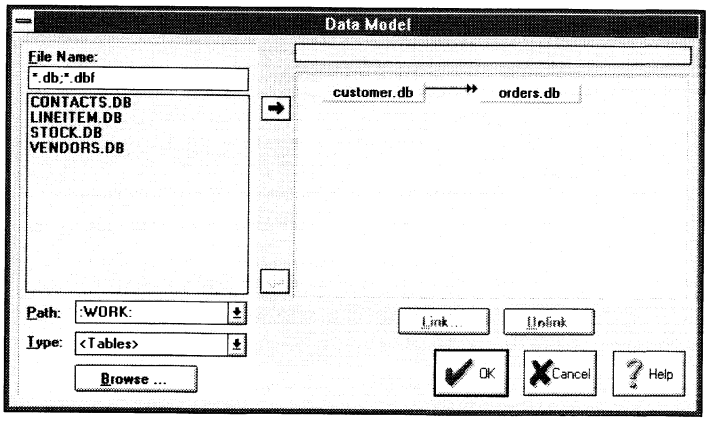
Example 10-3 Linking Paradox tables that have referential integrity

To link *Customer* and *Orders*,

1. Open the Data Model dialog box.
2. Double-click CUSTOMER.DB and ORDERS.DB in the File Name list. Paradox places the tables in the data model panel.

   When you pass the pointer over a table in the data model panel, it changes to a linking tool (shown at left).

3. Click *Customer*. This is the master table. You create a link by drawing a line from the master to the detail table.
4. Drag from *Customer* to *Orders* (the detail table). Paradox recognizes the referential integrity established between the two tables and links them on their Customer No fields.



Suppose you *don't* have referential integrity between the two tables you're linking. In that case, you create the link you want using the Define Link dialog box.

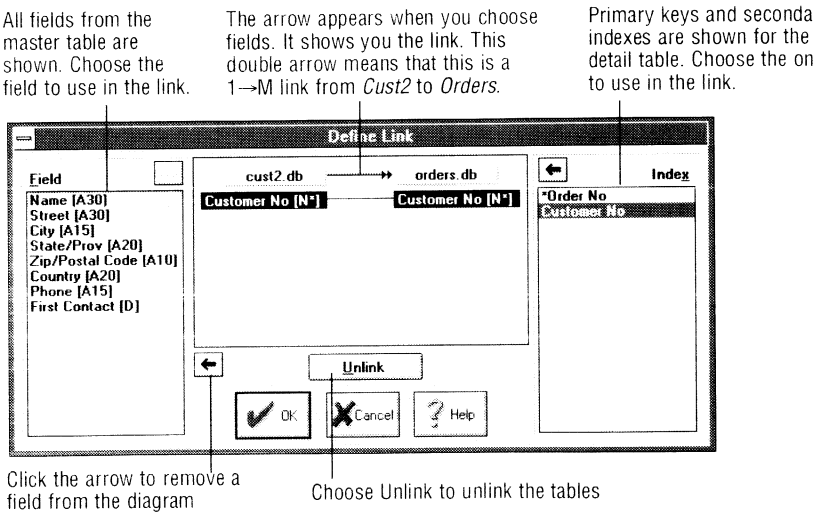
Example 10-4 Linking Paradox tables without referential integrity

Prerequisite Because all the sample tables use referential integrity, you need to create a new table to use in this example.

Copy *Customer* and name it CUST2.DB. Copying tables is discussed in Chapter 8.

Steps

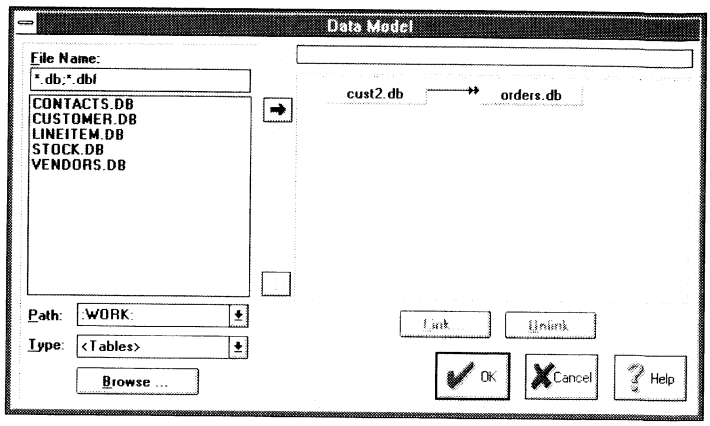
1. Open the Data Model dialog box.
2. Double-click CUST2.DB and ORDERS.DB in the Field Name list. Paradox places the tables in the data model panel.
3. In the data model panel, drag from *Cust2* to *Orders*. You'll see a line between the two tables.
4. Release the mouse. Paradox opens the Define Link dialog box.



5. Paradox places Customer No below the *Cust2* table in the link diagram panel of the dialog box. This is the *Cust2* table's key, and the field on which Paradox creates a default link.
6. Paradox places Customer No below the *Orders* table in the link diagram panel. If the detail table has an index that matches the primary index (key) of the master table, Paradox uses it.

   Paradox draws a line between the field and the index and places an arrow between the two table names.

7. Choose OK to accept the link. Paradox returns you to the Data Model dialog box.



Automatic links in the Define Link dialog box

Example 10-3 shows an automatic link created by Paradox in the Define Link dialog box. If there is an obvious choice of fields to link on (such as a match between the primary key field of the master table and an indexed field on the detail table), Paradox opens the Define Link dialog box with the link already created. You can either accept or override this choice. Choose OK to accept it, or choose Unlink to unlink the automatic link and manually create a new one.

Manually linking tables

Paradox shows all fields from the master table in the Field list.

Choose the link field from the master table.

Choose the field you want to link on. It appears below the table name in the link diagram panel of the dialog box. If Paradox finds an index of the detail table that matches the name and type of the field you've chosen, it completes the link for you. If no name and type match is found, Paradox uses the first index of the detail table that matches in type. You can choose another index to replace the automatic choice.

Choose an index from the detail table.

The Index list shows all predefined maintained indexes for the detail table. The table's key (its primary index) is marked with an asterisk (*). All fields of a composite key are displayed linked with a dash and marked with an asterisk (*). For example, the composite key of *Lineitem* is listed as ***Order#-Stock#**. The table's secondary indexes are listed after the key.

Choose the index you want to use for the detail table. It appears below the detail table name in the link diagram panel of the dialog box. If you're using a composite key on the master table, choose an indexed field of the detail table to match each field in the composite key.

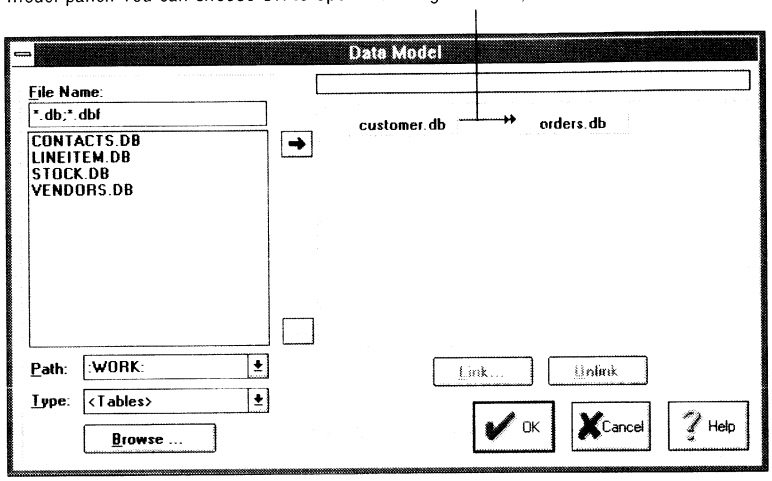
Previewing the link

After you choose a matching field from the master table and an index from the detail table, Paradox creates a link between the two and previews the data model in the link diagram panel. If you want a different link, click Unlink and choose a different field or index.

When you choose OK, you accept the link and return to the Data Model dialog box. The data model panel now shows the tables as linked.

Figure 10-5 A multi-table relationship

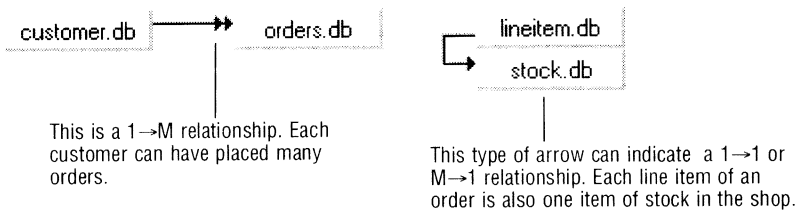
When the Define Link dialog box disappears, Paradox shows the linked tables in the data model panel. You can choose OK to open the design window, or add and link more tables.



The data model shows what type of a link exists between the tables. If two tables are side by side, with a double-headed arrow between them, it indicates a multi-valued relationship. The direction of the arrow shows the direction of the link (master→detail).

If one table is stacked below another table, with an arrow joining them from their sides, it shows a single-valued relationship.

Figure 10-6 1→M and 1→1 relationships



Removing or modifying a link

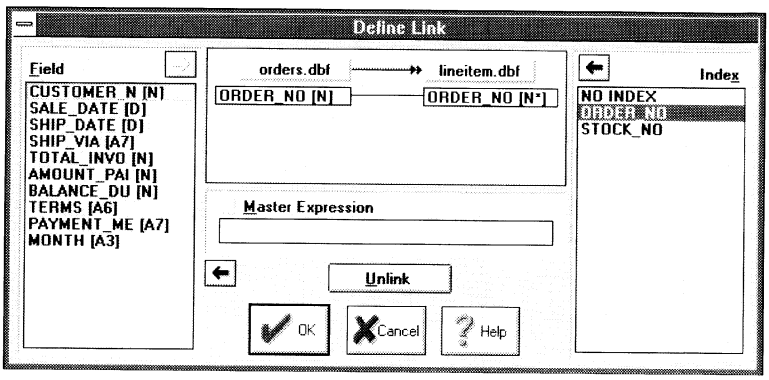
To remove an existing link, select the detail table in the data model panel and choose Unlink.

Whenever you want to change the way two tables are linked, right-click the arrow or select the detail table and click Link to display the Define Link dialog box. From there, choose Unlink to break the existing link, then specify the link you want.

Linking dBASE tables

Figure 10-7 shows the Define Link dialog box you'll see when linking two dBASE tables. Tag names are shown in the Index list.

Figure 10-7 The Define Link dialog box for dBASE tables



You can link dBASE tables only on like field types unless you use an expression index in the link. You can link dBASE tables only on maintained indexes (not .NDX files).

When working with dBASE indexes, it's recommended that the index on your master table be a unique index. Paradox treats dBASE maintained, unique indexes like Paradox primary keys. If you structure your master table this way, your dBASE data model will work just like the Paradox data models described earlier in this chapter.

You can link dBASE tables using a combination of fields, single-field indexes in the .MDX file, and expression indexes, as shown in Table10-1.

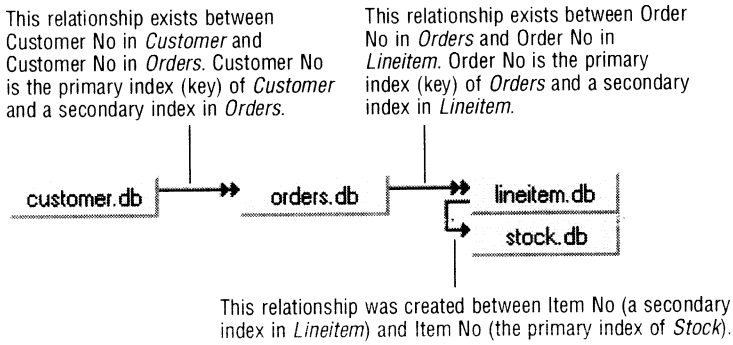
Table 10-1 dBASE linking combinations

From	To
Field	Expression index
Field	Single-field index
Master expression	Expression index
Master expression	Single-field index

Building complex data models

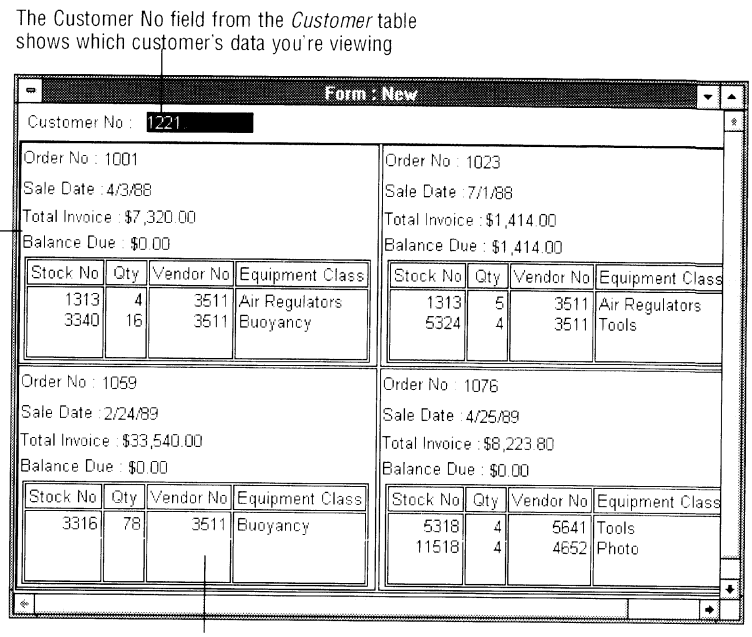
You can keep linking tables to the existing data model until you have the data model you want. As long as you have identified indexes properly, you can build data models that are as complex as you need them to be. Figure 10-8 shows a data model for some of the sample tables provided with Paradox.

Figure 10-8 A complex data model



This data model combines all the data in all the tables into a logically connected whole. As you scroll through the records in a form created from this data model (shown in Figure 10-9), you see the order information change for each customer. You'll also see line item information change for each order.

Figure 10-9 The form created from the complex data model



Note When tables are linked in a single-valued relationship, Paradox combines their fields into one table object that includes the fields of all the tables. Field names indicate which source table each field comes from. This extended table object exists only in the design document. Entries made to it are saved in the proper source tables.

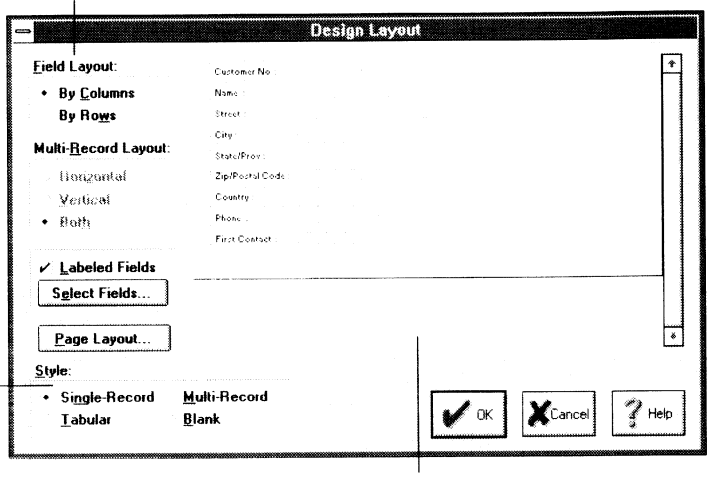
Specifying an initial layout

When you choose OK from the Data Model dialog box, Paradox displays the Design Layout dialog box. Paradox shows an image of the data model's fields in a preview window. Figure 10-10 shows the default layout for a single-table form.

Figure 10-10 The default single-table form layout

The Field Layout panel has options that control how fields in single-record and multi-record styles are displayed. The Multi-Record Layout panel has options that control how multi-record styles are displayed.

You can select specific fields to display, turn the display of field labels on and off, and specify the page layout of the form from this dialog box



To choose a different layout, use the options available from the Style panel

Use this area to view what the form's layout will look like when you open the Form Design window. This is your beginning point for designing the form.

The Design Layout dialog box is a powerful tool you can use to preview various layout options and choose one to start with.

Common features of design layouts

The Design Layout dialog box has different options for single-table documents and multi-table documents. Your document's data model determines what Design Layout dialog box you'll see.

Three features of the Design Layout dialog box remain the same whether you design a single-table or multi-table document. In both cases, you can

- Select fields to be displayed
- Display fields as labeled or unlabeled
- Specify a page layout designed for the screen or the printer

Selecting fields to display

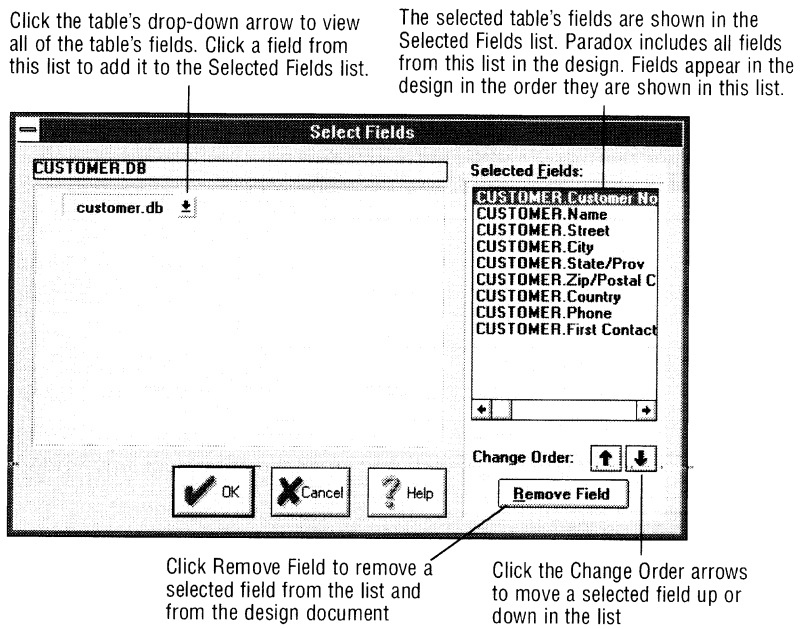
Select Fields...

By default, when you create a new design document, Paradox includes all fields from all of the tables you link to the master table of the document (except for the duplicated field between a linked master and detail table, which is shown only once in the master table). If you want to limit the included fields, you can specify the fields you want from the Design Layout dialog box.

Choose Select Fields to choose those fields you want displayed in the design. You'll see the Select Fields dialog box, as shown in Figure 10-11.

The Select Fields dialog box is invaluable for getting the basic design you want doing almost no work in a design window. It's the quickest way to decide exactly what you want to display in your design.

Figure 10-11 The Select Fields dialog box



The table(s) you've chosen for the design appear on the left side of the dialog box. All of the fields of the selected table appear in the Selected Fields list.

Note Paradox displays only fields from the master table and tables linked to it in the Select Fields dialog box. You can add fields from unlinked tables to your design in the design window, using the Field tool. See Chapter 11 for details.

To add a field to the Selected Fields list, click the table's drop-down arrow to see a list of all fields in the table. Click a field to add it, use *Shift*+click to add a range of adjoining fields, or use *Ctrl*+click to add more than one non-adjoining field.

To remove a field from the Selected Fields list (removing it from the design), select it and choose Remove Field. When removed from the

list, the field becomes available again from the table's drop-down menu, so you can always replace a removed field if you want to.

To change the order of the fields in the list (changing their order in the design), select the field you want to move and use the up and down Change Order arrows.

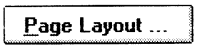
Note All changes you make in the Select Fields dialog box can be modified in a design window. You can replace removed fields with the Field tool. The Select Fields dialog box gives you an extra opportunity to make choices before opening the design window.

Hiding or showing field labels

By default, all fields in the Design Layout dialog box (and in the design window) have field labels. A field label is a text object that contains the field name. You can turn the display of all field labels off by unchecking the Labeled Fields check box. Check Labeled Fields again to turn field labels back on.

Once in a design window, you can inspect individual fields to turn on or off the display of field labels. In the Design Layout dialog box, you should think about how you want the fields to be displayed by default.

Page layout options



Choose Page Layout to display the Page Layout dialog box. Use this dialog box to define the page size of the document. You can choose from predefined page sizes or enter a custom size.

The Page Layout dialog box is different for forms and reports. It is discussed in Chapters 12 and 13.

Note If you don't choose a table from the Data Model dialog box, the Design Layout dialog box is bypassed, and you go directly to the Page Layout dialog box. Choose the page layout you want and choose OK to open a design window.

Designing single-table layouts

You use the Design Layout dialog box the same way whether you're designing a form or a report. The only difference is the way the preview image is displayed.

Bands are shown when designing report layouts.

Reports use *bands* to separate different areas of the layout. There are bands for report headers and footers, page headers and footers, and the body of the report. The Design Layout dialog box shows report bands when previewing a report layout. Paradox places the contents of your report's data model within the record band. (Report bands are discussed in detail in Chapter 13.)

Bands are not shown when designing form layouts.

Forms don't use bands, so the Design Layout dialog box preview area for a form is blank except for the contents of your form's data model.

Most of the options available for design layouts are the same for forms and reports. Each time an option is explained in the following sections, a figure of both a form and report is provided.

Single-table design style options

The Style panel of the Design Layout dialog box gives you four options for the basic layout of your design, as described in Table 10-2.

Table 10-2 Single-table style options

Choose	To display
Single-Record	One record of the table at a time
Multi-Record	Several records of the table at a time in a multi-record object
Tabular	Several records of the table at a time in a table frame
Blank	No records of the table

Single-Record is the default style for forms, and Tabular is the default style for reports.

Note If your table contains long memo fields, choose the single-record style for your report. In a report, a record must fit on a single page or Paradox displays an error message. (Sometimes a long memo can't fit on one page of a tabular report.)

Single-record layouts

Choose Single-Record to display one record of the table at a time. Figures 10-12 and 10-13 show a single-record layout for a form and a report.

Figure 10-12 A single-table, single-record form layout

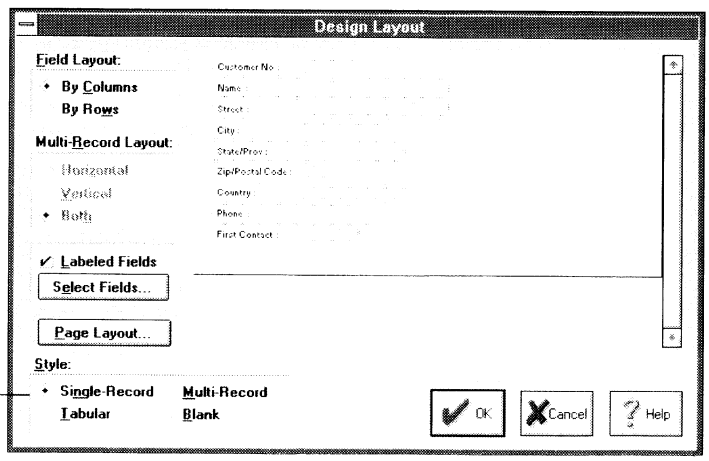
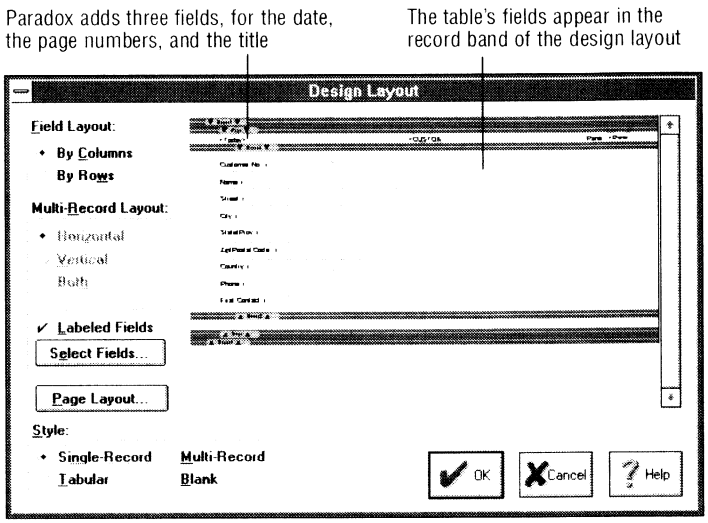


Figure 10-13 A single-table, single-record report layout



When you choose Single-Record or Multi-Record, you have the option of displaying the fields by columns or by rows. Use the Field Layout panel to choose the layout you want.

- Choose By Columns if you want the fields to appear in a top-to-bottom column along the left side of the screen. Paradox creates columns as needed until all fields are displayed or the dialog box is filled.
- Choose By Rows if you want the fields to appear one after another in a row along the top of the screen. Paradox creates additional rows as needed until all fields are displayed or the dialog box is filled.

Multi-record layouts

Choose Multi-Record to display several records of the table at a time. You'll see a multi-record object in the Design Layout dialog box. In a multi-record object, you view the fields of a record in the first record region, then specify whether you want repeated regions (each displaying an additional record) across and down the page.

Use the Multi-Record Layout panel of the Design Layout dialog box to choose the order in which the records are repeated.

- Choose Horizontal if you want the records to repeat *across* the page. (This is the default multi-record layout for a report.)
- Choose Vertical if you want the records to repeat *down* the page.
- Choose Both if you want the records to repeat *both* across and down the page. (This is the default multi-record layout for a form.)

Figures 10-14 and 10-15 are examples of the *Customer* table as a multi-record design.

Note Both these figures use the By Columns option. You can use either Field Layout option within a multi-record region.

Figure 10-14 A single-table, multi-record form layout

You see the fields in only the first region. The same pattern of fields is repeated in each region.

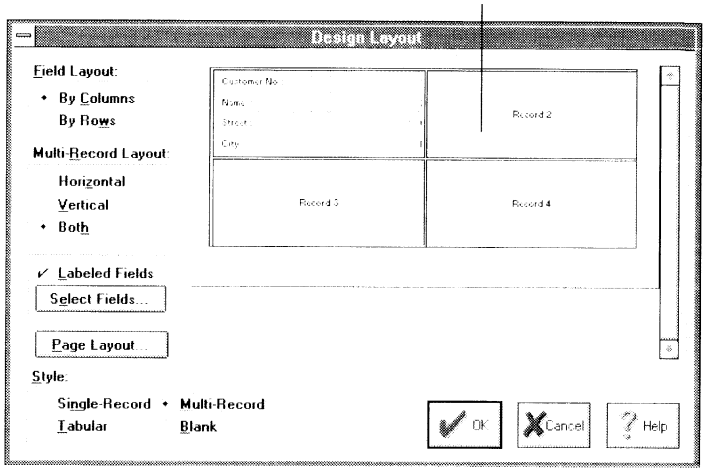
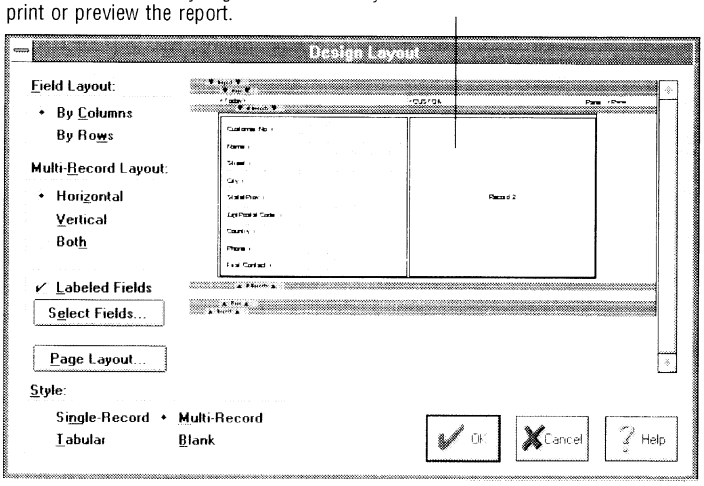


Figure 10-15 A single-table, multi-record report layout

The dialog box doesn't show how many regions will be repeated downward. By default, Paradox adds as many regions as necessary to show all of the table's data whenever you print or preview the report.



Note You specify only the initial layout from the Design Layout dialog box. Paradox provides a variety of ways you can control the layout and display of multi-record objects from the design windows.

Tabular layout

Choose Tabular to display a representation of the table you chose in the Data Model dialog box. Rows and columns are shown just as if you were working with the table itself.

Figures 10-16 and 10-17 are examples of the *Customer* table in a tabular design.

Figure 10-16 A single-table tabular form layout

The Labeled Fields option is dimmed when you choose the Tabular style. Table frames automatically include field labels as column headings.

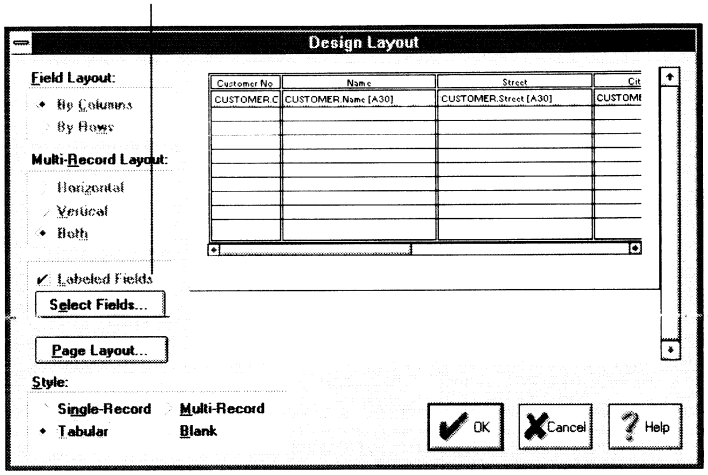
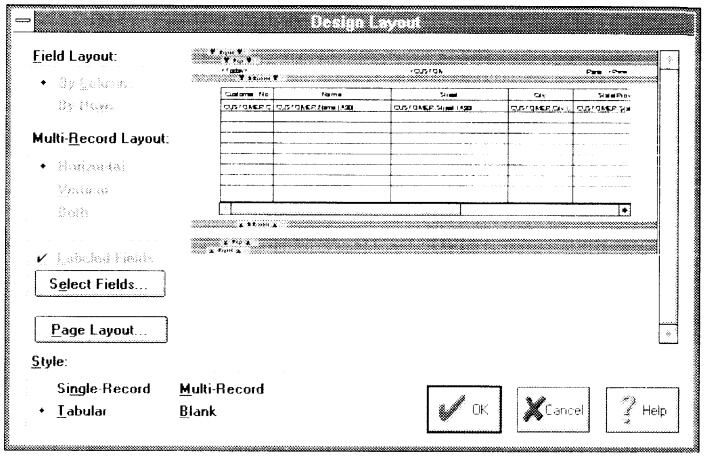


Figure 10-17 A single-table tabular report layout

This is the default layout for a single-table report



Blank layout

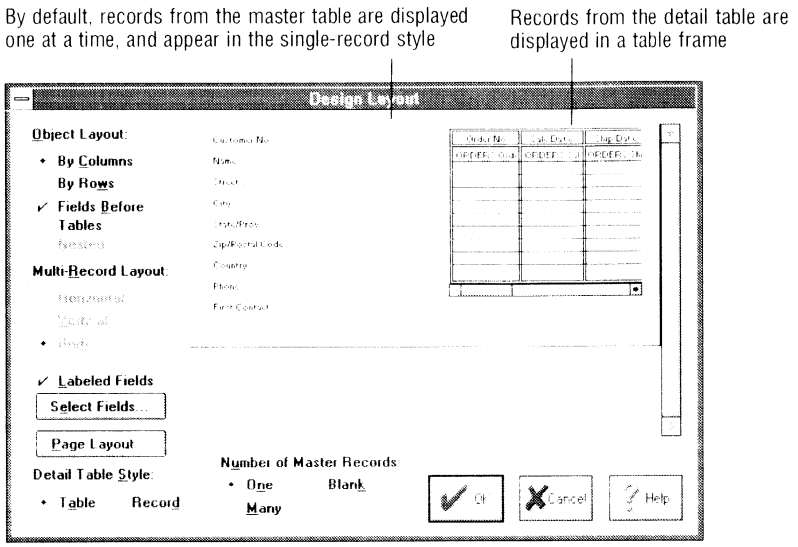
Choosing Blank from the Style panel removes the contents of the document's data model from the design. The fields of the chosen table are still available for manual placement (use the Field tool in either design window), but they are not automatically placed in any layout style.

Note Creating a design document by choosing a table with a blank layout is different from creating a blank design document. When you choose a table, then choose a blank layout, the design document you create is associated with the table, and its fields are available for placement. A *truly* blank form is not associated with any table, and only special fields and design objects can be placed on it. (You can return to the Data Model dialog box by clicking the Data Model SpeedBar button and add a table to the blank design whenever you want.)

Designing multi-table layouts

When you design a multi-table document, the options available in the Design Layout dialog box change, as shown in Figure 10-18.

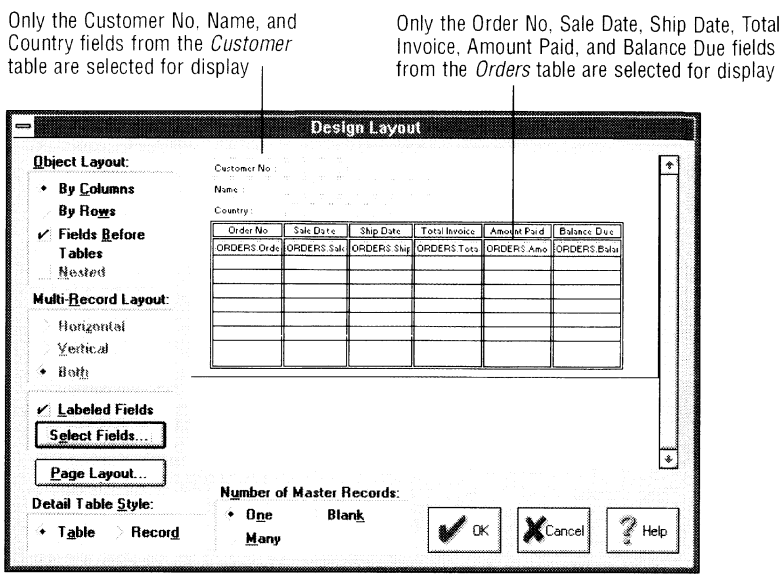
Figure 10-18 The multi-table Design Layout dialog box



Choose Blank if you don't want anything automatically placed in the design from the Design Layout dialog box. You can then place the fields you want when you open the Form Design or Report Design window.

It's a good idea to use the Select Fields button and choose those fields you want to display in the design *before* you specify an initial layout, particularly when you design multi-table layouts. This cuts down the number of objects you'll see previewed in the Design Layout dialog box, and makes previewed layouts easier to evaluate. Figure 10-19 shows the same layout as Figure 10-18, but with fewer fields from each table displayed.

Figure 10-19 Showing only selected fields in the Design Layout dialog box



Working with multi-table layouts

Earlier in this chapter you saw how the single-table Design Layout dialog box is different for a form design and a report design. This difference is also apparent when you design multi-table layouts. However, whether you're designing the layout of a form or a report, you follow the same simple steps to create the document you want.

Example 10-5 Designing a multi-table layout

When using the multi-table Design Layout dialog box for either a form or a report,

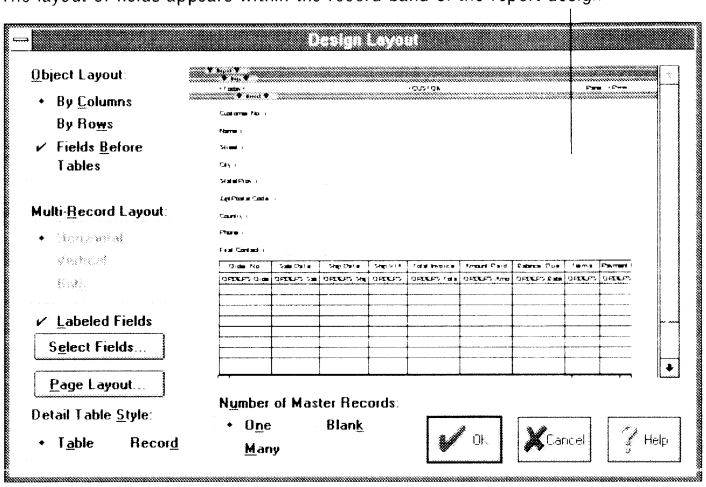
1. Use the Select Fields button to choose the fields you want Paradox to display in the design.
2. Use the Number of Master Records panel to display either one or many records from the master table.
3. Use the Detail Table Style panel to choose either a table frame or a multi-record object as the display for detail records. (The style you choose will also be the style of the master records if you choose Many from the Number of Master Records panel.)
4. Use the Object Layout panel to choose advanced layout options for your design.
5. Choose OK.

Displaying one master record at a time

The default layout for a 1→M multi-table form is shown in Figure 10-18. It shows one record of the master table and a set of detail records from the detail table displayed in a table frame. The default layout for a 1→M multi-table report is the same, as shown in Figure 10-20.

Figure 10-20 The default multi-table report layout

The layout of fields appears within the record band of the report design



Displaying the detail records in a multi-record object

Both Figures 10-18 and 10-20 show detail records in a table frame. You can choose Record from the Detail Style panel to display detail records in a multi-record object, as shown in Figures 10-21 and 10-22.

Figure 10-21 A form layout with detail records in a multi-record object

When you enter the Form Design window, you can inspect the multi-record object to change the number of regions that repeat across or down

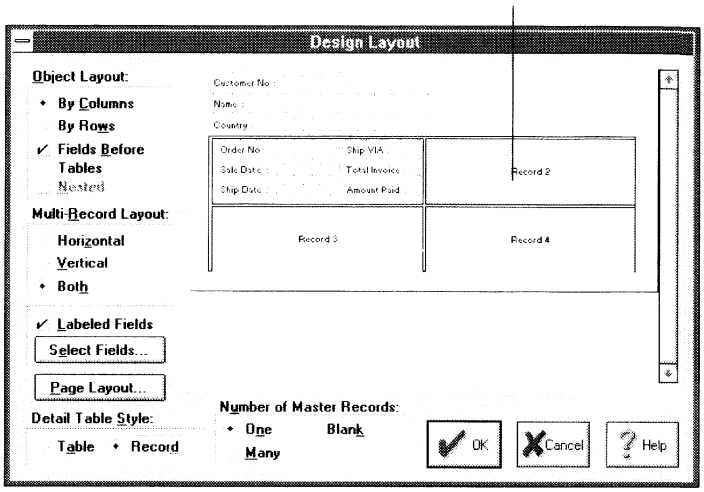
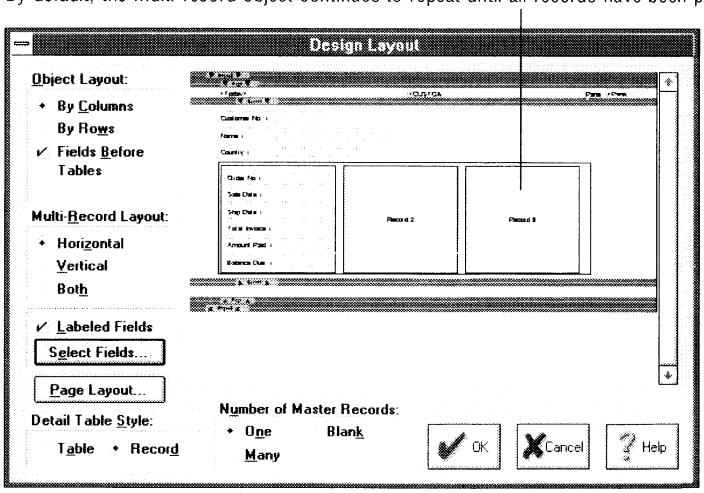


Figure 10-22 A report layout with detail records in a multi-record object

In a report layout, Paradox doesn't show how many regions will be repeated down the page. By default, the multi-record object continues to repeat until all records have been printed.



Displaying many master records at a time

When you choose Many in the Number of Master Records panel, Paradox displays more than one record at a time from the master table. In a form, the way these records are displayed depends on your Detail Table Style choice and whether the design is nested. In a report, the master record is displayed as a multi-record object, and

the detail records can be displayed in either a table or a multi-record object nested within the master multi-record object.

Master and detail table objects in form designs

If you choose Table from the Detail Table Style panel and Many from the Number of Master Records panel in a non-nested layout, Paradox displays both master and detail records as table frames. Figure 10-23 shows a form with this layout.

Note Non-nested layouts are available only in forms.

Figure 10-23 A form with both master and detail records as table objects

Many records from the master table are shown at one time. They are displayed in a table frame because Table is chosen from the Detail Table Style panel.

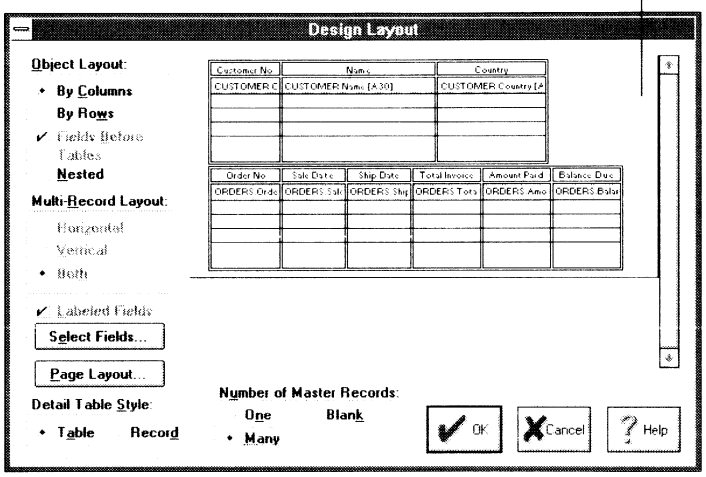
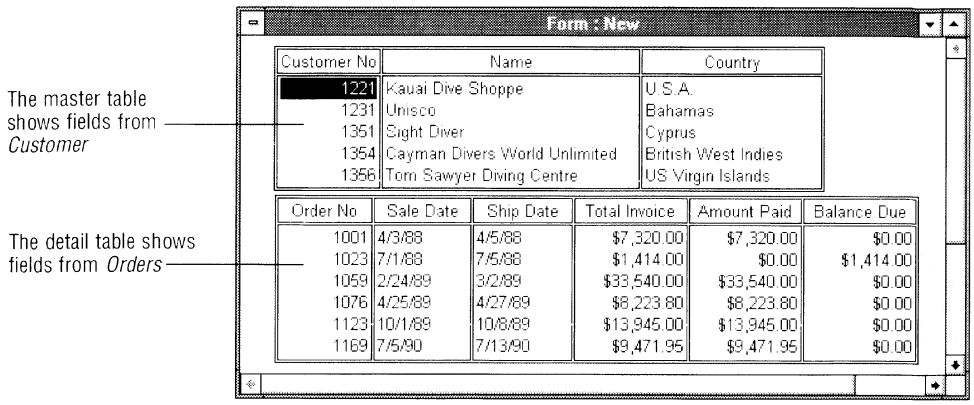


Figure 10-24 shows how this form works when you use it to view or edit data.

Figure 10-24 Viewing a two-table form

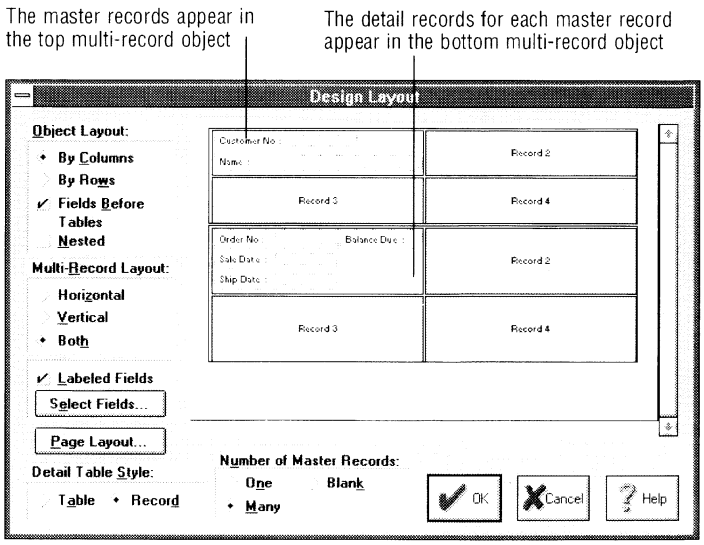
As you move through the records of the master table, Paradox updates the detail table to display only the current customer's orders



Master and detail multi-record objects in form designs

If you choose Record from the Detail Table Style panel and Many from the Number of Master Records panel, Paradox displays both master and detail records as multi-record objects. Figure 10-25 shows a form with this layout.

Figure 10-25 A form with master and detail records in multi-record objects



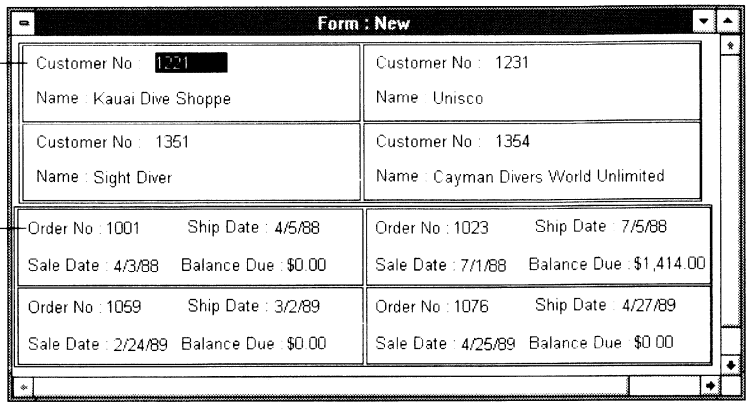
When you view data with this type of layout, you'll see a form like the one shown in Figure 10-26.

Figure 10-26 Viewing a multi-record object form

As you move through the master records, Paradox shows each master's detail records in the bottom multi-record object

The top multi-record object shows records from *Customer* (the master table)

The bottom multi-record object shows records from *Orders* (the detail table)



Note In Paradox reports, you must structure your design so that a record appears on a single page. You cannot split a record across two pages. If you have many detail records for each master, or many levels of nesting (as in a 1→M→M data model) you should make sure that all details will fit on a single page before running the report. You can do this by limiting the size or number of detail records, or by inverting the data model.

Using object layout options

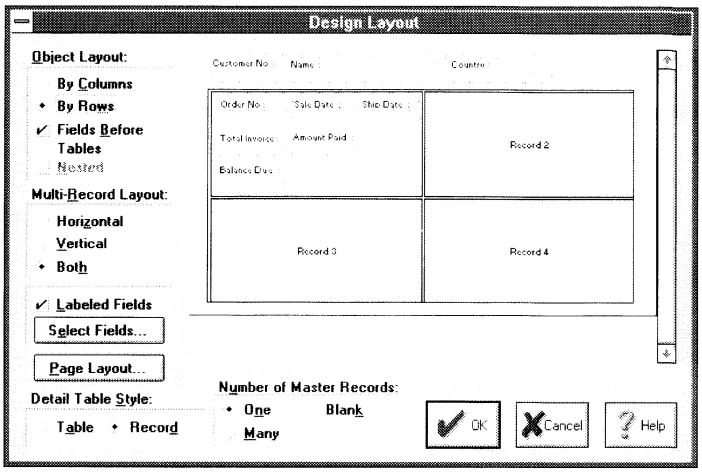
Choosing the number of master records and the detail style may be all you need to do in the multi-table Design Layout dialog box. There are also options that you can use to define the layout in greater detail.

Displaying objects by columns or rows

When working with multi-table design layouts, you can choose to display objects (whether they are fields, tables, or multi-record objects) either as columns (up and down the page) or as rows (across the page). All the figures so far in this section have shown objects displayed by columns. This is the default layout. Figure 10-27 shows how choosing By Rows can affect a design layout.

Figure 10-27 Displaying objects by rows

Both the master and the detail fields are now displayed in rows across the screen, rather than in a column down the screen

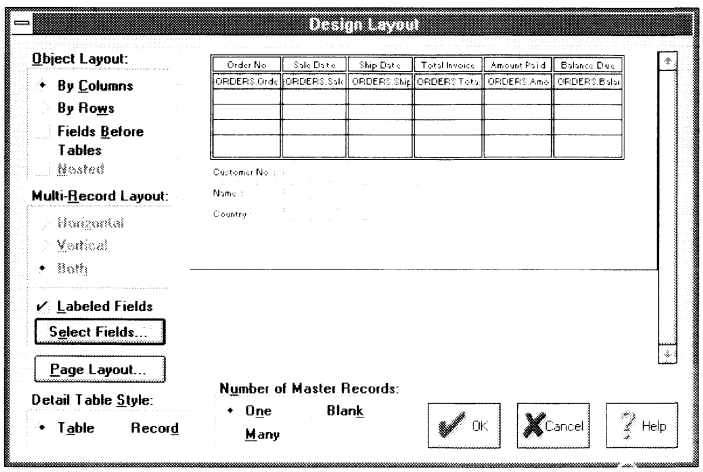


Placing fields before tables

In a multi-table design, if Fields Before Tables is checked, master records are placed before any related detail tables. If Fields Before Tables is unchecked, detail tables are placed before fields of the master record, as shown in Figure 10-28.

Figure 10-28 Displaying tables before fields

With Fields Before Tables unchecked, the detail records in their table frame are displayed before the master table's fields

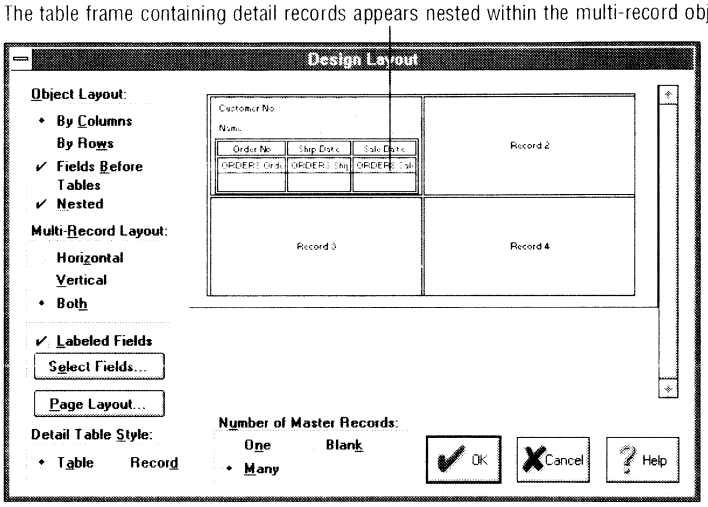


Nesting detail records in forms

In a 1→M form design, if you choose Many from the Number of Master Records panel, Paradox makes the Nested check box available in the Object Layout panel. If you choose Nested, Paradox displays the master records in a multi-record object and places the detail record object inside the master multi-record object. The details are "nested" within the master. Figure 10-29 shows a detail table object nested within a master table frame.

Note In a 1→M→M form design, the Nested check box is available whether or not you choose Many from the Number of Master Records panel.

Figure 10-29 Nesting detail records in a form



If you choose Record from the Detail Table Style panel, Paradox displays the detail records in a multi-record object nested within the master multi-record object.

Note When you design a report layout, Paradox automatically nests detail objects within master objects whenever you choose to display many master records (or have a 1→M→M or more data model). Figure 10-29 shows a nested detail table frame within a master multi-record object. Because nesting is automatic and required, there is no Nested option in the multi-table Design Layout dialog box for a report.

Designs using three or more tables

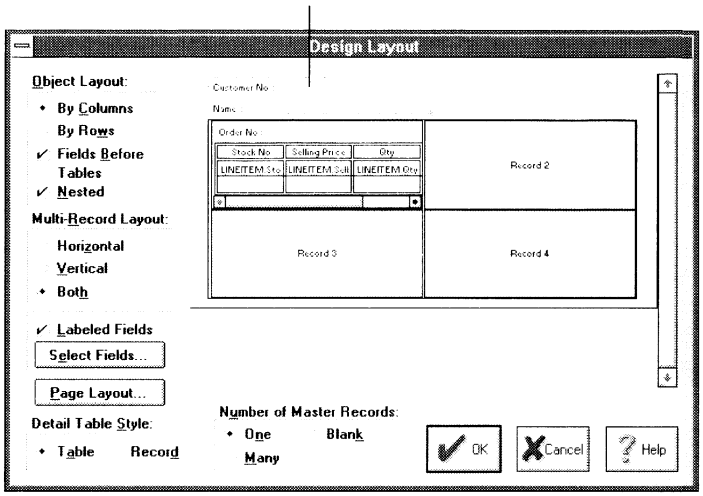
Figure 10-30 shows a layout using three tables. The relationship is *Customer*→*Orders*→*Lineitem*. *Customer* is in the single-record style, *Orders* is in the multi-record style, and *Lineitem* is in a tabular style nested within the multi-record region of *Orders*.

This is a 1→M→M link. Whenever you work with a 1→M→M link, Paradox requires both detail tables (in this case, *Orders* and *Lineitem*)

to be multi-record regions (either tables or multi-record objects). In any report design, or in any nested design, Paradox makes the first detail table (in this case *Orders*) a multi-record object. (In the Form Design and Report Design windows you can manually create a design in which the first detail table is a table frame.)

Figure 10-30 A layout using fields from three tables

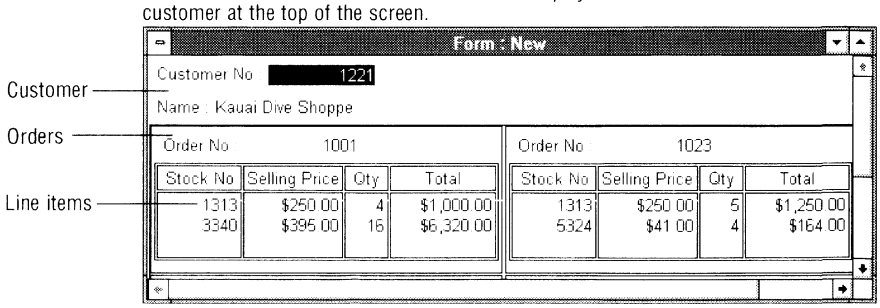
Selected fields from one record of *Customer* are displayed. Each region of the multi-record object contains fields from one record of *Orders* and a table of corresponding records from *Lineitem*.



This layout shows the relationships among the three tables. For each record in *Customer*, there can be many records in *Orders*. For each record in *Orders*, there can be many records in *Lineitem*. Figure 10-31 shows what a form looks like with this layout.

Figure 10-31 Viewing a 1→M→M form layout

Each table shows the line items for the order displayed above it. Each order refers to the customer at the top of the screen.



The variety of layouts that are possible from the Design Layout dialog box are starting points for your document design. When you open the Form Design or Report Design window, you'll be able to further customize these basic layouts to get just the look you want.

Returning to the Design Layout dialog box

The Design Layout dialog box is a powerful aid to laying out your design, but it is only a beginning point. You can change the design as much as you want in a design window after you leave the Design Layout dialog box.

You can return to the Design Layout dialog box from a design window by choosing Design | Design Layout. If you do this and make a change in the Design Layout dialog box, Paradox warns you that the design you've worked on will be replaced with the layout you choose.

Note When you return to the Design Layout dialog box, you'll see only those fields that are currently in place in the design. You can add or remove fields using Select Fields.

Although you can open the Page Layout dialog box from the Design Layout dialog box when you return to it, you should instead go directly to the Page Layout dialog box using the Form | Page | Layout (or Report | Page | Layout) command if you want to change only the page layout.

Creating documents from queries

You can design forms and reports directly from queries so that the design document is always current—Paradox runs the query before the document is used.

For example, suppose you need to produce a weekly report that lists the week's orders. You can design the report directly from a saved query.

1. Create and save a query on *Orders* that generates only this week's orders in the *Answer* table. (See Chapter 6 for information on creating and saving queries.)
2. Choose File | New | Report. In the Data Model dialog box, use the Type drop-down list to choose <Queries>. The query you saved appears in the File Name list. Choose it to design a report on the fields included in the query's answer.

3. You can change the Type choice back to <Tables> and add another table (or more) to the data model. The result of the query is the master table for the design, and the other tables can be linked details or remain unlinked.
4. In the Design Report window, make any changes you want to the report layout or properties.
5. Save the report.

Each time you run the report (either by printing or previewing it) Paradox first runs the query. This means you get the most current data as a basis each time. You don't have to repeat your work every week.

CHAPTER 11

Design tools and techniques

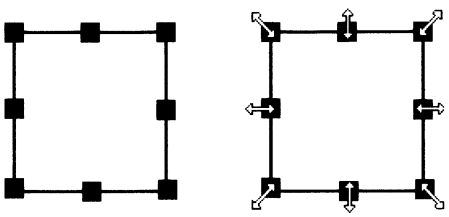
This chapter discusses design tools and techniques that you can use in Form Design or Report Design windows. You select objects, inspect objects, and use the SpeedBar and a variety of design layout and style techniques the same way in both design windows.

Selecting objects

Use the Selection Arrow to select objects for moving, resizing, editing, or otherwise manipulating in a design window.

When you select an object in a design window, handles appear around it. When you pass the pointer over a handle, the pointer changes shape to show the direction of movement possible with that handle. Grab the handles by clicking, then drag to change the size or shape of the object. Figure 11-1 shows a selected box and the directions in which you can resize it.

Figure 11-1 Selection handles



Selection options

When you click an object that is contained by another object, you have a choice for how you want Paradox to select it.

Suppose you have an ellipse contained in a box. What do you want selected when you click the ellipse—the box or the ellipse? Paradox's default action is to select the outermost object first. This means, even

though you click *inside*, Paradox selects the outer object first. The second click selects the ellipse. Likewise, if you have a field contained in an ellipse contained in a box, and you click the field, the first click selects the box, the second click selects the ellipse, and the third click selects the field.

If you prefer, you can use a design preference called *Select From Inside*. You can turn Select From Inside on by choosing Properties | Designer. You'll see the Designer Properties dialog box, discussed later in this chapter. Check the Select From Inside preference.

When Select From Inside is checked, you can select whatever object you click. In the example of a field contained in an ellipse contained in a box, you can click the field to select the field, click the ellipse to select the ellipse, and click the box to select the box.

When you've selected an object contained by another object, you can press *Esc* to select the next outermost object. For example, if you've selected an ellipse within a box, press *Esc* to select the box.

Selecting more than one object

You can select multiple objects (this is called *multi-selecting* objects) in different ways, depending on their positions and your needs.

- Use the *Shift*+click technique to select isolated objects.

  Press and hold *Shift* while you click on objects to select them. You can select as many objects as you want this way, adding them one at a time. Deselect objects by clicking them again.

- Use the *Shift*+drag technique (sometimes called *marquee selection*) to select objects that can be surrounded by an imaginary box.

  Press and hold *Shift* while you use the Selection Arrow to click on an imaginary corner near one of the objects. Hold and drag the mouse to create a box around the objects. When you release the mouse, all the objects surrounded by the box are selected.

- Use the Edit | Select All command to select all the objects within the currently selected object(s). If no object is selected when you use this command, Paradox selects all objects.

Inspecting objects and changing properties

Every object in your design has a self-contained menu of properties that determine its appearance (and sometimes its behavior). You can view an object's menu by inspecting the object.

To inspect an object's properties, right-click the object. The object's menu appears onscreen, attached to the object. Some menu choices lead to further levels of menus, some lead to dialog boxes, and some can be checked or unchecked.

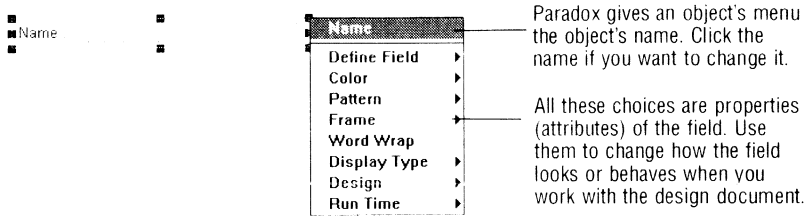
If you prefer to use the keyboard to inspect objects in the Form Design or Report Design windows, you can

- Select an object (*Tab* to it) and choose Properties | Current Object
- Select an object and press *F6*

When the object's menu appears, either type the first letter of the menu choice, or use the up and down arrow keys to move through the properties, and press *Enter* to make a choice.

Figure 11-2 shows a field object (the Name field) with its menu displayed.

Figure 11-2 Viewing an object's menu



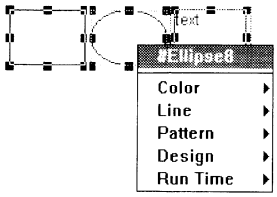
Note Some object properties are available only through ObjectPAL. Refer to your ObjectPAL documentation for details.

Inspecting multiple objects

Paradox makes it easy for you to inspect more than one object at a time. When you use any of the multi-selection techniques described earlier in this chapter, you have several inspection options.

Suppose you have a box, an ellipse, and a text object. You can multi-select them to inspect them all at once. Multi-select the objects and right-click one of the selected objects to display its property menu (as shown in Figure 11-3). Paradox applies the property you choose to all selected objects that can accept it.

Figure 11-3 Inspecting one selected object



Although all three objects are selected, when you right-click on just one of them, you get only that object's properties

Using penetrating properties

Penetrating properties are those properties that Paradox can apply to any object in a selected group *and* to any objects contained by a selected object.

To view a menu of penetrating properties, hold down *Ctrl* and at the same time right-click an object. (This is sometimes called *Ctrl*+right-clicking the object.)

To view penetrating properties using the keyboard, press *Shift+F6*.

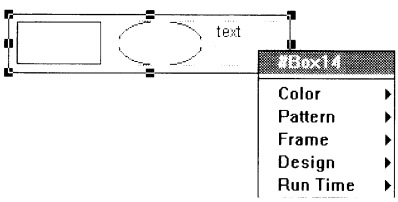
You'll see the Objects in Selected menu. This contains all properties that Paradox can apply to any of the selected objects. Some can apply to all of the objects. Others might apply to only one of the objects.

When you choose a property from this menu, Paradox applies your property choice to all selected objects for which the property is valid *and* to any objects contained by a selected object.

When several objects are contained by another object (for example, if a box and an ellipse and a text object are contained by a larger box), you can inspect the container itself, or the container and all objects it contains:

- Select the container and right-click to display the container's menu (shown in Figure 11-4). Paradox applies property choices only to the container.

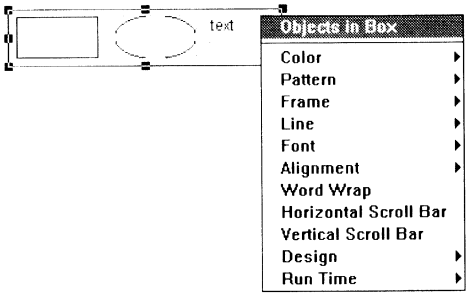
Figure 11-4 Inspecting the container



When you right-click the container, you see only the container's properties. Paradox applies the choices you make only to the container object.

- Select the container and *Ctrl*+right-click to display the penetrating properties of the container and all objects contained in it (shown in Figure 11-5). Paradox applies your property choice to all objects for which the property is valid.

Figure 11-5 Inspecting penetrating properties of contained objects



When you *Ctrl*+right-click the container, you see properties of the container and all objects within the container. Paradox applies the choices you make to all objects that can accept them.

Suppose you want to inspect everything on the form or report. First you must make sure no objects are selected, then inspect the form's page or the report's band.

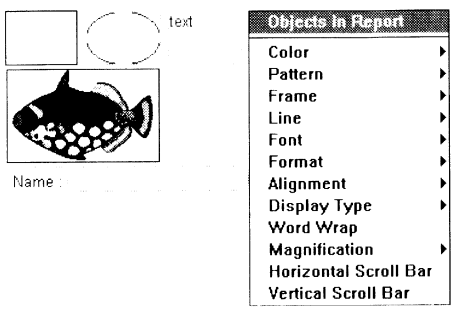
In a form, if you select nothing and

- Right-click, you'll see the page's property menu. Paradox applies your property choice only to the page.
- *Ctrl*+right-click, you'll see the penetrating properties of the page. Paradox applies your property choice to the page and all objects on the page for which the property is valid.

In a report, if you select nothing and

- Right-click, you'll see the selected band's property menu. Paradox applies your property choice only to the band.
- *Ctrl*+right-click, you'll see the penetrating properties of the selected band (shown in Figure 11-6). Paradox applies your property choice to the band and all objects in the band for which the property is valid.

Figure 11-6 Inspecting penetrating properties of all objects in the band



When none of the objects is selected, *Ctrl*+right-click opens a menu of all properties that Paradox can apply to any objects in the band.

When you change a property, Paradox applies the change to all objects that can use it.

For another way to change the properties of several different object types, see "Using a floating property palette" in the next section.

Using property palettes

Paradox displays some property choices on palettes rather than on menus. A palette *shows* you what the choices are, rather than *telling* you. Most visual properties (like colors and patterns) are displayed in palettes rather than described in menus.

You can use palettes as temporary tools. This means as soon as you use one, it goes away. Choosing an option from a temporary palette is just like choosing an option from a menu. You click the option you want, and Paradox applies it to the inspected object. Then the palette disappears. This is Paradox's default option for palettes, but you can change that.

Using a floating property palette

Suppose you want to change several objects to different colors. You could inspect each one individually, choose Color, and use the temporary Color palette, but this might get tedious after a while. Instead, Paradox provides a way to hold temporary palettes onscreen for as long as you need them.

Each temporary palette has a snap at the top. If you want to keep the palette onscreen, click the snap.

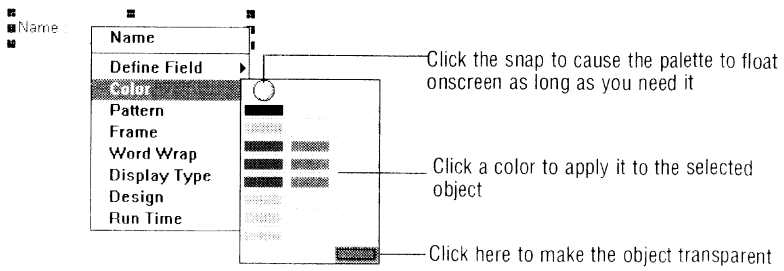
This causes the palette to "float" onscreen. You can move a floating palette anywhere on the Desktop by dragging its title bar.

When you've finished using a floating property palette, click the snap in its upper right corner to remove it from the screen.

Using the Color palette

Most objects' menus have the Color choice. When you choose Color, you'll see the Color palette appear onscreen, as shown in Figure 11-7.

Figure 11-7 The Color palette

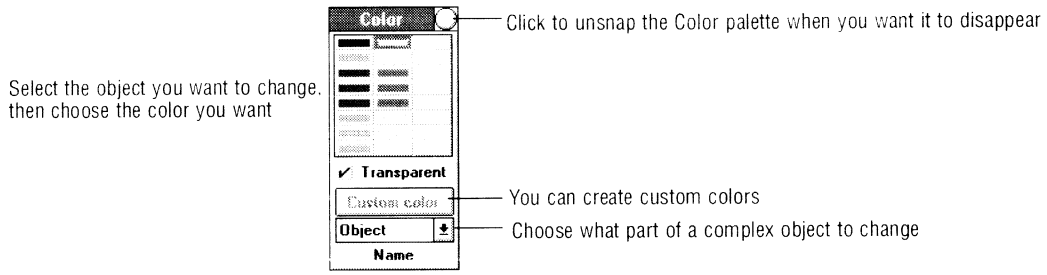


The color menu in Figure 11-7 is a temporary palette. When you click a color (or select one with the arrow keys and press *Enter*), Paradox applies the color to the object you inspected and removes the Color palette from the screen.

Click the snap at the top of the Color palette to cause it to float onscreen. Figure 11-8 shows the floating Color palette.

To snap the Color palette to the screen using the keyboard, inspect an object and press ↓ to choose Color on its menu, then press *Enter*. The temporary Color palette appears. Press ↓ to select the first color (black), then press ↑ to select the snap. Press *Enter* to snap the palette to the screen. Use the arrow keys to select the color you want. Press *Alt+F4* to unsnap the palette.

Figure 11-8 The floating Color palette



Property palettes change in appearance, and sometimes gain functionality, when you snap them to the screen.

Example 11-1 Using the floating Color palette

To change an object's color using the floating palette, follow these steps:

1. Select the object you want to change. The name of the selected object is displayed at the bottom of the palette.
2. Use the drop-down list above the object's name to choose the part of the object you want to change. (The contents of this list change based on what type of object you select.)
3. Click the color you want.

Paradox applies the color to the selected object and keeps the Color palette onscreen. You can either choose another color or select a different object and begin again.

If you prefer to use the keyboard to choose an option from a floating palette, use the arrow keys to move to the choice you want. As you move to each option, the selected object changes. Press *Tab* to move to different areas of the palette.

Using transparent colors

Both the temporary and floating Color palettes give you the ability to use transparent colors. However, the results you get differ, depending on which palette you use.

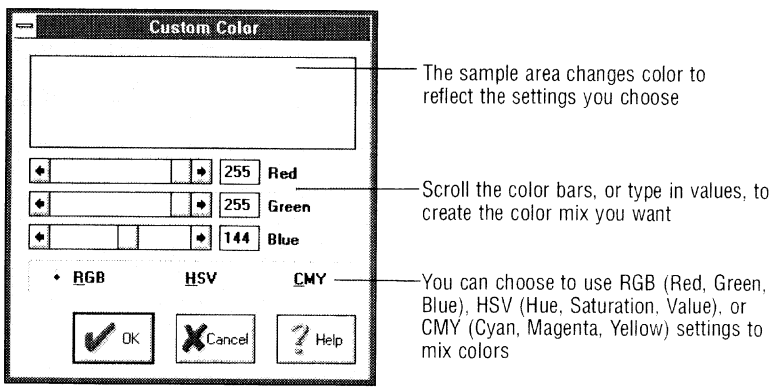
- When you choose the transparent option from the temporary Color palette, Paradox makes the inspected object transparent. This means you'll see the color of any underlying objects (including the page) through it. Transparent in this sense means *clear*.
- When you choose a color and check Transparent from the floating Color palette, Paradox applies the chosen color to the inspected object *and* makes the object transparent. This means you'll see any underlying objects through it, as if through a colored screen. This lets you blend colors onscreen. Transparent in this sense means *translucent*.

Creating custom colors

The floating Color palette gives you the option of creating custom colors.

When you choose one of the blank spaces on the floating Color palette (not the color white), the Custom Color button becomes available. Choose it to use the Custom Color dialog box, shown in Figure 11-9.

Figure 11-9 The Custom Color dialog box



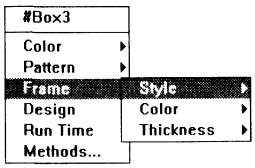
When you get the color mix the way you want it and choose OK, the custom color appears on the Color palette and is available for use.

Paradox saves custom colors in the PDXWIN.INI file, not with the particular document you're working on when you create the color. This gives you the ability to create a custom color in one design document and use it in any other design document.

Using the Frame palette

Many design objects are surrounded by a frame. Objects that have frames have the Frame property choice on their menus. Choose this to change the color, style, or thickness of the frame.

Text objects have no frame by default. Before you customize the color or thickness of a text object, choose a frame style. Then you'll see the color and thickness settings take effect.

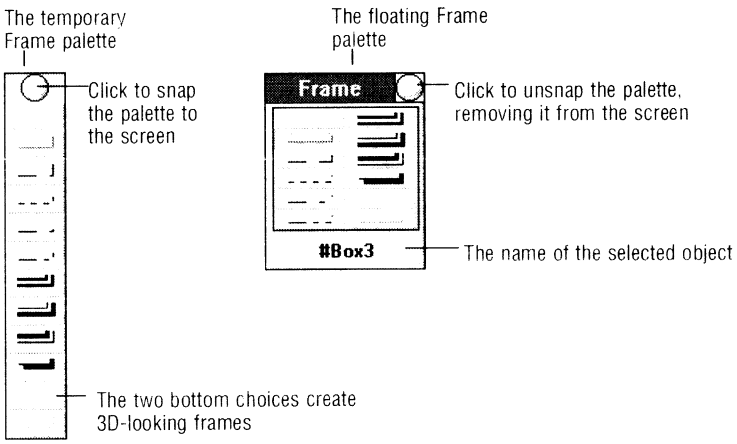


Choose Frame | Color to display the Color palette, described earlier in this section. Paradox applies the color you choose from the Color palette to the inspected object's frame.

Choose Frame | Thickness to display the Thickness palette, described later in this section. Paradox applies the line thickness you choose from the Thickness palette to the inspected object's frame.

Choose Frame | Style to display the Frame palette, shown in Figure 11-10.

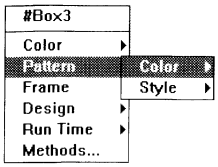
Figure 11-10 The temporary and floating Frame palettes



Choose the frame style you want (either click it or move to it and press *Enter*). Paradox changes the frame style of the selected object.

Note Frame styles that are unavailable are dimmed on the palette. Some line and frame styles can be applied only when the line or frame is set to the thinnest choice. See "Using the Thickness palette" later in this section.

Using the Pattern palette

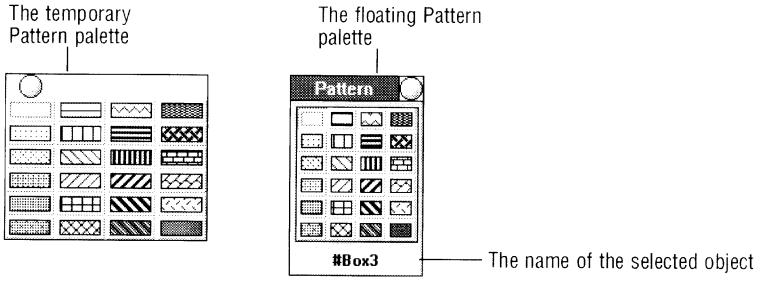


Another common menu choice is Pattern. When you choose it you have a choice of changing the color or style of the fill pattern of the selected object.

If you choose Pattern | Color, Paradox applies the color from the Color palette to the foreground (the lines or dots) of the pattern. To change the pattern's background, choose Color from the object's menu.

Choose Pattern | Style to use the Pattern palette. You'll see the Pattern palette, shown in Figure 11-11.

Figure 11-11 The temporary and floating Pattern palettes



Choose the pattern style you want (either click it or move to it and press *Enter*). Paradox fills the selected object with the pattern.

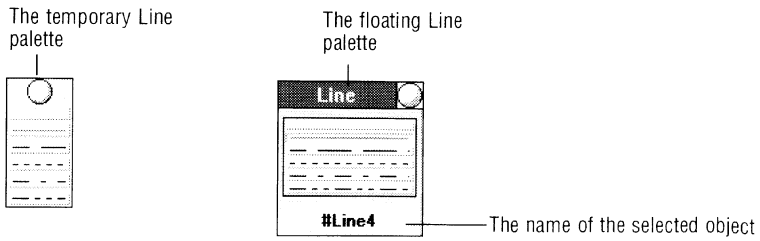
If choosing a pattern style doesn't seem to have any effect, make sure the object's foreground and background colors are different.

Using the Line palette

Several Paradox objects have one or more line options on their menus. You can change the color, the style, the type, and the thickness of lines, as well as place arrows at the ends of lines you draw with the Line tool.

Choose Line Style to use the Line palette, shown in Figure 11-12.

Figure 11-12 The temporary and floating Line palettes



Choose the line style you want (either click it or move to it and press *Enter*). Paradox changes the line style of the selected object.

Note The styles available to you depend on the thickness of the line you're changing. Not all styles can be applied to all thicknesses. Unavailable styles are dimmed on the palette.

Using the Thickness palette

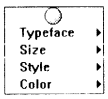
Lines and frames have the Thickness property. Use this to specify the thickness of a line or of the frame that surrounds an object.

Unlike other palettes, the Thickness palette has no snap at the top. It is always a temporary palette.

To choose a line or frame thickness, click the thickness you want.

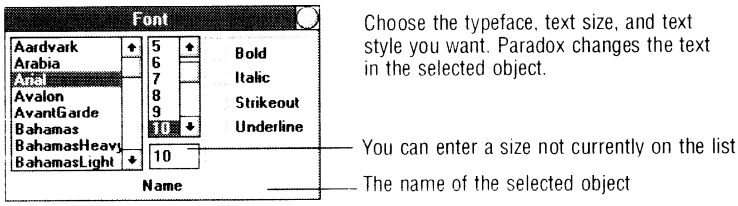
Note If you choose (in the Page Layout dialog box) to design your document for the printer rather than for the screen, you won't see the Thickness palette when you inspect an object. Instead, you'll see a menu of line weights (such as Hairline, 1pt, 2pt and so on).

Using the Font palette



When you inspect any object that can contain text (text objects, fields, tables, and so on), you'll see the Font property choice. You can change all aspects of font display separately (choose Typeface, Size, Style, or Color from the Font menu) or click the snap at the top of the menu to use the Font palette, shown in Figure 11-13.

Figure 11-13 The Font palette



Use the Font palette when you want to change more than one aspect of displayed text or more than one object.

Note The typefaces available from the Typeface menu or the Font palette show only the fonts you've installed on your system. Your fonts may not match the fonts shown in Figure 11-13.

The Font palette is also discussed in Chapter 4.

Naming design objects

When you inspect an object, the topmost item on its property menu is its name. By default, Paradox names the object with its type and a number. For example, you may see something like #ellipse32 at the top of an ellipse's menu, or #box3 at the top of a box's menu.

You don't need to inspect an object to see its name. Paradox displays a selected object's name on the status bar.

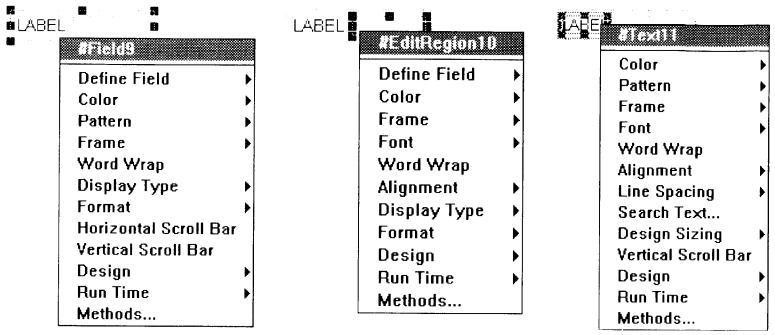
How does Paradox number objects?

Paradox numbers objects within a design document sequentially, from the first object created to the most recent. For example, when you create a form, the form itself is #1, and the page is #2. The first thing you place on a form is #3.

Suppose you create a new form and place a labeled field object on it. Because a labeled field object is made up of three parts, you can inspect it in three different places, as shown in Figure 11-14. Each part has a different sequential number.

Figure 11-14 The parts and numbers of a labeled field object

Paradox considers each part of the labeled field to be a separate object



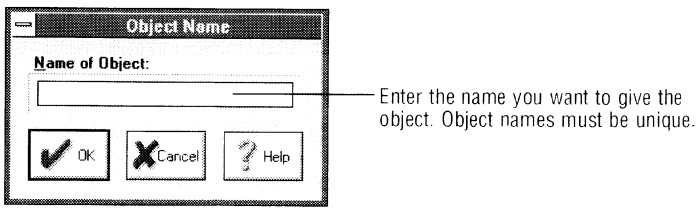
Why name an object?

You don't have to name objects. The most common reason for naming an object is so that you can easily refer to it using ObjectPAL methods. When you have a lot of objects in your design, it might be easier to remember them by the names you give them, rather than the number Paradox assigns.

How do you name an object?

To change an object's name, inspect the object and click its default name. For example, to change the name of #Field3, click #Field3 on the field's property menu. You'll see the Object Name dialog box, shown in Figure 11-15.

Figure 11-15 The Object Name dialog box



Object names can be 32 characters long and cannot contain spaces.

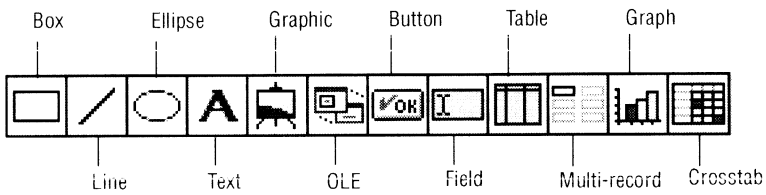
Using the SpeedBar's design tools

There is a group of objects on the SpeedBar in design windows that function differently from most buttons in Paradox. These objects are the tools you need to place objects in your designs. Figure 11-16 shows what type of object each tool creates.

This section discusses only how to create and (if necessary) define design objects. Most objects have different properties depending on whether you work with them in the Form Design or Report Design window. The properties available for design objects are discussed separately in Chapters 12 and 13.

Note Buttons are available only in forms. They are discussed in Chapter 12. Crosstabs are also available only in forms. Graphs and crosstabs are discussed in Chapter 14.

Figure 11-16 The SpeedBar's design tools



Creating new design objects

To place a design object in your design, click the tool you want, then click and drag in the design window to create the object. The pointer reverts to the Selection Arrow after you place an object. If you want to create more than one object of the same type, hold *Shift* down while you use the tool to place as many objects as you want. The tool remains active until you release *Shift*. The pointer then reverts to the Selection Arrow.

Note You must use the mouse to place objects in your designs. There is no keyboard equivalent for using the SpeedBar's design tools.

Placing boxes, lines, and ellipses

Paradox provides three drawing tools—the Box, Ellipse, and Line tools—that you can use to add graphical elements to your design.

Figure 11-17 SpeedBar drawing tools

Use the Box tool to create squares, rectangles, and boxes

Use the Line tool to draw horizontal, vertical, or diagonal lines

Use the Ellipse tool to create circles and ellipses

To create boxes, lines, and ellipses, click the appropriate tool, then click and drag in the design until the object has the shape and size you want.

Creating curved lines

Paradox gives you the option of drawing straight or curved lines. A straight line is the default. This is what you'll create when you click the Line tool, then click and drag across the page.

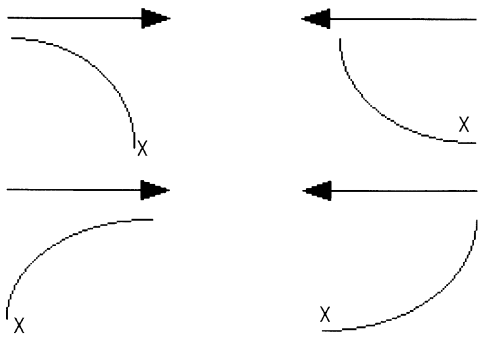
Example 11-2 Creating a curved line

If you want the line you've drawn to be curved,

1. Inspect the line and choose Line Type|Curved.
2. Drag an endpoint.

   Adjust either endpoint to adjust the angle of the curve.

   The direction of the curve depends on the direction in which you draw the line, on which endpoint you drag, and on the direction you drag the endpoint, as shown in the following figure.



Each curved line was drawn in the direction of the arrow above it

The X shows the endpoint that was dragged to make the curve

3. Experiment with dragging either endpoint to get just the effect you want.
4. To straighten a curved line, inspect it and choose Line Type|Straight.

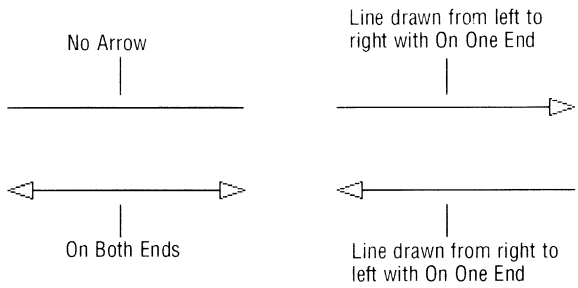
Adding arrows to lines

Paradox gives you the ability to place arrows on the ends of lines you draw. When you inspect a line and choose Line Ends, you can choose

- *No Arrow*, to tell Paradox you don't want an arrow at either end of the line. (This is the default choice.)
- *On One End*, to tell Paradox to place an arrow on one end of the line. Because you create a line by clicking and dragging with the mouse, Paradox places the arrow on the end of the line where you *release* the mouse. The arrow points in the direction you drag to create the line.
- *On Both Ends*, to tell Paradox to place arrows on both ends of the line.

Figure 11-18 shows the results of different Line Ends choices.

Figure 11-18 Line Ends options



Placing text

Use the Text tool to place an object that contains text in the design. You type text inside the object's frame.

Text objects in Paradox design documents grow and shrink to fit text differently, depending on how you create them.

You can change how a text object resizes to fit the text by inspecting the object and choosing a Design Sizing option from its menu.

Creating a resizing text object

To create a resizing text object, click the Text tool, then click in the design window and begin typing. Paradox creates a single-row text object that grows to the right until you press *Enter*. The insertion point then moves to a new line. As you continue typing, the text wraps automatically at the right border (which you defined by pressing *Enter*) and continues to expand downward until you finish typing and click somewhere else.

If you delete text, the text object shrinks, leaving no empty space.

This is a *fit text* type of text object—it grows or shrinks to fit the amount of text you enter into it. The Word Wrap property for this

type of text object turns on automatically when you press *Enter*. Paradox checks and dims it on the object's menu.

Note When Word Wrap is checked on this type of text object, you can resize the object horizontally only. When Word Wrap is unchecked, you can't resize the text object at all. (If you need to resize the object, first inspect it and choose Design Sizing | Fixed Size.)

Creating a fixed size text object

To create a fixed size text object, click the Text tool, then click and drag to place a frame on the page. Because the Word Wrap property is on by default for text objects, Paradox automatically wraps the text at the right border of the frame. When you reach the bottom of the frame, Paradox scrolls the text upward so you can view the data you're entering.

This is a *fixed size* type of text object—it doesn't grow or shrink based on the amount of text you enter into it. You can manually resize it by dragging the frame.

Placing graphics

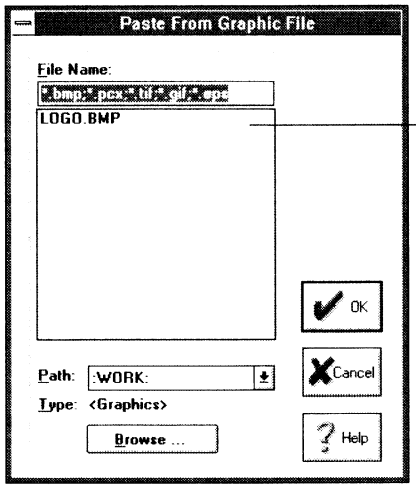
Use the Graphic tool to place graphics in your design document. You can either paste a graphic from the Windows Clipboard, or choose a .BMP, .PCX, .TIF, .GIF, or .EPS file.

To place a graphic, click the Graphic tool, then click and drag to create a frame the size and shape you want. The words **Undefined Graphic** appear in the graphic object.

Next, inspect the graphic object and choose Define Graphic from its menu.

- Choose Paste to place the contents of the Clipboard in the graphic object. (If nothing is currently on the Clipboard, Paste is dimmed.)
- Choose Paste From to name the file you want to place in the graphic object. You'll see the Paste From Graphic File dialog box, shown in Figure 11-19.

Figure 11-19 The Paste From Graphic File dialog box



Note When you define a graphic object, Paradox resizes it to fit the contents you choose and checks its Design | Size To Fit property. You must uncheck this property before you can resize the graphic object.

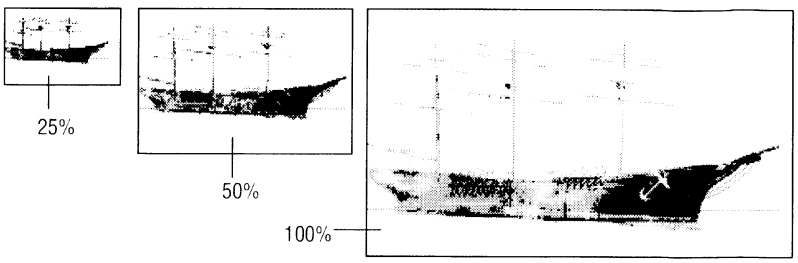
You can move the graphic within its frame by clicking and dragging it. When you click and begin to drag, the pointer changes to an open hand (shown at left). Drag the graphic to the position within the frame you want. Using this method, you can *crop* a graphic by moving it within the container, then resizing the container (you can do this only if Design | Size To Fit is off). Cropping cuts the graphic down to the size and area you want.

Clicking inside the container moves the graphic *within* the container, so you must select the container itself to move the graphic object as a whole.

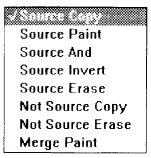
Magnifying or shrinking graphics

Choose Magnification to increase or decrease the size of the graphic. You can choose to display the graphic at 25%, 50%, 100%, 200%, or 400% of its original size. Paradox proportionally resizes the graphic to whichever setting you choose. You can also choose Best Fit, which proportionally resizes the graphic to fit the size and shape of the frame. Figure 11-20 shows the same graphic at various magnifications.

Figure 11-20 Using Magnification on a graphic object



Using raster operations



When you define a graphic object, you identify a *source graphic* (the file you choose) to be placed in a *destination* (your computer's screen). Most often, Paradox assumes you want an unchanged copy of the source placed on the screen.

Suppose, however, you want the source graphic and the screen to interact. You might want to make the source graphic transparent, so the color of the page shows through it, or you might want to invert the color of the source graphic. When you want to achieve these kinds of effects, use the graphic object's Raster Operation properties.

Raster operations define how Paradox combines the source graphic with the destination—inverting, combining, including or excluding colors to your specifications. Paradox uses the Boolean AND, OR, and XOR comparison operators to combine individual pixels of color during raster operations.

Table 11-1 briefly describes what each raster operation does.

Table 11-1 Raster operations

Raster operation	Onscreen result
Source Copy	Copy an unchanged source graphic to the destination.
Source Paint	Combine the source graphic and the destination using the Boolean OR operator.
Source And	Combine the source graphic and the destination using the Boolean AND operator.
Source Invert	Combine the source graphic and the destination using the Boolean XOR operator.
Source Erase	Invert the destination and combine it with the source graphic using the Boolean AND operator.
Not Source Copy	Invert the source graphic and copy it to the destination.
Not Source Erase	Combine the source graphic and the destination using the Boolean OR operator
Merge Paint	Invert the source graphic and combine it with the destination using the Boolean OR operator.

Creating a mask

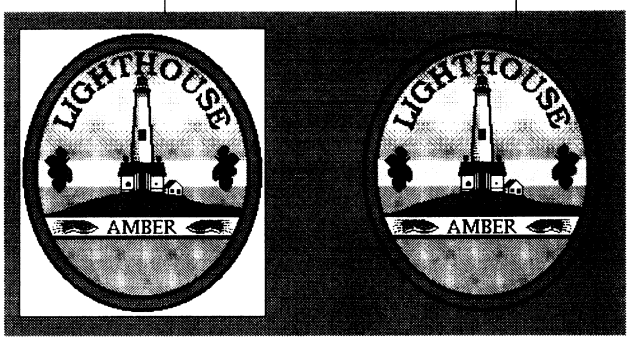
Suppose your form's page is colored, and you want to place a graphic object on it. If the background of the graphic object doesn't match the color of the page, the borders of the graphic will be obvious. A mask provides a way for you to make some areas of the graphic transparent, so the page's color shows through it.

Example 11-3 Creating a graphic mask

Suppose your form's page is green, and you want to place an oval-shaped graphic object on it. Unless the background of the oval graphic and the green of the page match exactly, you'll be able to see the borders of the graphic object.

This graphic object is completely opaque. The shape of the container obscures the page color.

This graphic object uses a mask to make the area outside the oval picture transparent. The page color shows through it.

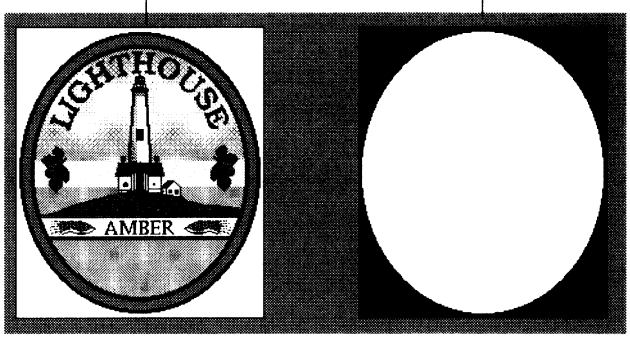


To create a mask,

1. Make a copy of the source graphic. Call it MASK.BMP.
2. In your paint program (like PaintBrush), modify MASK.BMP so that the parts you want to be transparent are black and all other parts are white.

This is the original graphic

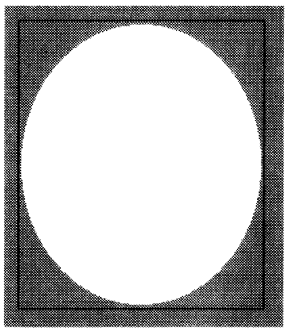
This is MASK.BMP. The part you want to be transparent is black, everything else is white.



3. In the Form Design window, place a graphic object. Inspect it and choose Define Graphic|Paste From.

   You'll see the Paste From Graphic File dialog box. Choose MASK.BMP from the File Name list.

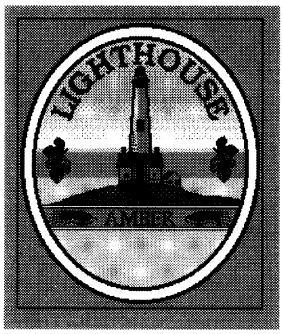
4. Inspect the graphic object and choose Raster Operation|Source Paint.



MASK.BMP with the Source Paint raster operation applied

5. Place another graphic object. Inspect it and define it as your original graphic.

6. Inspect the graphic object and choose Raster Operation|Source And.



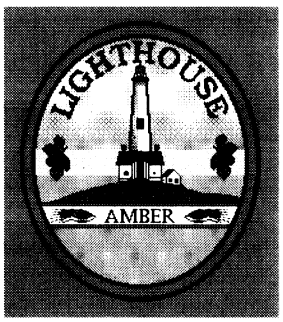
The original graphic with the Source And raster operation applied. The green of the page fills all areas that were white.

7. Select both graphic objects (***Shift***+click them).

8. Right-click one of the objects and choose Frame|Style. Choose the top style on the Frame palette to remove the frames from the graphic objects.

9. With both graphic objects still selected, choose Design|Align|Align Left. Then choose Design|Align|Align Top. Lastly, choose Design|Group.

When the original graphic and the mask are combined, the areas you want to be transparent allow the page color to show through.



The result of using the mask. The area surrounding the graphic is transparent.

Placing OLE objects

OLE stands for Object Linking and Embedding. Using OLE, Paradox can access and display data such as graphics, text, sound, and spreadsheet data from other applications. The OLE object that you place in a design gets its data from another OLE-capable application, called a *server*. Paradox is called a *client* because it receives OLE data.

For more information on working with OLE, see Chapter 15.

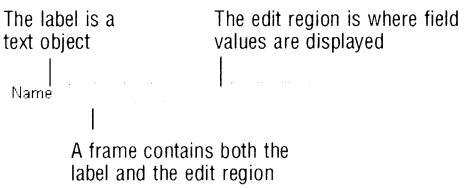
Note When you define an OLE object, Paradox resizes it to fit the contents you choose and checks its Design | Size To Fit property. You must uncheck this property before you can resize the OLE object.

Placing fields

When you create a new design document and choose any layout other than blank from the Design Layout dialog box, Paradox places the fields from your table in the design. If you want to add more fields to the design, use the Field tool.

Click the Field tool and click and drag on the page to place a field object. By default, Paradox creates a labeled field object. Labeled fields are compound objects, made up of three parts. The field object itself contains the field label (a text object), and an edit region in which the field's data appears, as shown in Figure 11-21.

Figure 11-21 The parts of a labeled field

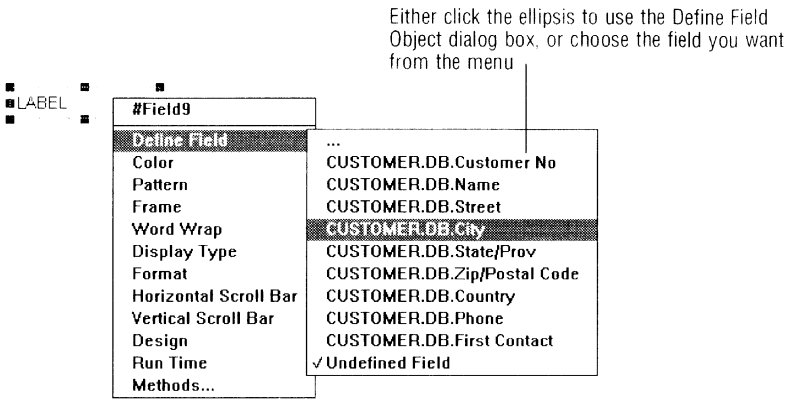


Defining a field object

You must define which field's values you want to display in the field object you place.

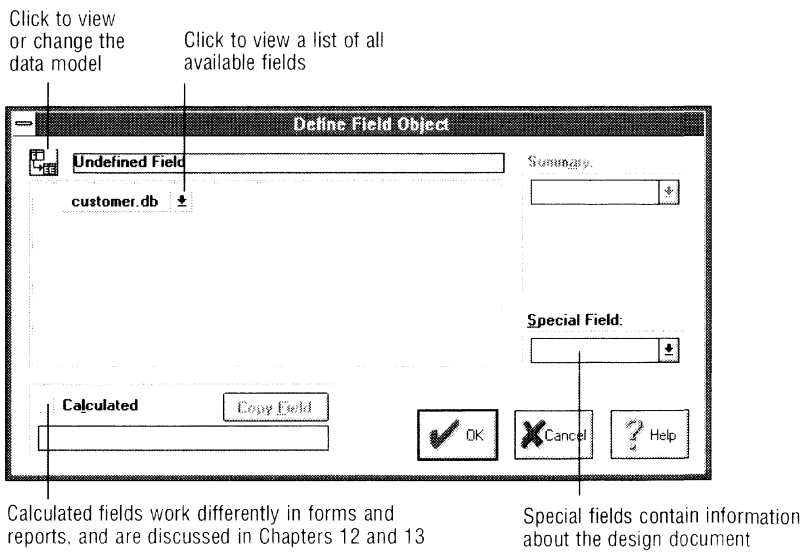
The definition of a field object is one of its properties. Inspect a field and choose Define Field. Paradox displays a menu of available fields. Figure 11-22 shows the menu of available fields for a field object placed in a form bound to the *Customer* table. Click a field name to define the field object.

Figure 11-22 Defining a field object



If you need to place a field that isn't available from the menu, choose the ellipsis (...) to display the Define Field Object dialog box.

Figure 11-23 The Define Field Object dialog box



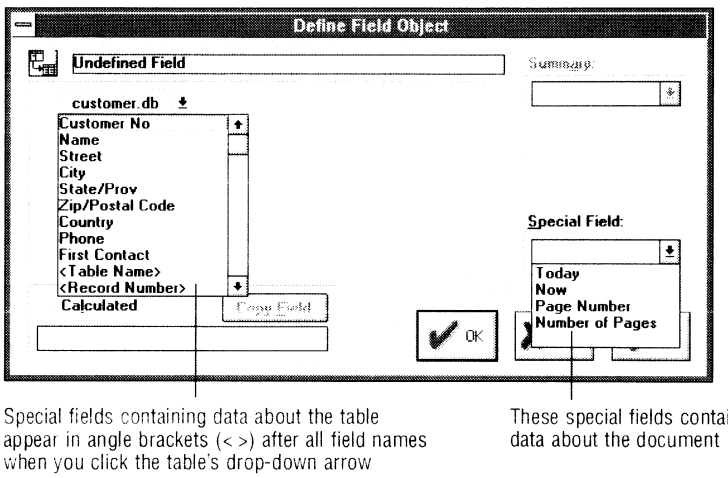
Defining special fields

A *special* field doesn't contain data from a table. It contains information about the table or about the design as a whole.

Choose special fields that relate to the table (the table's name, the current record number, the number of records in the table, and the number of fields in the table) by clicking the drop-down arrow attached to the table name in the Define Field Object dialog box.

Choose special fields that relate to the design as a whole (today's date, the current time, a page number, the number of pages) by clicking the drop-down arrow in the Special Field panel of the Define Field Object dialog box. See Figure 11-24.

Figure 11-24 Special fields



Special fields containing data about the table appear in angle brackets (< >) after all field names when you click the table's drop-down arrow

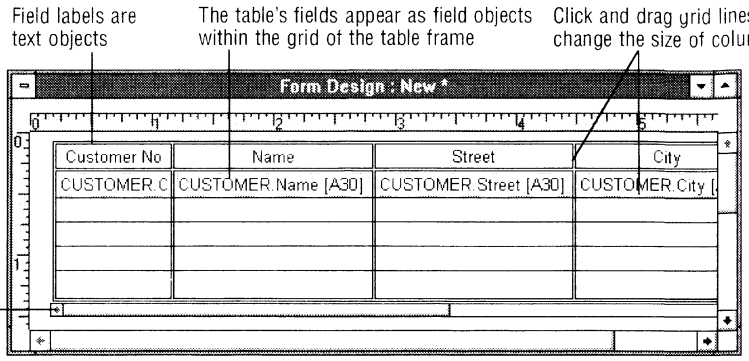
These special fields contain data about the document

Choose the special field you want and choose OK. Paradox defines the field object according to your choice.

Placing tables

If you choose the tabular layout from the Design Layout dialog box (discussed in Chapter 10), you see a *table frame* in your design. Figure 11-25 shows a *Customer* form with a table frame containing all the fields from the *Customer* table.

Figure 11-25 A table frame in the Form Design window



By default, a table frame looks like the table that defines it. In Figure 11-25 the table frame looks like the *Customer* table. But *a table frame isn't a table.* It is a composite object consisting of

- *Field objects*: the fields from the source table
- *Text objects*: the labels of the fields
- *Columns*: the vertical display of fields that you can insert, or delete
- *Rows*: the horizontal display of records that you can inspect
- *Headers*: the row of field labels

Creating a new table frame

If you choose the blank layout from the Design Layout dialog box (discussed in Chapter 10), or if you want to display additional tables in your design, you can use the Table tool to place table frames on the page.

If you've already specified a table in the document's data model, the new table frame can be either linked to or independent of it. (See Chapter 10 for information about linking tables in a multi-table design.)

To place a table frame, click the Table tool and click and drag to define the size of the table on the page. You'll see a table grid with labels and undefined fields. This is the table frame.

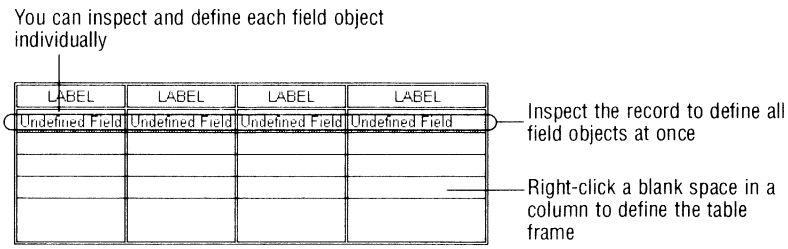
Defining a table frame

When you define a table frame, you specify the fields you want displayed in it. You can do this in any of three ways:

- Inspect each field and choose Define Field. This way you can define the individual field objects.

- Inspect the record and choose Define Record. This way you choose a table and Paradox defines the field objects in the table frame as the fields of that table.
- Inspect the table frame and choose Define Table. This way you choose a table and Paradox defines the field objects in the table frame as the fields of that table.

Figure 11-26 Defining a table frame



Defining field objects is discussed earlier in this chapter.

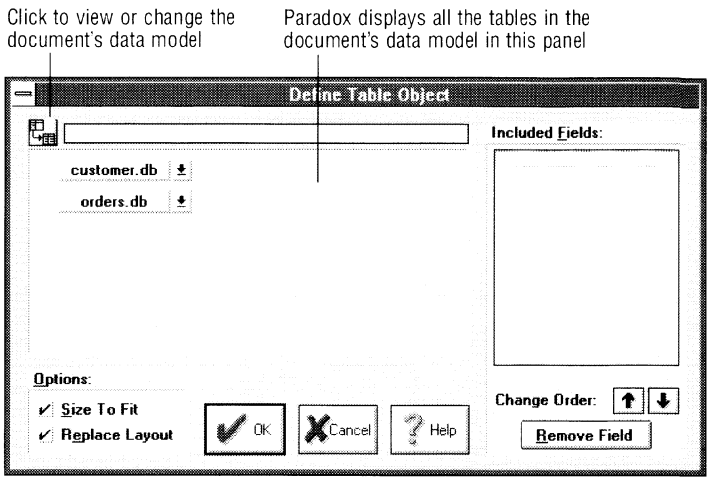
Whether you inspect the record and choose Define Record or inspect the table frame and choose Define Table, you'll see a list of the tables that are in the document's data model. Choose the table you want. Paradox places its fields and field labels in the table frame, replacing anything currently in the record or header (including property settings or ObjectPAL code).

If you want to change the definition of the table frame, inspect the table frame or the record to view the menu of available choices, then choose the ellipsis (...) to open the Define Table Object dialog box, shown in Figure 11-27.

Using this dialog box, you can customize the table you want displayed in the table frame before you define it. You can

- Select the fields to be shown in the table frame
- Rearrange the fields
- Add more fields to an existing table frame definition

Figure 11-27 The Define Table Object dialog box

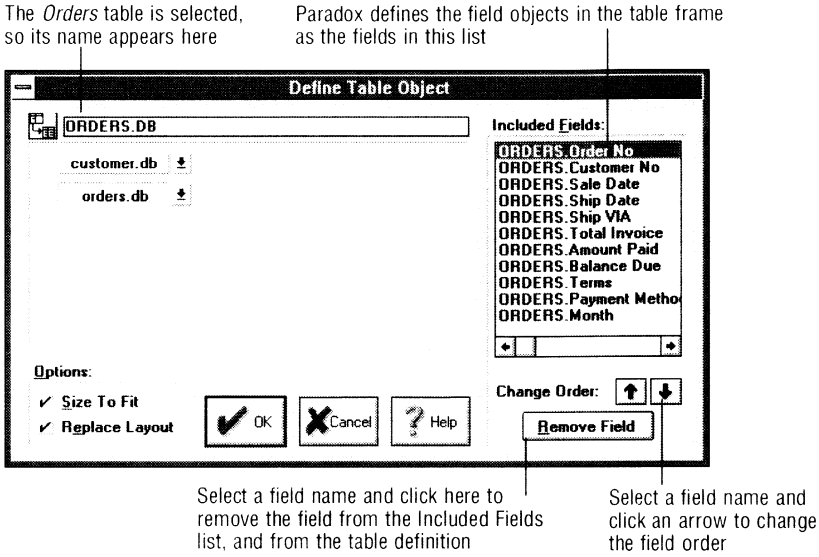


When you click the table's drop-down arrow, you can multi-select fields to include in the definition of the table frame

If you click a table in this dialog box, its name appears next to the Data Model button and the words <No fields included> appear in the Included Fields list. If you choose OK at this point, Paradox defines the table frame as the table you choose, but does not define any field objects with the chosen table's fields. You can inspect and define each field object individually.

To define the fields you want displayed in the table, click the table's drop-down arrow. You'll see a list of all the table's fields. Hold *Ctrl* and click the fields you want, or hold *Shift* and click to select a range of fields. The fields you choose appear in the Included Fields list, shown in Figure 11-28.

Figure 11-28 Choosing fields to display in the table frame



Once you choose the table and fields you want displayed in the table frame, and arrange the order of those fields, you have further options:

Options:
✔ Size To Fit
✔ Replace Layout

- Check Size To Fit if you want the table frame to grow or shrink to fit all fields in the table you've defined. If you uncheck Size To Fit, the table frame retains the size and shape you gave it when you placed it.

- Check Replace Layout to replace fields that are currently in the table frame with the fields that are listed in the Define Table Object dialog box. If you uncheck Replace Layout, Paradox appends the fields you add to the table frame, leaving existing fields intact (even if existing fields are undefined).

  If you don't check Replace Layout, the new definition may be incompatible with some fields already in the table frame. In this case, the previously existing fields become undefined.

Caution

Replace Layout deletes all objects currently contained in the record or header and rebuilds the table. Anything in the table (including ObjectPAL code) is lost when you choose Replace Layout.

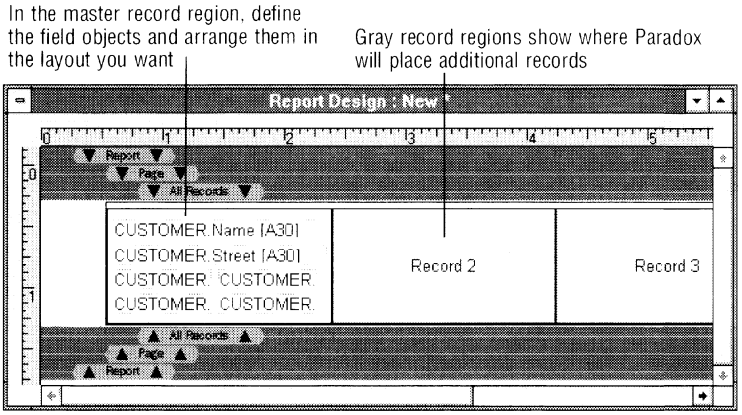
When you choose OK, Paradox defines the table frame with the fields you've chosen.

Placing multi-record objects

A *multi-record* object displays several records at a time, using a field layout that repeats a specified number of times horizontally and vertically on the page. You can place fields in any pattern. You define the field layout for one record and then specify how many records across and down you want.

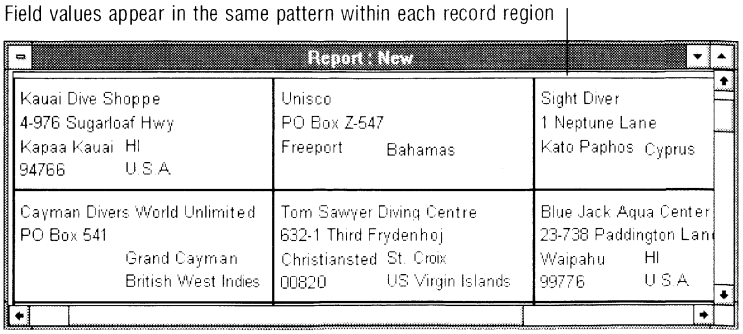
You can choose a multi-record layout from the Design Layout dialog box when you create a new form or report. A common use of a multi-record object is to create mailing labels. Each label is a group of fields (like Name, Address, City, State, and Zip) in a layout, repeated for every record of a table. Figure 11-29 shows the design for a multi-record report using fields from the *Customer* table.

Figure 11-29 Field objects within a multi-record object



When you print (or preview) this report, Paradox repeats the pattern of the fields in the master record region for every record in the *Customer* table.

Figure 11-30 Previewing a multi-record object in a report

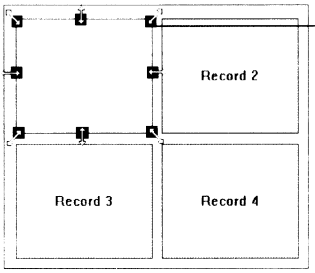


Creating a new multi-record object

If you want to add a new multi-record object to a design, use the Multi-Record tool. Click the tool, then drag until the multi-record object is the size and shape you want.

To resize the records, select the master record region and drag any of its selection handles. Paradox resizes the gray repeating regions along with the master record region.

Figure 11-31 Resizing record regions of a multi-record object



Defining a multi-record object

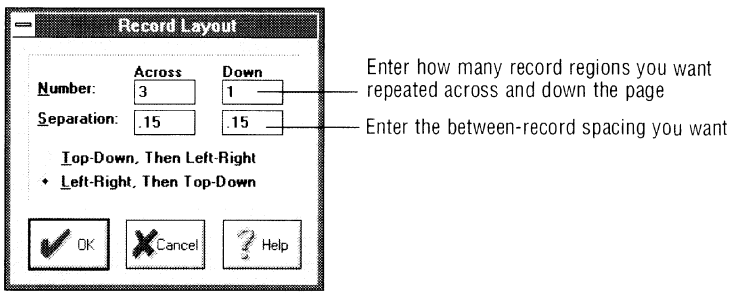
To define the fields you want to display in the multi-record object, inspect the object and choose Define Record. You'll see a menu of the tables in the document's data model. Choose the table you want, and Paradox places its fields in the master record region. If you don't see the table you want in this menu, choose the ellipsis (...) to open the Define Multi-Record Object dialog box. This dialog box works the same as the Define Table Object dialog box (see Figure 11-27). Use the Define Multi-Record Object dialog box to choose the table and fields you want to display.

If you prefer, instead of defining the multi-record object, you can use the Field tool to place field objects individually in the master record region. Define the field objects individually, by inspecting them and choosing Define Field. (See "Defining a field object" earlier in this chapter.)

Specifying the layout of a multi-record object

Inspect the multi-record object and choose Record Layout to specify how many records across and down you want repeated. You'll see the Record Layout dialog box.

Figure 11-32 The Record Layout dialog box



Use this dialog box to

- Specify the number of records you want repeated across and down the page.
- Set the vertical and horizontal spacing between the records. Paradox uses the unit of measurement (inches or centimeters) you specify in the Grid Settings dialog box (see "Using the grid" later in this chapter).
- Establish the order in which the records appear. If you choose Top-Down, Then Left-Right, Paradox places the records down the first column of record regions, then down the next column, and so on. If you choose Left-Right, Then Top-Down, Paradox places the records across the top row, then across the next row, and so on.

Note When specifying the layout of a multi-record object in a report, the number of repeats down can be affected by the Run Time | Show All Records and Delete When Empty properties. See Chapter 13 for details.

Changing a tool's properties

You can change the properties of any of the design tools on the SpeedBar. This changes the *default properties* for the tool. All objects you subsequently create with that tool use the properties as you have changed them.

Inspecting design tools

One way to change a tool's properties is to inspect the tool. Right-click the tool on the SpeedBar to view its menu. In the title bar, you'll see the word PROTO: followed by the name of the tool. Use this menu to set prototype properties for objects you create using the tool.

Example 11-4 Changing a tool's default properties

Suppose you want all boxes in your design to have a red frame and a dot pattern. You can change the Box tool's properties so that every box you create using this tool will have a red frame and a dot pattern.

1. Right-click the Box tool. You'll see the PROTO:box menu.
2. Choose Frame | Color and choose red from the Color palette. (See "Using the Color palette" earlier in this chapter for information on choosing colors.)
3. Choose Pattern | Style and choose dots from the Pattern palette. (See "Using the Pattern palette" earlier in this chapter for information on choosing patterns.)

Copying an object's properties to the tool

Another way to change a tool's properties is to copy the properties of an existing object to the appropriate tool on the SpeedBar. For example, if you've created a yellow ellipse with a thick blue frame and you want all the ellipses you create to look just like it, select it and choose Design | Copy To SpeedBar. Whenever you create a new ellipse, the Ellipse tool uses those properties.

Even though there is no Page tool on the SpeedBar, you can inspect and change the properties of a document's page and choose Design | Copy To SpeedBar. Paradox saves the page properties for use the same way it saves design tool properties. This is also true for records of table frames or multi-record objects, edit regions of field objects, and headers of table frames.

Saving changed tool properties

The properties you set for a tool remain in effect for all design documents until you exit Paradox. If you want to keep them permanently, choose Properties | Designer to open the Designer Properties dialog box. You can either create a new file to store design tool properties, or modify the existing file. The Designer Properties dialog box is discussed later in this chapter.

Using Design properties

All design objects have the Design choice available on their menus. When you inspect an object and choose Design, you see a menu of properties that Paradox applies to the object only in the design window. These properties help you work with objects in a Form Design or Report Design window.

The Design choices available differ depending on the object you inspect. For example, Contain Objects is not available for a line because a line is incapable of containing another object. On the other hand, some objects (like tables) are always containers, and you can't

uncheck the Contain Objects property. Table 11-2 shows each design object and the Design properties available for it.

Table 11-2 Design property options

Object	Design properties			
	Pin Horizontal	Pin Vertical	Contain Objects	Size To Fit
Box	●	●	●	
Line	●	●		
Ellipse	●	●	●	
Text	●	●	●	
Graphic	●	●	●	●
OLE	●	●	●	●
Button*	●	●	●	
Field	●	●		●
Table	●	●		●
Multi-record	●	●		
Graph	●	●	●	
Crosstab*	●	●		

* Buttons and Crosstabs are available only in the Form Design window

Note In addition to the objects shown in Table 11-2, you can also inspect a form's page, a report's bands, a table or multi-record object's record, a table's header, and a field's edit region.

Containing objects

When one object exists completely within the borders of another, it can be *contained* by the outside object. Contained objects move when you move their containers, and are deleted when you delete their containers.

Creating a contained relationship

All objects that can use the Design | Contain Objects property have it checked by default. This means you have only to place one object inside another to create a contained relationship. There are several ways you can place one object inside another. You can

- Create a new object within the borders of an existing object
- Move an existing object completely within the borders of another object
- Move or resize a container around an object

- Paste an object into another

If you have Snap To Grid on, it may be difficult to have one object contain another because both objects might try to align on the same grid line. In this case, resize one or both of the objects so they snap to different grid lines, or turn off Snap To Grid.

Breaking a contained relationship

To break a container/contained relationship, you can

- Inspect the container object and uncheck Design | Contain Objects
- Select the contained object and move it outside the border of the container

It's not necessary to move the contained object completely outside the border of the container. The relationship is broken as soon as one part of the contained object is moved outside the border of the container.

Unbreakable contained relationships

You can't move certain objects out of their containers under certain circumstances. For example, if you're working with a labeled field object, you can't move either the field label (a text object) or the field edit region out of the container. This is because the labeled field object, by definition, includes all three parts in a contained relationship.

Deleting objects in contained relationships

Keep these two rules in mind when you delete objects in contained relationships:

- Deleting a container deletes any objects contained in it.
- Deleting a contained object does not affect its container.

Pinning objects in design windows

You can move any object in either design window by clicking and dragging it. This lets you put every object exactly where you want it. You can use the Design | Pin Horizontal or Design | Pin Vertical properties to pin an object to its onscreen position. Pinning is especially useful if you want to move something horizontally but not vertically, or vertically but not horizontally.

Keep these rules in mind when you pin objects:

- You pin an object relative to its container. You can still move a pinned object's container as long as the container itself isn't pinned.
- Moving or resizing an object to surround a pinned object does not cause it to become contained.
- Paradox can move pinned objects by automatic actions such as using the Design | Align command. Pinning is provided only to prevent you from inadvertently moving an object with the mouse.

You can pin any object in either design window.

All objects in both design windows have the Design | Pin Horizontal and Design | Pin Vertical properties available.

When you pin an object horizontally (choose Design | Pin Horizontal), you can move it up or down on the page, but you can't move it left or right.

When you pin an object vertically (choose Design | Pin Vertical), you can move it left or right on the page, but you can't move it up or down. You can pin an object both horizontally and vertically.

You can unpin objects.

When you choose either Pin Horizontal or Pin Vertical, a checkmark appears next to the choice on the property menu. If you change your mind about pinning an object, inspect the object again, and choose either Pin Horizontal or Pin Vertical (whichever you want to remove) to remove the checkmark and unpin the object.

Note In addition to pinning objects in the design window, you can also pin them when you run (print or view) the report. See "Pinning objects at run time" later in this chapter.

Sizing objects to fit their contents

Fields, tables, graphic, and OLE objects in design documents use the Design | Size To Fit property. If you check Size To Fit, the object automatically grows or shrinks to fit the size of its contents.

For example, suppose you create a small field object, then define it as Customer No. If Size To Fit is checked, the field label and edit region automatically resizes to fit the definition, and the whole field object resizes around them. If you redefine it as Qty, the field automatically shrinks to fit the smaller definition.

Size to Fit can work slightly differently on different objects.

- *Tables*: If the table tries to grow and can't, Paradox places a horizontal scroll bar and turns Size To Fit off. When you manually resize a table with Size To Fit on, Paradox resizes the table's columns.
- *Fields*: Size To Fit remains on, even if there is a problem resizing the field object. You can resize field objects manually, but Paradox resizes them automatically when you change the font, definition, display type, and so on.
- *Graphic and OLE objects*: Size To Fit remains on, even if there is a problem resizing the graphic or OLE object. You cannot manually resize a graphic or OLE object with Size To Fit on.

Using Run Time properties

All design objects have the Run Time choice available on their menus. When you inspect an object and choose Run Time, you see a menu of properties that Paradox applies to the object only when you *run* (view or print) the document.

The Run Time choices differ depending on the object you inspect and the type of document you're working with. Table 11-3 shows each design object and the Run Time properties available for it.

Table 11-3 Run Time property options

Objects	Run Time properties																
	Visible	No Echo	Comp. Display	Tab Stop	Read Only	Pin Horizontal	Pin Vertical	Fit Height	Fit Width	Breakable	Shrinkable	Orphan/Widow	Field Squeeze	Line Squeeze	All Columns	All Records	Invisible
Box	○					◗	◗	◗	◗	◗	◗						◗
Line	○					◗	◗			◗							◗
Ellipse	○					◗	◗	◗	◗		◗						
Text	○					◗	◗	◗	◗	◗		◗	◗	◗			
Graphic	○					◗	◗										
OLE	○					◗	◗										
Button*	○			○													
Field	○	○	○	○	○	◗	◗	◗	◗								
Table	○					◗	◗			◗					◗	◗	
Multi-record	○					◗	◗			◗						◗	
Graph	○			○		◗	◗										
Crosstab*	○																

○ Indicates the property is available only in the Form Design window.

◗ Indicates the property is available only in the Report Design window.

* Buttons and Crosstabs are available only in the Form Design window.

Invisible objects

All objects in the Form Design window have the Run Time | Visible choice on their menus. Visible is checked by default. If you uncheck Visible, Paradox hides the object (and all objects contained by it) when you run the document. This feature is useful mainly for ObjectPAL developers who want to design documents in which objects are visible only when needed.

Boxes and lines in the Report Design window have the Run Time | Invisible choice on their property menus. Invisible objects can be used to control the growing and shrinking of other objects. See Chapter 13 for details. When you check Run Time | Invisible, Paradox hides the object, but doesn't hide any objects contained by it.

Pinning objects at run time

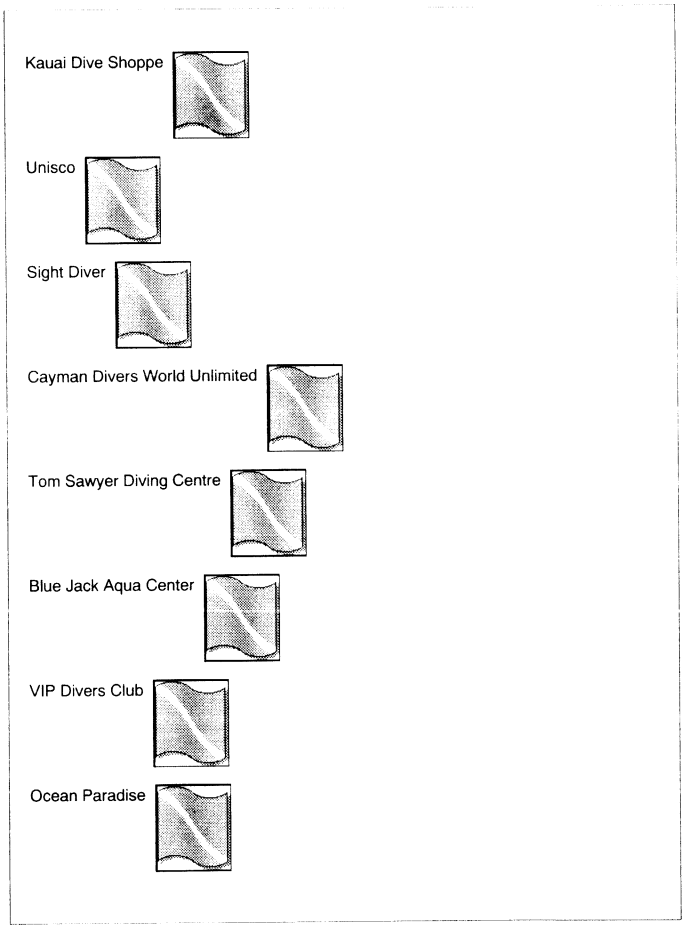
When you view or print a report, some objects fill with data. This may cause them to grow or shrink. (You can control the automatic resizing of objects. This is discussed in Chapter 13.) As objects resize, they may push or pull other objects on the page.

For example, suppose you place the Name field from *Customer* in a report. When you're working in the Report Design window, the field object is always the same size. When you run the report, however, the values displayed in the field object differ in size, and by default the field object grows or shrinks to fit the data.

Now suppose you have a graphic object to the right of the Name field. Choosing the Design | Pin Horizontal property keeps the graphic in place while you work in the Report Design window, but has no effect when you run or print the report. Figure 11-33 shows how the graphic can be pushed or pulled by the Name field.

Figure 11-33 An unpinned graphic object pushed and pulled

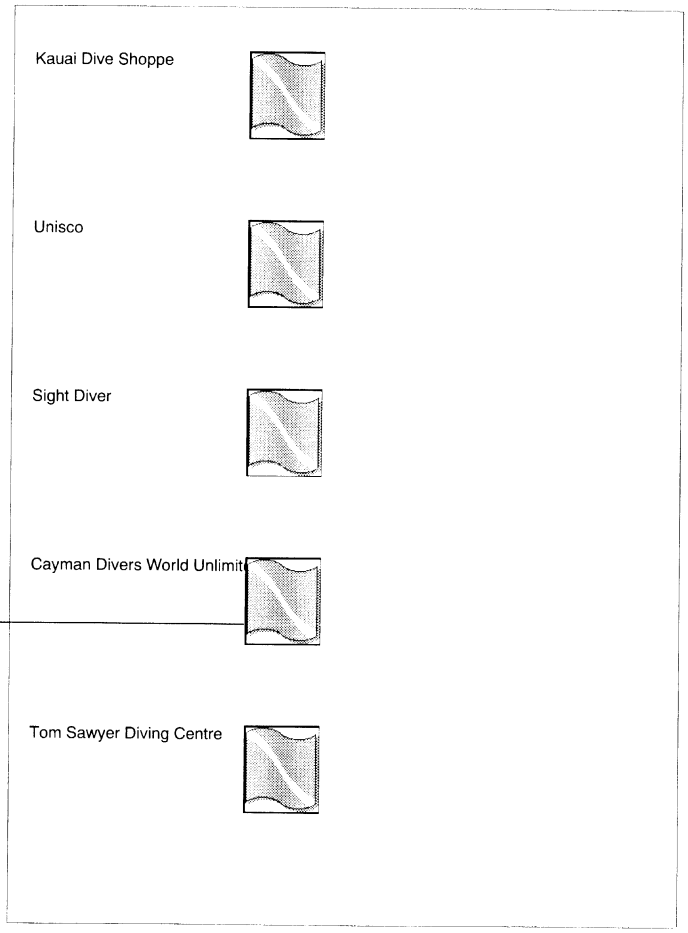
The size of the data in the Name field causes the field object to expand or contract. When it expands, it pushes the graphic to the right. When it contracts, it pulls the graphic to the left.



If you inspect the graphic object and choose Run Time | Pin Horizontal, Paradox prevents the pushing or pulling of other objects from moving the graphic. Figure 11-34 shows what pinning the graphic at run time does to the report.

Figure 11-34 A pinned graphic object at run time

When you inspect the graphic and choose Run TimeIPin Horizontal, the size of the data in the Name field does not affect the graphic. Because it is pinned, the graphic is neither pushed nor pulled as the data changes.



When you pin an object, be sure to leave enough room for the possible expansion of other objects, or one could overwrite the other

When working with data objects like fields, tables, and multi-record objects in reports, you can use a variety of properties to get the run time behavior you want. See Chapter 13 for details.

Attaching methods

ObjectPAL is Paradox's database application development language. You use ObjectPAL by attaching *methods*, pieces of ObjectPAL code, to objects on a form. You can create methods that manipulate data,

respond to actions, perform functions, and do almost anything else you can think of.

All objects in a form, including the underlying page of the form, have the Methods choice available on their menus. Choose this to define the ObjectPAL methods you want to attach to the object.

Refer to your ObjectPAL documentation for information on using ObjectPAL.

Using the SpeedBar's buttons

In addition to the design tools, the SpeedBars in the Form Design and Report Design windows contain several buttons you can use to quickly access some of Paradox's features and functions.

Cut: Delete selected text or objects and place them on the Windows Clipboard.

Copy: Copy selected text or objects to the Clipboard. Paradox does not remove the selected text or objects from the design.

Paste: Paste the contents of the Clipboard into a selected object on the design.

View Data: Leave the design window and view the document with its data displayed. When working with forms, you click View Data to view or edit data in the Form window. When working with Reports, the View Data button previews the printed output onscreen, one page at a time.

Print: Print the document.

Data Model: Open the Data Model dialog box. You can view the data model of the document and add, remove, link, and unlink tables using this dialog box.

Object Tree: View the Object Tree for the document (or the selected portion of the document).

Open Folder: Open the Folder window for the working directory.

Techniques for working in design windows

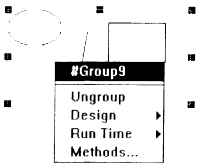
The Form Design and Report Design windows have many menu commands and features in common. This section discusses techniques you can use in both windows.

Stacking objects

Objects in a design document can be on top of or underneath other objects. To change the layering of objects or groups of objects, use Design | Bring To Front and Design | Send To Back.

In design windows, the tab order is back to front. You can use the stacking commands to change your design tab order. (This doesn't change the tab order when you run the document.)

Grouping objects



If you want to group separate objects together so they behave as one, use Design | Group. Select the objects to be grouped using any of the techniques described in "Selecting more than one object" earlier in this chapter, and choose Design | Group. When you select a grouped object, the menu command changes to Design | Ungroup.

When you group objects, they function as a single object. When you select a group, a single set of handles forming a rectangle appears surrounding the whole group. You can move or delete the group as a whole.

A group can't contain another object that isn't a member of the group, even if that object is completely within its borders. To add another member to the group, you can either create a new group or ungroup and redefine the group.

Groups within groups

Groups can exist within other groups. You can select a group and select other objects, then group all of them together. The first group remains intact within the larger group.

Group properties

You can inspect an object in a group to view its properties, or inspect the group to change the group properties.

To inspect the group, right-click inside the group border (but not on any object).

Choose Ungroup to ungroup the objects, or Methods to attach ObjectPAL methods to the group.

Note You can inspect several objects at once without grouping them. See "Inspecting multiple objects" earlier in this chapter for details.

When you run a form, Paradox's default tab order moves to every object contained within an object before moving outside the container object. You can use groups to change this tab order when you want to move among specific objects more quickly.

Duplicating objects

You have two ways to copy an object in Paradox design windows. Choosing Edit | Copy places a copy of the selected object on the Windows Clipboard. It can later be pasted where you want it. This takes two steps—one to copy and one to paste.

If you select an object, then choose Design | Duplicate, Paradox copies and pastes the selected object all in one step. A duplicate of the object appears adjacent to the original object. The object is not placed on the Clipboard.

Note You can duplicate objects only within the same window, not from one window to another.

Using rulers

Both design windows have horizontal and vertical rulers you can use when placing, resizing, or moving objects.

If you don't want to use the rulers, you can turn them off by choosing either Properties | Horizontal Ruler or Properties | Vertical Ruler. Turn them back on the same way.

When you select an object, the rulers change color to indicate the object's placement and size.

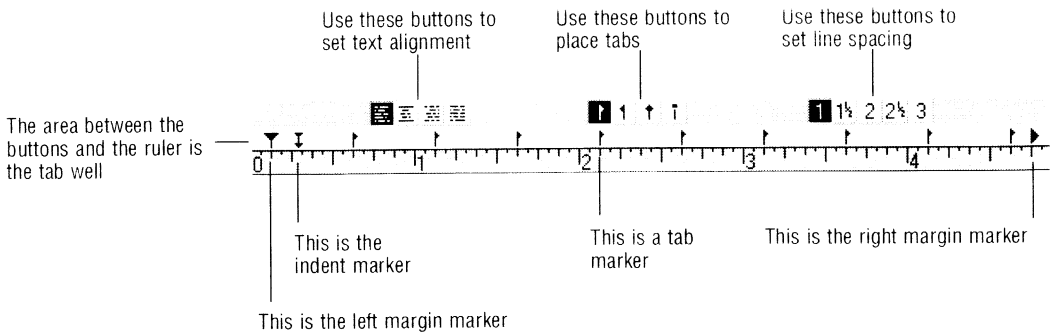
To change the unit of measurement for the rulers, choose Properties | Grid Settings. This displays the Grid Settings dialog box (shown in Figure 11-38). Use the Grid Settings dialog box to set the unit of measurement for both the grid and the rulers.

Using the expanded ruler

The expanded ruler is an editing and layout tool you can use when you're working with text objects. You can use it to control the margins, tabs, line spacing and alignment of your text.

Display the expanded ruler by choosing Properties | Expanded Ruler.

Figure 11-35 The expanded ruler



The expanded ruler applies only to one text object at a time. It is displayed regardless of the object selected, but the tab, indent, and margin markers are displayed only when you place an insertion point in a text object (not when you select the object as a whole). The tab, indent, and margin markers apply only to the text object in which you are working.

When you select the whole text object, the expanded ruler's settings apply to all the text within it. When you select specific text and change the settings, the changes apply only to the selected text. When you position the insertion point in the text object without selecting any text, no changes to settings take effect.

Adding tabs

To add a tab to the expanded ruler, click its button and click in the tab well where you want the tab to be. Paradox supports these tabs (in the order that they appear on the expanded ruler):

- *Left tabs*: The tab sets your left indent. Characters you type appear to the right of the tab.
- *Right tabs*: The tab sets your right margin. Characters you type appear to the left of the tab.
- *Center tabs*: Text is centered on either side of the tab marker.
- *Decimal tabs*: Use a decimal tab to align columns of figures at the decimal point. Characters you enter appear to the left of the insertion point until you type a period (or other decimal character). Subsequent characters appear to the right of the decimal.

You can move tabs by dragging them to a new location. Remove them by dragging them out of the tab well.

Adding indentations

Use indent markers to place indents and create hanging paragraphs. To place an indent, drag the indent marker in the tab well to the location you want. When the indent marker is to the right of the margin marker, the paragraph is indented. When the indent marker is to the left of the margin marker, the paragraph is *outdented*.

Move an indent marker after placement by dragging it.

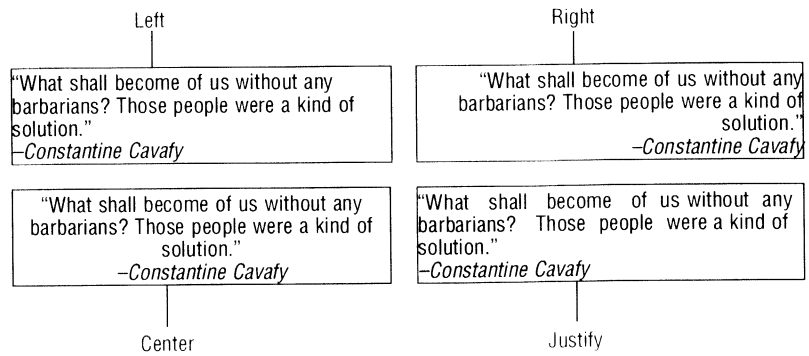
Changing margins

The default margins of your text are the left and right borders of the selected text object. Change a margin by dragging its icon in the tab well to the location you want.

Changing alignment

Change the alignment of the text with the alignment buttons. Either click the alignment button you want before you begin typing, or highlight typed text and then choose the alignment you want. You can align text at the left or right margin, down the center of the text object, or at both left and right margins. Figure 11-36 shows the results of each type of alignment.

Figure 11-36 Text alignment options



Changing spacing

1 1½ 2 2½ 3

You can change the line spacing within a text object by clicking the button you want from the expanded ruler. This is faster than inspecting the text object and choosing Line Spacing.

Using the grid

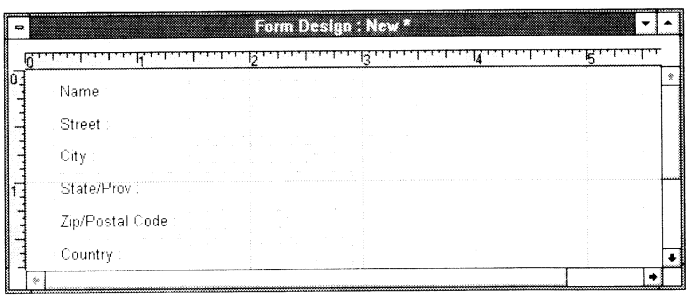
A grid is a background of horizontal and vertical lines that help you align the placement of objects on the page.

To view the grid while designing, choose Properties | Show Grid. Figure 11-37 shows a Form Design window with the grid turned on.

Note The grid doesn't have to be visible for you to use it.

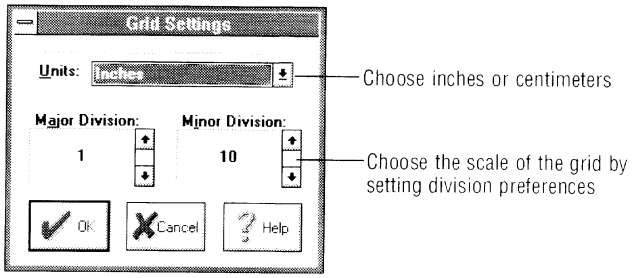
Figure 11-37 Using the grid

Lines show the grid's major divisions, and dots show the grid's minor divisions. Use the grid to align the objects on the page.



The unit of measurement used by the grid is the same as the unit of measurement displayed in the ruler. For example, if metric measurements are used in the ruler, the grid increments are metric as well. Choose Properties | Grid Settings to change the scale or unit of measurement of the grid. This displays the Grid Settings dialog box, shown in Figure 11-38.

Figure 11-38 The Grid Settings dialog box



The Major Division indicates the measurement between the solid lines when Show Grid is on. For example, if you choose 2, you'll see a solid line every two inches. (Assuming you chose Inches as your unit of measurement).

The Minor Division indicates how many dotted lines you'll see when Show Grid is on. For example, if you choose 16, you'll see 16 dotted lines between each solid line.

Choosing Properties | Snap To Grid causes Paradox to align all objects directly on the grid lines (major or minor) whenever you place, resize or move them. When an object snaps to the grid, its top left corner is moved to the nearest intersection of grid lines.

In the Report Design window, if the grid is visible, you can inspect a band and choose Move Grid to Band to reorient the grid at the top left corner of the inspected band.

Using the status bar

The status bar is located along the bottom of the Paradox Desktop. When working in design windows, you can look at the right side of the status bar to see what object is selected, and at the left side to see what is happening to it. For example, when you move an object, the left side of the status bar tells you which object is moving, and its size and position. This can help you to move or resize objects more accurately.

Using Zoom

If you need to take a closer look at your design window, choose Properties | Zoom. Zooming in increases the scale of the design window. You can zoom to 400% of the original size of your document.

Properties | Zoom can also be used to zoom out, to get a broader picture of the design window. You can zoom out to 25% of the original size of your document.

In addition to the general range, Paradox gives you three automatic zoom sizes. They are

- *Fit Width*: proportionally resizes the onscreen display to show the full width of the design
- *Fit Height*: proportionally resizes the onscreen display to show the full height of the page
- *Best Fit*: proportionally resizes the onscreen display to show the full width and height of the page

These zoom sizes are retained when windows are resized, expanding or contracting as necessary.

Aligning objects

Paradox provides a variety of ways to align design objects when you choose Design | Align. You can align two or more objects to the left, right, and center horizontally, and to the top, bottom, and middle vertically.

- *Align Top* moves each object so that its top aligns with the top of the highest object.
- *Align Bottom* moves each object so that its bottom aligns with the bottom of the lowest object.
- *Align Middle* moves the objects to align their midpoints horizontally.
- *Align Left* moves each object so that its left side aligns with the left side of the leftmost object.
- *Align Right* moves each object so that its right side aligns with the right side of the rightmost object.
- *Align Center* moves the objects to align their midpoints vertically.

Note In reports, objects that are in different bands can't be aligned vertically using Design | Align.

To align objects, use any multiple-selection technique described earlier in this chapter in "Selecting more than one object," then choose the alignment you want.

If Snap to Grid is on, Paradox moves the objects to the closest grid point possible.

Note If an object is contained by another object, aligning it won't break the container relationship.

Adjusting size and spacing of multiple objects

When you create a design in the Form Design or Report Design window, Paradox gives you the Adjust Size and Adjust Spacing commands to help you achieve a symmetrical look. Suppose you've created a group of buttons, and you want them all to be exactly the same size. You can select them and choose Design | Adjust Size. You'll

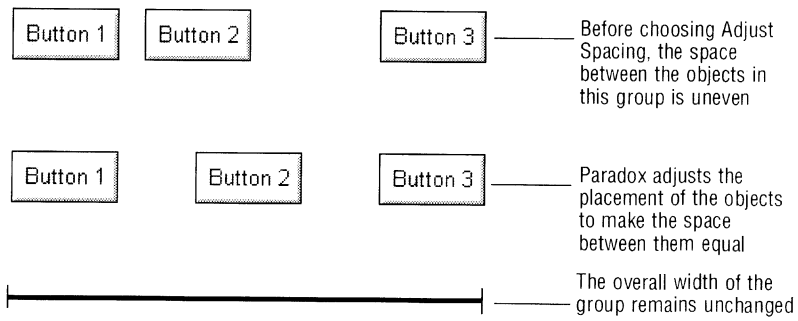
see a variety of options that let you choose which selected object you want to use as a standard size for *all* the selected objects.

- Choose Minimum Width to resize all objects to be the same size as the narrowest object.
- Choose Maximum Width to resize all objects to be the same size as the widest object.
- Choose Minimum Height to resize all objects to be the same size as the shortest object.
- Choose Maximum Height to resize all objects to be the same size as the tallest object.

Note If one of the objects you select cannot be resized, Paradox disregards that object and resizes all the objects it can.

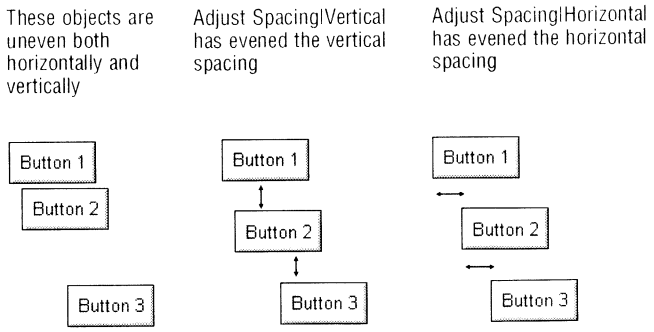
Suppose you've created a group of objects, and you want the space between the objects to be exactly the same. You can select them and choose Design | Adjust Spacing. You can adjust either the horizontal or the vertical spacing. Figure 11-39 shows how Paradox adjusts spacing horizontally.

Figure 11-39 Adjusting space horizontally



You can combine horizontal spacing adjustments with vertical spacing adjustments. Figure 11-40 shows examples of various spacing adjustments.

Figure 11-40 Adjusting space vertically and horizontally



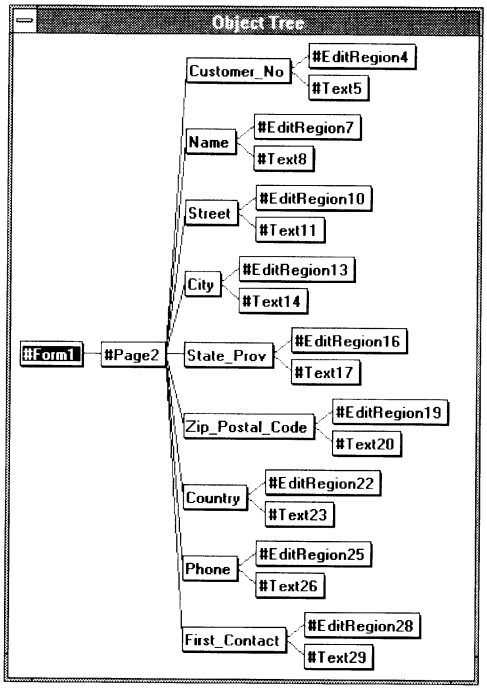
Note Choosing Design | Adjust Spacing overrides any Pin Horizontal or Pin Vertical properties you've set for the selected objects.

Using the Object Tree

If you place a lot of objects on your design, and especially if you attach ObjectPAL code to them, you might forget what something does or what you have named it. Paradox provides a handy way to step back from the design and take a look at the big picture of all the objects you have placed.

Click the Object Tree button on the SpeedBar, or choose Form | Object Tree (or Report | Object Tree in the Report Design window) to get a visual map of the objects on the design. The Object Tree shown in Figure 11-41 illustrates the hierarchy of the objects on the design—the fields and text object labels of the *Customer* table.

Figure 11-41 An Object Tree



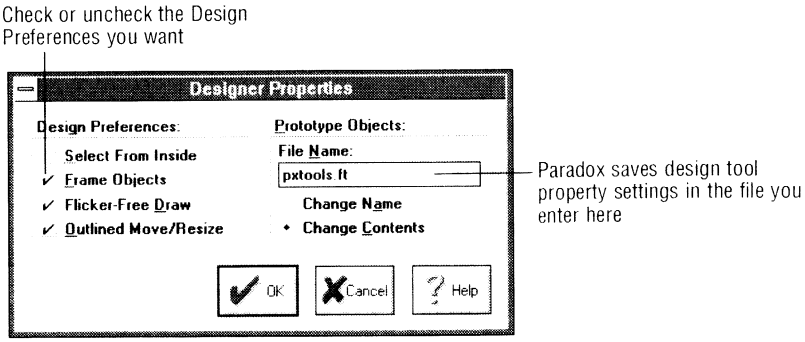
The Object Tree uses any selected object as the "root" of the tree. For example, if you select a field, you'll see an Object Tree that begins with that field. This is so you can examine separate sub-trees of complex designs. If you want to see all objects in the Object Tree, press *Esc* repeatedly until no object is selected in the Design window, then open the Object Tree. You can also inspect a group to display its Object Tree, or an individual object to display its Object Tree.

You can inspect any object from the Object Tree, and change its properties from there rather than in the design window. This is especially useful if you have a large design and don't want to use the scroll bars to move around in it.

Setting design window preferences

You can set preferences that are common to both design windows—forms and reports—by choosing Properties | Designer. You'll see the Designer Properties dialog box, shown in Figure 11-42.

Figure 11-42 The Designer Properties dialog box



Using Select From Inside

When you click a composite object—an object made up of more than one part—you have a choice for how you want Paradox to select each part.

- If Select From Inside is off, you'll select the outermost object first, then the object inside.
- If Select From Inside is on, you'll select the object you click, whether it is contained in another object or not.

For more information on using Select From Inside, see "Selection options" earlier in this chapter.

Using Frame Objects

You can choose to display the objects on your screen with or without frames. If you use Frame Objects, objects on the screen are framed with dotted lines. This helps you see the borders of objects that don't have visible frames by default. If you uncheck Frame Objects, Paradox shows frames only on objects whose Frame property (the frame's color, style, or thickness) you've changed.

Using Flicker-Free Draw

Sometimes you may notice that the screen flashes a bit when you move or resize objects. This is especially noticeable when the design you're working with has a dark background. Check Flicker-Free Draw to suppress this behavior.

While turning Flicker-Free Draw on does eliminate some screen flickering, it may cause the movement or resizing of objects to be somewhat slower. Experiment with Flicker-Free Draw on and off to see what works best for you.

Using Outlined Move/Resize

The Outlined Move/Resize preference gives you a choice of what you'll see when you move or resize an object.

- If you want to see the object itself move, grow, or shrink as you move or resize it, uncheck Outlined Move/Resize.
- If you want to see an *outline* of the object move, grow, or shrink as you move or resize it, check Outlined Move/Resize.

Most movement and resizing can be performed more quickly using Outlined Move/Resize on. This is because Paradox doesn't have to pause to redraw the screen image until the operation is complete.

Using saved SpeedBar settings

If you change the properties of any of the design tools (see "Changing design tool properties" earlier in this chapter) you can save the changes to a file. You can have several SpeedBar property files.

- To use an existing file, choose Change Name in the Designer Properties dialog box and type the name of the file you want in the File Name text box. Paradox displays a message informing you that the file already exists and asks if you want to load the file.
  - Choose Yes to load and use the file. Changes you've made to the SpeedBar are not applied to the file you load.
  - Choose No to replace the file shown in the File Name text box with your current settings.
  - Choose Cancel to cancel the operation and return to the Designer Properties dialog box.
- To create a new file, choose Change Name and type a new file name in the File Name text box. The file name must be eight characters or fewer, with the extension .FT. Paradox keeps the original SpeedBar property settings in PXTOOLS.FT, and creates an additional SpeedBar property file to store the SpeedBar properties as you've changed them.
- To overwrite the contents of the current SpeedBar property file, choose Change Contents. When you choose OK to exit the Designer Properties dialog box, Paradox overwrites the contents of the file shown in the File Name text box with the changes you've made to the design tools.

Note If you overwrite the original PXTOOLS.FT SpeedBar property file, you can recover it by loading PXTOOLS.FT in the Designer Properties dialog box, then deleting PXTOOLS.FT from your working directory. The next time you open Paradox, the original file is restored.

If you sometimes design documents for the screen, and sometimes for the printer, you may want to create two specialized .FT files, one with settings appropriate for screen documents and one with settings appropriate for printed documents.

Saving properties and preferences

The preferences in the Designer Properties dialog box replace the default or previous settings for *both* design windows. The next time you open the Form Design or Report Design window, Paradox uses these settings.

You can save zoom, ruler, and grid properties differently in the Form Design and the Report Design windows. For example, in the Form Design window, choose Properties | Form Options | Save Defaults. Paradox saves the current Properties menu settings as the default settings for all Form Design windows. Report Design window property settings are not affected.

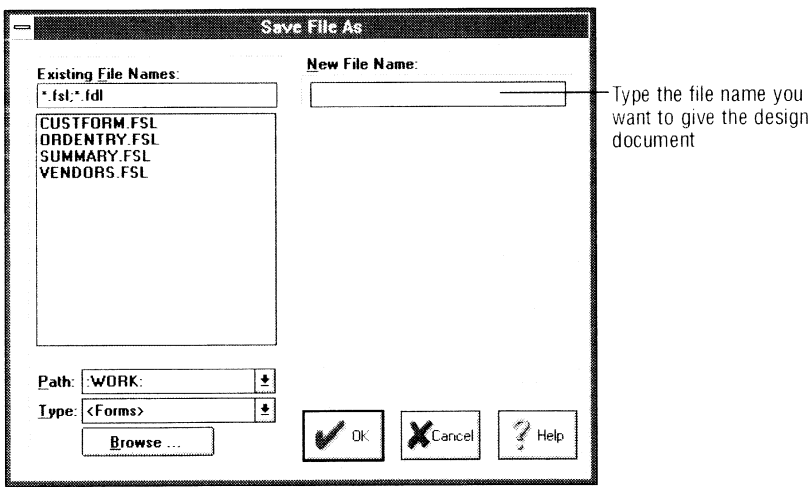
When you choose Save Defaults, Paradox notes the settings of all items that appear below Form Options (or Report Options) on the Properties menu. These are the property settings you save.

You can restore the previously saved Properties menu settings by choosing Restore Defaults.

Saving the design

You must always tell Paradox when you want to save a design document. Save a design by choosing File | Save or File | Save As. You'll see the File Save As dialog box shown in Figure 11-43.

Figure 11-43 The File Save As dialog box



The Type drop-down list shows the type of document you're saving—a form or a report. All existing documents of the appropriate type in the working directory are shown in the file list. To save a document somewhere other than the working directory, you can

- Type the name (including optional full path) for the document in the New File Name text box.
- Choose Path to choose a different aliased directory. The document is then saved in that database or directory.
- Choose Browse to open the Browser. From the Browser, you can choose the directory where you want the file to be saved.

Note If you don't specify a path or alias, Paradox saves the document in the working directory.

Paradox prompts you to save documents.

If you attempt to close a design window without saving it, Paradox displays a dialog box asking if you want to save the document.

Naming documents

You can give a document whatever name you want. Just because a form has been designed using the *Customer* table doesn't mean you must call it *Customer*.

It isn't necessary to type a file extension when you save a design document. Paradox automatically gives design documents the appropriate extension so Paradox can access them by their type in the Open Document dialog box and the Browser.

CHAPTER 12

Designing forms

Chapter 10 showed you how to use the Data Model dialog box and the Design Layout dialog box to identify the data and initial layout of a new form. Chapter 11 introduced you to design tools, techniques, and concepts that function the same in the Form Design window as they do in the Report Design window.

This chapter deals with those issues, commands, and functions that apply only to the Form Design window.

What can you do in the Form Design window?

You can create and work with forms without ever working in the Form Design window. Paradox provides quick forms (discussed in Chapter 4) that give you a default form layout, which may be all you ever need.

Even if you create sophisticated, multi-table forms, there is a lot you can do in the Design Layout dialog box (discussed in Chapter 10) to prevent the need for much work in the Form Design window.

So when do you need to work in the Form Design window? When you want to customize a form layout. In the Form Design window, you can

- Move objects
- Add, delete, or rearrange pages
- Add or remove design elements, such as boxes, fields, tables, or graphs
- Inspect and change the properties of any object on the screen
- Add ObjectPAL methods to the objects on the form to customize functionality

Customizing a default form

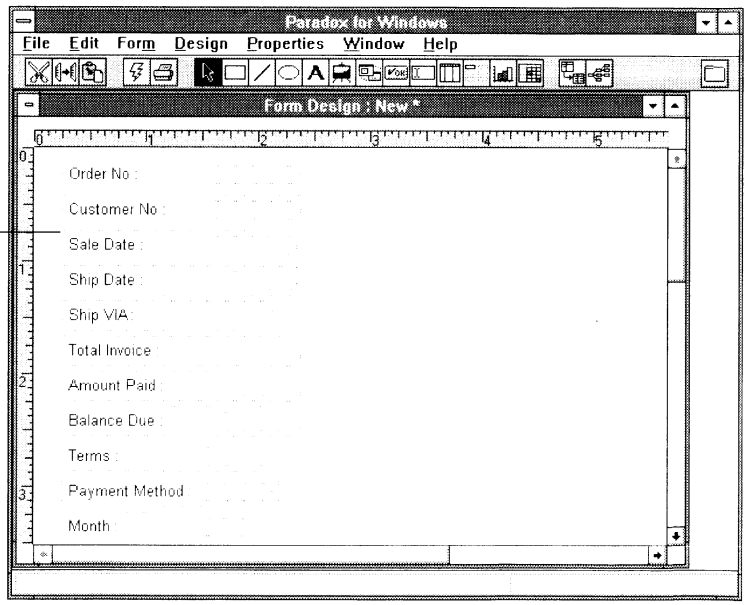
This section shows you how to customize a default form created on the *Orders* table. You'll see how to move objects, add design elements, and inspect properties.

Some of the terms used in this section (like *multi-select* and *penetrating properties*) are discussed fully in Chapter 11.

Example 12-1 shows how you can take a default form layout and customize it by inspecting and manipulating objects.

Example 12-1 Customizing a form in the Form Design window

The default layout of a single-table form shows fields from the table on which the form is based in a column along the left side of the screen.



There are two ways you might create this default layout:

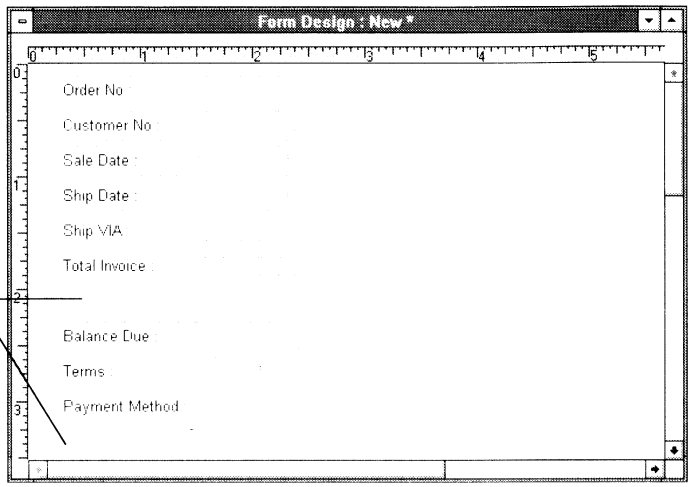
- Choose File|New|Form, choose the *Orders* table in the Data Model dialog box, and accept the default layout from the Design Layout dialog box.

- From the *Orders* Table window, choose Table|Quick Form, press *F7*, or click the Quick Form SpeedBar button.

The default layout is where you begin when you customize a form.

By default, Paradox includes all of the table's fields in the form. You can remove any fields you don't want to use.

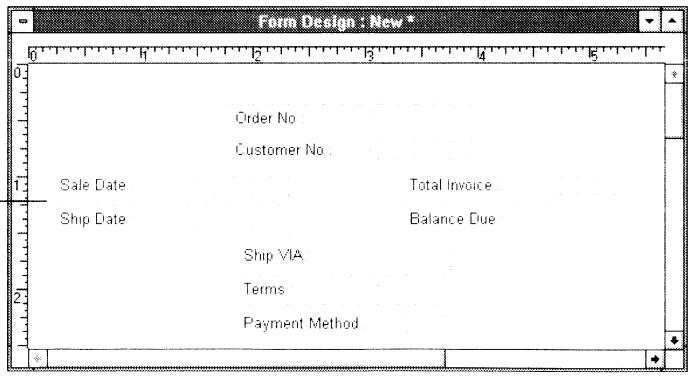
1. Remove the Amount Paid field by selecting it and pressing ***Del***. Remove the Month field the same way.



The Amount Paid and Month fields have been deleted from the design

You can move objects on the page.

2. Click and drag field objects to move them. When you click a field, you'll see handles appear around it. Drag it to its new location. Arrange field objects in groups based on the kind of information they show.

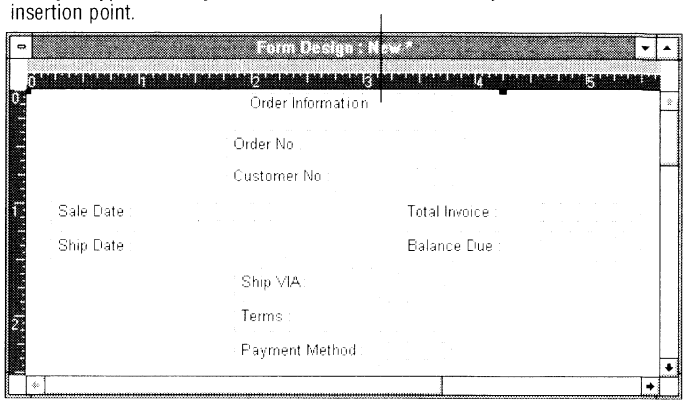


You can hold *Shift* and click several fields to move them all at once

You can add a title to the form.

3. Click the Text tool. Click and drag above the Order No field to create a text object. Paradox places the insertion point in the text object. Type **Order Information**. Click outside the text object to remove the insertion point from the text object.

Paradox places the insertion point within the text object as soon as you create it. After you type the text you want, click outside the text object to remove the insertion point.

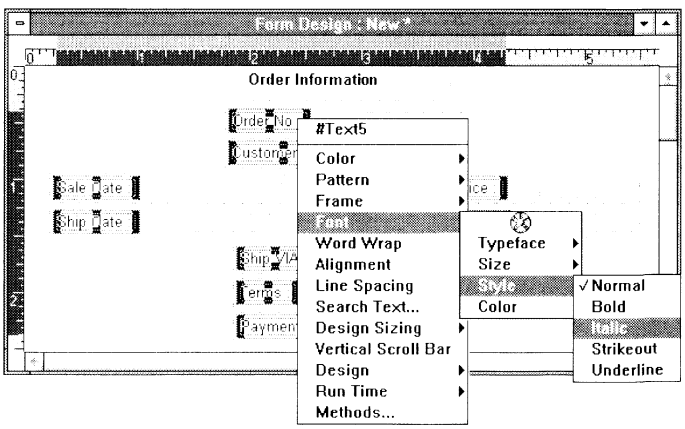


You can change the properties of text objects and field labels.

4. Inspect (right-click) the text object you created. Choose Font|Style|Bold.
5. Multi-select each field label. (Hold down ***Shift*** and click each label. If your Select From Inside property is off, you must click twice on each label—once to select the field's frame, and the second time to select the label itself. See Chapter 11 for information about using Select From Inside.)
6. Change the properties of all the selected field labels (right-click a field label).

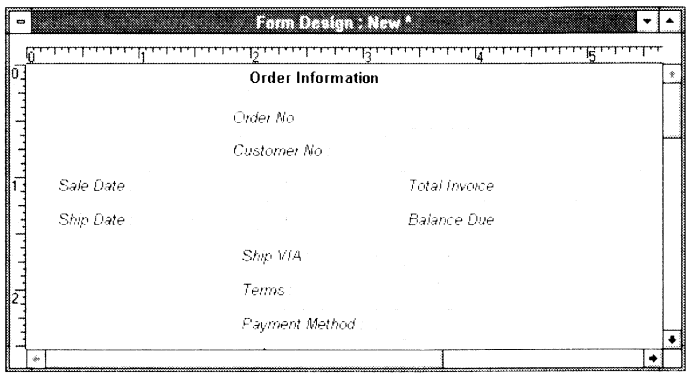
   You'll see the property menu of the field label you right-clicked on.
7. Choose Font|Style|Italic.

When you inspect properties, Paradox applies the property choice to all selected objects that can accept it



All selected text objects become italic.

All of the selected objects (field labels) can accept the Font property change, so Paradox changes them all



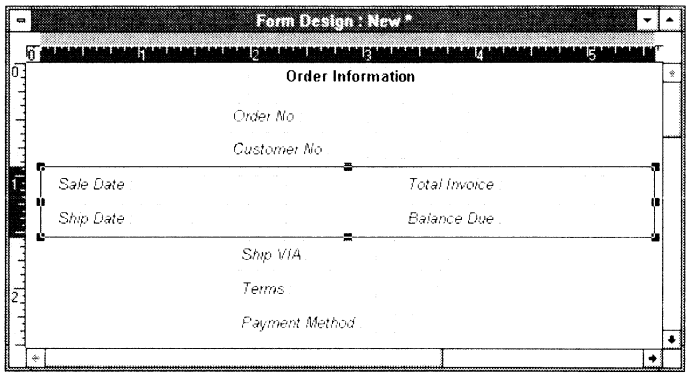
You can center text within a text object.

8. Inspect the title text object and choose Alignment|Center. Paradox moves the text to the center of the text object.

You can place design objects on the form.

9. Click the Box tool. Click and drag a box around the two center groups of fields.

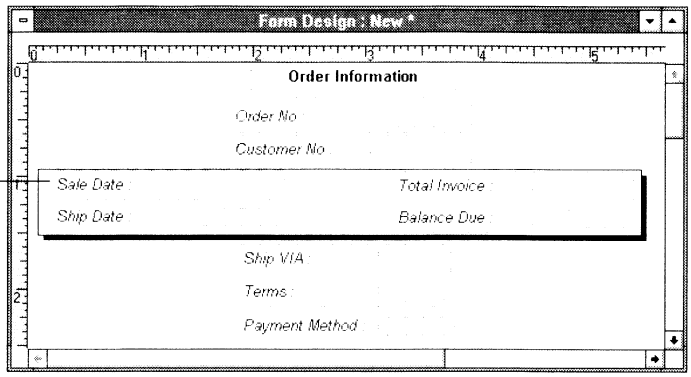
When one object completely surrounds objects, it *contains* them. Moving the container object (in this case, the box) moves all contained objects too.



You can change the properties of the box you place.

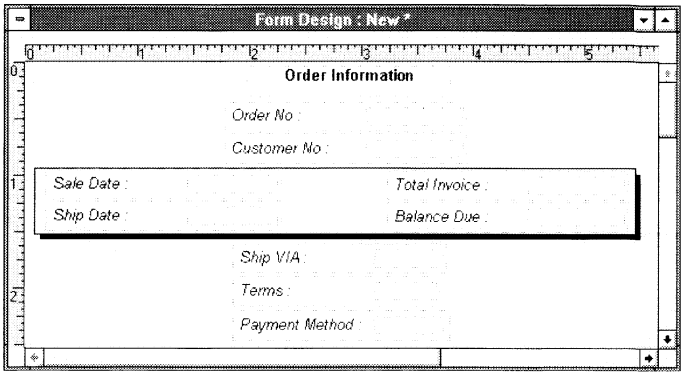
10. Inspect the box and choose Frame|Style. Choose the drop-shadow style from the Frame palette.

Not just boxes, but many objects, have the Frame property



You can change the background color.

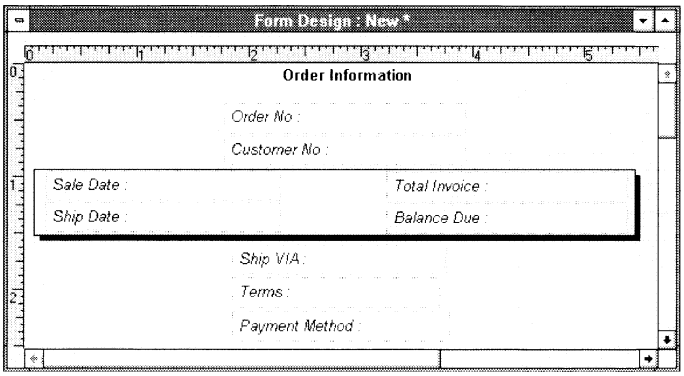
11. Inspect the page and choose Color. Choose light gray from the Color palette.



Because the objects are all transparent, you can see the color of the page through them

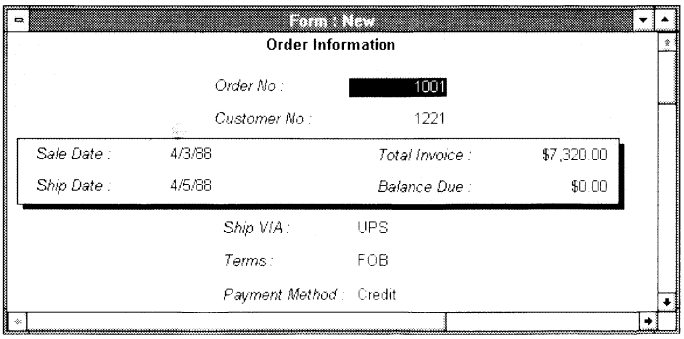
You can change the color of individual objects.

12. Multi-select the title text box and all field edit regions. Inspect their properties and choose Color. Choose white from the Color palette.



If objects aren't lined up neatly, or their sizes don't match, use the Design menu's Align and Adjust Sizing commands. These are described in Chapter 11 .

13. Click the View Data button to view the form in the Form window. You can scroll through the records of the table and see the data in the form.



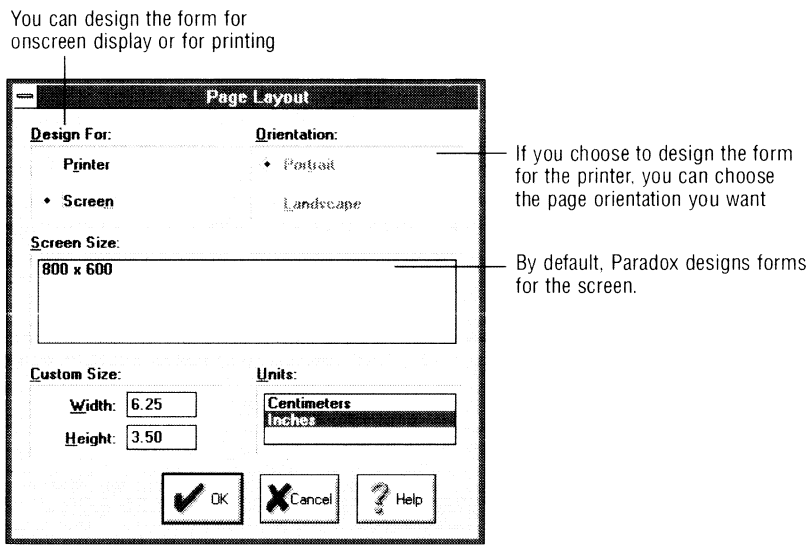
The customized form draws your attention to the most important information, and provides an easy data-entry format

Of course, this example has given you only the smallest idea of what is possible in the Form Design window. Use your imagination and Paradox's powerful tools and features to get just the look you want.

Choosing the form's page layout

You can specify the size of the form's page from the Design Layout dialog box (choose the Page Layout button) or from the Form Design window (choose Form | Page | Layout). Either way, you'll see the Page Layout dialog box, shown in Figure 12-1.

Figure 12-1 The Page Layout dialog box



Use this dialog box to define the form's page size. You can choose from predefined page sizes, or enter a custom width and height. You can choose to design a printed form in either portrait or landscape orientation.

Paradox gives you the choice of designing the document for onscreen viewing or for printed output.

Designing for the screen

By default, Paradox designs forms for the screen. This allows you to use any screen fonts that are installed on your system. These fonts may not be available on your printer, so documents you create for the screen might not appear identical to their printed versions. Of course, if your screen fonts match your printer fonts, this will not be a problem.

When you choose Screen, Paradox uses your system's current screen driver size in pixels in the Paper Sizes panel. You can design a larger or smaller form by entering the sizes you want in the Custom Size panel. You can choose the unit of measurement you want for the custom size from the Units panel.

Designing for the printer

If you choose Printer, Paradox makes available for use only those fonts that are currently installed on your active printer. This may limit your onscreen display, but it ensures a similar document for onscreen viewing and printed output. Paradox attempts to match onscreen what the printed output will look like.

The Paper Sizes panel shows standard page sizes that you can pick, or you can enter your own measurements in the Custom Size panel.

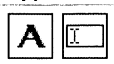
Using design objects in forms

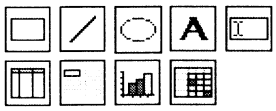
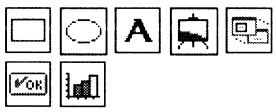
Chapter 11 showed you how to create and define objects in a design window using the SpeedBar design tools. You create and define objects the same way no matter which design window you're working in. Object properties, however, are unique to each design window. This section discusses the properties that the objects use in the Form Design window.

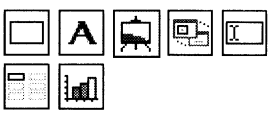
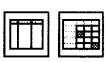
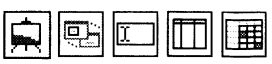
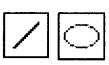
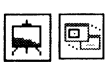
Table 12-1 alphabetically lists properties available from object menus in a form, describes what each property means, and shows which objects can use the property. Use this table as a quick reference, either when you need to know what a property will do, or when you need to know if you can achieve a certain effect with a certain object.

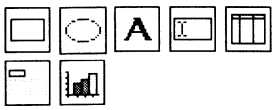
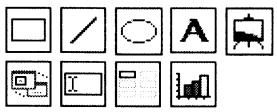
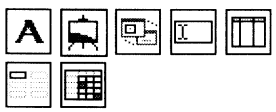
Note Properties of graphs and crosstabs are discussed in detail in Chapter 14.

Table 12-1 Form design object properties

Property	Description	Applies to
Alignment	Align text at the right border, left border, or center, or justify within a text object.	
Button Type | Check Box	Turn a button object into a check box.	
Button Type | Push	Turn a button object into a pushbutton. (This is the default button type.)	
Button Type | Radio	Turn a button object into a radio button.	

Property	Description	Applies to
Center Label	Center the text label on a pushbutton.	
Color	Change the color of the selected object or part of object.	
Data Type	Choose to design either a tabular, 1-D summary, or 2-D summary graph.	
Define Crosstab	Bind a table's data to the crosstab object.	
Define Field	Bind a field's data to the field object.	
Define Graph	Bind a table's data to the graph object.	
Define Graphic	Place a graphic value in a graphic object.	
Define OLE	Place an OLE value in an OLE object.	
Define Table	Bind a table's data to the table frame.	
Design Sizing | Fixed Size	The text object does not expand or contract to fit text.	
Design Sizing | Fit Text	The text object expands or contracts to fit text.	
Design Sizing | Grow Only	The text object expands but does not contract to fit text.	
Design | Contain Objects	Object will contain all objects within its borders.	
Design | Pin Horizontal	Pin the object to its current horizontal position in the design.	All design objects
Design | Pin Vertical	Pin the object to its current vertical position in the design.	All design objects
Design | Size To Fit	Allow the object to expand or contract to fit data.	
Detach Header	Remove the table frame's header of field labels from the body of the table.	
Display Type | Check Box	Display the field values as a check box.	
Display Type | Drop-Down Edit	Display the field values in a drop-down edit list.	

Property	Description	Applies to
Display Type | Labeled	Display the field with a field label.	
Display Type | List	Display the field values in a list.	
Display Type | Radio Buttons	Display the field values as a set of radio buttons.	
Display Type | Unlabeled	Display the field values without a field label.	
Font	Change the typeface, style, color, or size of text.	
Format | Date Format	Change the display format of a date field.	
Format | Logical Format	Change the display format of a dBASE logical field.	
Format | Number Format	Change the display format of a number field.	
Format | Time Format	Change the display format of a time field.	
Format | Timestamp Format	Change the display format of a time/date field.	
Frame	Change the style, color, or thickness of an object's frame.	
Graph Type	Choose the display type for a graph object.	
Grid	Change the color or style of the grid lines; choose to display a record divider.	
Horizontal Scroll Bar	Display a scroll bar along the bottom of the object.	
Line Ends	Choose to display arrows at one or both ends of a line.	
Line Spacing	Choose the inter-line spacing of text in a text object.	
Line Style	Choose a solid, dashed, dotted, or combination line style.	
Line Type	Choose to create either a curved or straight line.	
Magnification	Choose to increase or decrease the size of the object within its container.	
Methods	Attach ObjectPAL methods to the object.	All design objects

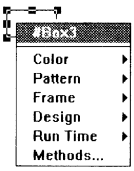
Property	Description	Applies to
Options	Choose to display a graph's axes, grid, labels, legend or title.	
Pattern	Change the fill pattern of the object.	
Raster Operation	Change the interaction of a graphic's pixels with its background.	
Record Layout	Change the separation and number of repeats in a multi-record object.	
Run Time | Complete Display	In memo or formatted memo fields, Paradox displays only the portion of the memo stored with the table, not the portion stored in the .MB file.	
Run Time | No Echo	Accept but do not display entered data.	
Run Time | Read Only	Do not allow the data in the object to be changed.	
Run Time | Tab Stop	Use the *Tab* key to move to the object on the form.	
Run Time | Visible	Choose to make the object visible or invisible when you run the form.	All design objects
Search Text	Search and replace text values.	
Style	Choose either the Borland or the Windows look for a button.	
Thickness	Choose a thickness for a line or a frame.	
Vertical Scroll Bar	Display a scroll bar along the right side of the object.	
Word Wrap	Automatically create a new line at the object's right border.	

Many object properties work the same way in either the Form Design or Report Design windows. These properties and their uses are discussed in Chapter 11. Table 12-2 shows where to look for details about common property choices you'll see on design objects in the Form Design window.

Table 12-2 Cross-reference to common property descriptions

Property	See this section in Chapter 11
Color	"Using the Color palette"
Pattern	"Using the Pattern palette"
Frame	"Using the Frame palette"
Thickness	"Using the Thickness palette"
Line Style	"Using the Line palette"
Design | Pin Horizontal, or Design | Pin Vertical	"Pinning objects in design windows"
Design | Contain Objects	"Containing objects"
Design | Size To Fit	"Sizing objects to fit their contents"
Run Time | Pin Horizontal, or Run Time | Pin Vertical	"Pinning objects at run time"
Run Time | Visible	"Invisible objects"
Methods	"Attaching methods"

Using boxes



Place boxes around objects to give them frames, or use them alone for visual impact. You can surround objects with a box by either dragging a box around existing objects, or dragging existing objects into a box.

Boxes have many of the standard properties shown in Table 12-2. You can customize them to get just the look and functionality you need.

Note If a box surrounds an object, and you want to delete the box *but not* the object within it, make sure the box's Contain Objects property is unchecked. If you delete any object that has Contain Object checked, Paradox deletes the object and everything it contains. (Choose Edit | Undo to undo the deletion.)

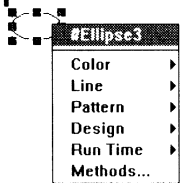
Using lines

Use the Line tool to place lines on your forms. You can create straight lines at any angle.

Lines have the standard Color, Thickness, Line Style, Design, Run Time, and Methods properties shown in Table 12-2. Use these properties, along with the line's unique properties, to get just the look you want.

Use the Line Type property to create curved lines, and the Line Ends property to add arrows to one or both ends of a line. See Chapter 11 for details.

Using ellipses



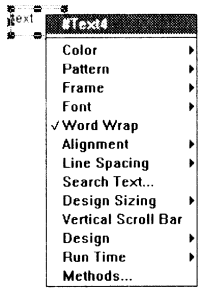
Place an ellipse around an object to give it a frame, or use an ellipse alone for visual impact.

You can surround objects with an ellipse by either dragging one around existing objects, or by dragging existing objects into an ellipse.

Ellipses have all the standard properties shown in Table 12-2. You can customize them to get just the look and functionality you need.

Note If an ellipse surrounds an object, and you want to delete the ellipse *but not* the object within it, make sure the ellipse's Contain Objects property is unchecked.

Using text

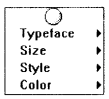


Text objects in forms fill a wide variety of needs. You can add labels, provide instructions, or create titles using text objects.

Text objects have most of the standard properties shown in Table 12-2. The way you inspect a text object determines how Paradox applies the properties you choose.

- If you select the whole text object (click anywhere else on the screen, then right-click the text object), Paradox applies the properties you choose to all of the text in the text object. When the whole text object is selected, you'll see selection handles around the object.
- If you inspect specific text within the object (click and drag over text to highlight it, then right-click the highlighted text), Paradox applies the properties only to the highlighted text.
- If you place the pointer in the text object, then right-click and choose a property, Paradox applies the property to all text you subsequently type.

Choosing fonts



Choose Font from a text object's menu to change the typeface (Courier, Times Roman, and so on), size, style (bold, italic, and so on), and color of the text. If you want to change more than one font property, click the snap at the top of the menu to display the Font palette. (See Chapter 11 for information about using the Font palette.)

Note The typefaces available from the Typeface menu or Font palette depend on the fonts you have installed on your system.

Using Word Wrap

All text objects have the Word Wrap option on their menus. Choose this if you want Paradox to wrap text automatically at the text object's right border.

If Word Wrap is unchecked, you can have only one line of text in the text object. Pressing *Enter* does not create a new line.

Formatting text

Choose Alignment from a text object's menu to align the text to the left, center, or right or to justify it on both sides (right *and* left aligned). Alignment is relative to the text object's frame.

Choose Line Spacing from a text object's menu to choose the spacing you want between lines of text.

Tabs, margins, and indents, as well as line spacing and alignment options, are available from the expanded ruler. See Chapter 11.

Searching for values in a text object

Choose Search Text to find specific text in the text object and change it using the Search & Replace dialog box, discussed in Chapter 5.

Choosing a Design Sizing option

The way you create a text object determines how Paradox initially sets its Design Sizing property (see Chapter 11 for details). You can override the automatic setting by inspecting the text object and choosing Design Sizing.

Note Design Sizing choices control only how the object grows in the design window, not what happens when you *run* (view or print) the document.

You have three choices:

- *Fixed Size* text objects don't grow or shrink to fit the amount of text they contain. If you want to change the size of the object, select it and resize it manually.

You can display large amounts of text in small text objects by adding a vertical scroll bar to the text object.

- *Fit Text* objects grow or shrink to fit the amount of text they contain.

Note If you choose Fit Text *without* Word Wrap, the text object can be only one line. It grows or shrinks horizontally to fit the amount of text it contains. You can't manually resize the height.

- *Grow Only* text objects *grow but don't shrink* to fit the amount of text they contain. The most common use for this type of text object is for a field label in a table.

Note If you choose Grow Only *without* Word Wrap, the text object can be only one line. It grows horizontally to fit the amount of text it contains.

Adding a scroll bar

Choose Vertical Scroll Bar to add a scroll bar to the right side of the text object. Use the scroll bar to view text that doesn't fit in a fixed-size text object.

Editing text

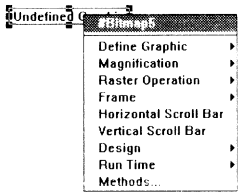
You enter and edit text in text objects in the Form Design window. When you run the form, you can read the text in text objects, but you cannot edit it. To edit existing text, click the text object once to select it. The pointer changes to the insertion point. Click again to place the insertion point in the text object.

If you prefer to use the keyboard, press *Tab* to select the text object and *Spacebar* to position the insertion point.

The arrow keys, *Backspace*, *Del*, and most other keys work the same in a text object as they do when editing the fields of a table or a form. You can also use commands from the Edit menu, or the buttons on the SpeedBar.

Caution Paradox does not save text you enter into a text object until you save the design document.

Using graphics



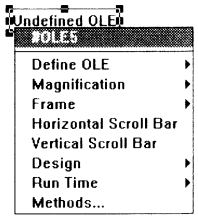
Paradox tables give you the ability to store graphics in fields. In forms, graphic objects give you the ability to place single graphic images anywhere you want in a design. See Chapter 11 for information on creating graphic objects and pasting graphics in them.

The graphic object's Frame, Design, Run Time, and Methods properties are common to most objects and are discussed in Chapter 11.

You can choose to place a horizontal scroll bar across the bottom of the graphic object, or a vertical scroll bar along its right side.

Cropping graphics, magnifying and shrinking graphic images, and using raster operations are discussed in Chapter 11.

Using OLE objects



OLE objects give you the ability to place entire files from other applications within containers on your form, and to maintain a link to their source application.

Creating OLE objects and placing values in them are discussed in Chapter 15.

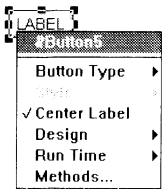
OLE objects have the standard Frame, Horizontal Scroll Bar, Vertical Scroll Bar, Design, Run Time, and Methods properties discussed in Chapter 11.

OLE objects, like graphic objects, have the Magnification property, which you can use to proportionally resize the contents of the OLE container. See Chapter 11 for details.

Using buttons

Use the Button tool to create buttons on your form. You can assign a specific function to a button using an ObjectPAL method, so that clicking the button performs an action.

To create a button, click the Button tool, then click and drag the size and shape of the button you want.



Paradox places a text object containing the word LABEL on the button. You can change the label to anything you want, and Paradox automatically centers the text on the button. (If you don't want the label centered on the button, inspect the button and uncheck Center Label.)

If you don't want a label, select the text object and click the Cut SpeedBar button (or press *Del* or choose Edit | Cut).

If you want an icon on the button, use the Graphic tool to place a graphic object on it. Make sure the button object's Design | Contain Objects property is checked.

Buttons have the standard Design, Run Time, and Methods properties discussed in Chapter 11.

The Center Label property automatically centers the button's text label.

Button types and styles

A button's type controls its functionality, while its style controls its visual display.

By default, the button you create is a standard pushbutton. Choose Button Type to turn it into a radio button or a check box.

You can also create a group of radio buttons or a check box from a field object. The advantage of using a field instead of a button is that a field object can post a value (the button or check box the user chooses) to the table the form is bound to. To post a value to a table with a button object, you must use ObjectPAL.

A button's type determines the functionality that a button object has; whether it is a pushbutton that carries out an action described by an ObjectPAL method, a set of radio buttons that provide options, or a check box that indicates a yes/no state. A button's style determines its look.

If you choose a radio button or check box button type, you can choose to customize its look with one of two button styles. Inspect the button and

- Choose Style | Borland if you want the radio button or check box you create to look like the ones you see in Paradox. Radio buttons appear as diamond shapes, and check boxes are gray, with a three-dimensional look.
- Choose Style | Windows if you want the radio button or check box you create to look like the ones you see in Windows, a standard circle (for a radio button) or square (for a check box).

Creating a tab stop

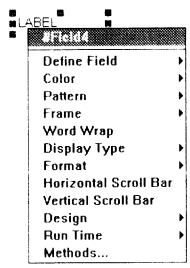
When you *run* a form—view data in the Form window—you can press *Tab* to move from object to object. (See Chapters 4 and 5 for information on working in the Form window.)

Buttons have the Run Time | Tab Stop property, which lets you control access to the button using *Tab*. If you use Run Time | Tab Stop, Paradox includes the button in the *Tab* sequence of movement among objects. If you don't choose Tab Stop, Paradox bypasses the button in the *Tab* sequence (but you can still use the mouse to push the button).

Methods on buttons

Choose Methods to define one or more ObjectPAL methods for the button. This is how you assign functionality to the button. For example, you could attach a method to a button that tells Paradox to print a specific report or move to a specific record or find a certain value when you push the button. For more information about using ObjectPAL methods, see your ObjectPAL documentation.

Using field objects

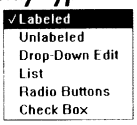


In a form, field objects display the data contained in the fields of the table(s) on which the form is built. Placing and defining field objects are discussed in Chapter 11.

In the Form Design window, you don't see the data in the field. When you run the form, Paradox places the field's data in the field object for you to view and edit.

Field objects have the standard Color, Pattern, Frame, Horizontal Scroll Bar, Vertical Scroll Bar, Design, Run Time, and Methods properties discussed in Chapter 11.

Choosing a display type



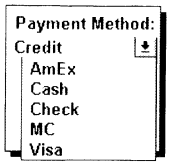
You can display a field's data in a variety of ways in Paradox forms. To change a field's display type, inspect the field and choose Display Type. A menu of available types is displayed. The default display type is Labeled. Choose the type of display you want and Paradox changes the field to that type.

Labeled and unlabeled display types

Paradox can display a field object with or without a label. To display a field as labeled, inspect the field object and choose Display Type | Labeled. To remove a label from a field, inspect it and choose Display Type | Unlabeled.

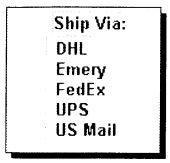
Drop-down edit, list, and radio button display types

Drop-down edit, list, and radio button display types provide quick ways to enter data into fields that have a limited number of valid values. When you choose any of these display types, you specify the valid values in the Form Design window, then pick from these values when entering data in the Form window.



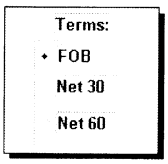
A drop-down edit display type is one in which you can either type data directly into the field or choose the data value to be entered from a drop-down list. For example, if you create a form for data entry into the *Orders* table, and you know that there are only six valid values for the Payment Method field, you can display these values in a drop-down edit field object.

When you enter data using a drop-down edit field, you can either type a value in the edit region, or click the drop-down arrow to choose a value from the list. Using the list, you have a handy way to enter common field values.



A list field is one in which you can choose a value from a list. For example, if you create a form for data entry into the *Orders* table, and you know that there are only five valid values for the Ship Via field, you can display these values in a list field object.

Using a list, you can avoid typing and spelling errors, and specify exactly what data can be entered in the field. The list display type limits possible values for entry in the field, because you cannot enter values that aren't on the list.

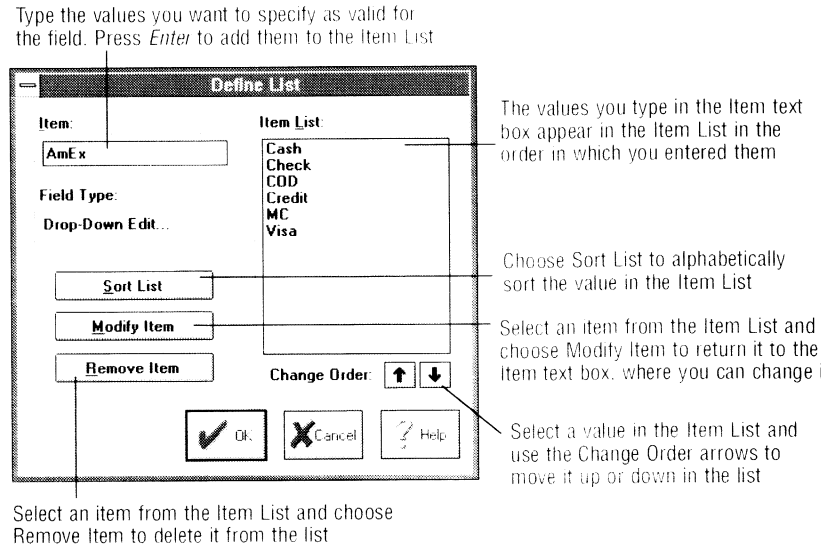


The radio button display type offers the same functionality as the list display type, but is visually different. You define the values that can be entered in the field, and when performing data entry, choose values by clicking the appropriate radio button.

To enter the values you want displayed in a drop-down edit, list, or radio button field, inspect the field object and choose Display Type and the type of field you want. You'll see the Define List dialog box, shown in Figure 12-2.

Figure 12-2 The Define List dialog box

You use the Define List dialog box the same way for drop-down edit, list, or radio button field types. The Field Type panel tells you what type you're defining



Example 12-2 Entering values in the field

To enter the values you want in the field, follow these steps:

1. Type the choices for the field's value in the Item text box.
2. Press ***Enter*** after each choice you type. The choice appears in the Item List.
3. Choose Sort List to sort all choices in the Item List in ascending (A to Z) order. (This step is optional.)
4. Select a choice in the Item List and choose Modify Item to move the choice back to the Item text box, where you can edit it. Press ***Enter*** to return the choice to the Item List.
5. Select a choice in the Item List and choose Remove Item to remove it from the Item List.
6. Select a choice and use the up and down Change Order arrows to move the choice up or down in the Item List.
7. Choose OK to accept the list as Paradox displays it in the Item List.

Caution When you enter values in the field, make sure the field size is large enough to fit the value. Paradox trims values that are too large to fit in the field. Also, make sure any values you enter meet the requirements of any validity check for the field.

Figure 12-3 shows the use of the labeled, drop-down edit, list, and radio button display types in a data entry form for the *Orders* table.

Figure 12-3 Different field display types in the Form Design window

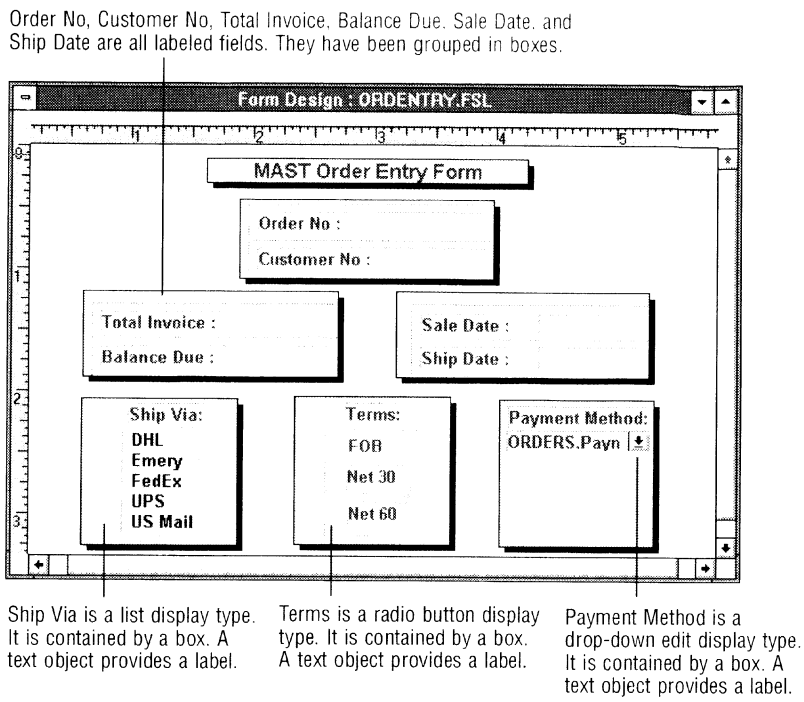
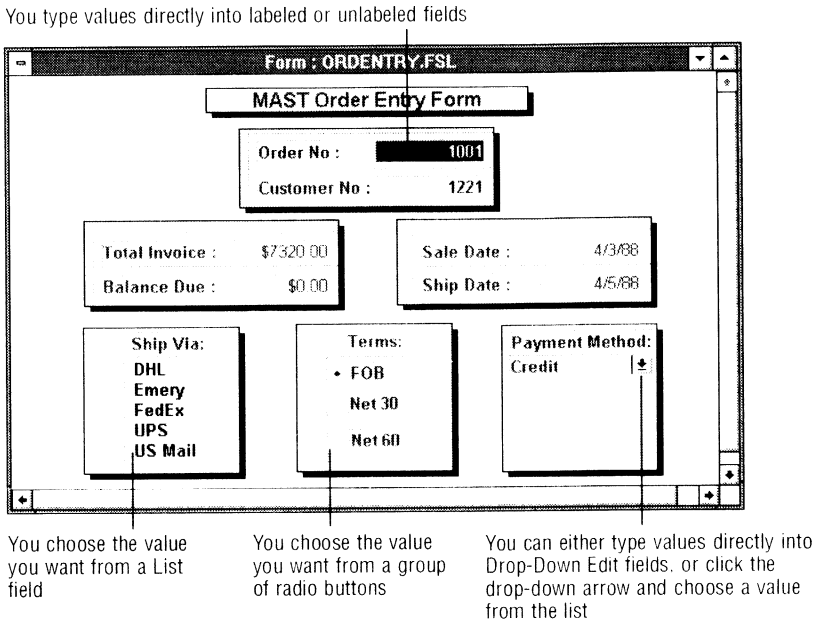


Figure 12-4 shows the same form when it is run. You can see how the different types of fields are used.

Figure 12-4 Different field display types when you run the form



This form (named ORDENTRY.FSL) is included in Paradox's sample files. You can open it and inspect the objects to see how the effects in this figure were achieved.

Check box fields

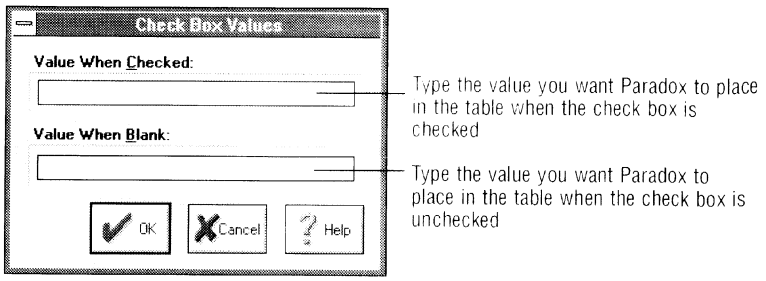
A check box has two states: checked or unchecked. You indicate the the field's value by checking it or leaving it unchecked.

For example, suppose you design a form on the *Vendors* table. The Preferred field indicates whether the vendor has perferred status or not. There are only two valid values for the field: yes and no. In the form, you can specify a check box display type on the Preferred field object.

The dBASE logical field type is a perfect candidate for the check box field type.

To create a check box, inspect a field object and choose Display Type | Check Box. You'll see the Check Box Values dialog box, shown in Figure 12-5.

Figure 12-5 Specifying values for a check box



Enter the value for when the box is checked in the top text box. Enter the opposite value (the value for when the box is *not* checked) in the bottom text box and choose OK.

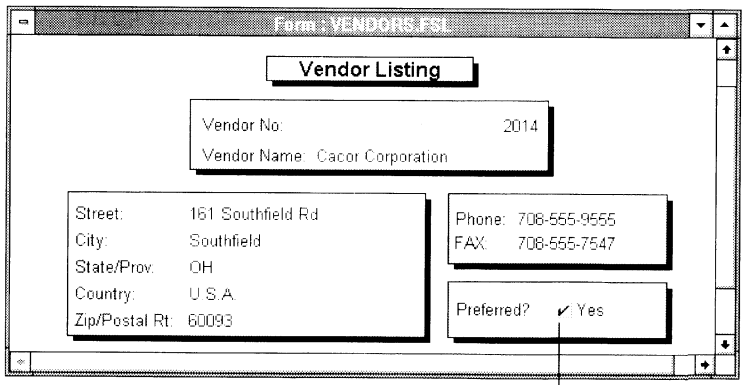
Using the example of the Preferred field in the *Vendors* table, the Value When Checked entry should be Yes and the Value When Blank entry should be No.

Paradox displays the Value When Checked entry in the form. When you run the form, you can check or uncheck the box to indicate its value.

Note To use the Value When Blank entry, you must check and uncheck the box. If you leave the check box blank, Paradox leaves the field in the table blank.

Figure 12-6 shows the *Vendors* form using the check box display type on the Preferred field.

Figure 12-6 Using a check box in a form



When you check Yes, Paradox writes the value Yes to the *Vendors* table. When you uncheck Yes, Paradox writes the value No to the *Vendors* table.

This form (named VENDORS.FSL) is included in Paradox's sample files. You can open it and inspect the objects to see how the effects in this figure were achieved.

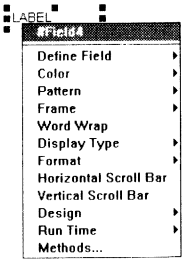
There is a difference between values and labels.

For radio button and check box display types, the values you enter in either the Define List or Check Box Values dialog boxes are the actual values that Paradox enters in the table. Unless you change them, the labels that you see for the check box or the group of radio buttons match the entered values. But you can change the labels in the Form Design window without changing the values you've specified. The labels are standard text objects.

For example, if the value you want to enter in the table is the two-letter abbreviation for a state, you enter those two-letter abbreviations in the Define List (or Check Box Values) dialog box. After you've done that, you can change the labels for each value in the Form Design window to be the full name of each state. This ensures that Paradox enters the state in the table using its standard, two-letter format, but lets you see the whole state spelled out when you choose the value (just in case you can't remember if AL stands for Alaska or Alabama).

Once you define a list, drop-down edit, check box, or radio button display type, you can change the display definition. For example, if you create a list field display type, then inspect it, you'll see the choice List on the object's menu. When you choose List, Paradox opens the Define List dialog box so you can change the list.

Field properties



This section discusses using the Define Field property to define a field object as a summary or calculated field, and using the Format property to format a field's data.

Field objects have the standard Color, Pattern, Frame, Design, Run Time and Methods properties, discussed in Chapter 11. The Define Field choice is also discussed in Chapter 11. The Display Type choice is discussed in "Choosing a display type" earlier in this chapter.

Choose Vertical Scroll Bar to place a scroll bar along the right side of the field object, or Horizontal Scroll Bar to place a scroll bar across the bottom of the field object. When you run the form, you can use the scroll bar to view data that doesn't fit in the field object.

Formatting options

You can format the field's data by inspecting the field object and choosing a Format option. When you inspect an undefined field, all formatting options (date, number, time, timestamp, and logical) are available. If the field object is defined, the available formatting option depends on the field's type. Number Format is available for number fields, Date Format is available for date fields, and so on.

Suppose you want to change the formatting of a date field to show two digits each for the month, day, and year. All you have to do is inspect the field object and choose Format | Date Format | mm/dd/yy. When you run the form, Paradox formats the data in the date field accordingly.

Paradox gives you the ability to define your own formats. Formatting data in a form is just like formatting data in a table. For details on creating your own formats, see Chapter 4.

Run Time field properties

The properties available from the Run Time choice take effect only when you run the form.

Fields have the standard Run Time | Visible property. See Chapter 11 for details.

Choose Run Time | Read Only if you want to prevent the data in the field from being changed. Read Only fields can be viewed but not edited.

If you want to prevent someone from changing data in a field no matter how they access it (from a table, any form, or a query) use a read-only auxiliary password. Password protection is discussed in Chapter 9.

Choose Run Time | Tab Stop if you want to be able to use *Tab* to move to the field.

Choose Run Time | No Echo if you don't want to see the contents of a field when you run the form. When you choose No Echo, Paradox does not display the data you enter in the field. This is especially useful if you enter passwords or other protected information into a field.

Using Complete Display to work with memo fields

When you create a table, you specify a field size for memo or formatted memo field types (see Chapter 9 for details about field types and sizes). The field size you define tells Paradox how many characters of the memo to store in the table. The whole memo is stored in a different file, which has the same name as the table and the .MB extension.

For example, in the *Biolife* table, the Notes field is a memo field with a size of 50. This means Paradox stores the first 50 characters of each memo in BIOLIFE.DB. Paradox stores the complete contents of the memos in BIOLIFE.MB.

The time it takes Paradox to access the .MB file and display its information in your form depends on the size of the memo, the speed of your system, and a variety of other factors. To increase speed, you can uncheck Run Time | Complete Display. This tells Paradox to display only the amount of data stored in the .DB file. Paradox can

move through records more quickly when you uncheck Complete Display because it doesn't have to access the .MB file.

When you run the form with Complete Display unchecked on a memo field, you'll see only as many characters displayed in the memo as are specified in the table's structure. These characters are followed by an ellipsis (...) to tell you there is more information. When you want to view the full memo, move to it and enter Field View. Paradox locates the rest of the memo in the .MB file and displays it.

.DBF

If you're working with a dBASE memo field, Paradox doesn't store any memo data in the .DBF file. Because of this, when you uncheck Complete Display on dBASE memo fields, you won't see any of the memo. When you select the field, Paradox displays the memo value from the .DBT file.

Using field summaries

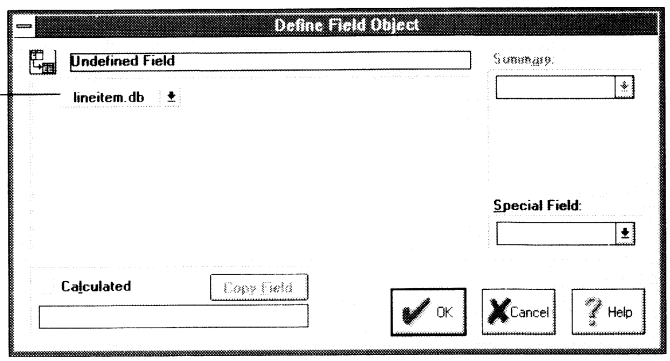
A summary performs a specific calculation on a specific set of values in a table. Using summaries, you can sum, count, or average the values in a field. You can find the minimum, maximum, standard deviation, and variance of values in a field.

Example 12-3 Creating an average summary field

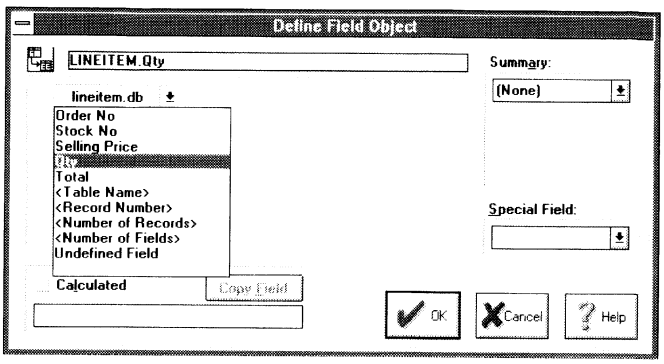
Suppose you want to know what average quantity your customers order per line item. You can

1. Create a form for *Lineitem*.
2. Place a field object on the form.
3. Inspect the field object, and choose Define Field. You'll see a menu of available fields.
4. Choose the ellipsis (...). You'll see the Define Field Object dialog box.

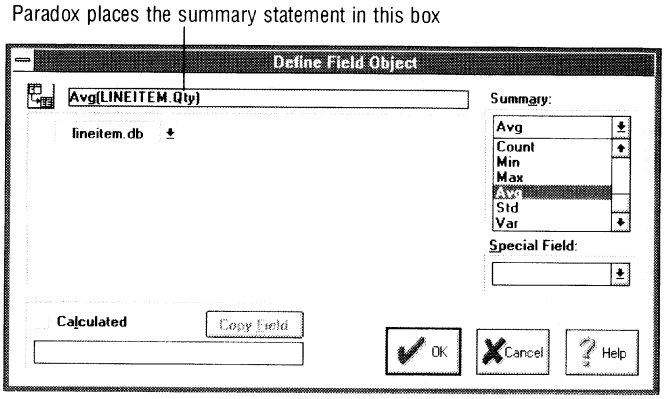
The *Lineitem* table appears in the dialog box. Click the drop-down arrow to view all of its available fields.



5. Click the table's drop-down arrow and choose the Qty field.



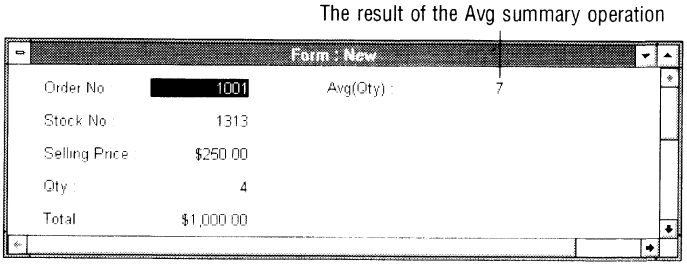
6. Click the drop-down arrow in the Summary panel to display available summaries. Choose Avg.



7. Choose OK.

8. In the Form Design window, Paradox changes the field object's label to Avg(Qty).

9. Run the form. You'll see that Paradox calculates the average of all quantities ordered and displays the value in the summary field object.



Summary operators

Table 12-3 lists Paradox summaries and what operations they perform.

Table 12-3 Summary operators

Summary	Function
Sum	Finds the total of all values in the set
Count	Counts the number of non-blank values in the set
Min	Finds the minimum value in the set
Max	Finds the maximum value in the set
Std	Finds the standard deviation of values in the set
Var	Finds the statistical variance of values in the set
Avg	Divides the total of all non-null values in the set by the number (count) of all non-null values in the set

Understanding scope

A summary performs a calculation on a set of records. Before you can *sum* the set (add all values together), *count* the set (find how many values there are) or *average* the set (find what the average of all values is), or perform any other operation, you must *define* the set. This is done by defining the *scope* of the summary.

Scope in single-table forms

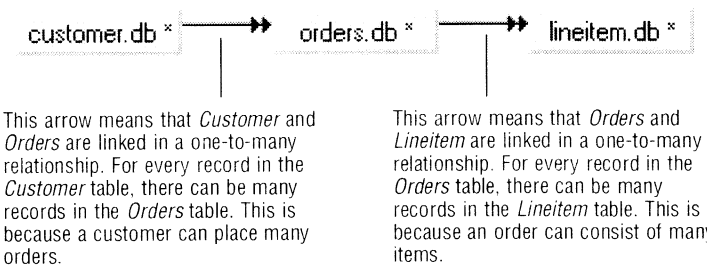
When you design a single-table form, Paradox works with only one set of data. In this case, the scope of the summary is the whole table. Example 12-3 shows how to create an Avg summary on a single-table form.

Scope in multi-table forms

When you design a multi-table form, the scope of a summary is dependent on the data hierarchy. The hierarchy is defined by the form's data model.

Suppose you have defined your data model like the one shown in Figure 12-7.

Figure 12-7 The data model shows the data hierarchy



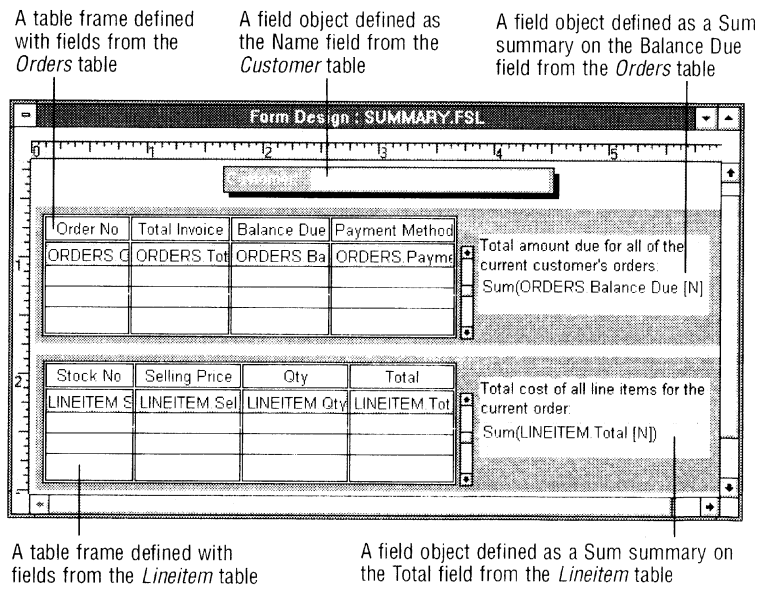
In this case, you can summarize values for fields in the *Orders* table for each record in the *Customer* table. In this relationship, *Customer* is the master table and *Orders* is the detail table. Paradox sums the set

of *Orders* detail records for the current *Customer* record. Likewise, you can summarize values in the *Lineitem* table for the current record in the *Orders* table. Again, the master table (*Orders*) determines the scope of a summary on the detail table (*Lineitem*). The summary of *Lineitems* is performed on the set of all items for the current customer's current order.

Note In the data model *Customer→Orders→Lineitem*, you cannot create a summary of each customer's lineitems—only of each order's lineitems. Paradox can move only one level up in the data hierarchy when performing a summary.

Figure 12-8 shows how summaries should be placed in the Form Design window for a form with this data model.

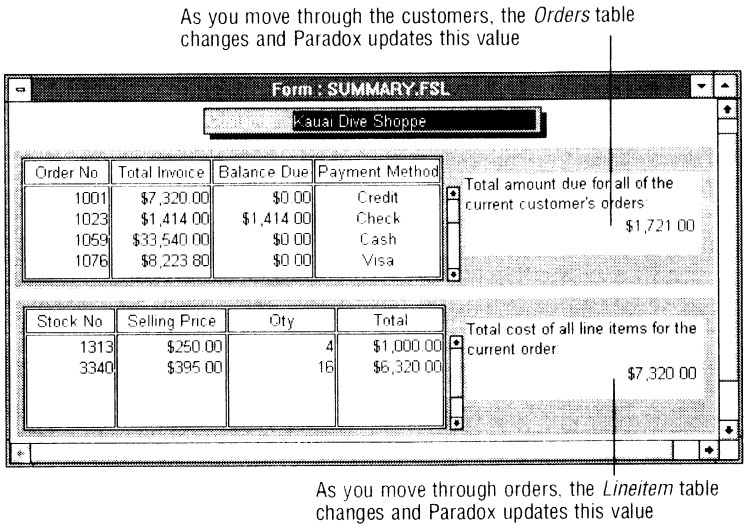
Figure 12-8 Summaries in a multi-table design



Note When placing a summary field on a detail set of records in a one→many→many form, you must position the summary field within that detail's repeating region (the table frame or multi-record object that displays its records) or within the repeating region of the next table up in the data hierarchy.

Figure 12-9 shows how the value in the summaries change depending on what level in the data hierarchy you move the pointer through.

Figure 12-9 Viewing summaries in a multi-table form



Using calculated fields

A *calculated field* shows the result of a calculation Paradox performs on the values of one or more fields. A calculated field is an expression that must resolve to a single data value.

You can create a calculated field from the Define Field Object dialog box. Check Calculated and type the calculation you want into the text box below the Calculated check box. You can use

- Operators, including
  - Arithmetic operators +, -, *, /, and ( )
  - Logical operators AND, OR, and NOT
  - Comparison operators <, >, <>, =, >=, and <=
- Operands, including
  - Field names, enclosed in square brackets ([]). (See "Using field names in calculations" later in this section.)
  - Summary fields. (Although the calculation SUM(FIELD A + FIELD B) is not allowed, the calculation SUM(FIELD A) + SUM(FIELD B) is.) When using summary fields in calculations, remember the scoping rules that summary fields must follow. See the previous section, "Understanding scope."
  - Object references, like the name of an object on the form. (Object names must be unique.)
  - Numeric constants.

- Alphanumeric strings.
- Any of the ObjectPAL mathematical, statistical, string manipulation, and date/time methods that return a single value.
- Combinations of any of the above.

Using field names in calculations

An easy way to use a field name accurately in a calculation is to choose the field you want from the table's drop-down list. The field name appears in the text box at the top of the dialog box. Choose Copy Field to place that field in the calculated text box below the Calculated check box. In addition to the field name, you'll see the directory alias (if any) of the table and the table name. For example, if you choose the Length field from the *Biolife* table (and the *Biolife* table is in your working directory), you'll see [:WORK:BIOLIFE.Length] appear in the Calculated Field text box. This points to the exact location of the field you want to use in the expression.

Understanding fields and field objects

There is a difference between the field object you use in your design and the actual field of a table that the field object represents and contains. It's important to remember this when using field names in calculations. For example, if you type the expression **Qty * Price**, you tell Paradox to perform the calculation on the *field objects* named Qty and Price. If you type the expression **[Lineitem.Qty] * [Lineitem.Price]** , you tell Paradox to perform the calculation on the values in the actual Qty and Price fields in the *Lineitem* table.

Usually the field object in the design and the field in the table to which the form is bound are equivalent. There are times, however, when

- Field objects are not associated with a table (for example, they may be other calculated fields).
- Fields from the table that the form is bound to are not displayed in the design, but you still need to work with them.
- A field object might not have the same name as the field that it is bound to.

Paradox makes the distinction between field objects and a table's actual fields because of these possibilities. Be sure to create the calculated expression using the correct syntax for the result you want.

Calculating with fields

A common use of a calculated field is to calculate values of two or more fields from a table. For example, you can create a field object in a form on *Lineitem*, and define it as **[Lineitem.Qty] * [Lineitem.Selling Price]**. The value for a record in this calculated field is the product of the values of the Qty field and the Selling Price field.

Calculating with a field and a constant

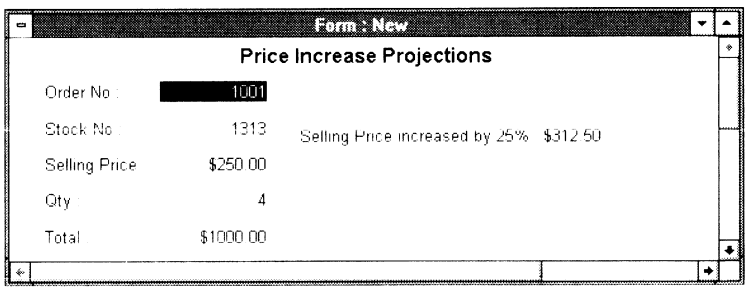
Chapter 6 discusses how to use arithmetic operators with numeric constants in a query. If you prefer, you can use calculated fields in forms instead, or in combination with query results.

Example 12-4 Creating a calculation with a field value & a numeric constant

If you want to show what the selling price of line items would be if you raised all prices by 25%, you can

1. Create a form bound to the *Lineitem* table.
2. Place a field object on the form.
3. Inspect the field object and choose Define Field. Choose the ellipsis (...) to open the Define Field Object dialog box.
4. Change the field label to **Selling Price increased by 25%:**
5. Check the Calculated check box, and enter the formula **[Lineitem.Selling Price] * 1.25** in the Calculated text box.

   When you run the form, for each record in the table, the Selling Price field shows the current price, and the calculated field shows the price with the proposed increase.



Calculating with alphanumeric strings

You can use the + operator to combine alphanumeric strings. Suppose you want to create a field called Address that combines the values of the Street, City, State, and Zip/Postal Code fields for the *Customer* table.

Example 12-5 Creating a calculation with alphanumeric strings

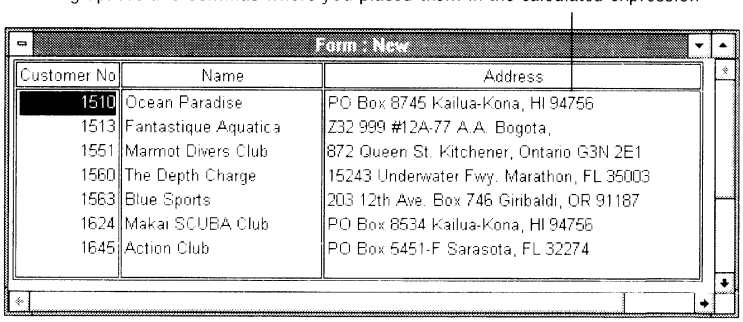
If you want to place a calculated field in a table frame to combine the customer's address fields, you can

1. Create a form for the *Customer* table.
2. In the Design Layout dialog box, choose the Blank style.
3. In the Form Design window, use the Table tool to place a table frame with three columns.

4. Inspect the first field in the table frame. Choose Define Field and choose Customer No from the menu that appears.
5. Inspect the middle field in the table frame. Choose Define Field and choose Name from the menu that appears.
6. Inspect the third field in the table frame. Choose Define Field and choose the ellipsis (...) to open the Define Field Object dialog box.
7. In the Define Field Object dialog box, type the calculation **[Customer.Street] + " " + [Customer.City] + ", " + [Customer.State/Prov] + " " + [Customer.Zip/Postal Code]**. (You must type the spaces and commas you want inserted between fields within quotation marks.) Choose OK.
8. In the Form Design window, Paradox displays the word **formula** in the calculated field object.
9. Enter the word **Address** as the calculated field's label.

   When you run the form, Paradox combines the values from the four fields into the one calculated field.

Paradox combines the values from the four fields for each record of the table, inserting spaces and commas where you placed them in the calculated expression



Calculating with ObjectPAL methods

You can use certain ObjectPAL methods as part of your field calculations. Most methods that involve numeric or alphanumeric strings are available in calculated fields. Any ObjectPAL expression that evaluates to a single value is valid in a field calculation.

For information on using ObjectPAL in calculations, refer to your ObjectPAL documentation.

Using tables

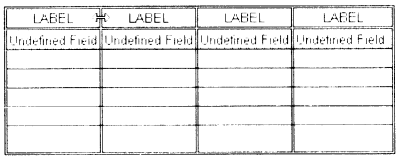
A table object is a collection of other objects; this gives you flexibility in customizing it to be the perfect display of your data.

You can resize columns.

Resize a column by clicking and dragging its right grid line in the header area. You can't resize a column to be narrower than its header.

Figure 12-10 Resizing a column in a table frame

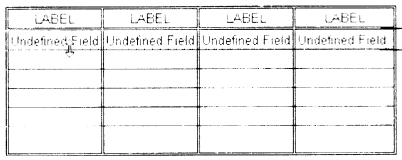
The pointer changes shape to show when you can drag a grid line. You can drag anywhere along the line.



When you drag a grid line, the column to the left of the line is affected

You can resize rows. Resize the row height by clicking and dragging the horizontal grid line. You can resize the row height of the header row by dragging the line under the field labels, or resize the row height of all fields by dragging the line under the field objects.

Figure 12-11 Resizing a row in a table frame



Drag this line to resize the header

Drag this line to resize all field rows. The pointer shows when you can drag the grid line up or down. When you resize the first row of fields, all rows of fields are affected.

You can delete columns. Delete a column by selecting it and pressing *Del*. Select a column by pointing to it *below* the header and record rows, in a blank field area. If your Select From Inside setting is unchecked, click once to select the table, once again to use the column selection pointer, and once again to select the column. When the column is selected, it is highlighted.

Note If your Select From Inside design preference is on (set this preference from the Designer Preferences dialog box), you'll only need to click once to select the column. See Chapter 11 for information about using Select From Inside.

You can insert new columns. Insert a new column by selecting an existing column (see Note above) and pressing *Ins*. Paradox inserts the new column to the left of the selected column.

The new column contains a text object with the word LABEL in the header, and an undefined field object in the first row. Edit the text object to display the column name you want, and inspect the undefined field object to define it. (See Chapter 11 for details.)

You can move columns. To move a column, click and hold the column's heading. When the pointer is in the right place, it changes in appearance. Drag the column to its new position.

You can redefine fields.

Redefine a field object by inspecting it and choosing Define Field from its menu. Redefine it as if you were defining it for the first time. (See Chapter 11.)

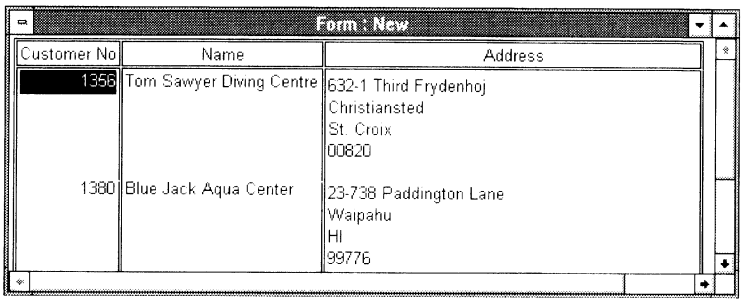
You can put more than one field in a column.

To stack field objects in the same column, first resize the record area of the column (adjusting its width and height), then either drag existing field objects from other columns into the desired column, or create new field objects within the column.

Example 12-5 shows how to combine the values of the Street, City, State/Prov, and Zip/Postal Code fields from the *Customer* table into one field. Figure 12-12 shows a similar table, but this time the fields aren't combined, they are stacked in the same column.

Figure 12-12 Stacking fields in a column

The Street, City, State/Prov, and Zip/Postal Code fields are all in the same column



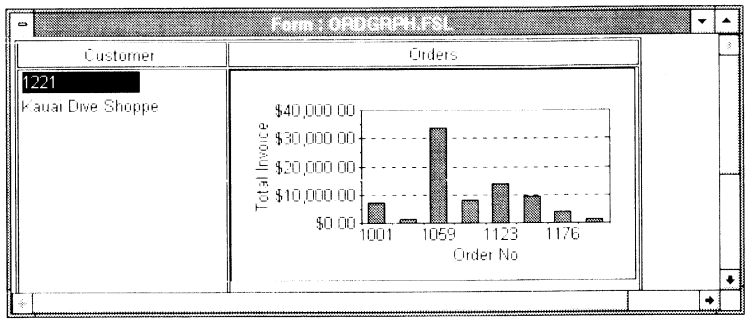
You can place other objects in table frames.

Use the SpeedBar's design tools to place design objects like lines, boxes, and ellipses—even other tables or graphs—within the table. Figure 12-13 shows a form that has *Customer→Orders* as its data model. The table frame in this form has two fields from *Customer* in its first field. The second field has a graph object in it, which illustrates information about orders placed by each customer.

Figure 12-13 A graph object within a table frame

As you move through the table, the graph in each record reflects the orders placed by each customer.

Using graph objects in design documents is discussed in Chapter 14.



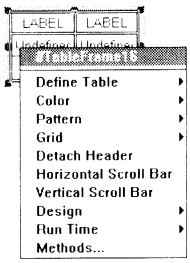
Inspecting the parts of a table frame

In addition to the changes you can make to the table as a whole, you can inspect and change the parts of the table individually. You can

- Retype the labels, and inspect them to change any text properties. (See "Using text" earlier in this chapter.)
- Inspect the field objects to change properties. (See "Using field objects" earlier in this chapter.)
- Inspect the record (the row of field objects) to affect properties of the row
- Inspect the header to change its text properties

Note Because the table frame in a form is not the actual table, property changes and table frame restructuring do not affect the actual table.

Table Properties



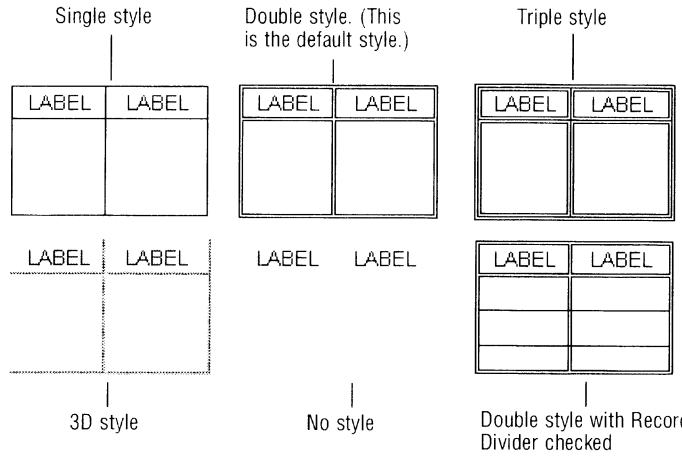
In addition to the properties of the several parts of a table (field, text, and record properties) you can inspect the properties of the table frame as a whole.

Table frames have the standard Color, Pattern, Design | Pin Horizontal, Design | Pin Vertical, Design | Size To Fit, Run Time | Visible, and Methods properties, all of which are discussed in Chapter 11.

Chapter 11 also discusses defining a table by inspecting it and choosing Define Table.

You can change the grid's style and color, and choose to display a record divider between each row of data. Figure 12-14 shows the different grid styles available.

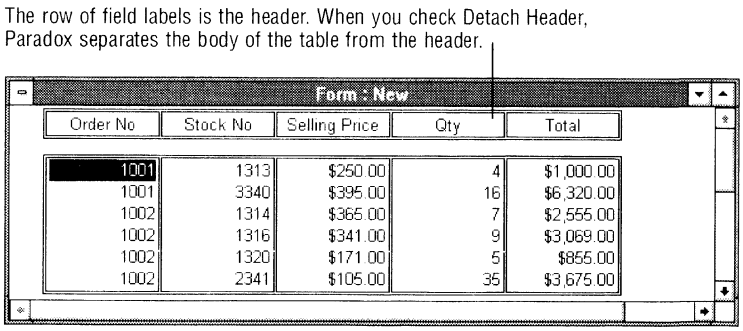
Figure 12-14 Table frame grid styles



Note When you choose Grid | Record Divider, Paradox doesn't change the table frame image you see in the Form Design window. That image has record dividers already visible. You'll see the difference when you run the form. Without record dividers, there are no horizontal lines between the records in the table frame.

Choose Detach Header to separate the header (the labels) from the body of the table. You can then drag the header to a new position. Figure 12-15 shows a table with detached headers. Choose Attach Header to attach the header to the body of the table again.

Figure 12-15 A table frame with a detached header



Check Horizontal Scroll Bar to place a scroll bar along the bottom of the table frame. Paradox places this scroll bar automatically if you define a table too large to fit on the page (when Design | Size To Fit is set).

Check Vertical Scroll Bar to place a scroll bar along the right side of the table frame.

Record properties

You can inspect the properties of the record (the top row) of the table frame. The record has the standard Color, Pattern, Design | Pin Horizontal, Design | Pin Vertical, Run Time | Visible, and Methods properties discussed in Chapter 11.

Choose Define Record to view a menu of the tables in the document's data model. Choose a table whose records you want to place across the row. If you choose the ellipsis (...), you'll open the Define Table Object dialog box, discussed earlier in this section. Defining a record is the same as defining a table. Paradox defines the record with the fields of the table, and the contents of the header with field labels.

Using multi-record objects

Use a multi-record object when you want to view more than one record of a table at a time in a non-tabular format. With a multi-record object, you design the layout of one record, then tell Paradox how many times to repeat the layout across and down the page.

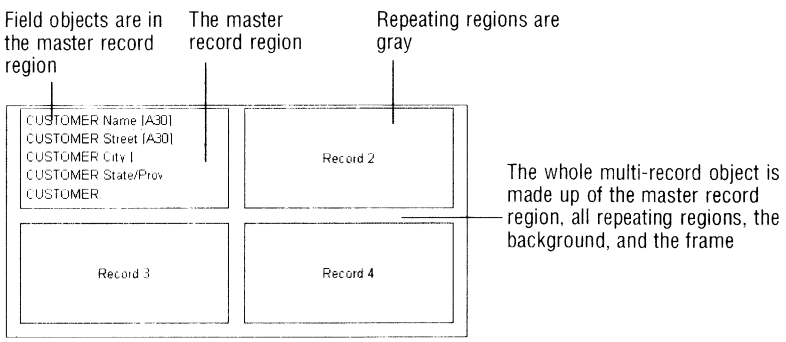
Placing and defining multi-record objects in forms are discussed in Chapter 11.

Multi-record object properties

Multi-record objects, like tables, are made up of several parts.

- The multi-record object as a whole contains record regions.
- The master record region contains fields. Gray repeated regions indicate how many records Paradox will repeat across or down the page.
- Field objects contain data from one or more tables.

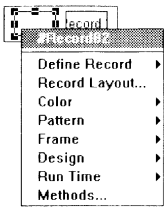
Figure 12-16 The parts of a multi-record object



In addition to the properties of the fields placed in the multi-record object, you can inspect and change the properties of the master record region (this affects all repeated records as well) or the properties of the multi-record object as a whole.

The properties of the multi-record object are almost identical to those of the master record region. The difference is where Paradox applies the properties. Changes to the multi-record object affect the background area that surrounds and contains the record objects. Changes to the master record region affect each record within the multi-record object.

Inspecting the master record region

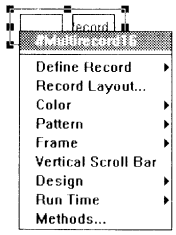


The master record region of the multi-record object has the standard Color, Pattern, Frame, Design | Pin Horizontal, Design | Pin Vertical, Run Time | Visible, and Methods properties. These are all discussed in Chapter 11.

Defining a record with the Define Record property and specifying a record layout with the Record Layout property are also discussed in Chapter 11.

When you change a property in the master record region, Paradox applies the property to all repeating regions as well.

Inspecting the multi-record object



One difference between the master record region properties and the multi-record object properties is the addition of the Vertical Scroll Bar property for the multi-record object. Choose this to place a scroll bar along the right side of the multi-record object.

When you place a scroll bar on the multi-record object, you can scroll through the data displayed in the multi-record object.

Another difference between the properties of the master record region and the multi-record object is that when you apply color, pattern, or frame properties from the multi-record object, Paradox applies them to the outer frame of the multi-record object, not to the individual records.

Working with multi-page forms

Choose Form | Page | Add to add a blank page to the form. Paradox always adds the new page after all existing pages. You cannot add a blank page between existing pages. (You can move pages to rearrange their order, or use Paste to insert a blank page.)

When working with multi-page forms, you may want to choose Properties | Zoom | Best Fit to see all pages of the form onscreen at the same time.

To delete a page, select it and press *Del* (or choose Edit | Cut or click the Cut button). Paradox deletes the page and all objects on it.

To copy a page, select it and choose Edit | Copy or click the Copy button. Paradox copies the page and all objects on it.

After you've cut or copied a page, select a page and choose Edit | Paste or click the Paste SpeedBar button to paste it back into the form design. Paradox inserts the pasted page before the selected page. For example, if you cut page two of a five-page report, then select page five and paste the page back in, Paradox inserts it as page four. Cutting and pasting gives you an easy way to rearrange pages.

Choose Form | Page | Rotate to move the selected page to the last page's position. For example, if you select page two of a five-page report and choose Form | Page | Rotate, Paradox moves page two to the end of the form (page five), and moves pages three, four, and five up one position.

Tiling multiple pages

When working with a multi-page form, you can control the onscreen display of the pages by choosing Form | Page | Tile.

- Choose Stack Pages to view the pages one at a time, one on top of another.
- Choose Tile Horizontal to view the pages side-by-side, horizontally across the screen.
- Choose Tile Vertically to view the pages top-to-bottom, vertically down the screen. (This is the default tiling option.)

You might not notice a difference in tiling options if you've specified a large page from the Page Layout dialog box. Try using Properties | Zoom to zoom out to a smaller display of pages (like 25%). You'll see more than one page at a time and the tiling options will be obvious.

Moving among pages

Choose Form | Page to move among the pages of a multi-page form. You can move to the first, last, next, or previous page. When you move to a page, Paradox selects it.

You can also use the Form Design window's scroll bars to move through the pages of a form, unless you have pages stacked. When you scroll to a page, Paradox doesn't select it.

Choose Page | Go To to display the Go To Page dialog box, discussed in Chapter 5.

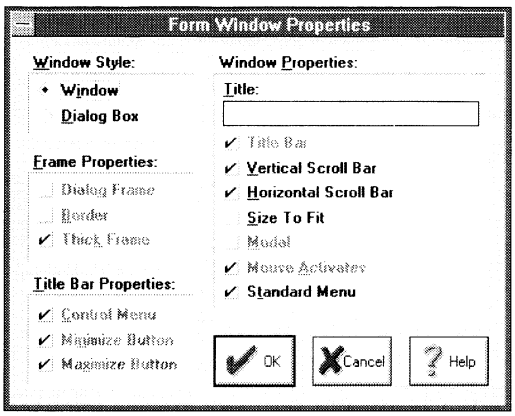
To change the page layout, choose Page | Layout. You'll see the Page Layout dialog box, discussed earlier in this chapter.

You cannot place a page break on a page in a form the way you would in a report. Instead, you can add a new page to the form.

Customizing the form's window

You can customize not only the form, but the window in which the form is displayed as well. Choose Properties | Form | Window Style to open the Form Window Properties dialog box, shown in Figure 12-17.

Figure 12-17 The Form Window Properties dialog box



In the Window Style panel, choose whether you want Paradox to display the form as a window or as a dialog box when you run it.

Customizing a form in a window

In the Window Style panel, if you accept the default choice of Window, some of the options in the Frame Properties, Title Bar Properties, and Window Properties panels are checked and dimmed. This means you must use these standard features of a window for your form's window. You can change

- The text that appears on the window's title bar. Type the text you want in the Title text box.
- The display of horizontal or vertical scroll bars. Uncheck either Vertical Scroll Bar or Horizontal Scroll Bar to remove it from the window.
- The Size To Fit option. Check this to have Paradox automatically size the window to fit the page size of the form. (Change the page size from the Page Layout dialog box, discussed earlier in this chapter.)

The effect of choosing Size To Fit may not be apparent unless your page size is smaller than your screen display size. Adjust your page size to be as small as it can be without removing any existing objects, then choose Size To Fit. All of the sample forms provided in the SAMPLE directory use Size To Fit.

- Display the standard form menus. The Standard Menu option is checked by default. If you create a new standard menu using ObjectPAL, and *don't* want your form to use it, uncheck Standard Menu. The form will then use Paradox's standard menu instead of your customized one. See your ObjectPAL documentation for information on customizing forms.

Customizing a form as a dialog box

You can create sophisticated dialog boxes for use in ObjectPAL applications. Refer to your ObjectPAL documentation for further information. When you choose Dialog Box in the Window Style panel, Paradox opens the form as a dialog box every time you run it. This means the form

- Appears in the center of your screen
- Appears on top of all open windows
- Can be moved like any other dialog box
- Can't be resized by the user

When you choose Dialog Box, all options *except* Size To Fit and Standard Menu are available to you. Size To Fit and Standard Menu are checked and dimmed: You must use these features of a dialog box. Additionally, you can choose

- Options from the Frame Properties panel
  - Dialog Frame displays the dialog box in a standard Windows dialog box frame. The border, colors, and other settings are set from the Windows Control Panel.
  - Border displays the dialog box with a black border instead of the normal Windows style.
  - Thick Frame displays the dialog box with a thick black border instead of the normal Windows style. Thick Frame is unavailable if you choose Dialog Frame.
- Options from the Title Bar Properties panel
  - Control Menu places the standard Window Control menu in the top left corner of the dialog box.
  - Minimize Button places a Minimize button on the top right corner of the dialog box.

- Maximize Button places a Maximize button on the top right corner of the dialog box.

- Options from the Window Properties panel
  - Title Bar places a title bar across the top of the dialog box.
  - Enter the text you want to appear on the dialog box's title bar in the Title text box.
  - To display horizontal or vertical scroll bars on the dialog box, check either Vertical Scroll Bar or Horizontal Scroll Bar.
  - Check Modal to prevent users from working anywhere else in Paradox until the dialog box is closed.
  - Uncheck Mouse Activates to allow users to click the dialog box to activate it without changing the focus to it. For example, if you've created a customized SpeedBar using ObjectPAL, and you want to use the tools on that SpeedBar in your dialog box, unchecking Mouse Activates will prevent Paradox from activating the SpeedBar window every time a user clicks one of its tools.

Note Before the settings you choose in the Form Window Properties dialog box can take effect, you must save the form, close the Form Design window, and open the form in the Form window.

If you open a form as a dialog box and it doesn't have a control menu, you can close it by pressing *Alt+F4*.

Delivering a form

The Form | Deliver command is mainly used by ObjectPAL developers. If you've created a form with ObjectPAL code attached to objects, and you save the form for others to use, anyone who uses it can modify the design or the ObjectPAL code—changing your application.

When you choose Form | Deliver, Paradox saves a copy of the form with an .FDL extension. The *D* stands for *Delivered*. You can still change your ObjectPAL code using the form with its .FSL extension, but if you want others to use it safely, give them the delivered form, which can be opened only in the Form window.

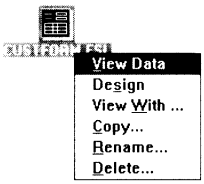
Delivery gives you a way to let others *use* your form, but not *change* it. When you deliver a form, Paradox creates a copy of the form and removes all the source code from it. Buttons and other objects still work exactly the way you've designed them. Your code isn't lost—it's protected.

You may, after delivering a form, discover a need to make changes to it. In this case, you can work with the .FSL form, then deliver it again.

When designing a form for others to use, consider the screen display with which users will view the form. It's best to use standard color and font choices, as well as standard form window sizes, to ensure the usability of the finished form.

For information on developing applications using forms and programming using ObjectPAL, see your ObjectPAL documentation.

The form icon's menu



If you inspect a form icon in the Browser or the Folder window, you'll see its menu. You can

- Choose View Data to open the form in the Form window and view its data. (This is the default action you get from double-clicking the icon.)
- Choose Design to open the form in the Form Design window and modify its design.
- Choose View With to bind the form to a table different from the one you originally designed it on. This is discussed in the following section.

See Chapter 8 for information about the Copy, Rename, and Delete commands.

Viewing a form with a different table

Paradox gives you the ability to open a form created on one table using the data from another table or from a query. Suppose you design a form for *Vendors*. At some later point, you decide to copy the *Vendors* table to a dBASE format, to use the logical field type on the Preferred field. Instead of re-creating the existing form on the new table, you can inspect the existing form's icon and choose View With.

When you use View With, Paradox creates a new form, copying the existing form's layout and properties, and attempts to place the fields from a different table or query in the new form. The original form is not changed.

You can also open a form with a different table or query from the Open Document dialog box by choosing the Change Table button.

Paradox opens the Select File dialog box, from which you can choose a different table (or use the Type drop-down list to choose a query) to view in the form. Choose the table or query you want.

Paradox searches through the fields in the new table. If there is no corresponding field object on the existing form, Paradox informs you that all objects that depend on the table's field will become undefined. This will happen unless the new table and the original table have matching field names.

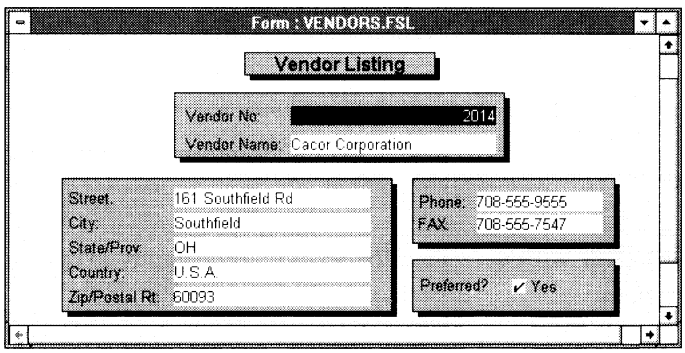
Paradox opens the form in the Form window. Unless all of the fields from the new table matched fields in the existing table, you'll probably need to switch to the Form Design window and redefine some field objects.

In the Form Design window, inspect and redefine all of the fields, tables, or multi-record objects you need to.

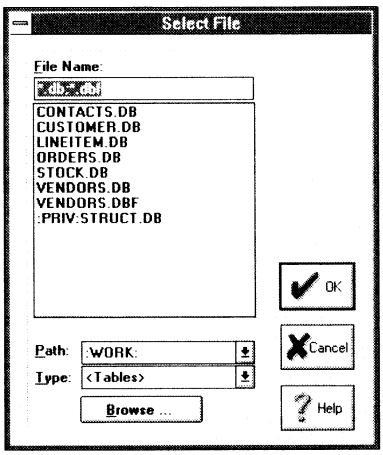
Example 12-6 Viewing a form on VENDORS.DB with VENDORS.DBF

Prerequisite Before working through this example, copy VENDORS.DB to VENDORS.DBF. (Copying tables is discussed in Chapter 8.) Then restructure VENDORS.DBF to convert the Preferred field to the logical field type.

Steps Suppose you want to view the form *Vendors*, originally designed with the VENDORS.DB table, using the VENDORS.DBF table. The *Vendors* form looks like this:

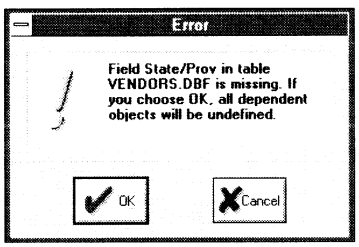


1. Close the *Vendors* form.
2. Open the Folder window.
3. Right-click the *Vendor* form's icon and choose View With. You'll see the Select File dialog box.



4. Choose VENDORS.DBF and choose OK.

   Because Paradox changed field names when converting the *Vendors* table to the dBASE format, you'll see messages warning you that some of the fields in VENDORS.DBF have no corresponding field objects in the form.

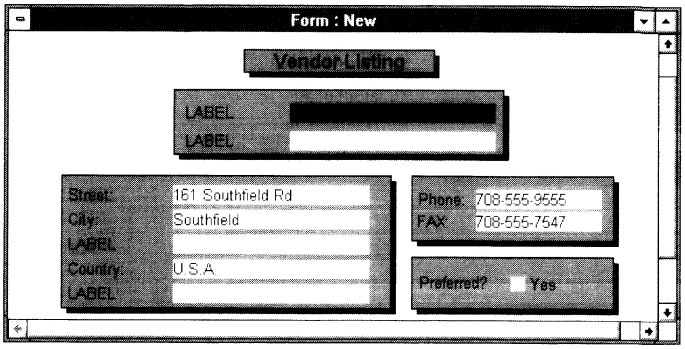


Paradox displays a warning message for each field it cannot automatically place. Continue to choose OK for each warning if you want to specify new field definitions on existing field objects in the form.

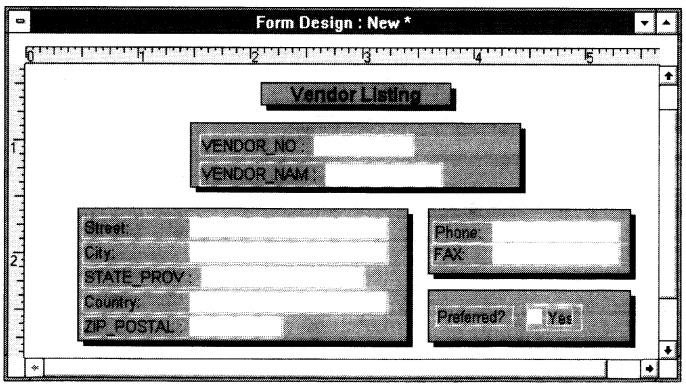
5. Four field names were changed in the conversion process. For each warning, choose OK to remove the existing field object definitions.

6. Paradox opens the form in the Form window. The four fields whose names where changed appear as undefined field objects.

Four field objects are undefined. Field labels for undefined field objects show the word LABEL.

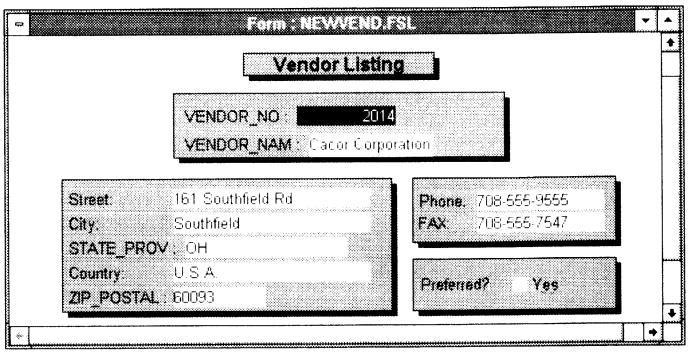


7. Click the Design SpeedBar button to switch to the Form Design window.
8. In the top group of fields, inspect the top field object and define it as VENDOR_NO. Inspect the field object below it and define it as VENDOR_NAM.
9. Inspect the field object between the City and Country fields and define it as STATE_PROV. Inspect the bottom field in this group and define it as ZIP_POSTAL.



10. Choose File|Save As and name the new form NEWVEND.FSL.
11. Click the View Data SpeedBar button to switch to the Form window and view the new form.

Fields from VENDORS.DBF now appear in a form that was originally designed for VENDORS.DB



Viewing a form with another table's data is a great way to save time in the Form Design window once you find a design you really like. But it can be complicated, depending on the complexity of the form design itself. If you attempt this with a multi-table form, you'll probably need to redefine links between tables. Whatever you do, remember Paradox keeps the original form, so you won't harm existing objects.

Opening reports as forms

Paradox gives you the option of opening forms as reports or reports as forms.

Suppose you've designed a report that you really like. If you want, you can open the report as a form. Paradox looks in the record band of the report and uses that as the form's layout.

Note Forms don't use the banded layout that reports do, so objects in group, page, and report bands are not included in the new form design.

Some objects behave differently in forms and reports. Calculated and summary fields, for example, look at data differently in forms and reports, so you may need to modify them to get the correct results. Summary fields located in the record band of a report work correctly in a form.

To open a report as a form, choose File | Open | Report. You'll see the Open Document dialog box, discussed in Chapter 3. In the Open As panel, use the drop-down list to choose Form. When you choose OK, Paradox creates and opens a new form based on the contents of the report's record band.

Note If the report design includes a page break in the record band, Paradox creates a multi-page form.

If you want to use a form's layout, but print it as a report, see Chapter 13.

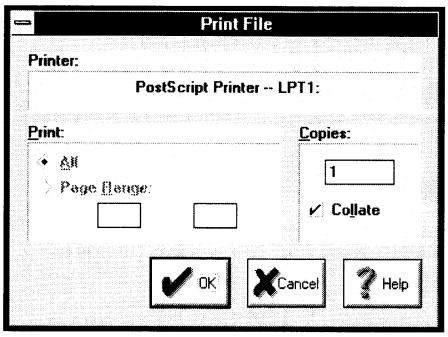
Printing the form

Although forms are designed primarily to be viewed onscreen, you can print a form directly from the Form window.

Printing the design

You can print the form's design by choosing File | Print from the Form Design window. You'll see the Print File dialog box, shown in Figure 12-18.

Figure 12-18 The Print File dialog box



If you're printing a multi-page form design, choose the page range you want, or choose All to print every page.

Choose the number of copies you want, and whether you want the pages to be collated. Choose OK to print the form design.

Printing records in a form

When you print a form with data in it, Paradox prints the current record (or current set of records if you have a multi-record object or table frame in the form). Paradox does not print a form for each record in the table. If you want to do this, use a report.

If you want to use a form's layout, but print it as a report, see Chapter 13.

To print a record in a form, choose File | Print from the Form window. You'll see the Print File dialog box, shown in Figure 12-18.

If you're printing a multi-page form, choose the page range you want to print. Choose All to print every page of a multi-page form.

Choose the number of copies you want, and whether you want the pages to be collated. Choose OK to print the form.

CHAPTER 13

Designing reports

Chapter 10 showed you how to use the Data Model dialog box and the Design Layout dialog box to identify the data and initial layout of a new report. Chapter 11 introduced you to design tools, techniques, and concepts that function the same in the Report Design window as they do in the Form Design window.

This chapter deals with those issues, commands, and functions that apply only to the Report Design window.

What can you do in the Report Design window?

You can create and work with reports without ever working in the Report Design window. Paradox provides quick reports (discussed in Chapter 4) that give you a default report layout, which may be all you ever need.

Even if you create sophisticated, multi-table reports, there is a lot you can do in the Design Layout dialog box (discussed in Chapter 10) to prevent the need for much work in the Report Design window.

So when do you need to work in the Report Design window? When you want to customize a report layout. In the Report Design window, you can

- Structure data using report bands
- Group data
- Move objects
- Set page breaks
- Add or remove design elements, such as boxes, fields, tables, or graphs
- Inspect and change the properties of any object on the screen
- Preview the finished design

Customizing a default report

This section shows you how to customize a default report layout created on a data model that links *Customer* and *Orders*. You'll see how to move objects, add new objects, and inspect object properties.

Some of the terms used in this section are discussed in Chapter 11.

Example 13-1 shows how you can take a default multi-table report and customize it to create the report design you want.

Note This example is intended to give you an idea of the possibilities available for report designs. Details on working in the Report Design window to achieve the effects shown in this example are provided later in this chapter.

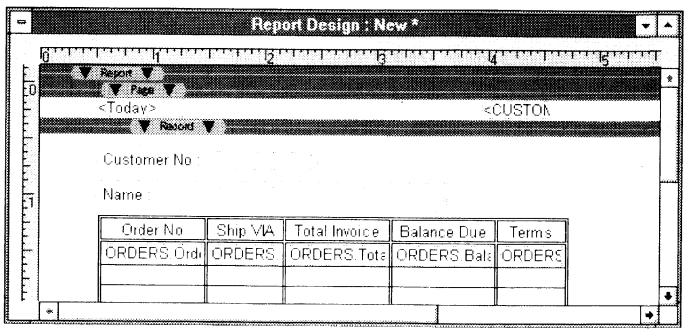
Example 13-1 Customize a report in the Report Design window

1. Choose File|New|Report.
2. Link *Customer* and *Orders* in the Data Model dialog box. (See Example 10-3 in Chapter 10 for details.)
3. In the Design Layout dialog box, use the Select Fields button to open the Select Fields dialog box.
   - From the *Customer* table, remove all fields except Customer No and Name.
   - From the *Orders* table, remove the Sale Date, Ship Date, Amount Paid, Payment Method, and Month fields.
   - Choose OK to return to the Design Layout dialog box.
4. Choose OK to accept the default layout from the Design Layout dialog box.

   The default layout of a multi-table report shows fields from the master table in the single-record style, and fields from the detail table in a table frame.

In the record band, fields from the master table (*Customer*) appear above a table frame showing fields from the detail table (*Orders*)

Band labels show the bands of the report

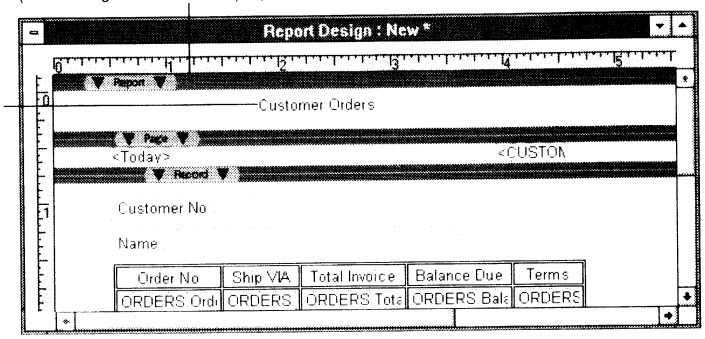


You can add a title in the report band.

5. The report band contains the report's header and footer. By default, the report band is empty. To place a title in the report band,
   - Click the report band to select it, then drag the top report band up. Paradox adjusts the report layout to add whitespace in the report band.
   - Place a text object in the report band.
   - Type **Customer Orders** in the text object.

Click the report band to select it, then drag the boundary line (containing the band label) up to add space in the band

Paradox will print the title once, at the top of the first page, because you put it in the top report band



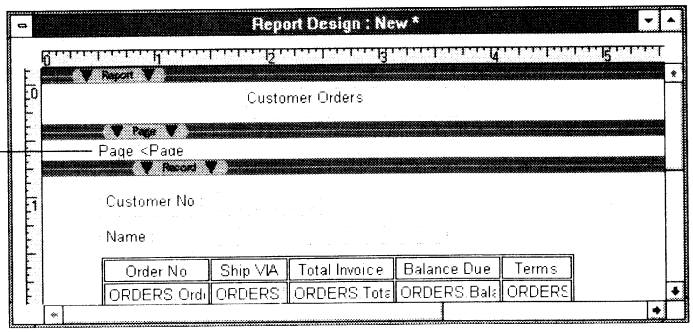
You can move or remove the report's default objects.

The page band contains a header and footer repeated on each page. By default, Paradox places three objects in the page band—a Today field, a special field for the name of the master table, and a Page Number field. (You may need to scroll the window to see the objects on the right side of the report.)

6. To remove the Today field, select it and press ***Del***. Remove the default title the same way.

7. Drag the Page field from the right border to the left border of the report.

Because the Page Number field is in the top page band, Paradox will print it at the top of each page of the report



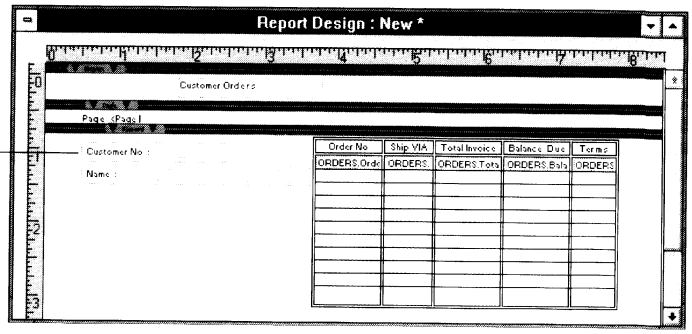
You can move the table frame.

8. To move the whole table, drag it to a new location to the right of the field objects.

   To view the full width of the report design, choose Properties|Zoom|Fit Width.

Using Properties|Zoom|Fit Width lets you view the full width of the report design, regardless of the size of the window.

The fields from the master table and the records from the detail table are now side by side



You can change the display type of field objects.

9. To turn off the field label for the Name field, inspect the field object and choose Display Type|Unlabeled.

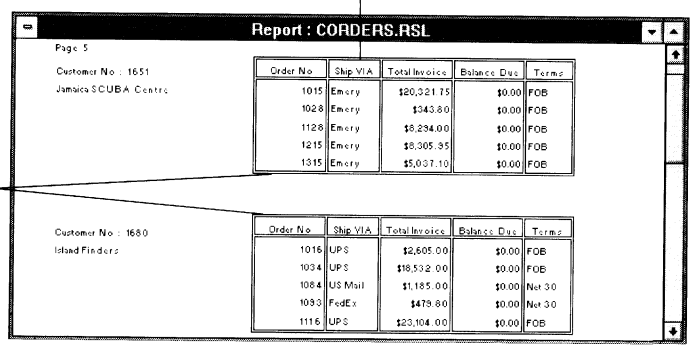
10. Save the report. Choose File|Save. Name the report *Corders*.

You can run the report to preview it onscreen.

11. Click the View Data SpeedBar button to run the report. Use the navigation SpeedBar buttons to move through the pages of the report, and the window's vertical scroll bar to view the full length of the previewed page.

For each master record, Paradox shows the related detail records in the table frame

There is extra space between tables because Paradox preserves the space between the Name field and the bottom of the report band



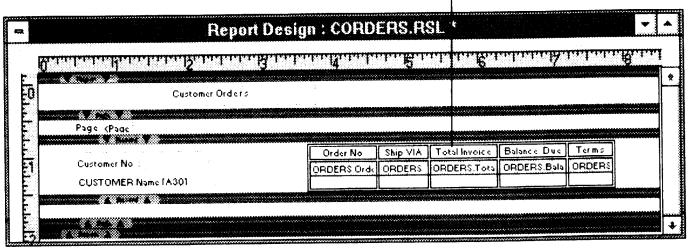
12. There are a few things to be fixed, so click the Design SpeedBar button to return to the Report Design window.

You can change the spacing between objects.

13. Resize the height of the table frame. Then resize the record band to delete whitespace between the table frames.

    To resize the record band, click on empty space within the record band. Then, drag the bottom record band label up until it almost touches the bottom of the table frame.

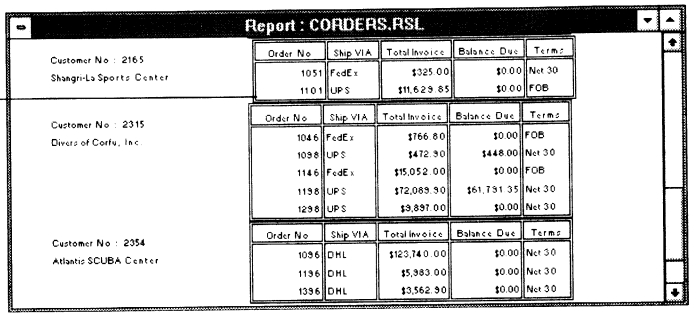
Even after you resize it, the table will expand to show as many records as necessary because its Run Time|Show All Records property is checked



14. Run the report again to see the effect of the change.

There is no wasted space between the tables

The expansion of the Name field has pushed this table to the right of the others



15. Click the Design SpeedBar button to return to the Report Design window.

You can change the expansion of objects.

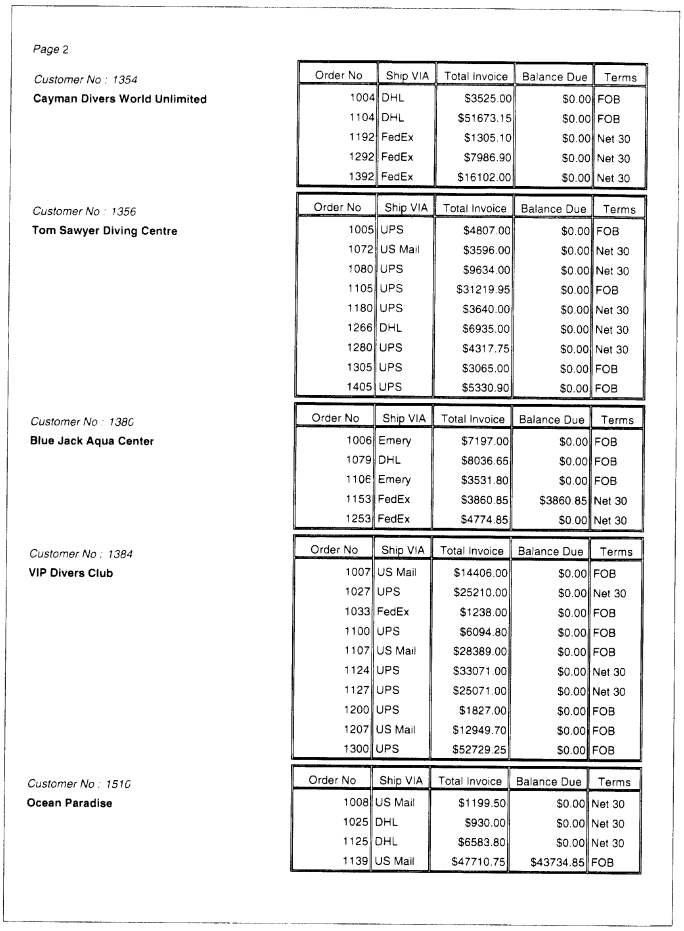
16. Inspect the Name field and uncheck Run Time|Fit Width. This prevents the Name field from expanding (and pushing the table to the right) when you run the report.

You can change the font properties of text.

17. Inspect the Name field object and change its font style to bold. Then, multi-select the field labels of the Page Number and Customer No field objects, and change their font style to italic.

18. Run the report again to see its final format.

19. Choose File|Print to print the report.



Page 2

Customer No : 1354
Cayman Divers World Unlimited

Order No	Ship VIA	Total Invoice	Balance Due	Terms
1004	DHL	$3525.00	$0.00	FOB
1104	DHL	$51673.15	$0.00	FOB
1192	FedEx	$1305.10	$0.00	Net 30
1292	FedEx	$7986.90	$0.00	Net 30
1392	FedEx	$16102.00	$0.00	Net 30

Customer No : 1356
Tom Sawyer Diving Centre

Order No	Ship VIA	Total Invoice	Balance Due	Terms
1005	UPS	$4807.00	$0.00	FOB
1072	US Mail	$3596.00	$0.00	Net 30
1080	UPS	$9634.00	$0.00	Net 30
1105	UPS	$31219.95	$0.00	FOB
1180	UPS	$3640.00	$0.00	Net 30
1266	DHL	$6935.00	$0.00	Net 30
1280	UPS	$4317.75	$0.00	Net 30
1305	UPS	$3065.00	$0.00	FOB
1405	UPS	$5330.90	$0.00	FOB

Customer No : 1380
Blue Jack Aqua Center

Order No	Ship VIA	Total Invoice	Balance Due	Terms
1006	Emery	$7197.00	$0.00	FOB
1079	DHL	$8036.65	$0.00	FOB
1106	Emery	$3531.80	$0.00	FOB
1153	FedEx	$3860.85	$3860.85	Net 30
1253	FedEx	$4774.85	$0.00	Net 30

Customer No : 1384
VIP Divers Club

Order No	Ship VIA	Total Invoice	Balance Due	Terms
1007	US Mail	$14406.00	$0.00	FOB
1027	UPS	$25210.00	$0.00	Net 30
1033	FedEx	$1238.00	$0.00	FOB
1100	UPS	$6094.80	$0.00	FOB
1107	US Mail	$28389.00	$0.00	FOB
1124	UPS	$33071.00	$0.00	Net 30
1127	UPS	$25071.00	$0.00	Net 30
1200	UPS	$1827.00	$0.00	FOB
1207	US Mail	$12949.70	$0.00	FOB
1300	UPS	$52729.25	$0.00	FOB

Customer No : 1510
Ocean Paradise

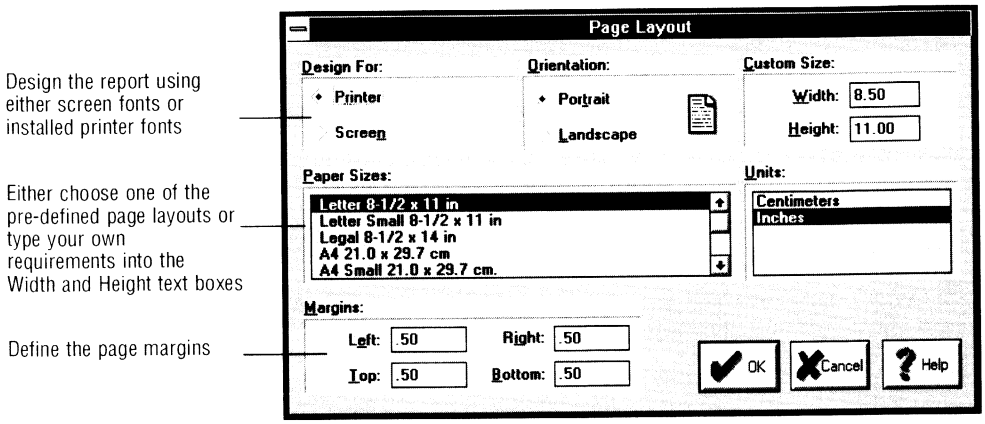
Order No	Ship VIA	Total Invoice	Balance Due	Terms
1008	US Mail	$1199.50	$0.00	Net 30
1025	DHL	$930.00	$0.00	Net 30
1125	DHL	$6583.80	$0.00	Net 30
1139	US Mail	$47710.75	$43734.85	FOB

Choosing the report's page layout

You can specify the size of the report's page from the Design Layout dialog box (choose the Page Layout button) or from the Report Design window (choose Report | Page Layout). Either way, you'll see the Page Layout dialog box, shown in Figure 13-1.

If, after you've entered the Report Design window, you want only to change the page's layout, choose Report | Page Layout instead of accessing the Page Layout dialog box through the Design Layout dialog box. When you use the Design Layout dialog box, Paradox overwrites any changes to the design you might have made in the Report Design window.

Figure 13-1 The Page Layout dialog box



Paradox gives you the choice of designing the document for onscreen viewing or for printed output.

Designing for the printer

By default, Paradox designs reports for the printer. If you choose Printer, Paradox makes available for use only those fonts that are currently installed on your active printer. This may limit your onscreen display, but it ensures a similar document for onscreen viewing and printed output. Paradox attempts to match onscreen what the printed output will look like.

You can choose from predefined page sizes (shown in the Paper Sizes list) or enter a custom width and height in the Custom Size panel. Change the default page margins by entering the values you want in the text boxes in the Margins panel.

You can design the report using portrait or landscape orientation.

Designing for the screen

Choose Screen in the Design For panel if you want to use any screen fonts that are installed on your system. These fonts may not be available on your printer, so documents you create for the screen might not appear identical when you print them. Of course, if your screen fonts match your printer fonts, this will not be a problem.

When you design a report for the screen, you must use portrait orientation. The Paper Sizes list changes to the Screen Sizes list, and Paradox displays your system's current screen driver size (in pixels) in it. You can design a larger or smaller report by entering the sizes you want in the Custom Size panel. You can choose the unit of measurement you want for the custom size from the Units panel.

Using report bands

Paradox uses bands to define the sections of your reports. Bands run horizontally across the page and represent the structure of the report. You'll see the bands in the Design Layout dialog box when you create a new report.

There are four types of bands in reports:

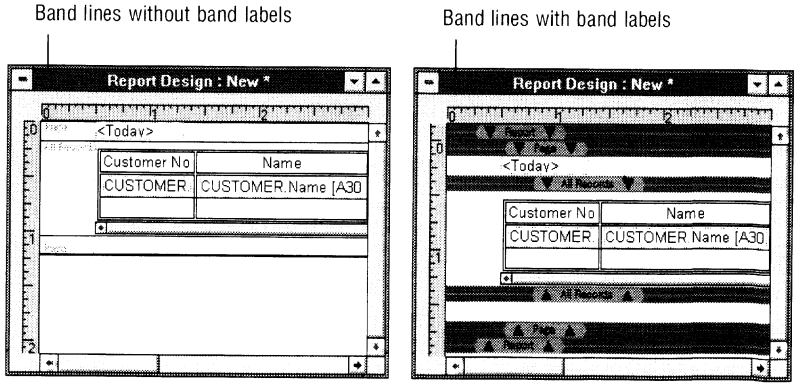
- The report band, which contains data to be printed at the beginning and end of the report.
- The page band, which contains data to be printed at the top and bottom of each page of the report.
- Group bands (optional), which you can choose to define a grouping or order for the records of the table you are reporting on.
- The record band, which contains the records of the table you are reporting on.

You can choose to show or hide band labels.

Choose Properties | Band Labels to turn the display of band labels on and off. Band labels are shown onscreen only in the Report Design window (not in the report itself), and turning them on or off does not affect the layout or presentation of your printed or previewed report.

Figure 13-2 shows the Report Design window for a report on the *Customer* table with band labels both on and off.

Figure 13-2 Showing and hiding band labels

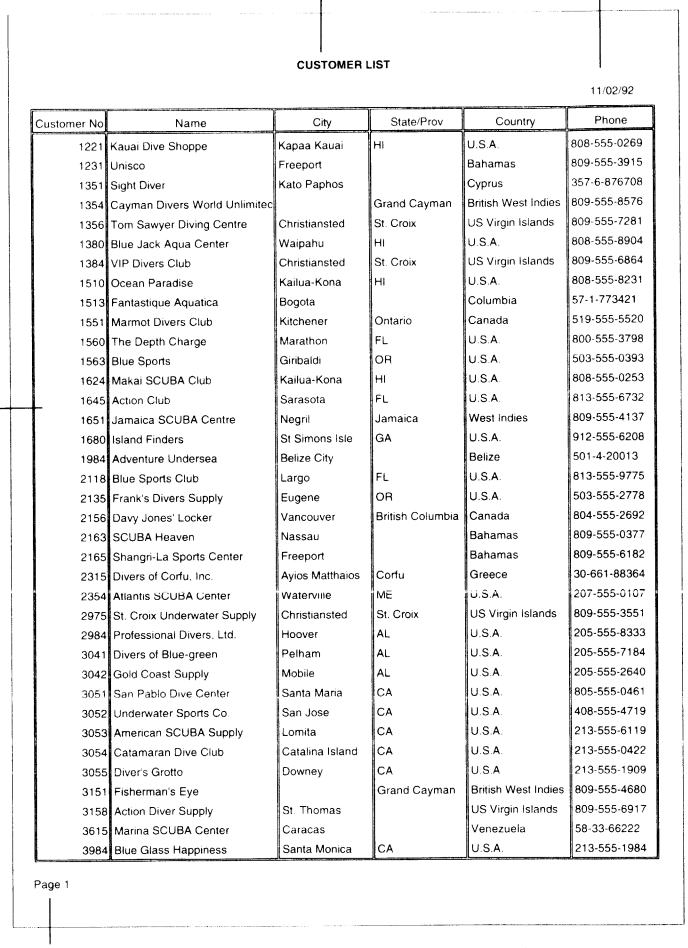


When you arrange data in bands, it's helpful to keep in mind the printed output you want. Figure 13-3 shows the first page of a report for the *Customer* table.

Figure 13-3 Page 1 of a report

The report title is a text object in the report band. This is the report header. Paradox prints it once, at the beginning of the report.

This Date field is located in the page band. This is the page header. Paradox prints it at the top of each page of the report.



CUSTOMER LIST

11/02/92

Customer No	Name	City	State/Prov	Country	Phone
1221	Kauai Dive Shoppe	Kapaa Kauai	HI	U.S.A.	808-555-0269
1231	Unisco	Freeport		Bahamas	809-555-3915
1351	Sight Diver	Kato Paphos		Cyprus	357-6-876708
1354	Cayman Divers World Unlimitec		Grand Cayman	British West Indies	809-555-8576
1356	Tom Sawyer Diving Centre	Christiansted	St. Croix	US Virgin Islands	809-555-7281
1380	Blue Jack Aqua Center	Waipahu	HI	U.S.A.	808-555-8904
1384	VIP Divers Club	Christiansted	St. Croix	US Virgin Islands	809-555-6864
1510	Ocean Paradise	Kailua-Kona	HI	U.S.A.	808-555-8231
1513	Fantastique Aquatica	Bogota		Columbia	57-1-773421
1551	Marmot Divers Club	Kitchener	Ontario	Canada	519-555-5520
1560	The Depth Charge	Marathon	FL	U.S.A.	800-555-3798
1563	Blue Sports	Giribaldi	OR	U.S.A.	503-555-0393
1624	Makai SCUBA Club	Kailua-Kona	HI	U.S.A.	808-555-0253
1645	Action Club	Sarasota	FL	U.S.A.	813-555-6732
1651	Jamaica SCUBA Centre	Negril	Jamaica	West Indies	809-555-4137
1680	Island Finders	St Simons Isle	GA	U.S.A.	912-555-6208
1984	Adventure Undersea	Belize City		Belize	501-4-20013
2118	Blue Sports Club	Largo	FL	U.S.A.	813-555-9775
2135	Frank's Divers Supply	Eugene	OR	U.S.A.	503-555-2778
2156	Davy Jones' Locker	Vancouver	British Columbia	Canada	804-555-2692
2163	SCUBA Heaven	Nassau		Bahamas	809-555-0377
2165	Shangri-La Sports Center	Freeport		Bahamas	809-555-6182
2315	Divers of Corfu, Inc.	Ayios Matthaios	Corfu	Greece	30-661-88364
2354	Atlantis SCUBA Center	Waterville	ME	U.S.A.	207-555-0107
2975	St. Croix Underwater Supply	Christiansted	St. Croix	US Virgin Islands	809-555-3551
2984	Professional Divers, Ltd.	Hoover	AL	U.S.A.	205-555-8333
3041	Divers of Blue-green	Pelham	AL	U.S.A.	205-555-7184
3042	Gold Coast Supply	Mobile	AL	U.S.A.	205-555-2640
3051	San Pablo Dive Center	Santa Maria	CA	U.S.A.	805-555-0461
3052	Underwater Sports Co	San Jose	CA	U.S.A.	408-555-4719
3053	American SCUBA Supply	Lomita	CA	U.S.A.	213-555-6119
3054	Catamaran Dive Club	Catalina Island	CA	U.S.A.	213-555-0422
3055	Diver's Grotto	Downey	CA	U.S.A.	213-555-1909
3151	Fisherman's Eye		Grand Cayman	British West Indies	809-555-4680
3158	Action Diver Supply	St. Thomas		US Virgin Islands	809-555-6917
3615	Marina SCUBA Center	Caracas		Venezuela	58-33-66222
3984	Blue Glass Happiness	Santa Monica	CA	U.S.A.	213-555-1984

Page 1

The table frame containing the records from the *Customer* table is in the record band. Paradox fills the page with records, and creates new pages until all records are printed.

The Page Number field is located in the page band. This is the page footer. Paradox prints it at the bottom of each page of the report.

Resizing bands

Paradox automatically places the page, report, and record bands for you. You cannot remove these three bands. If you choose not to use one, leave it blank and resize it to remove extra space.

You can add or remove whitespace in your report by resizing a band.

To resize a band you must first select it (click anywhere inside the band). There are three ways to tell which band is selected:

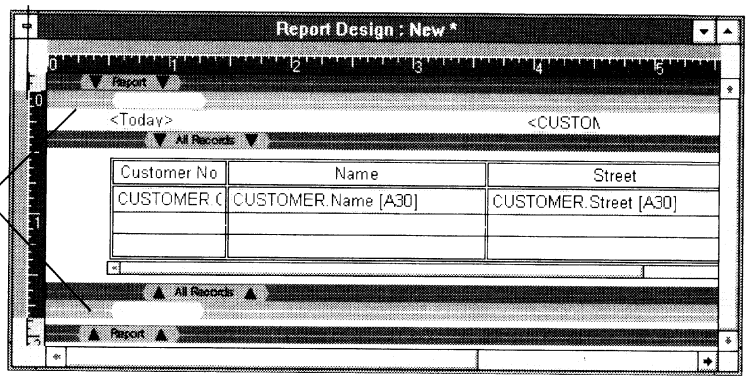
- If Properties | Band Labels is checked, you'll see the selected band's label change color.
- In the sidebar along the left side of the Report Design window, the selected band is highlighted.
- The right side of the Status bar at the bottom of the Desktop tells which band is selected.

You must use the mouse to resize bands. There is no keyboard equivalent to clicking and dragging.

Figure 13-4 Selecting bands

The highlighted area shows the boundaries of the selected page band. Notice that the page band surrounds the record band.

The color of the selected band's label is different from unselected bands. Its name is also highlighted.



For some users, it is much easier to see the resizing action take place when Outlined Move/Resize is unchecked in the Designer Properties dialog box. Whether this will work for you depends on your hardware. Experiment with this to see if the resizing action appears more obvious.

Once you've selected the band you want to resize, drag the appropriate band line up or down.

The pointer changes to the shape of a two-headed arrow when you pass it over the part of the band line you can drag to resize the band. You can drag up or down on either the top or the bottom band line.

When there is an object in a band, you drag the top band line to add or remove space above the object and the bottom band line to add or remove space below the object. Tables 13-1 through 13-6 describe specific movements to get the look you want. Figures 13-5 through 13-10 show exactly where to drag.

Note You cannot resize a band to be smaller than the objects within it.

Resizing the report header

Figure 13-5 shows where to drag when working with the report header.

Figure 13-5 Resizing the report header

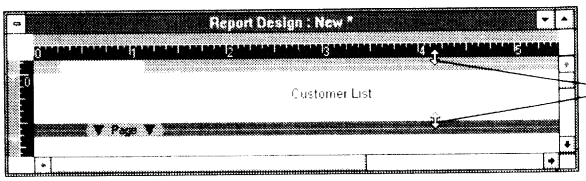


Table 13-1 Resizing the report header

To	Select	Drag
Add space above an object in the report header	Report band	Report band line up
Remove space above an object in the report header	Report band	Report band line down
Add space below an object in the report header	Report band	Page band line down
Remove space below an object in the report header	Report band	Page line band up

Resizing the page header

Figure 13-6 shows where to drag when working with the page header.

Figure 13-6 Resizing the page header

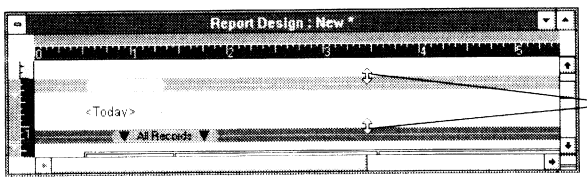


Table 13-2 Resizing the page header

To	Select	Drag
Add space above an object in the page header	Page band	Page band line up
Remove space above an object in the page header	Page band	Page band line down
Add space below an object in the page header	Page band	Group or record band line down*

To	Select	Drag
Remove space below an object in the page header	Page band	Group or record band line up*

* Group bands are optional. If you add a group band it appears between the page band and the record band.

Resizing the record band

Figure 13-7 shows where to drag when working with the record band.

Figure 13-7 Resizing the record band

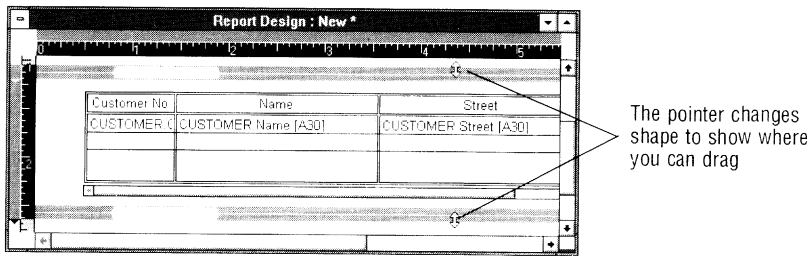


Table 13-3 Resizing the record band

To	Select	Drag
Add space above an object in the record band	Record band	Top record band up
Remove space above an object in the record band	Record band	Top record band down
Add space below an object in the record band	Record band	Bottom record band down
Remove space below an object in the record band	Record band	Bottom record band up

Resizing the page footer

Figure 13-8 shows where to drag when working with the page footer.

Figure 13-8 Resizing the page footer

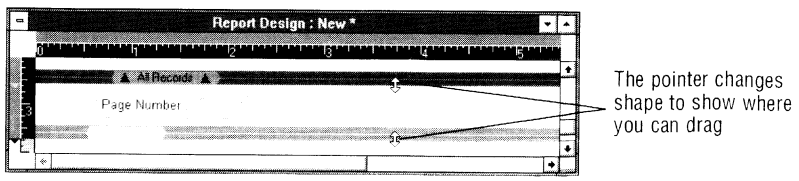


Table 13-4 Resizing the page footer

To	Select	Drag
Add space above an object in the page footer	Page band	Group or record band line up*
Remove space above an object in the page footer	Page band	Group or record band line down*
Add space below an object in the page footer	Page band	Page band line down
Remove space below an object in the page header	Page band	Page band line up

* Group bands are optional. If you add a group band it appears betwwen the page band the record band.

Resizing the report footer

Figure 13-9 shows where to drag when working with the report footer.

Figure 13-9 Resizing the report footer

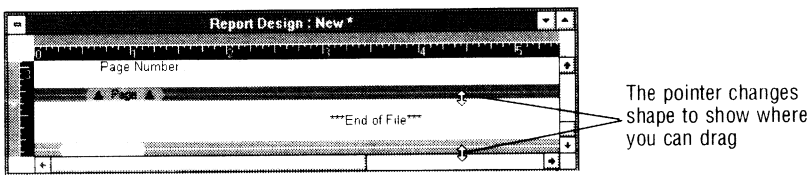


Table 13-5 Resizing the report footer

To	Select	Drag
Add space above an object in the report footer	Report band	Page band line up
Remove space above an object in the report footer	Report band	Page band down
Add space below an object in the report footer	Report band	Report band line down
Remove space below an object in the report footer	Report band	Report band line up

Resizing the group header or footer

Group bands are optional. If you add a group band, a group header appears between the page header and the record band, and a group footer appears between the page footer and the record band. Figure 13-10 shows where to drag when working with the group header.

Figure 13-10 Resizing the group header

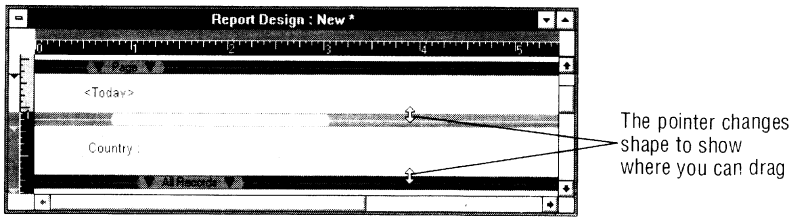


Table 13-6 Resizing group bands

To	Select	Drag
Add space above an object in the group header	Group band	Group band line up
Remove space above an object in the group header	Group band	Group band line down
Add space below an object in the group header	Group band	Record band line down
Remove space below an object in the group header	Group band	Record band line up
Add space above an object in the group footer	Group band	Record band line up
Remove space above an object in the group footer	Group band	Record band line down
Add space below an object in the group footer	Group band	Group band line down
Remove space below an object in the group footer	Group band	Group band line up

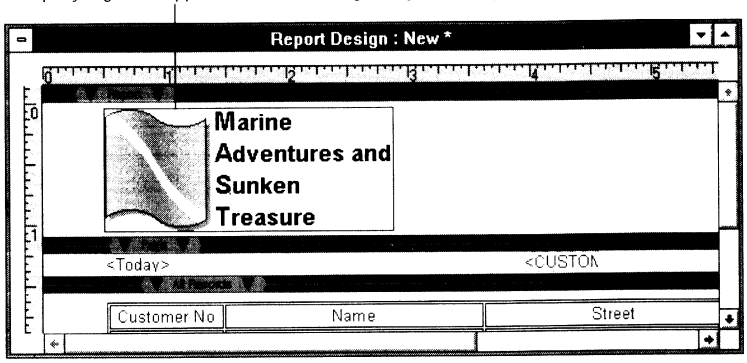
The report band

The *report band* defines the report header and report footer areas of the report. The report header is printed once, at the beginning of the report. The report footer is printed once, at the end of the report.

Typical information found in a report header is the company letterhead or report title. A report footer might be a summary field that provides data analysis. You place whatever objects you want to appear as report headers or footers in the appropriate report band. Figure 13-11 shows a graphic object containing the company logo in the report header area.

Figure 13-11 Placing a value in the report header area

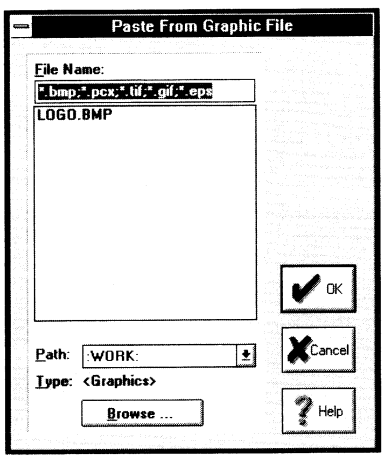
A graphic object has been placed in the report header area. The company logo will appear once, at the beginning of the report.



Example 13-2 Placing a graphic in the report header

To place a graphic object in the report header,

1. Open the Report Design window for a new report on the *Customer* table.
2. Select the report band.
3. Drag the top report band line up to make space within the report header.
4. Click the Graphic tool on the SpeedBar. Your pointer changes to the graphic tool.
5. Click and drag to place a graphic frame in the report header.
6. Inspect the graphic frame and choose Define Graphic|Paste From to open the Paste From Graphic File dialog box.



7. Choose LOGO.BMP from the file list.

   Paradox places the graphic in the frame within the report header.

The page band

The *page band* defines the header and footer areas of each page. Paradox places three objects in the top page band (the page header) for you:

- The Today field that shows the print date of the report at the top of each page. Paradox places this field at the left margin of the page header.
- A field object that contains the default title for the report. In a single-table report, Paradox uses the name of the table as the default title. In a multi-table report, Paradox uses the name of the master table as the default title. Paradox places the title in the center of the page header.
- The Page field that shows the page number of each page. Paradox places this field at the right margin of the page header.

You can choose to keep, delete, or change any object Paradox places for you.

Place the objects that you want to appear at the top and bottom of each page in the page band. Example 13-3 shows the Today and Page fields deleted, and the default title changed.

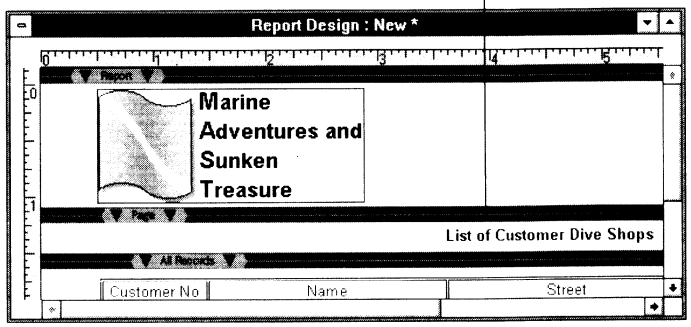
Example 13-3 Changing a page header

Prerequisite For your report to look like the one in this example, first complete Example 13-2.

Steps To change the default page header,

1. Delete the Today field by selecting it and pressing ***Del***. Delete the title and the Page field the same way. (You might have to scroll to the right margin before you can select the Page field.)
2. Click the Text tool on the SpeedBar. Click and drag in the page header to create a text object.
3. Type **List of Customer Dive Shops** in the text object.
4. Click outside the text object (or press ***Esc*** to deselect it), then select it and resize or reposition it, as necessary.
5. Inspect the text object and choose Font|Style|Bold.

The default "Customer" title and Today field have been deleted from the page header area, and a text object with a different title has been placed. It will be printed at the top of each page.



Note Unlike other bands, the page bands don't expand vertically when you view or print the report. This means Paradox will clip expanding objects (like tables) to fit inside the band.

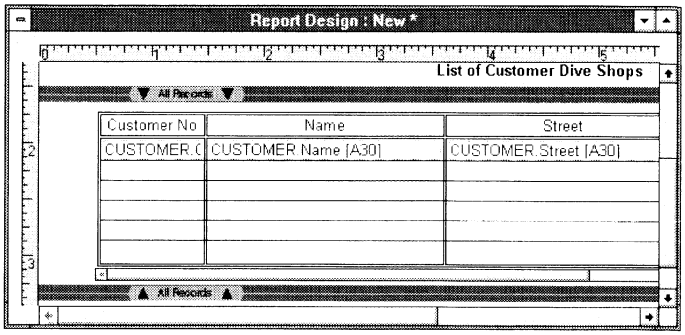
The record band

The *record band* contains the body of the report—the records of the table on which you are reporting.

- If you design a tabular report (the default style), the records of the table to which the report is bound appear within a table frame in the record band.
- If you design a single-record report, Paradox automatically places field objects in the record band. You can move, resize, or delete the objects.
- If you design a multi-record report, Paradox places field objects within a multi-record object in the record band. You can customize the multi-record object to your needs.
- If you choose to design a blank report, Paradox doesn't automatically place any objects for you. You can place any objects you want using the SpeedBar's design tools.

Figure 13-12 shows a table frame in the record band of a report designed for the *Customer* table.

Figure 13-12 A table frame in the record band



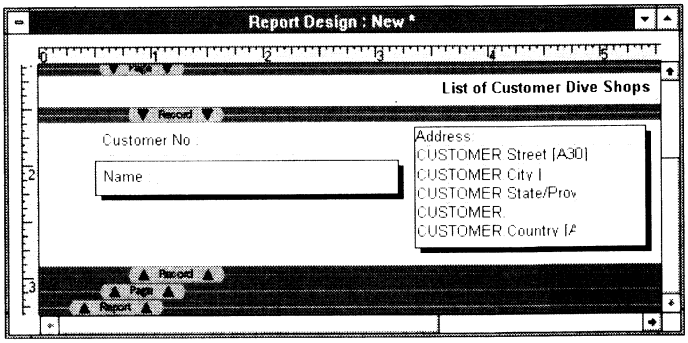
Example 13-4 shows how to a customize the record band for a report on the *Customer* table.

Example 13-4 Customizing the record band

Prerequisite For your report to look like the one in this example, first complete Example 13-3.

Steps To customize the record band,

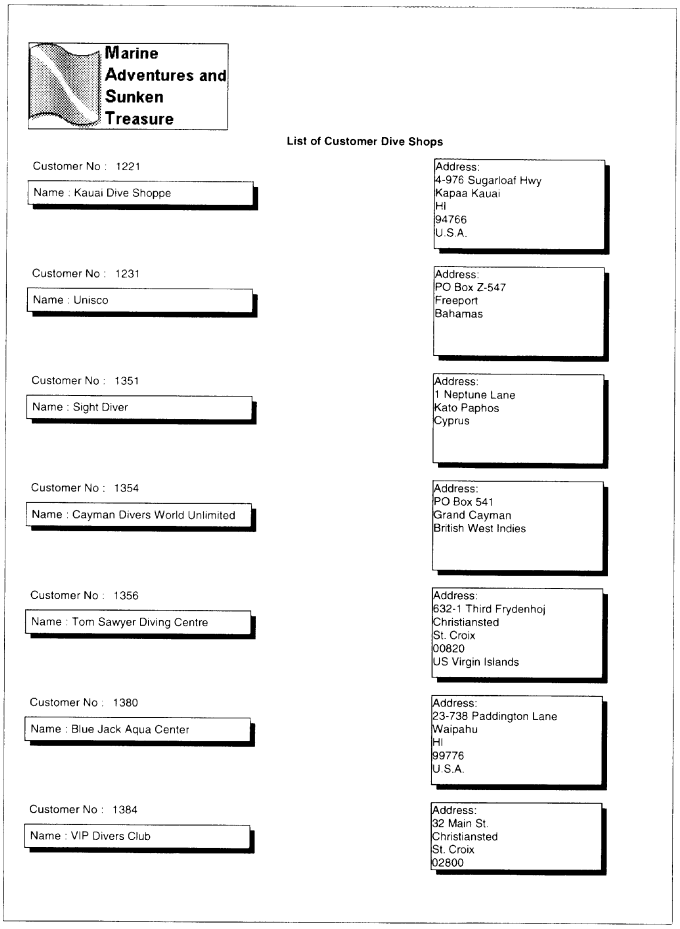
1. Select the table frame in the record band. Press ***Del*** to delete it.
2. Click the Field tool on the SpeedBar. Click and drag to place a field object. Inspect the field object and choose Define Field! CUSTOMER.DB:Customer No.
3. Repeat step 2, but this time define the field object as the Name field.
4. Click the Text tool on the SpeedBar. Click and drag to place a text object to the right of the field objects.
5. In the text object, type **Address:** and press ***Enter*** to create a new line.
6. On the new line, press ***F5*** to insert an undefined field object.
7. Press ***Enter*** and ***F5*** four more times, to create a total of five field objects on five separate lines.
8. Inspect each undefined field object. Define them as Street, City, State/Prov, Zip/Postal Code, and Country.
9. Multi-select the Name field and the Address text object and choose Frame! Style. Choose the drop-shadow style from the Frame palette.



If you don't want the Name field to push and pull the Address text object when you run the report, you can either inspect the Name field and uncheck Run Time|Fit Width, or inspect the Address field and check Run Time|Pin Horizontal. (See "Using Run Time properties" later in this chapter for details on how objects affect each other when you print or preview a report.)

When you print or preview the report, Paradox repeats the arrangement of objects in the record band for each record of the table. Figure 13-13 shows the first page of a report designed for the *Customer* table.

Figure 13-13 The first page of a report



The group band

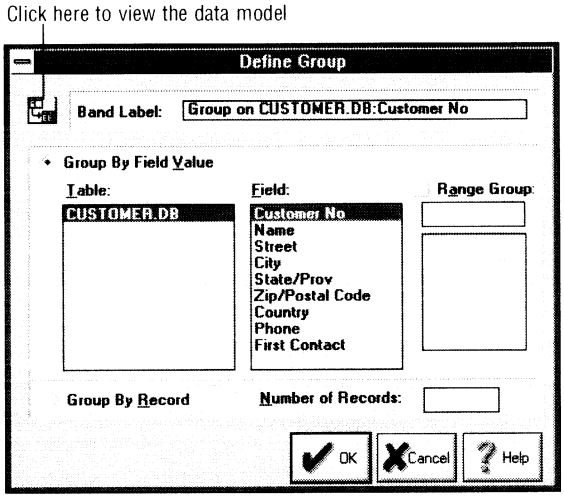
Paradox lets you place optional group bands in a report. Use *group bands* to break your information into groups of data. Groups can be based on the value of a field, a range of values, or a specified number of records.

When you group by the value of a field, you apply a sorting specification to your data. If, for example, you group on the Country field of *Customer*, the records from *Customer* appear in the report sorted by the values in their Country field.

Note Paradox always places group bands between the page band and the record band.

Create a group band by choosing Report | Add Band or clicking the Add Band SpeedBar button. You'll see the Define Group dialog box, as shown in Figure 13-14.

Figure 13-14 The Define Group dialog box



Tables from the report's data model are shown in the Table list. Select a table to view all of its fields in the Field list.

Grouping by a field value

You can group the records of your report based on the value of a field. This gives you a way of sorting the report. For example, you can view your customers grouped by their country or state, view orders grouped by a method of payment or shipment, or view stock items grouped by equipment classification.

Example 13-5 Grouping the *Customer* report by country values

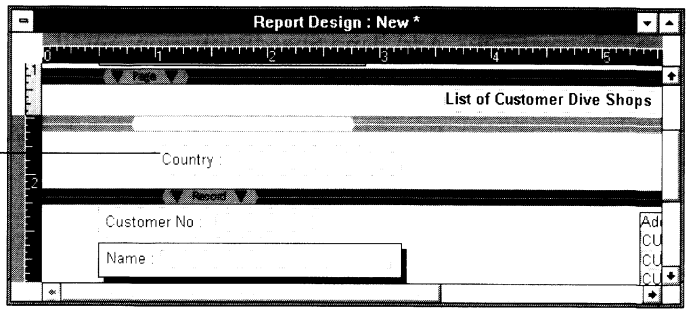
To group a report on the *Customer* table by the values in the Country field,

1. Click the Add Band button on the SpeedBar. Paradox opens the Define Group dialog box, with the *Customer* table in the Table list, and all the fields from the *Customer* table in Field list (see Figure 13-14).

2. Choose Country from the Field list. Paradox enters Group on CUSTOMER.DB:Country in the Band Label text box.

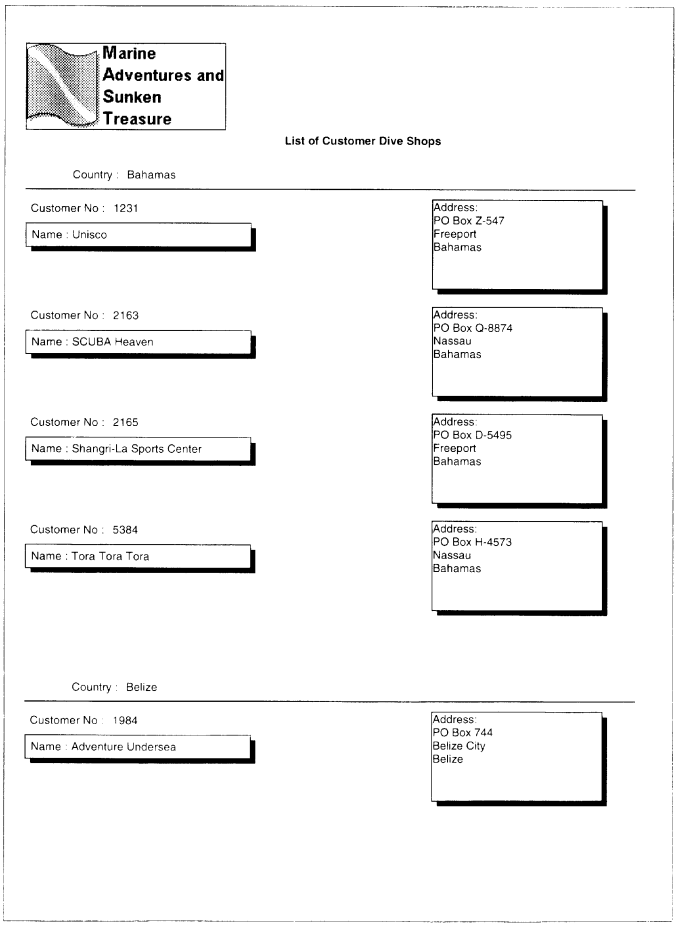
   Choose OK. Paradox adds a group band between the record and page bands, and places the Country field in it.

Paradox creates a group band and places the field object in it



You may want to place some sort of divider, like a line, within the group band to clearly show when one group ends and another begins.

3. When you run the report, Paradox groups the records according to the values in the Country field.



Grouping by a range

You can group the records of your report according to a range of values. For example, you might want to group the records in *Orders* by months or quarters, or group the records in *Lineitem* by the units in the Qty field.

Once you define a group, you can inspect the group band to change its sort order and set your preferences for repeating group headings and run-time behavior.

To specify a group band on a range, open the Define Group dialog box, (see Figure 13-14). Paradox shows all tables in the report's data model in the Table list, and all available fields in the Field list.

Note Because you cannot create a group on a BLOB field, Paradox doesn't show them in the Field list.

Choose the field you want and check the Range Group check box. Specifying the range itself depends on the type of the field you choose.

Ranges for number fields

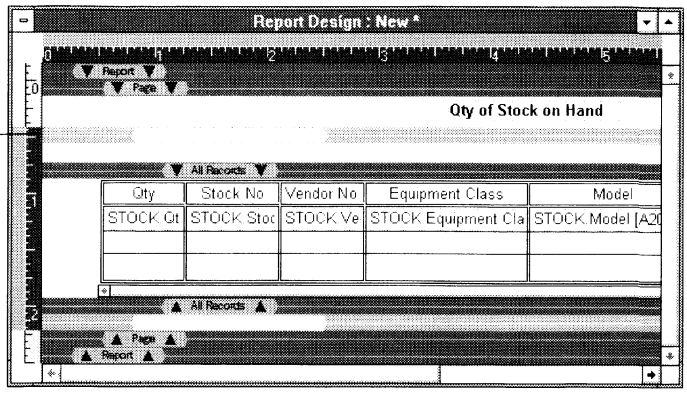
When you choose a Paradox number, currency, or short number field, or a dBASE number or float number field, you must enter the size of the range in the Range Group text box. The first group begins with zero and increases by the range size you enter. When you choose OK, Paradox places a group band in the Report Design window.

Example 13-6 shows a report based on a two-unit number range. Paradox doesn't print groups that contain no values.

Example 13-6 Grouping by a numbered range

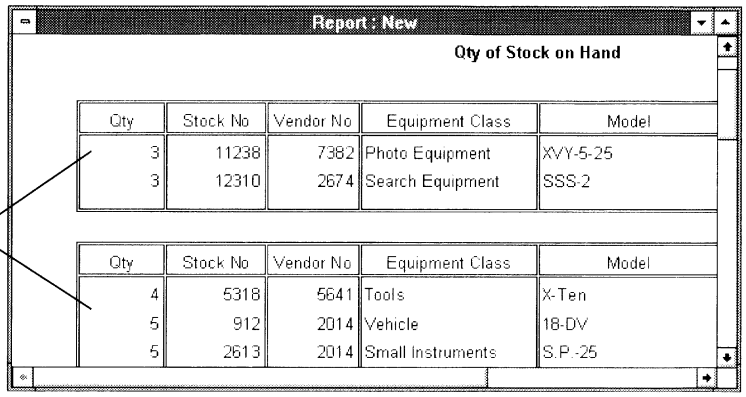
Suppose you want to know the unit quantity of your stock on hand, listed in the *Stock* table.

1. Open the Report Design window for a new report on the *Stock* table.
2. Choose Report|Add Band. Paradox opens the Define Group dialog box.
3. In the Define Group dialog box, select the Qty field, check the Range Group check box, and type **2** in the Range Group text box.
4. Paradox creates a group band.



The band label shows the group definition

This report groups records by Qty in ranges of two units.



Each group shows up to two values in the Qty field

The first group begins with zero and increases by the range size of two:

- Paradox first creates a group containing the values 0 and 1 in the Qty field. Since there are no values of 0 or 1 in the *Stock* table, this group is not printed.
- Paradox next creates a group containing the values 2 and 3 in the Qty field. Since there are no values of 2 in the *Stock* table, this group shows only values of 3.
- Paradox then creates a group containing the values 4 and 5 in the Qty field. Both values exist in the *Stock* table, so both are included in the group.

Ranges for date fields

When you choose a date field, you can further define the scope of the range.

- *Day* groups records that have the same date.
- *Week* groups records with dates that fall in the same week (Sunday to Saturday).

- *Month* groups records with dates that fall in the same month.
- *Quarter* groups records with dates that fall in the same quarter of the year.
- *Year* groups records with dates that fall in the same year.

When you choose a range and choose OK, Paradox places a group band in the Report Design window.

Note Grouping is always chronological. For example, when grouped by month, April 1989 and April 1990 appear as separate groups.

Ranges for alphanumeric fields

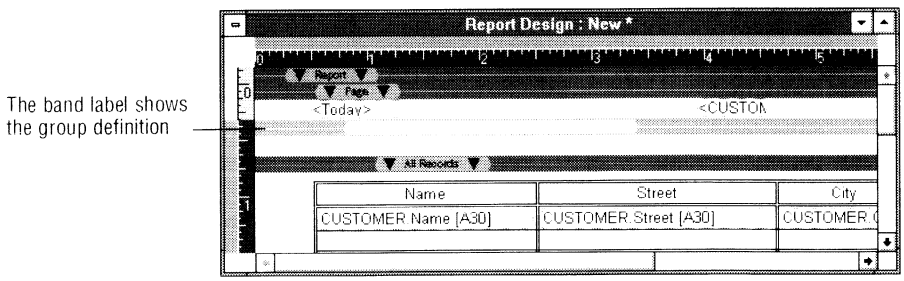
When you choose a Paradox alphanumeric or a dBASE character field type, you must enter the number of characters you want to group on in the Range Group text box.

A Range Group size of 1 tells Paradox to group all records that start with the same character together. (Example 13-7 shows this type of report.) A Range Group size of 2 tells Paradox to group all records that start with the same two characters together.

Example 13-7 Grouping by an alphanumeric range

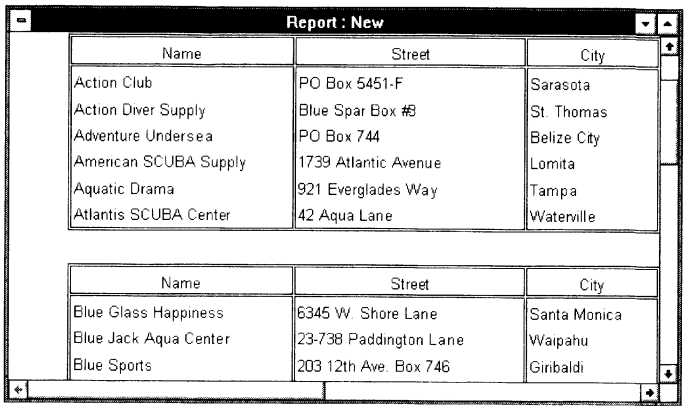
Suppose you want to group customer records by the first letter of the company's name.

1. Open the Report Design window for a new report on the *Customer* table.
2. Choose Report|Add Band. Paradox opens the Define Group dialog box.
3. In the Define Group dialog box, choose the Name field, check the Range Group check box, and type **1** in the Range Group text box.
4. Paradox creates a group band.



The band label shows the group definition

Paradox groups the records according to the first letter in the Name field



Grouping by a number of records

You can group the report into sets of records by defining a number to specify the set you want. This is useful if you want to group records for easy viewing without sorting them in any particular way.

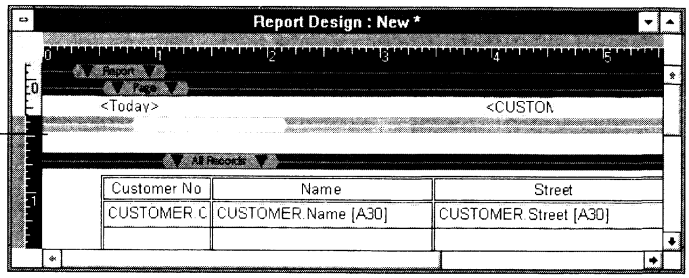
In the Define Group dialog box (see Figure 13-14), choose Group By Record. Enter the number of records you want in each group in the Number of Records text box. Example 13-8 shows a report grouped by three records per group.

Example 13-8 Creating three records per group

Suppose you want to divide the *Customer* records into three-record groups.

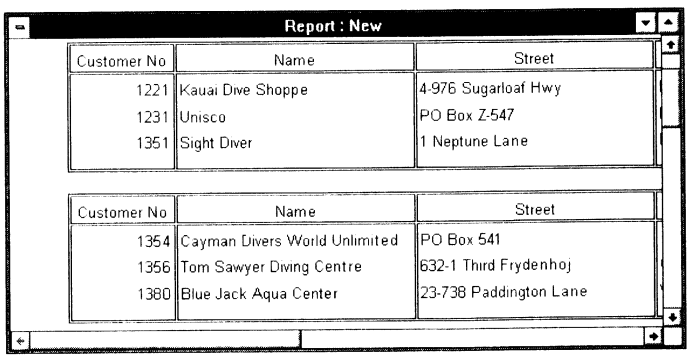
1. In the Define Group dialog box, choose Group By Record.
2. Enter **3** in the Number of Records text box.
3. Choose OK. Paradox creates a group band in the Report Design window.

The band label shows the group definition



When you print or preview the report, Paradox divides the records into groups of three.

Paradox groups the records into sets of three



Using multiple group bands

You can create more than one group band. Group bands should be added so that the largest data group is above all smaller data groups. For example, you would group by Country first, then by City, then perhaps by Zip Code. Start with the broadest category, then narrow the grouping.

Use two group bands when you want to group by a number of records within a given range, or when you want to group by a range within a given number of records.

If you have more than one group band in your report, you can move them. Drag the band to the position where you want it. Thin lines marking the size of the moving band appear to help you position it. Release the mouse when you've positioned the band where you want it. The effect of moving a band is to change the order of the grouping.

You can also exchange the header and footer of a group band by dragging them.

Group bands are the only type of band you can delete. Delete a group band by selecting it and pressing *Del*.

Displaying repeated group values

Choose Report | Group Repeats to retain or suppress repeated group values. When you turn Group Repeats off, Paradox displays the value of the grouped field for each record, including duplicates, in the group band. When Group Repeats is on, the value is printed for the first record of the group only.

Band properties

Display a band's menu by inspecting anywhere within the band area, including the band label.

When using the keyboard, you can use *Tab* to select the band you want, then choose Properties | Current Object or press *F6* to display the band's menu.

All bands have the Run Time | Breakable and Run Time | Shrinkable properties.

- *Breakable* means if the contents of the band don't fit on one page, Paradox can divide them across pages.
- *Shrinkable* means if the contents of the band will fit on the page, but the band itself is too big to fit (including whitespace), Paradox can shrink the band to fit on the page.

If Show Grid is checked, you'll see Move Grid To Band on the band's property menu. Choose this to orient the grid to the upper left corner of the band.

Note By default, both Breakable and Shrinkable are checked. In this case, Paradox attempts to shrink the band before breaking it.

Changing header order

By default, Paradox prints the report header (the contents of the top report band) before the page header (the contents of the top page band). You can reverse this ordering by inspecting the report band and unchecking Precede Page Header. Paradox will then print the report header *after* the page header. You won't see this in the Report Design window because the bands themselves don't move, but when you preview or print the report the change takes effect.

Suppressing on the first page

You can choose to suppress the contents of either the page header, the page footer, or both on the report's first page. By default, the Print on 1st Page property for both the page header and page footer is checked. Uncheck one or both if you *don't* want Paradox to print the contents on the first page of the report.

Group band properties

When you inspect a group band, you can change the definition of the group, and specify your preferences for the display of headings, the sort order within the group, and the display of conditional values.

Redefining a group band

Choose Define Group to change the group definition. Paradox displays a menu of all available fields that you can group the report on. Choose the field you want or click the top of the menu to open the Define Group dialog box with the current group definition entered. Change the definition and choose OK to redefine the group.

Setting headings preferences

- Choose Headings | Page and Group if you want the group heading to be printed at the beginning of each group *and* at the top of a page when the group is continued across page breaks.
- Choose Headings | Group Only if you want the group heading to be printed at the beginning of each group, but *not* at the top of a page when the group is continued across page breaks.

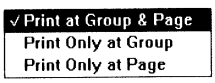
Changing the sort order

- Choose Sort Order | Ascending if you want the groups to be printed in A→Z order. In the example of the *Customer* table grouped on the Country field, ascending order would print records beginning with the Bahamas group and ending with the West Indies group.
- Choose Sort Order | Descending if you want the groups to be printed in Z→A order. In the example of the *Customer* table grouped on the Country field, descending order would print records beginning with the West Indies group and ending with the Bahamas group.

Note Sort Order is not available from the property menu of a group band that is defined on a number of records.

Displaying conditional values

Objects in the group header have the Conditional property. Conditional options give you the ability to specify when you want an object displayed.



- Choose Print at Group & Page if you want Paradox to display the object at the beginning of each group *and* at the top of each page, regardless of whether a group breaks across pages.
- Choose Print Only at Group if you want Paradox to display the object at the beginning of each group, but not at the top of each page (unless a group begins at the top of the page).
- Choose Print Only at Page if you want Paradox to display the object at the top of the page whenever a group breaks across pages. The object is never displayed on the first page of the report.

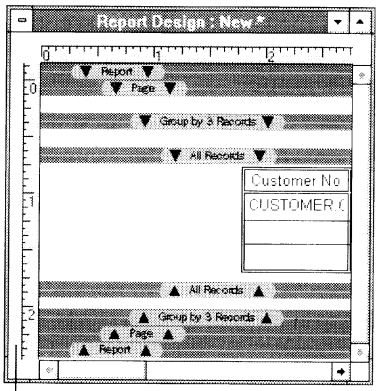
Using the sidebar

The *sidebar* is available in the Report Design window to provide an easy way of

- Seeing which band is selected
- Adding or removing page breaks

Figure 13-15 shows the sidebar.

Figure 13-15 The Report Design window's sidebar



The area between the ruler and the window's frame is the sidebar

Inserting and removing page breaks

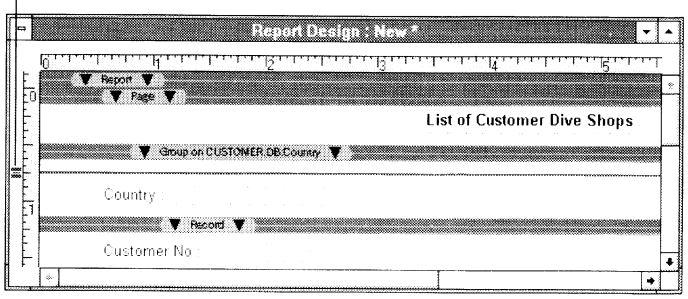
You can add and remove page breaks using the sidebar and the mouse. When adding a page break, follow these rules:

- You can place a page break in any band except the page band.
- A page break cannot cross an object in the band. It must fall either above or below any existing objects.

To place a page break, click in the sidebar. Paradox inserts a page break marker in the sidebar, and draws a line across the report design. Figure 13-16 shows a report design on the *Customer* table with a page break in the group band.

Figure 13-16 A page break

When you click in the sidebar, Paradox places a page break marker and a line across the design



You can reposition a page break by dragging it up or down the sidebar.

To remove a page break, click the marker and drag it out of the sidebar. The marker first dims, then disappears when you release the mouse.

Previewing a report

In the Report Design window, you work with objects that contain no data. Fields, tables, graphs, and multi-record objects don't fill with data until you run the report. You can run a report either by printing it on paper or by previewing it onscreen.

Previewing the report gives you the ability to see what it will look like when it's printed, and to fine tune it. See "Using Run Time properties" later in this chapter for information about controlling the behavior of objects as they fill with data when you run the report.

To preview the report, you can either click the View Data SpeedBar button, press *F8*, or choose Report | Preview. Paradox displays the message **Preparing Report** while it formats the data. Paradox previews the report in the Report window, which has a different SpeedBar and menus. (Working in the Report window is discussed in Chapter 4.)

When you preview the report, you might see something you want to change. You must return to the Report Design window to make any changes to the report design or layout. Click the Design SpeedBar button, press *F8*, or choose Report | Design to return to the Report Design window.

Using design objects in reports

Chapter 11 showed you how to create and define objects in a design window using the SpeedBar design tools. You create and define objects the same way no matter which design window you're working in. Some object properties, however, are unique to each design window. This section discusses the properties that objects use in the Report Design window.

All objects except buttons and crosstabs are available in Paradox reports.

The major differences between object properties in forms and those in reports are

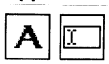
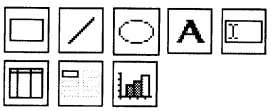
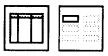
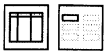
- Objects in reports do not have the Methods property, which lets you attach ObjectPAL methods to the object.

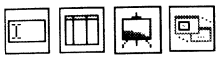
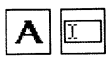
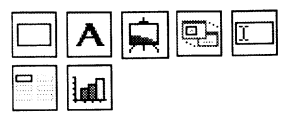
- Run Time properties for objects in reports are more sophisticated, to let you control exactly how objects will interact when they fill with data.
- In reports, objects can't use scroll bars when you run the report. (Scroll bars are available in the Report Design window, but they disappear when you run the report, at which time the object expands to fit its contents.)

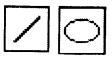
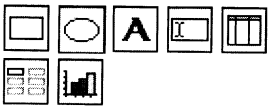
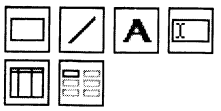
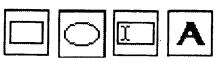
Table 13-7 alphabetically lists object properties available in a report, describes what each property means, and shows which objects can use the property. Use this table as a quick reference, either when you need to know what a property will do, or when you need to know if you can achieve a certain effect with a certain object.

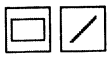
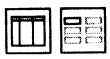
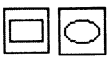
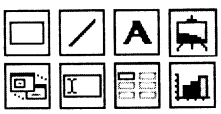
Note Graph properties are discussed in detail in Chapter 14.

Table 13-7 Object properties you can use in a report

Property	Description	Applies to
Alignment	Align text at the right border, left border, or center, or justify. (In field object, Fit Width must be off for Align Right to work.)	
Color	Change the color of the selected object or part of object.	
Define Field	Define the field data to appear in the field object.	
Define Graph	Define the table data to appear in the graph object.	
Define Graphic	Place a graphic value in a graphic object.	
Define OLE	Place an OLE value in an OLE object.	
Define Record	Define the table data to appear in the record area of a table or multi-record object.	
Define Table	Define the table data to appear in the table frame.	
Delete When Empty	Delete the table frame or multi-record object when it is blank.	
Design Sizing | Fixed Size	The text object does not expand or contract to fit text.	
Design Sizing | Fit Text	The text object expands or contracts to fit text.	

Property	Description	Applies to
Design Sizing | Grow Only	The text object expands but does not contract to fit text.	
Design | Contain Objects	Object will contain all objects within its borders.	
Design | Pin Horizontal	Pin the object to its current horizontal position in the design.	All
Design | Pin Vertical	Pin the object to its current vertical position in the design.	All
Design | Size To Fit	Allow the object to expand or contract to fit data.	
Detach Header	Remove the table frame's header of field labels from the body of the table.	
Display Type | Check Box	Display the field values as a check box.	
Display Type | Labeled	Display the field with a field label.	
Display Type | List	Display the field values in a list.	
Display Type | Radio Buttons	Display the field values as a set of radio buttons.	
Display Type | Unlabeled	Display the field values without a field label.	
Font	Change the typeface, size, style, or color of text.	
Format | Date Format	Change the display format of a date field.	
Format | Logical Format	Change the display format of a dBASE logical field.	
Format | Number Format	Change the display format of a number field.	
Format | Time Format	Change the display format of a time field.	
Format | Timestamp Format	Change the display format of a time/date field.	
Frame	Change the style, color, or thickness of an object's frame.	
Graph Type	Choose the display type for a graph object.	

Property	Description	Applies to
Grid	Change the color or style of the grid lines; choose to display a record divider.	
Horizontal Scroll Bar	Display a scroll bar along the bottom of the object.	
Line	Change the style, thickness, or color of a line.	
Line Ends	Choose to display arrows at one or both ends of a line.	
Line Spacing	Choose the inter-line spacing of text in a text object.	
Line Style	Choose a solid, dashed, dotted, or combination line style.	
Line Type	Choose to create either a curved or straight line.	
Magnification	Choose to increase or decrease the size of the object within its container.	
Options	Choose to display a graph's axes, grid, labels, legend or title.	
Pattern	Change the fill pattern of the object.	
Raster Operation	Change the way in which the pixels of a graphic object interact with the screen's background.	
Record Layout	Specify the number of records across and down in a multi-record object.	
Repeat Header	Choose to repeat the table's header on each page of the report.	
Run Time I Breakable	If the object crosses a page break, divide the object across the pages.	
Run Time I Field Squeeze	When a field object is embedded in text, push or pull the text following the field value.	
Run Time I Fit Height	Grow or shrink vertically to fit the contents of the object.	
Run Time I Fit Width	Grow or shrink horizontally to fit the contents of the object.	

Property	Description	Applies to
Run Time | Invisible	Choose to make the object visible or invisible when you run the report.	
Run Time | Line Squeeze	When a field object is embedded in text, delete the line of text that contains a blank field.	
Run Time | Orphan/Widow	Prohibit orphans (a single line of text at the bottom of a page) and widows (a single line of text at the top of a page).	
Run Time | Pin Horizontal	Prevent the object from being pushed or pulled horizontally on the page.	All
Run Time | Pin Vertical	Prevent the object from being pushed or pulled vertically on the page.	All
Run Time | Show All Columns	When you run a report, Paradox expands the table frame to fit all columns of the table.	
Run Time | Show All Records	When checked, the object grows to fit all records. When unchecked, the object is a fixed size and records are trimmed.	
Run Time | Shrinkable	If the object crosses a page break and contains no data on the second page, shrink the object to fit on the first page.	
Search Text	Search and replace text values.	
Thickness	Choose a thickness for a line or a frame.	
Vertical Scroll Bar	Display a scroll bar along the right side of the object.	
Word Wrap	Automatically create a new line at the object's right border.	

Many object properties work the same way in either the Form Design or Report Design windows. These properties and their uses are discussed in Chapter 11. Table 13-8 shows where to look for details about common property choices you'll see on design objects in the Report Design window.

Table 13-8 Cross reference to property descriptions

Property	See this section in Chapter 11
Color	"Using the Color palette"
Pattern	"Using the Pattern palette"
Frame	"Using the Frame palette"
Thickness	"Using the Thickness palette"
Line Style	"Using the Line palette"
Design I Pin Horizontal, or Design I Pin Vertical	"Pinning objects in design windows"
Design I Contain Objects	"Containing objects"
Design I Size To Fit	"Sizing objects to fit their contents"
Run Time I Pin Horizontal, or Run Time I Pin Vertical	"Pinning objects at run time"
Run Time I Invisible	"Invisible objects"

Using text in reports

In general, you work the same way with text in a report as you do in a form. You can change the fonts, alignment, color, frame, spacing, and automatic sizing in text objects in reports. See Chapter 12 for details on text display and formatting properties.

Using scroll bars on text objects

When you work with a text object in the Report Design window, you can choose to place a vertical scroll bar along its right side (inspect the object and choose Vertical Scroll Bar). This lets you enter as much text into the text object as you want when you're in the Report Design window without resizing the text object.

When you run the report, Paradox can expand the text object vertically down the page to display its entire contents. The expansion of the text object may push objects beneath it. You can control the effects of object expansion using Run Time properties (see "Using Run Time properties" later in this chapter).

Editing text

You enter and edit text in text objects in the Report Design window. (When you preview the report you can read the text, but you cannot edit it.) To edit existing text, click the text object once to select it. The pointer changes to the insertion point. Click again to place the insertion point in the text object.

If you prefer to use the keyboard, press *Tab* to select the text object and *Spacebar* to position the insertion point at the beginning of the text.

The arrow keys, *Backspace, Del,* and most other keys work the same in a text object as they do when editing the fields of a table or a form.

You can also use commands from the Edit menu, or the SpeedBar buttons.

Caution Paradox does not save data you enter into a text object until you save the report design.

Inserting fields in text

Paradox provides an easy way of inserting fields within text. As you are typing within a text object, press *F5* to insert an unlabeled, undefined field. Define this field as you would any other.

When you run the report, Paradox extracts the text value of the field and wraps it in its position within the line of text. The text following the field value is correctly spaced.

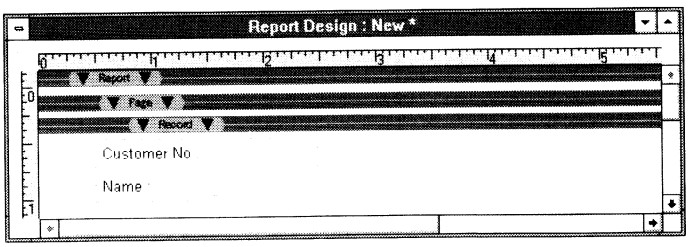
Example 13-9 shows how to insert fields within a line of text.

Note This example assumes you're working on a report using *Customer* linked to *Orders* as its data model, with a blank design layout. See Chapter 10 for information on creating new reports, linking tables to form a data model, and choosing an initial design layout.

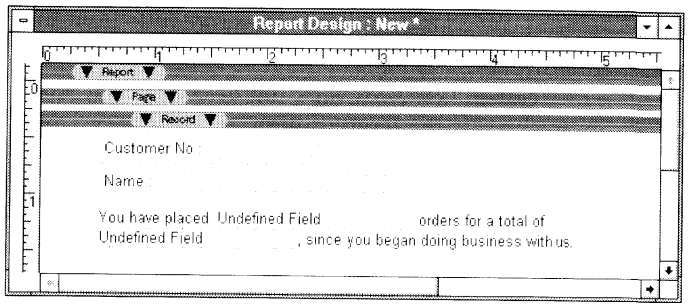
Example 13-9 Inserting fields in text

Suppose you want to insert a field value within a line of text. For example, you may want to include a line of text that states "You have placed X orders for a total of $X, since you began doing business with us." in a report using the Customer→Orders data model.

1. Place a field object in the record band of the report. Define it as CUSTOMER.DB:Customer No.
2. Repeat step 1, only this time define the field as CUSTOMER.DB:Name.

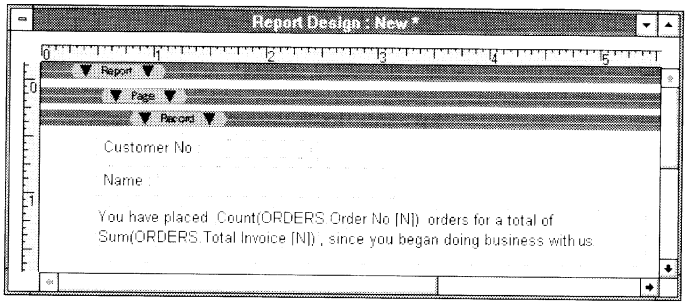


3. Place a text object in the record band of the report. In it, type **You have placed** and then press *Spacebar* to place a space between the text and the field value, and press *F5* to insert an undefined field. Press *Spacebar* again to place a space between the field value and the following text, then type **orders for a total of** and press *F5* to insert another undefined field. Now type **, since you began doing business with us.**



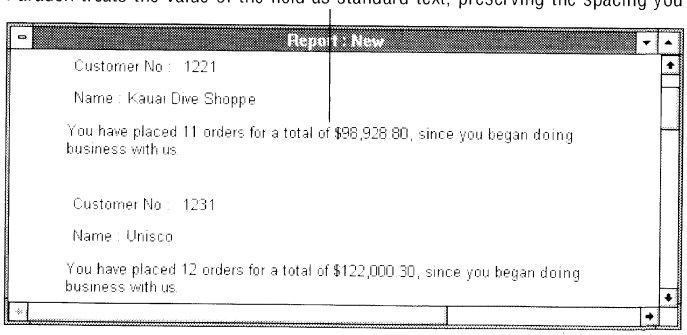
4. Inspect the first field object and define it as Count(ORDERS.Order No). (See "Using field summaries" later in this chapter for information on creating a summary field.)

5. Inspect the second field object and define it as Sum(ORDERS.Total Invoice).



6. When you run the report, Paradox pushes or pulls the text surrounding the field objects to adjust for the size of the field values.

Paradox treats the value of the field as standard text, preserving the spacing you define



Note If the text object's Run Time | Line Squeeze property is checked, and if there is only one field embedded in a line of text, and the field value is blank, Paradox blanks out the entire line of text that contains the blank field.

Using graphics and OLE objects in reports

In general, you work the same way with graphic and OLE objects in a report as you do in a form. You can change the magnification, frame, raster operation (on graphics) and object definitions using the same techniques in either design window. See Chapter 11 for details.

Resizing a graphic or OLE object and using scroll bars on them are done differently in reports.

Automatic sizing

When you define a graphic or OLE object in the Report Design window, the container you place automatically expands to fit the size of the contents. This is because the Design | Size To Fit property is checked by default. You must uncheck Size To Fit before you can resize a graphic or OLE object.

Using scroll bars on graphic and OLE objects

If you resize a graphic or OLE object container to be smaller than its contents, you can place scroll bars across its bottom (inspect the object and choose Horizontal Scroll Bar) or along its right side (inspect the object and choose Vertical Scroll Bar). Use the scroll bars to move to the section of the object you want to view. This lets you crop the object to show only the part of it you want to.

When you preview or print the report, the object's Run Time | Size To Fit property determines whether the frame expands to fit the contents or remains fixed and shows only part of the graphic or OLE value.

Using field objects in reports

In general, you work the same way with field objects in a report as you do in a form. You can change the color, pattern, frame, format, font, and definition using the same techniques in either design window. See Chapter 12 for details.

Where can you place fields?

In reports, you must follow certain rules when placing field objects in multi-table report designs.

- If the field object is defined as a field of the master table, you can place it in any band.
- If the field object is defined as a field of the detail table, it must be placed within the detail table's repeating region (a table frame or multi-region object).

Display types

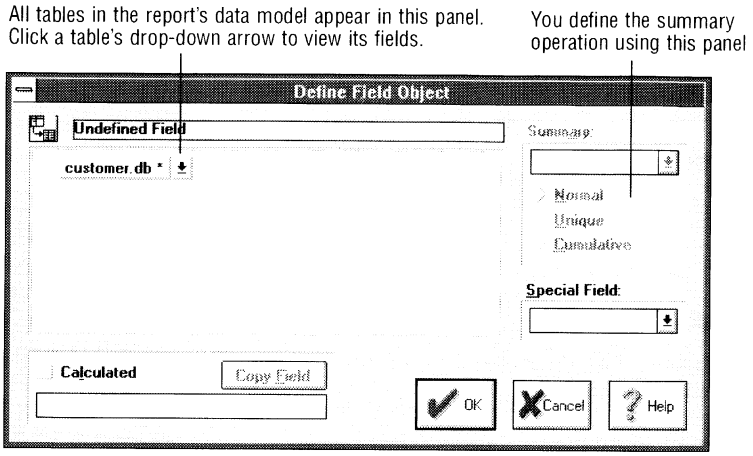
When choosing a display type for a field object in a report, the Drop-Down Edit choice is dimmed. This is because when you run a report (either preview it onscreen or print it) you can't click the drop-down arrow to view or change the field value. List, radio button, and check box display types all let you see the current value, so Paradox allows these display types in reports, along with standard labeled and unlabeled field objects.

Using field summaries

A summary performs specific calculations on a specific set of values in a table. Using summaries, you can sum, count, or average the values in a field. You can find the minimum or maximum value as well as the standard deviation and variation of values in a field.

You create field summaries in the Define Field Object dialog box. To open this dialog box, inspect a field, choose Define Field, and click the top of the menu you see. Figure 13-17 shows the Define Field Object dialog box you see when working in the Report Design window.

Figure 13-17 The Define Field Object dialog box



Summary operators

Table 13-9 lists Paradox summaries and what operations they perform in reports.

Table 13-9 Report summary operators

Summary	Function
Sum	Finds the total of all non-null values in the set
Count	Counts the number of non-null values in the set
Min	Finds the minimum value in the set
Max	Finds the maximum value in the set
Std	Finds the standard deviation of values in the set
Var	Finds the statistical variance of values in the set
Avg	Divides the total of all non-null values in the set by the number (count) of all non-null values in the set
First	Finds the first value in the set
Last	Finds the last value in the set
Prev	Finds the previous value in the set

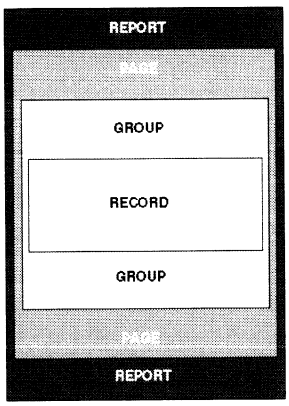
Understanding scope

A summary performs a calculation on a set of records. Before you can *sum* the set (add all values together), *count* the set (find how many values there are) or *average* the set (find what the average of all values is), or perform any other operation, you must *define* the set. In reports, the *scope* of the summary defines the set. It specifies what values you want the summary to operate on.

Both the report's data model and the placement of the summary field in the report design determine the scope of a summary.

Figure 13-18 shows how the bands of a report group data.

Figure 13-18 Report band grouping



Group bands are optional, and you can create more than one group.

Summaries on single-table reports

When placing summaries in a single-table report, keep these rules in mind:

- Corresponding band headers and footers calculate to the same value. This means you can place a summary in either the report header or report footer and get the same result. Likewise, a calculation in either the page header and page footer yield the same result.
- If you place a summary in the report band (either the header or the footer area), the scope of the calculation is all values contained by the report band—all records for the table.
- If you place a summary in the page band (either the header or the footer area), the scope of the calculation is all values contained by the page band—all records on the page.
- If you place a summary in a group band (either the header or the footer area), the scope of the calculation is all values contained by the group band—all records for the group.

- If you place a summary in a record band, it will behave differently in different situations:
  - In a report without a group band, Paradox performs the summary on all records in the table.
  - In a report with a group band, Paradox performs the summary on all records in the group.
  - In a tabular or multi-record report with the Run Time | Show All Records property of the table frame (or multi-record object) *unchecked*, Paradox performs the summary on the number of records that fit in the table frame or multi-record object. In this case the table frame or multi-record object acts like a band defined as a number of records.

Example 13-10 shows how to create a summary on a single-table report.

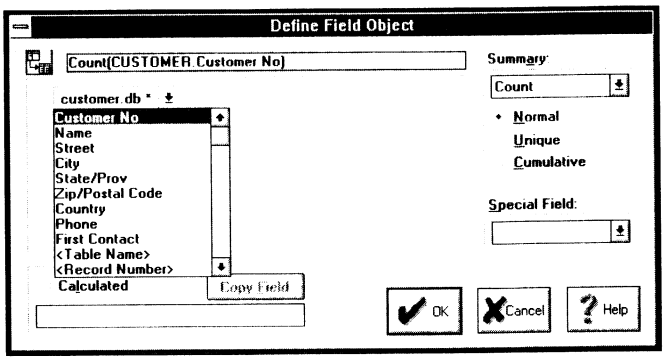
Note This example assumes you're working with a tabular report on the *Customer* table. See Chapter 10 for information on creating a new report.

Example 13-10 Creating a count summary in a single-table report

Suppose you want to know how many customers you have in each country. Define a summary by following these steps:

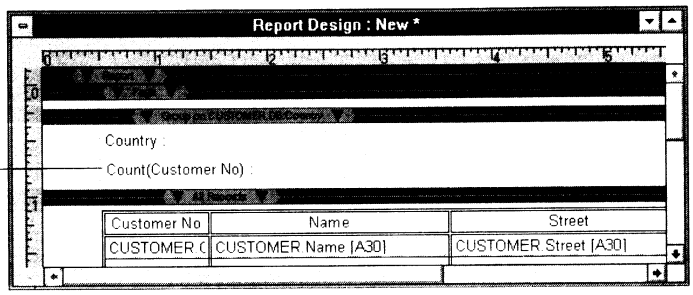
1. Create a group band on the Country field of *Customers*. (See "The group band" earlier in this chapter for information on creating a group band.) Paradox places the Country field in the group band.
2. Click the Field tool on the SpeedBar. Click and drag in the group band to place an undefined field object below the Country field.
3. Inspect the undefined field and choose Define Field. You'll see a menu of the fields from the *Customer* table.
4. Click the menu title bar to display the Define Field Object dialog box (see Figure 13-17).
5. In the Define Field Object dialog box, choose the Customer No field from the *Customer* table's drop-down list. (It's always a good idea to perform a Count summary on a table's key field. See the tip following this example.)
6. Choose Count from the Summary drop-down list.

   Paradox displays **Count(CUSTOMER.Customer No)** in the text box at the top of the dialog box.



7. Choose OK.

   In the Report Design window, the field object shows its new definition.



The summary field object

8. Print the report. For each unique country value, Paradox shows the country name and the number of customers in that country, followed by a table frame displaying customer information.

Country : Bahamas
Count(Customer No) : 4

Name	Street	City	State/Prov	Zip/Postal Code
Unisco	PO Box Z-547	Freeport		
SCUBA Heaven	PO Box Q-8874	Nassau		
Shangri-La Sports Center	PO Box D-5495	Freeport		
Tora Tora Tora	PO Box H-4573	Nassau		

Country : Belize
Count(Customer No) : 1

Name	Street	City	State/Prov	Zip/Postal Code
Adventure Undersea	PO Box 744	Belize City		

Country : Bermuda
Count(Customer No) : 2

Name	Street	City	State/Prov	Zip/Postal Code
Underwater SCUBA Company	PO Box Sn 91	Somerset		SXBN
Norwest'er SCUBA Limited	PO Box 6834	Paget		PSBZ

Country : British West Indies
Count(Customer No) : 3

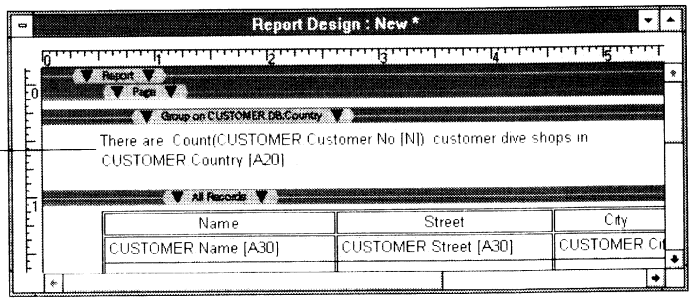
Name	Street	City	State/Prov	Zip/Postal Code
Cayman Divers World Unlimited	PO Box 541		Grand Cayman	
Fisherman's Eye	PO Box 7542		Grand Cayman	
Safari Under the Sea	PO Box 7456		Grand Cayman	

Country : Canada
Count(Customer No) : 3

When defining a count, it's a good idea to count the values of a table's primary key field. A primary key field *must* contain data, so you'll be sure of getting an accurate count.

Figure 13-19 shows a report design that includes a Count summary on the Customer No field in the Country group band. The Count summary and the Country field have been inserted within a text object. (See "Inserting fields in text" earlier in this chapter.)

Figure 13-19 Inserting a summary field in text



When you print or preview the report, Paradox looks at the set of values in the group. It performs the calculation defined by the summary and returns a value.

In the example of the count-by-country summary, Paradox looks at the record band *for each group* and returns the number of records in that band.

Figure 13-20 Viewing a summary field in text

The field values appear as part of a sentence

There are 4 customer dive shops in Bahamas.

Name	Street	City	State/Prov	Zip/Postal Code
Unisco	PO Box Z-547	Freeport		
SCUBA Heaven	PO Box Q-8874	Nassau		
Shangri-La Sports Center	PO Box D-5495	Freeport		
Tora Tora Tora	PO Box H-4573	Nassau		

There are 1 customer dive shops in Belize.

Name	Street	City	State/Prov	Zip/Postal Code
Adventure Undersea	PO Box 744	Belize City		

There are 2 customer dive shops in Bermuda.

Name	Street	City	State/Prov	Zip/Postal Code
Underwater SCUBA Company	PO Box Sn 91	Somerset		SXBN
Norwest'er SCUBA Limited	PO Box 6834	Paget		PSBZ

There are 3 customer dive shops in British West Indies.

Name	Street	City	State/Prov	Zip/Postal Code
Cayman Divers World Unlimited	PO Box 541		Grand Cayman	
Fisherman's Eye	PO Box 7542		Grand Cayman	
Safari Under the Sea	PO Box 7456		Grand Cayman	

There are 3 customer dive shops in Canada.

Name	Street	City	State/Prov	Zip/Postal Code
Marmot Divers Club	872 Queen St.	Kitchener	Ontario	G3N 2E1
Davy Jones' Locker	246 South 16th Place	Vancouver	British Columbia	K8V 9P1
On-Target SCUBA	7-73763 Nanakawa Road	Winnipeg	Manitoba	J2R 5T3

There are 1 customer dive shops in Columbia.

Name	Street	City	State/Prov	Zip/Postal Code
Fantastique Aquatica	Z32 999 #12A-77 A.A.	Bogota		

Summaries on master records in multi-table reports

When you place a summary field on the master table of a multi-table report, the scope of the summary is the innermost group of data.

Note

When working with a 1→1 or M→1 data model, Paradox joins the two tables in the data model *before* performing the summary.

When you place a summary field in the record band of a 1→M report, the summary can calculate only on the current record of the master table. In this case, the current master record behaves like a group band, grouping the detail records.

Summaries on detail records in multi-table reports

When placing summaries on the detail table of a multi-table report, the record, page, and group band rules stated earlier remain true. Additionally, keep these rules in mind:

- If you place a summary in the record band, Paradox performs the summary all detail records of the current master records.
- If you embed a summary within a table frame or multi-record object defined as the master table, Paradox performs the summary on each record of the master table.

Note In the data model *Customer→Orders→Lineitem*, you cannot create a summary of each customer's lineitems—only of each order's lineitems. Paradox can move only one level up in the data hierarchy when performing a summary.

Summaries on unlinked tables in multi-table reports

When placing a summary on an unlinked table in a multi-table report, the sum is performed for the whole table.

Normal, Unique, and Cumulative summaries

In a report, you can choose from three types of summaries—normal, unique, and cumulative. These options appear below the drop-down list of summary operators in the Define Field Object dialog box.

- Normal summaries consider all non-null values in the set, including duplicates.
- Unique summaries only look at unique non-null values in the set. Duplicates are ignored.
  - Using a unique summary to perform a Sum or Avg function would not yield true results because some values (duplicates) are not considered when the operation is performed.
  - A common use of a unique summary is to count all unique values in a set. For example, how many different kinds of items does a certain customer order? Or, how many zip codes are there in the state of Utah?
- Cumulative summaries return a running total for the operation they are performing. For example, if you place a cumulative Sum summary on a Balance Due field, Paradox sets the value to zero initially, then keeps a running total from the start of the report through the end of the report.

Using calculated fields

Calculated fields follow the same rules of scoping that summary fields follow.

In general, you create calculated fields the same way in reports as you do in forms. See Chapter 12 for details.

Calculating with summary field values

In reports, you can perform calculations on the values generated by summaries. For example, you can group the *Orders* table by Customer No, then create a summary field (called Total Due) to sum the Balance Due field. You would then know the total that each customer owes. Suppose a new policy calls for you to charge each

customer $5 if they have an outstanding balance. You can create the formula [Orders.Total Due] + 5. As the report is run, Paradox adds all the values in the Balance Due field for each customer, then adds five to the total.

Note Although you can perform calculations on summary fields, you *can't* perform summary operations on calculated fields. The formula Sum ([Lineitem.Selling Price] * [Lineitem.Qty]) is not allowed.

Using tables and multi-record objects in reports

In general, you work the same way with table frames and multi-record objects in a report as you do in a form. You can change the fonts, colors, pattern, frame and/or grid properties of these objects. In a report, you can also use scroll bars to view data and repeat table headers on each page.

Using scroll bars on tables and multi-record objects

When you work with a table frame in the Report Design window, you can choose to place a horizontal scroll bar (inspect the table and choose Horizontal Scroll Bar). This lets you view as much data as you want when you're in the Report Design window.

By default, when you run the report Paradox deletes the scroll bar and expands the table frame to display its entire contents. The expansion may push objects beneath it. You can control the effects of object expansion using Run Time properties (see the next section, "Using Run Time properties").

Note If a table's contents are too wide to fit on the page, Paradox automatically places a horizontal scroll bar. This lets you scroll to view all of the columns of the table. By default, when you run the report the table expands horizontally to fit its contents. In the Print File dialog box, you can tell Paradox how to handle data that doesn't fit on the page. (You can also control the effects of object expansion using Run Time properties.)

Repeating a table header

When a table breaks across several pages, you have the option of repeating the table header at the top of each page. Paradox checks a table frame's Repeat Headers property by default. If you *don't* want to repeat the header at the top of each page, inspect the table frame and uncheck Repeat Headers. This property is not available for a table frame with detached headers.

Using Run Time properties

All design objects have the Run Time choice available on their property menus. When you inspect an object and choose Run Time,

you see a menu of properties that Paradox applies to the object only when you *run* (view or print) the document.

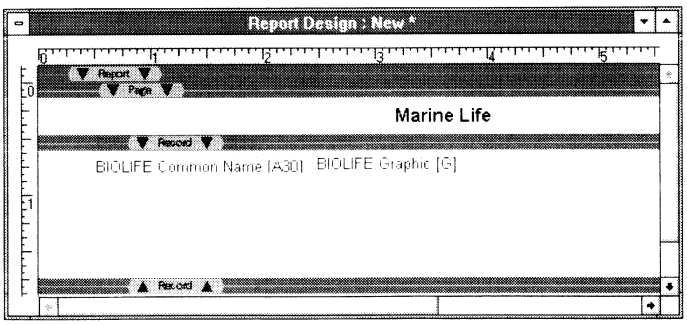
The Run Time choices differ depending on the object you inspect. Table 11-3 in Chapter 11 shows each design object and the Run Time properties available for it.

Pinning objects at run time

When you run a report, some objects (like fields, tables, multi-record objects, or graphs) fill with data. This may cause them to grow or shrink (although you can control the automatic resizing of objects, see "Fitting height and width" later in this section). As objects resize, they push or pull other objects on the page.

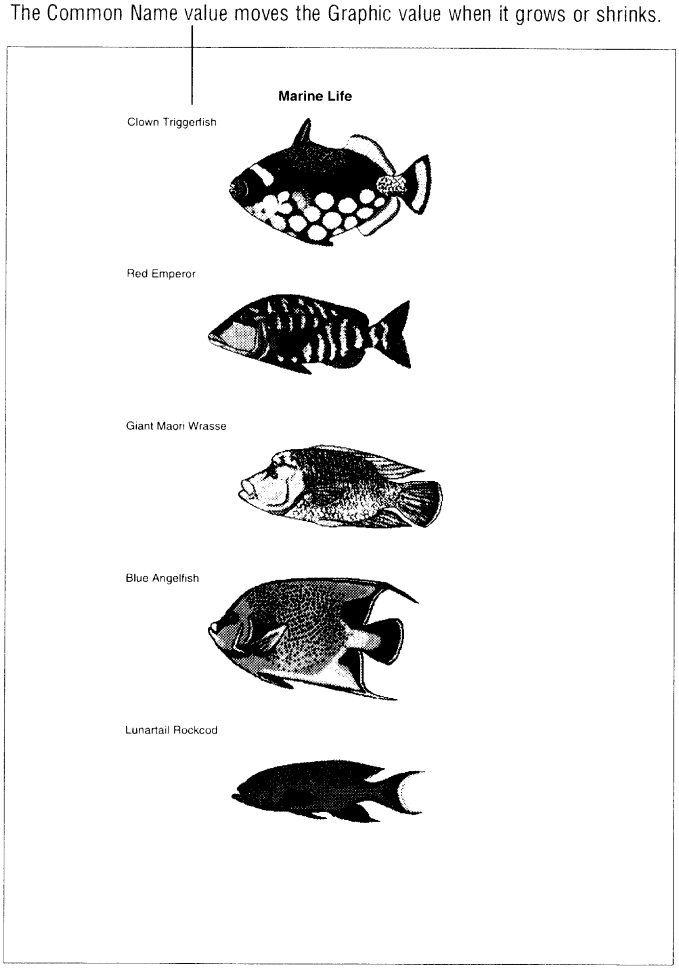
For example, suppose you place the Common Name field from *Biolife* in a report. When you're working in the Report Design window, the field object is always the same size. When you run the report, however, the values displayed in the field object differ in size, and the field object can grow or shrink to fit the data. Now suppose you place the Graphic field from *Biolife* to the right of the Common Name field. Figure 13-21 shows the Report Design window with these objects in place.

Figure 13-21 Side-by-side objects



When you run the report, the resizing of the Common Name field pushes or pulls the contents of the Graphic field. Figure 13-22 shows how the Graphic field is affected by the resizing of the Common Name field.

Figure 13-22 Graphics moved by field values

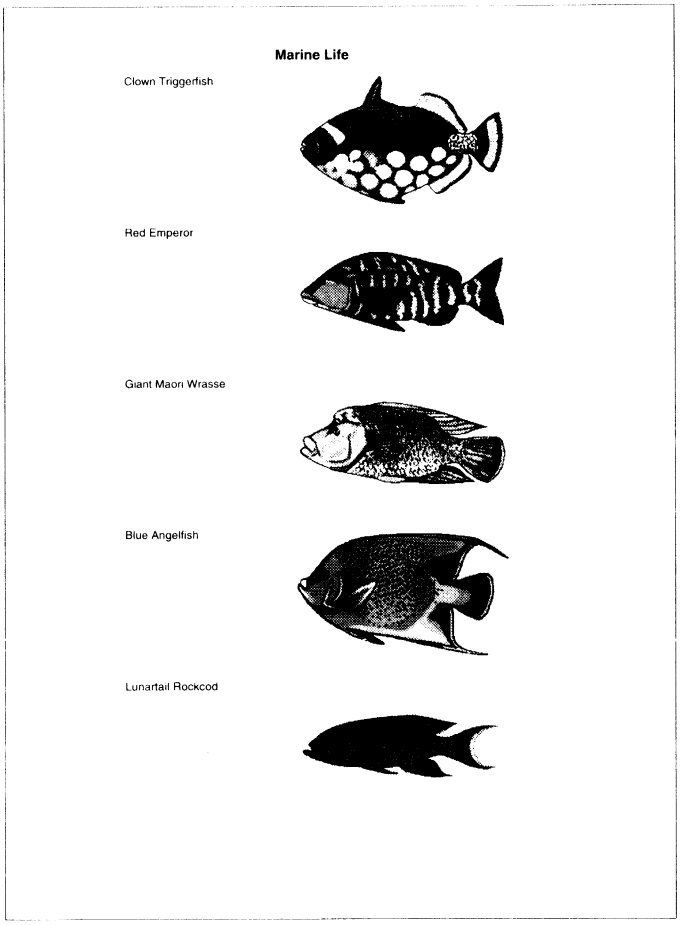


You can pin objects so they don't move when you run the report.

If you inspect the Graphic field and check Run Time | Pin Horizontal, Paradox prevents the pushing or pulling of other objects from moving the graphic. Figure 13-23 shows what pinning the graphic at run time does to the report.

Figure 13-23 Graphics pinned at run time

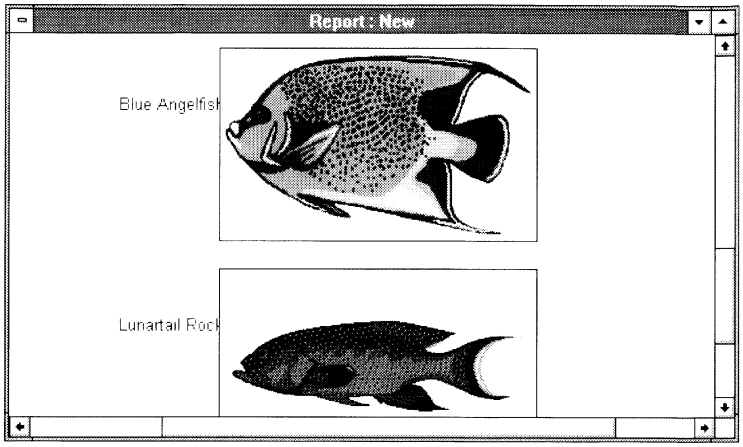
The Graphic field is pinned, so the Common Name field doesn't move it.



One possible consequence of pinning an object, which might otherwise be pushed, is that the expanding object can expand over the pinned object. Figure 13-24 shows the Common Name field value obscured by the Graphic field value. This happens because the Graphic field was placed after the Common Name field in the Report Design window.

Figure 13-24 A pinned object in front

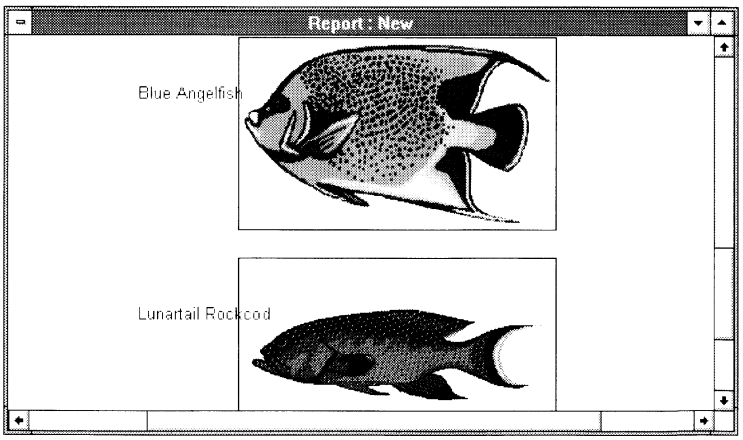
The Common Name field grows but the Graphic field obscures it



In the Report Design window, you can select the Common Name field and choose Design | Move To Front. This makes Paradox display the Common Name field value on top of the Graphic field value, as shown in Figure 13-25.

Figure 13-25 A pinned object in back

The Common Name field grows on top of the Graphic field



Paradox gives you the ability to choose the effect that works for you.

Fitting height and width

When you place boxes, text, ellipses, and field objects in a report design, you have the option of setting their Run Time | Fit Height and Run Time | Fit Width properties.

If these Fit properties are unchecked, the objects retain their size and shape when you run the report. Paradox trims data that is too large to fit inside them.

If these Fit properties are checked, the objects grow or shrink to fit their contents when you run the report.

In Figure 13-23, the Graphic field is pinned to prevent its movement. Another way to control its movement is to restrict the resizing of the Common Name field.

If you inspect the Common Name field and check Run Time | Fit Width, Paradox prevents the field from growing or shrinking to fit the value of each record. As a result, other objects on the page (like the Graphic field) are not pushed or pulled.

If you uncheck the Fit Width or Fit Height of an object, be sure the object itself is big enough to show all that you want it to. It's a good idea to preview the report, then resize the object in the Report Design window to get its sizing right.

Showing all records and columns

Table frames and multi-record objects, both have the Run Time | Show All Records property. When this property is checked on a table frame, Paradox expands the object vertically down the page, creating as many pages as necessary to show all records of the table.

When this property is checked on a multi-record object, the way in which the object expands is determined by the options you choose in the Record Layout dialog box. If you choose Top Down, Then Left-Right, Paradox creates additional columns. If you choose Left-Right, Then Top-Down, Paradox creates additional rows.

If Show All Records is unchecked, Paradox displays a fixed number of records.

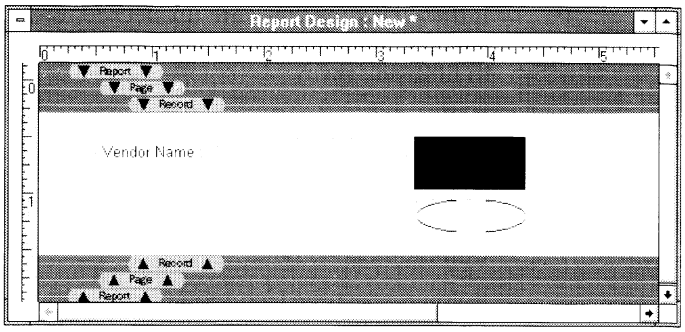
Table frames also have the Run Time | Show All Columns property.

Aligning pushed objects

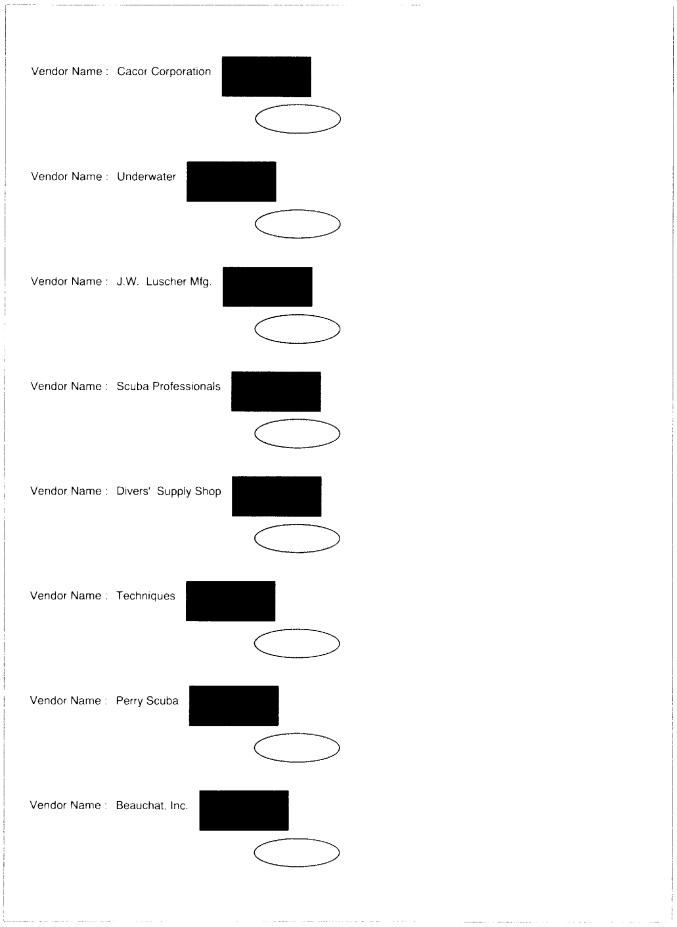
Suppose you align objects in the Report Design window, and find that only one of them is pushed by another object when you run the report. You can use invisible lines or boxes to group and control the alignment of multiple pushed objects.

Example 13-11 Aligning pushed objects

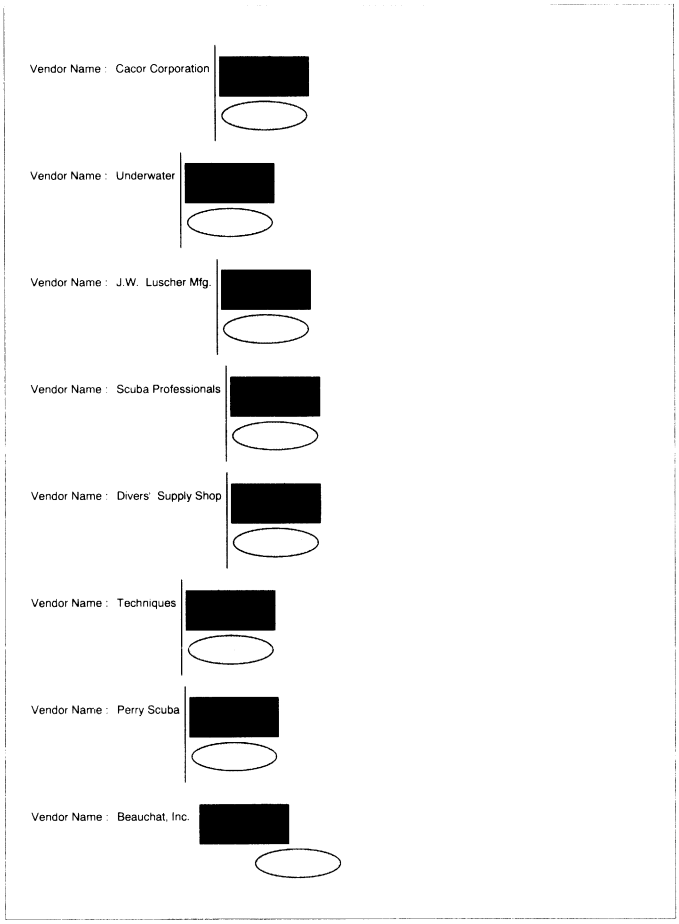
Suppose you have a report design that looks like this:



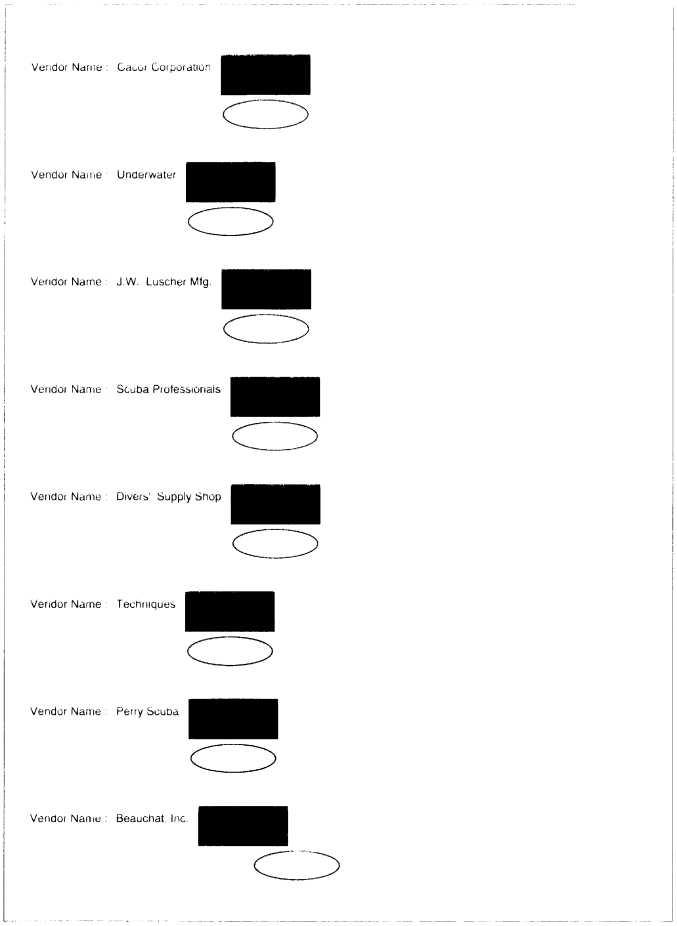
When you run the report, the Vendor Name field pushes or pulls the box, but not the ellipse.



If, in the Report Design window, you place a vertical line between the field and the other two objects, the expanding field pushes the *line*, which subsequently pushes both objects.



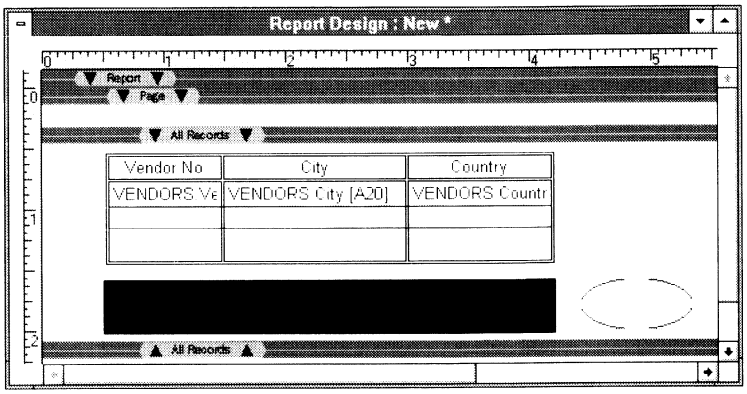
If you don't want to see the line, inspect it and check Run TimeInvisible.



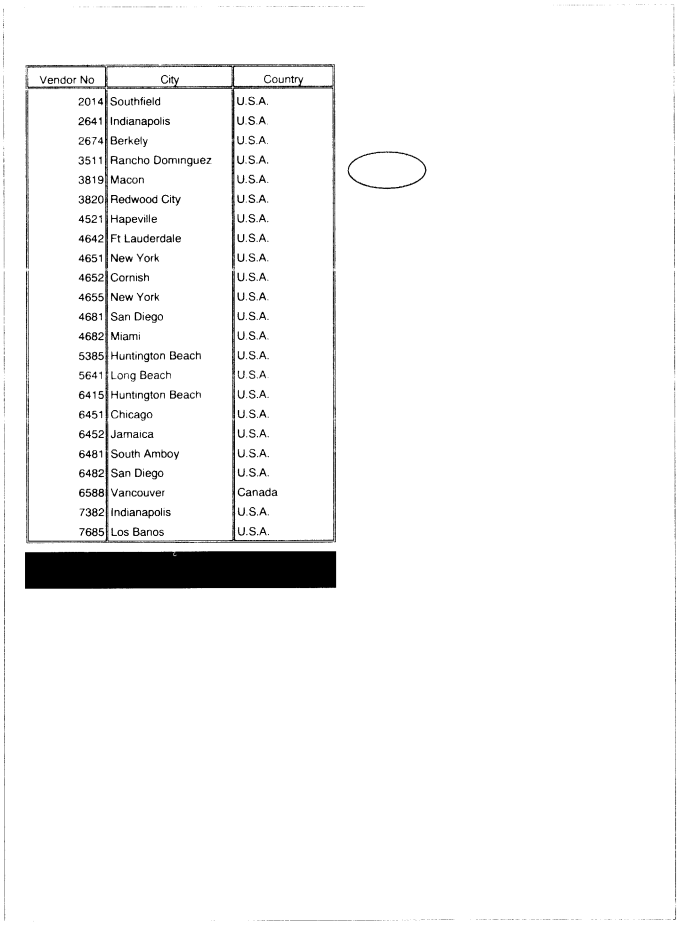
The bottom set of objects is still misaligned, because the invisible line was too long to fit on the page, and moved to the next page. The solution to this problem is to use an invisible unbreakable box to contain both the box and ellipse. See Example 13-13 for information on how to handle this situation.

Example 13-12 Using a horizontal line to push all objects down.

Suppose you have a report design containing two objects that you need to keep together. You want to make sure that if one object is pushed, the other object is also pushed. For example, in a report design that looks like this, you want the box and ellipse to stay aligned horizontally.

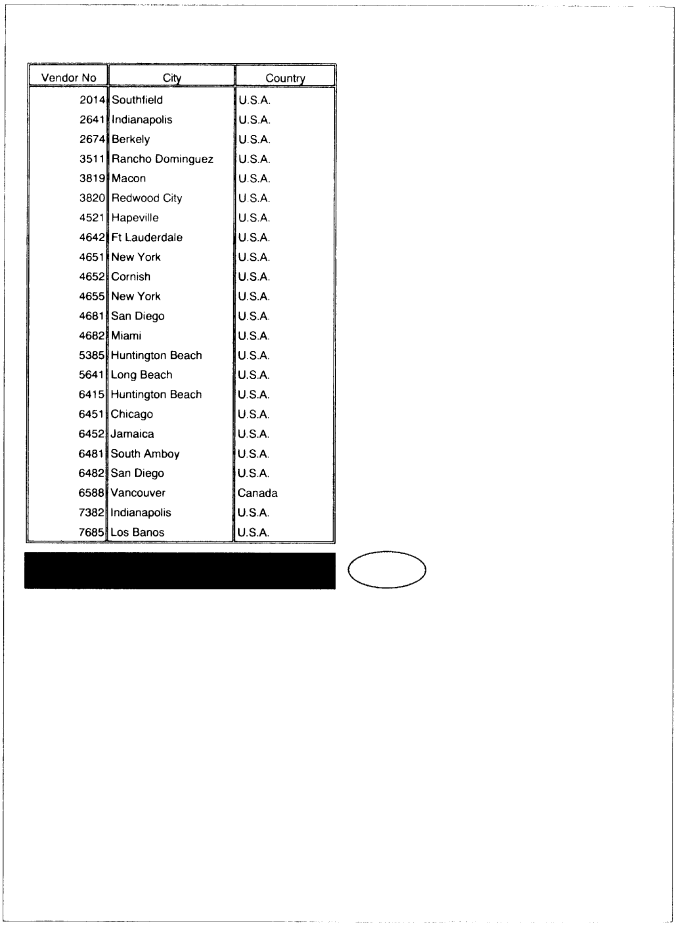


When you run the report, the table frame expands down the page until all records are displayed. The box is pushed, but the ellipse is left in place.



Vendor No	City	Country
2014	Southfield	U.S.A.
2641	Indianapolis	U.S.A.
2674	Berkely	U.S.A.
3511	Rancho Dominguez	U.S.A.
3819	Macon	U.S.A.
3820	Redwood City	U.S.A.
4521	Hapeville	U.S.A.
4642	Ft Lauderdale	U.S.A.
4651	New York	U.S.A.
4652	Cornish	U.S.A.
4655	New York	U.S.A.
4681	San Diego	U.S.A.
4682	Miami	U.S.A.
5385	Huntington Beach	U.S.A.
5641	Long Beach	U.S.A.
6415	Huntington Beach	U.S.A.
6451	Chicago	U.S.A.
6452	Jamaica	U.S.A.
6481	South Amboy	U.S.A.
6482	San Diego	U.S.A.
6588	Vancouver	Canada
7382	Indianapolis	U.S.A.
7685	Los Banos	U.S.A.

If, in the Report Design window, you place an invisible horizontal line between the table frame and the other objects, the expanding table pushes the line, which in turn pushes *both* objects.

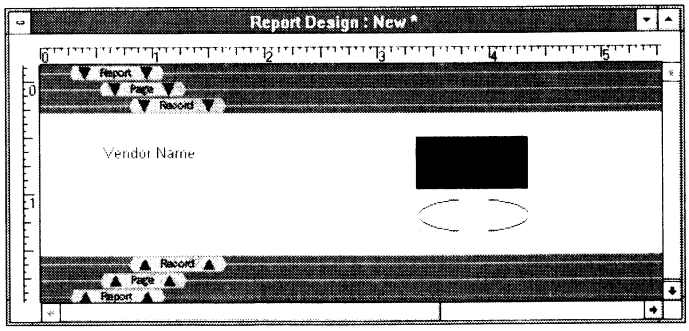


Vendor No	City	Country
2014	Southfield	U.S.A.
2641	Indianapolis	U.S.A.
2674	Berkely	U.S.A.
3511	Rancho Dominguez	U.S.A.
3819	Macon	U.S.A.
3820	Redwood City	U.S.A.
4521	Hapeville	U.S.A.
4642	Ft Lauderdale	U.S.A.
4651	New York	U.S.A.
4652	Cornish	U.S.A.
4655	New York	U.S.A.
4681	San Diego	U.S.A.
4682	Miami	U.S.A.
5385	Huntington Beach	U.S.A.
5641	Long Beach	U.S.A.
6415	Huntington Beach	U.S.A.
6451	Chicago	U.S.A.
6452	Jamaica	U.S.A.
6481	South Amboy	U.S.A.
6482	San Diego	U.S.A.
6588	Vancouver	Canada
7382	Indianapolis	U.S.A.
7685	Los Banos	U.S.A.

You can place a horizontal line under any vertically expanding object, such as a text or multi-record object.

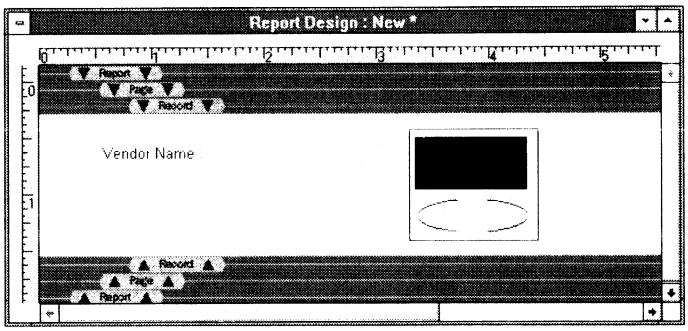
Example 13-13 Using a box to push or pull contained objects

Suppose you have a report design that looks like this:

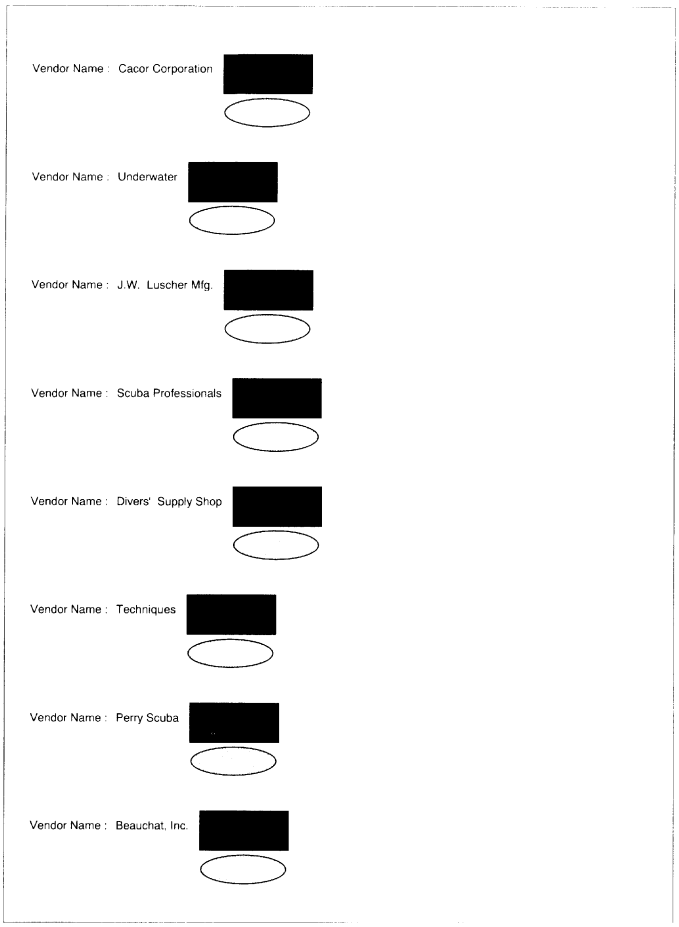


Example 13-11 shows how to use a vertical line to align the box and the ellipse as they are pushed by the Vendor Name field's growth, but the line doesn't solve all problems with the layout.

You can place a box around all of the objects you want Paradox to push or pull in reaction to another object's resizing. Inspect the container box and check its Run TimeInvisible property if you don't want to see it.



When an invisible box surrounds both objects, Paradox both pushes and pulls them together. If the box's Run Time|Breakable property is unchecked, Paradox cannot break the group of contained objects across pages.



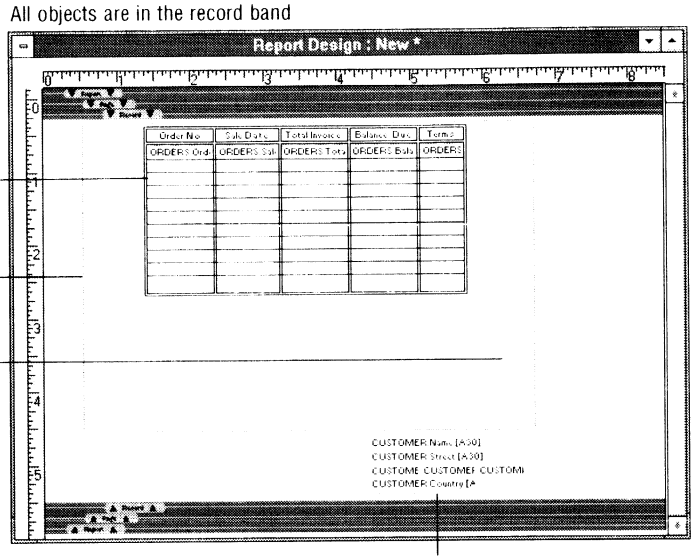
You can also contain objects in a box to cause Paradox to push objects down the page in reaction to a vertically expanding object.

Example 13-14 Using an expanding box and a fixed line

Suppose you want to design a report in which address fields *must* appear on the bottom third of the page so the page can be folded with the address showing through a window of an envelope.

1. Create a report design using the *Customer→Orders* data model. Design a report that looks like this:

All objects are in the record band



The table frame has Run TimelShow All Records checked. It will grow down the page to fit all data.

The box maintains white space between the table frame and the text object. It has Run TimelFit Height and Invisible checked.

The vertical line prevents the box from shrinking. It has Run TimelInvisible checked.

The fields are embedded in a text object. It can appear lower on the page, but must not appear higher. It is not pinned.

When you print the report,

- The table frame containing order information can grow as much as it needs to. The text object containing the *Customer* fields is unpinned, so it can move down the page if necessary.
- If the table frame shrinks, the line within the box prevents the box from shrinking with it. This prevents the text object containing the *Customer* fields from moving up on the page.
- The box ensures the proper distance between the bottom of the table frame and the top of the text object containing the *Customer* fields.

All the run time properties work together, so the fields are always displayed in the correct area, regardless of the size of the table frame

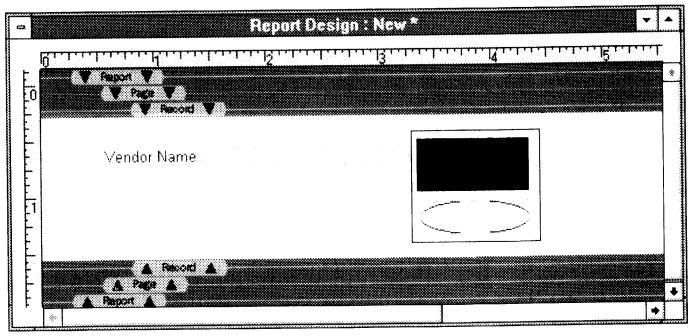
Order No	Sale Date	Total Invoice	Balance Due	Terms
1001	4/3/88	$7,320.00	$0.00	FOB
1023	7/1/88	$1,414.00	$1,414.00	Net 30
1059	2/24/89	$33,540.00	$0.00	FOB
1076	4/25/89	$8,223.80	$0.00	FOB
1123	10/1/89	$13,945.00	$0.00	Net 30
1169	7/5/90	$9,471.95	$0.00	FOB
1176	7/25/90	$4,178.85	$0.00	FOB
1269	4/5/91	$1,400.00	$0.00	FOB
1369	12/5/91	$5,427.35	$0.00	FOB
1469	4/5/92	$13,682.85	$0.00	FOB
1669	5/5/92	$325.00	$307.00	FOB

Kauai Dive Shoppe
4-976 Sugarloaf Hwy
Kapaa Kauai HI 94766
U.S.A.

Keeping objects together

You can use a container to keep a group of objects on the same page. For example, suppose you have a report design that looks like the one in Figure 13-26.

Figure 13-26 Keeping objects together



Surround all objects with a container object and uncheck the container's Run TimelBreakable to keep them together on a page

It's possible, whether you use a line or a box to control the horizontal movement of the box and ellipse, that Paradox could separate the box from the ellipse at a page break. This happens if

- You use a line to align the objects
- You use a box with its Run Time | Breakable property checked

To prevent a group of objects from becoming separated at a page break, you must surround them with a box (or ellipse or any other container object) with its Run Time | Breakable property unchecked.

Delivering a report

Paradox gives you a way to protect your report design. This is useful if you want to distribute a standard report to other users, and need to ensure they won't change the design. When you finish designing the report, you can *deliver* it by choosing Report | Deliver from the Report Design window.

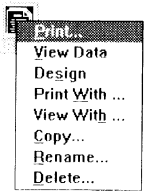
When you deliver a report, Paradox creates a new file and gives it the .RDL extension. For example, when you deliver a report named CUSTORD.RSL, Paradox creates the file CUSTORD.RDL.

Your original report remains intact. You can use the .RDL file to preview or print the report, but Paradox prevents it from being opened in the Report Design window.

If at some later date you need to change the report design, use the original .RSL file, then deliver the report again, creating a new .RDL file.

Note If you try to open an .RDL file in the Report Design window, Paradox displays a message informing you that the report design cannot be edited and opens the file in the Report window.

The report icon's menu



If you inspect a report icon in the Browser or the Folder window, you'll see its property menu. You can

- Choose Print to send the report to the printer (this is the default action you get from double-clicking the icon).
- Choose View Data to open the report in the Report window and view its data.
- Choose Design to open the report in the Report Design window and modify its design.
- Choose Print With or View With to bind the report to a table different from the one on which you originally designed it. This is discussed in the following section.
- Choose Copy, Rename, or Delete to copy or delete the report or to give it a new name.

Printing or viewing a report with a different table

Paradox gives you the ability to open a report created on one table using the data from another table. Suppose you design a report for *Lineitem* and like the layout, colors, and other attributes so much that you want to display the data from *Orders* in the same style. Instead of re-creating the report on the new table, you can inspect the existing form's icon and choose Print With or View With.

When you choose Print With or View With, Paradox opens the Select File dialog box, from which you can choose a different table to use in the report. Choose the table you want.

Paradox searches through the fields in the new table. If there is no corresponding field object on the existing report, Paradox informs you that all objects that depend on the table's field will become undefined. This will happen unless the new table and the original table have matching field names.

Note If the new table and the original table don't have matching field names, you'll probably need to redefine some field objects in the Report Design window.

Paradox creates a new report, copying the existing report's layout and properties, and attempts to place the fields from a different table in the new report. The original report is not changed. If you choose Print With, Paradox prints the report with the new table's data. If you choose View With, Paradox opens the report with the new table's data in the Report window. Print With and View With are especially useful for quickly using an existing report layout to print or view the *Answer* table of a query.

You can also open a report using a different table from the Open Document dialog box by choosing the Change Table button.

Opening forms as reports

Paradox gives you the option of opening forms as reports or reports as forms.

Suppose you've designed a form you really like. If you want, you can open the form as a report to print it. Paradox uses the form's layout in the record band of the report.

Some objects behave differently in forms and reports. For example,

- Calculated and summary fields look at data differently in forms and reports, so you may need to modify them to get the correct results.
- Non-nested form design layouts aren't valid for reports. They will result in undefined objects.
- If you use a multi-page form, Paradox inserts page breaks at the appropriate places in the record band.
- Buttons are not available in reports.
- Crosstabs are not available in reports.
- Graphs created on the master table will become undefined.

To open a form as a report, choose File | Open | Form. You'll see the Open Document dialog box, discussed in Chapter 3. In the Open As panel, use the drop-down list to choose Report. When you choose OK, Paradox creates and opens a new report based on the contents of the form.

Paradox doesn't change the existing form; it remains untouched.

Printing the report

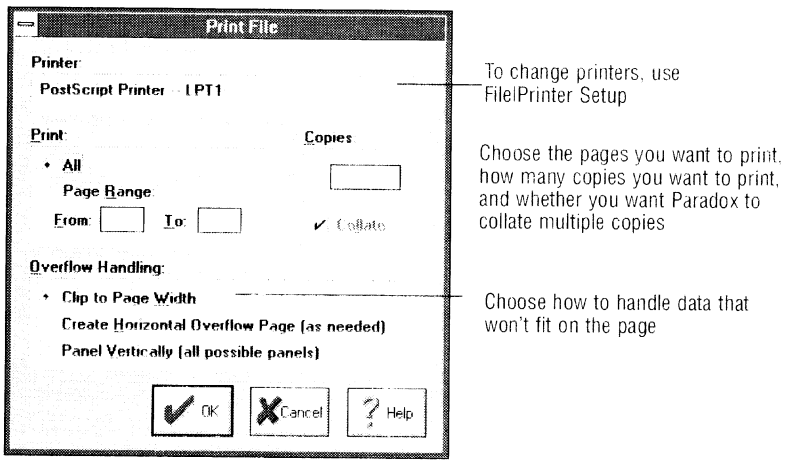
When you want to print the report, you can choose Report | Print or File | Print, or click the Print button on the SpeedBar. You have several options.

- If you choose Report | Print or File | Print from the Report Design window, you have the option of printing the report design layout (choose Print | Design), or printing the report and its data (choose Print | Report).

- If you choose Report | Print | Current Page or File | Print | Page from the Report window, you'll print the page you're currently previewing.
- If you choose Report | Print | Report or File | Print | Report, you can print the whole report or a selected page range (specified in the Print File dialog box).
- If you click the Print button on the SpeedBar, you can print the whole report or a selected page range (specified in the Print File dialog box).

Whether you choose to print a specific page, a range of pages, or all pages of the report, Paradox opens the Print File dialog box.

Figure 13-27 The Print File dialog box

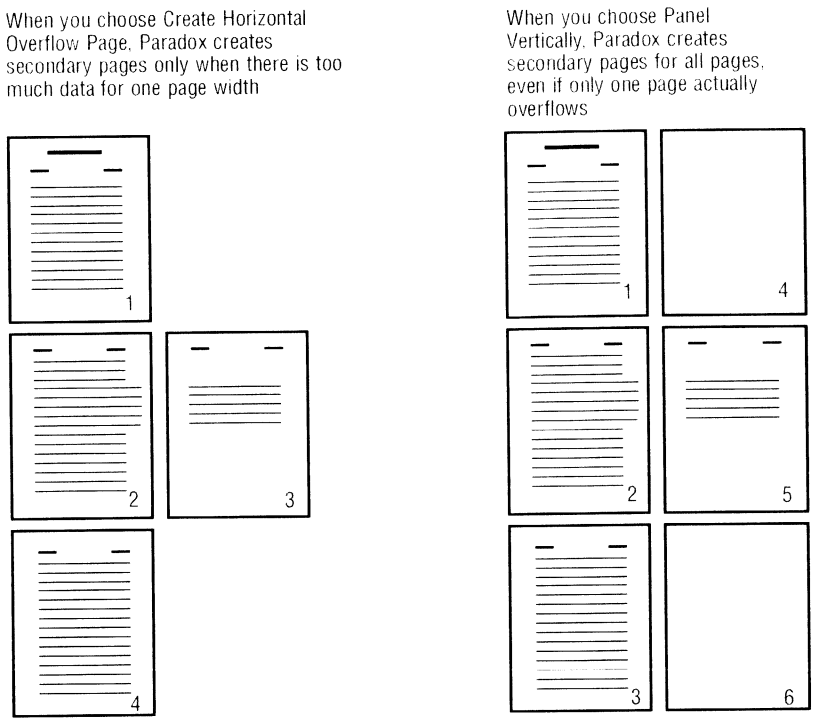


Use the Overflow Handling options area to tell Paradox how you want to treat data that is too wide to fit on the printed page.

- Choose Clip to Page Width if you want Paradox to clip (trim) all data that doesn't fit across the page.
- Choose Create Horizontal Overflow Page if you want Paradox to print additional pages whenever necessary to fit all of the data.
- Choose Panel Vertically if you want Paradox to print a second page for each page of the report, regardless of how many pages actually have data that overflows.

The difference between the Create Horizontal Overflow Page option and the Panel Vertically option is shown in Figure 13-28.

Figure 13-28 Overflow handling options



When you choose all the options you want, choose OK. You'll see a dialog box with a Cancel button. Choose Cancel from this dialog box at any time to stop sending the report to the printer.

Note Choosing Cancel does not cancel any pages Paradox has already sent to the printer.

Tips for faster printing

Many factors can affect the speed of your report printing. The following tips can help you to make choices that can speed up the printing of reports.

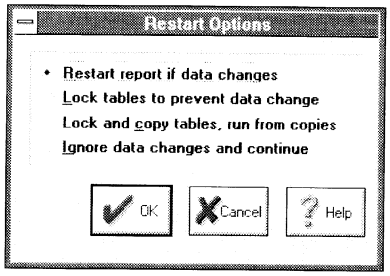
- When printing a small or medium size report on a network, or any size document on a local printer, turn the Windows Print Manager on. This allows Paradox to return you to work quickly.
- When printing a large document on a network, you might want to turn off the Print Manager. This prevents Paradox from sending the report to the Print Manager before it goes to the printer, and saves both time and memory.

Using restart options

When you run a report on shared data, you run the risk of reporting on changing data. For example, if you print a report on the *Customer* table while another user is editing the table, your report might be out of date by the time it's printed.

Paradox gives you several ways of handling this situation. In the Report Design window, choose Report | Restart Options. Paradox opens the Restart Options dialog box.

Figure 13-29 The Restart Options dialog box



- Choose *Restart report if data changes* when you want to be sure to get the latest data but you don't want to lock other users out of the table. If someone makes a change to the table you're reporting on, Paradox restarts the report from the beginning. This is the default restart option for Paradox tables. It isn't available for dBASE tables.
- Choose *Lock tables to prevent data change* when you want to prevent other users from editing the table while the report is printing. Paradox releases the lock as soon as the printing is complete.
- Choose *Lock and copy tables, run from copies* when you want to prevent other users from editing the table for the shortest possible time. Paradox locks the table long enough to copy it, then uses the copy to print the report. Paradox deletes the copied table as soon as the printing is complete.

Note Make sure you have enough memory to create a copy of the table when you use Lock and copy tables.

- Choose *Ignore data changes and continue* when you don't need to have the latest data. If data is changed while the report is printing, Paradox continues to use the old data. This is the default restart option for dBASE tables.

CHAPTER 14

Using crosstabs and graphs

Cross-tabulating and graphing the data in a table are ways of focusing on subsets of the whole set of table data. A table's fields often represent separate sets, or categories, of data. A crosstab focuses on summaries of data from one or more fields of a table that are divided into the categories of unique values from one or more other fields of the table. A graph presents this categorized and summarized data visually.

You create crosstabs in forms, and graphs in either forms or reports. Crosstabs and graphs use the data model of the design document you place them in. See Chapter 10 for information on creating a data model.

You don't need to create a crosstab of a table to derive a graph from that table. However, when you create a graph, you're graphing cross-tabulated data. When you define the parts of a graph, you're actually specifying a crosstab.

What is a crosstab?

Crosstabs give you a whole new way to analyze your data. A crosstab summarizes (cross-tabulates) information according to one or more fields. It then displays the summary in tabular, spreadsheet-like format.

Crosstabs are valuable for getting at "hidden" information in your tables. A crosstab

- Classifies data by one or more categories
- Summarizes the data within these categories
- Sorts the summarized information
- Displays the data in a spreadsheet-like format

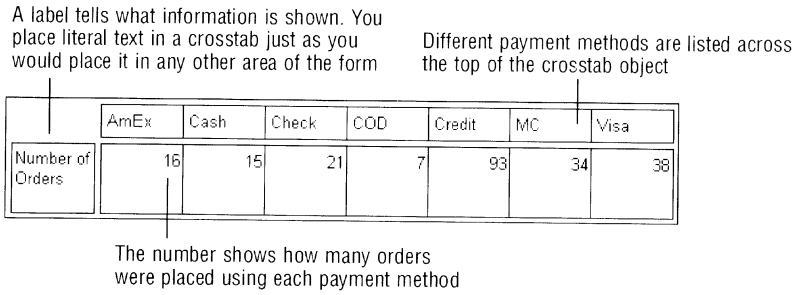
You can place crosstabs only in forms. You can't place them in reports.

One-dimensional crosstabs

A simple crosstab is one-dimensional. You analyze one type of data in light of another. For example, you can see how order amounts break down when classified by the method customers used to pay for them.

The *Orders* table has a Payment Method field. You can create a crosstab that counts the number of orders placed using each of the seven payment methods used. The crosstab displays information like a spreadsheet, as Figure 14-1 shows. In this example, Payment Method is the category of information, and the calculation **Count(Order#)** provides the data for each category.

Figure 14-1 A horizontal one-dimensional crosstab



You can arrange the display of information horizontally, as in Figure 14-1, or vertically, as in Figure 14-2.

Figure 14-2 A vertical one-dimensional crosstab

	Number of Orders
AmEx	16
COD	7
Cash	15
Check	21
Credit	93
MC	34
Visa	38

Paradox can usually calculate and generate a vertical one-dimensional crosstab like the one in Figure 14-2 faster than a horizontal one-dimensional crosstab like the one in Figure 14-1.

Two-dimensional crosstabs

A more complex type of crosstab summarizes information by more than one category. For example, the *Orders* table contains a Month field, whose values are the month of Sale Date. With this field and the Payment Method field, you can generate a crosstab that presents the sum of orders by payment method *and* by month. Figure 14-3 shows this crosstab. The numbers are spread out to reflect both the month when the orders were placed and the method used to pay for them. Values from the Payment Method field appear across the top, and values from the Month field appear down the left side.

Figure 14-3 A two-dimensional crosstab

Months appear down the left side

Values from the Payment Method field appear across the top

The numbers show the count of orders by month and by payment method

	AmEx	Cash	Check	COD	Credit	MC	Visa
Apr		3	1		10	5	5
Aug		3	1	3	8	2	4
Dec	4		1		3	1	2
Feb		1	3		4	3	
Jan		1			7		2
Jul	2	1	3		8	5	6
Jun	1		2		12	7	3
Mar	1				6	1	5
May	2	4	1	3	16	3	4
Nov		2	2	1	4	1	3
Oct	2		4		7	2	3
Sep	4		3		8	4	1

The summary information (count of orders) appears sorted in rows by Month (alphabetical order, not numerical order) and in columns by Payment Method. This is a convenient way of analyzing the buying habits of customers over a period of time.

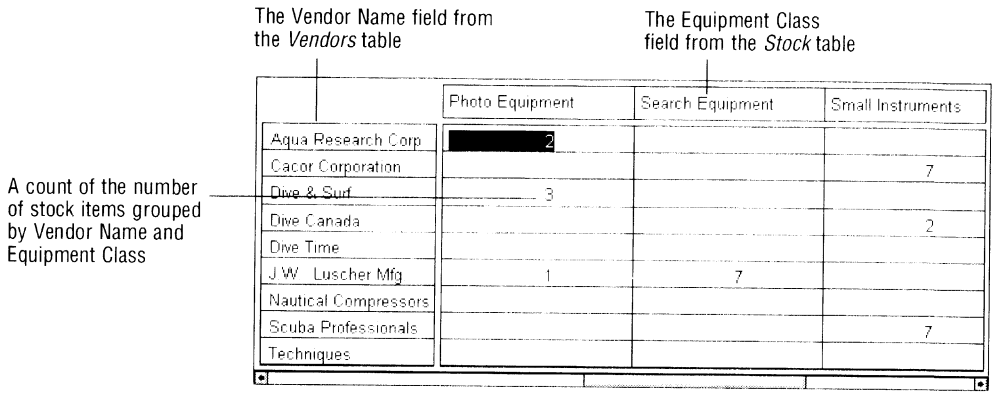
Multi-table crosstabs

You can create a crosstab that takes its information from more than one table. Establish the data model you want. (See Chapter 10 for information on creating a data model.)

A crosstab can draw information from any number of tables that are linked in a *single-valued* (one→one or many→one) relationship. For example, if you want to view the number of items in stock by equipment class and the vendor that supplies them, you can link the *Stock* and *Vendors* tables. You're then free to define the rows, columns, and summary fields of the crosstab using any field from either table. Figure 14-4 shows a crosstab of data from the *Stock* and *Vendors* tables.

Note You can use fields from linked tables *only* if the link is single-valued. You can't crosstab information from fields of tables linked in multiple-valued (one→many) relationships.

Figure 14-4 A crosstab using tables linked in a one-to-one relationship



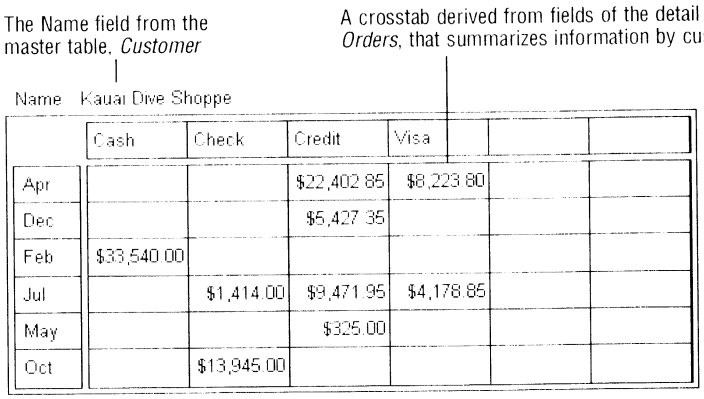
Using this type of crosstab, you can look at combinations of information in a new way and analyze your buying strategies accordingly.

Crosstabs of detail tables

Suppose you have a linked multiple-valued (one→many) relationship and you want to see a summary crosstab of only those records in the detail table that apply to a record of the master table. For example, you can link *Customer* and *Orders*. In this relationship, each customer can have many orders. You can link the two tables and create a crosstab on the detail table, *Orders*. You can then place the Customer No or Name field (or both) from the master table, *Customer*, on the form. Because of the data model, Paradox knows that the information in the crosstab applies only to the current record of the master table.

Figure 14-5 shows a crosstab of the detail table *Orders* that sums the Total Invoice field by payment method and by month *for each customer*. As you scroll through the *Customer* table, the crosstab is updated to show each customer's order information.

Figure 14-5 A crosstab of a detail table



Creating a crosstab

You can create a crosstab in one of these ways:

- *Quick Crosstab*: Open the table from which you want to derive a crosstab and
  - Click the Quick Crosstab SpeedBar button
  - Choose Table | Quick Crosstab
- *Undefined crosstab model in Form Design window:* Create a new form for the table from which you want to derive a crosstab and, in the Form Design window, click the Crosstab tool to place an undefined crosstab model on the form.

Note As with all SpeedBar buttons, you can specify prototype crosstab properties by inspecting the Crosstab SpeedBar button. See Chapter 10 for details.

Using Quick Crosstab

To create a crosstab quickly, follow these steps:

1. Choose File | Open | Table to open the table from which you want to derive a crosstab.
2. Click the Quick Crosstab SpeedBar button or choose Table | Quick Crosstab. The Define Crosstab dialog box appears (Figure 14-6).
3. In the Define Crosstab dialog box, specify the fields whose values you want to use as the column headings, leftmost row categories, and summarized data. See "Using the Define Crosstab dialog box" later in this chapter for a description of how to do this.

4. Choose OK. Paradox calculates and generates the crosstab in a new Form window. From this Form window, you can
   - Click the Form Design SpeedBar button
   - Press *F8*
   - Choose Form | Design

   to modify the crosstab further in the Form Design window.

Using the Form Design window and Crosstab tool

To create a crosstab from the Form Design window, follow these steps:

1. Choose File | New | Form. The Data Model dialog box appears.
2. Choose the table(s) from which you want to derive the crosstab. If you choose more than one table, define their relationship to one another. See Chapter 10 for details.
3. Choose OK. The Design Layout dialog box appears.
4. Choose the Blank layout style.
5. Choose OK. A new Form Design window appears.

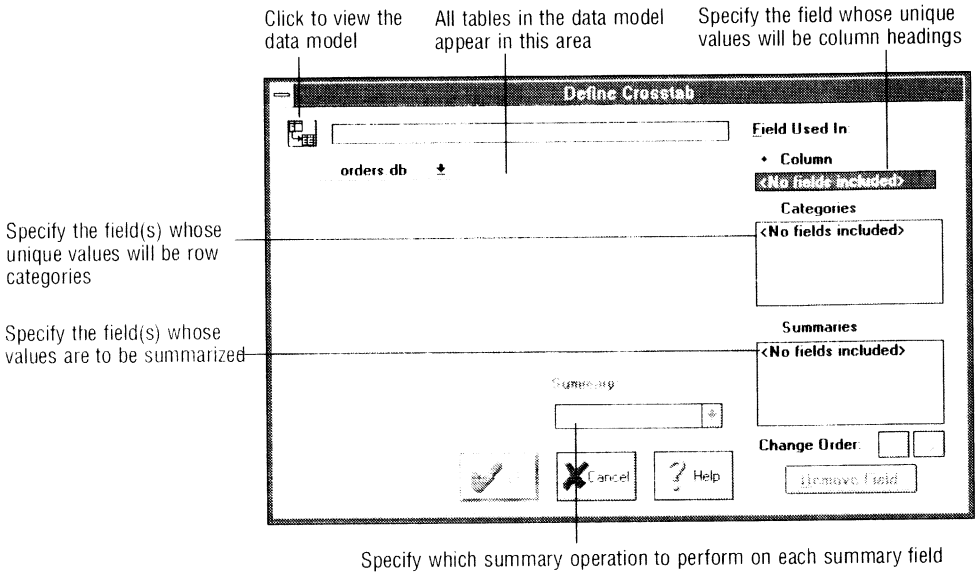
6. In the Form Design window, create a crosstab by clicking the Crosstab tool, then clicking the position on the form where you want to place the upper left corner of the crosstab object, and then dragging to the size and shape you want. An empty crosstab object appears with undefined fields in the row header, column header, and first summary area (Figure 14-9).

   At this point, you can
   - Inspect the various undefined fields, the row area, the column area, the summary area, and/or the entire crosstab object to define and format them
   - Inspect the entire crosstab object to open the Define Crosstab dialog box and then define the crosstab from it

Using the Define Crosstab dialog box

Figure 14-6 shows the single-table data model of the *Orders* table in the data model area.

Figure 14-6 The Define Crosstab dialog box



In the Define Crosstab dialog box, you can

- Specify which field's values to use as column headings across the top of the crosstab
- Specify the fields whose values you want to use as row headings, or categories, down the leftmost column of the crosstab
- Specify the fields whose values you want to perform a summary operation on, thus providing the data of the crosstab
- Specify the type of summary operation to perform on each summary field you choose

Specifying column headings

When you first open the Define Crosstab dialog box, Column is selected by default in the Field Used In area. With Column selected, choose from the drop-down menu of the table the field whose values you want to be the column headings.

You can only choose one field to supply column heading values. If you're creating a vertical one-dimensional crosstab (like the one in Figure 14-2), don't choose a field for column heading values.

Specifying row headings, or categories

To choose a field to supply values for row headings, or categories, select Categories in the Field Used In area. With Categories selected, choose from the drop-down menu of the table the field(s) whose

values you want to be the row categories. (You can't use the same field for column headings and row categories. If you've already chosen a field from this table to supply the column heading values, that field will be dimmed in the menu.)

If you're creating a horizontal one-dimensional crosstab (like the one in Figure 14-1), don't choose a field for row categories. For all two-dimensional crosstabs, as long as you have at least one field specified for column headings, you can choose as many fields as are available and that are valid in the tables of the data model to be row categories. Each field you add to the Categories list further refines the grouping of information. When Paradox generates a crosstab with multiple fields specified for categories, it sorts the information by the top category first, then by the next, and so on.

For example, if you're creating a crosstab of the *Orders* table, and you choose Payment Method as the field to supply column headings, you can then choose more than one of the remaining fields to supply row category values. You can choose Customer No and then Month as row categories, meaning each combination of customer number and month is a category. Figure 14-7 shows this crosstab, using Total Invoice as the summary field.

Figure 14-7 Row categories by Customer No and then by Month

	AmEx	Cash	Check	COD	Credit	MC	Visa
1221 Apr					$22,402.85		$8,223.80
1221 Dec					$5,427.35		
1221 Feb		$33,540.00					
1221 Jul			$1,414.00		$9,471.95		$4,178.85
1221 May					$325.00		
1221 Oct			$13,945.00				

If you reverse the field order, categorizing by Month first and then by Customer No, the crosstab looks like Figure 14-8.

Figure 14-8 Row categories by Month and then by Customer No

	AmEx	Cash	Check	COD	Credit	MC	Visa
Apr 1221					$22,402.85		$8,223.80
Apr 1231					$10,154.00	$19,414.00	
Apr 1351					$104,563.60	$25,499.50	$4,495.00
Apr 1354			$3,525.00				
Apr 1356		$3,596.00					$4,807.00
Apr 1380					$3,860.85		$7,197.00
Apr 1551					$156.00		

Specifying the summary data

Whether your crosstab is one-dimensional or two-dimensional, you need to specify the field(s) whose data you want to summarize in the crosstab. A one-dimensional crosstab summarizes just within each of the categories represented by the column headings or just within each of the row categories. A two-dimensional crosstab summarizes by the categories of both the column and the row.

With Summaries selected, choose from the drop-down menu of the table the field(s) you want to supply the set of values to summarize. (You can't choose the same field to summarize that you've chosen for column headings or for row categories. If you've already chosen fields from this table to supply column heading and row category values, those fields will be dimmed in the menu.)

You can choose as many fields as are available and that are valid from the tables of the data model. The order in which you choose them determines the order in which the summarized data appears in each block, or cell, of the crosstab.

Unlike fields you choose for column heading values and row category values, fields you choose to summarize are available for choosing more than once. The number of summary fields times the number of column values, however, can't exceed 250.

Specifying summary operations

When you choose fields to summarize, Paradox chooses by default to sum numeric field data, to count unique alphanumeric (including dBASE character and logical) field data, and to count unique date field data. These default summary operations appear in the Summary drop-down list to the lower left of the Fields Used In area when you highlight each field in the Summaries panel.

If you don't want the default summary operation Paradox chooses for you, select the summary field in the Summaries panel whose summary operation you want to change. Then, choose one of the available summary operations for that field from the Summary drop-down list. Tables 14-1 and 14-2 list the summary operations allowed by each Paradox and dBASE field type, respectively.

Table 14-1 Paradox field types allowing summary operations

Operation	A	N	$	D	S	M	F	B	G	O
SUM		√	√		√					
COUNT	√	√	√	√	√					
MIN	√	√	√	√	√					
MAX	√	√	√	√	√					
AVG		√	√		√					

Table 14-2 dBASE field types allowing summary operations

Operation	C	F	N	D	L	M
SUM		√	√			
COUNT	√	√	√	√	√	
MIN	√	√	√	√	√	
MAX	√	√	√	√	√	
AVG		√	√			

Changing the order of category and summary fields

When you choose more than one field to define the row categories and more than one field to summarize, these fields appear in the order you choose them in their respective Categories or Summaries panels. If you want to change the order of the category or summary fields, use the Change Order arrows at the bottom of the Field Used In area. These arrows become active when you select either Categories or Summaries and when you have more than one field in their panels.

Note You can always rearrange the categories or summaries in the Form Design window by dragging them to a different location.

Removing fields from the crosstab

If you decide you want different fields than the ones you've chosen for column headings, row categories, and summaries, you can remove them with the Remove Field button. Select the field you want to remove in the Column, Categories, and Summaries panels and choose Remove Field.

Generating the crosstab or returning to the Form Design window

After you finish specifying the fields for the crosstab to use, choose OK.

- If you opened the Define Crosstab dialog box by doing a quick crosstab, Paradox generates the crosstab and displays it in a new Form window.

Note

You can't generate the crosstab if you haven't defined its fields—at least one field for either the column headings or row categories and at least one field to summarize. The OK button isn't available until these minimal conditions are satisfied.

- If you opened the Define Crosstab dialog box from the Form Design window, you return to the Form Design window. To run the crosstab from the Form Design window, choose Form | View Data or click the View Data SpeedBar button.

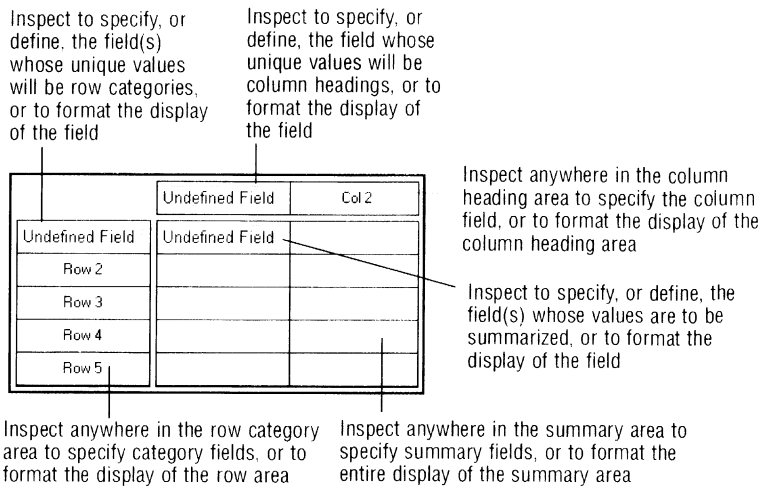
Designing the crosstab from the Form Design window

A crosstab object in the Form Design window is a composite object made up of

- Fields
- A row area
- A column heading area
- A summary area

Each of these parts of the crosstab object has a unique properties menu. In addition, the crosstab object as a whole has a properties menu.

Figure 14-9 A new crosstab object



Anything you can do in the Define Crosstab dialog box can be done by inspecting and choosing from each object's menu. To create a multi-table crosstab of a linked one-to-one relationship (like the one in Figure 14-4) from the Form Design window, you must define the relationship with the data model first. Then, any object's menu that includes a Define Field choice will produce a menu including all valid fields from all tables in the relationship.

Inspecting the entire crosstab object

Right-click in the upper left corner of the crosstab object to inspect the whole object. When you inspect the entire crosstab object, you can

- Generate a default crosstab
- Open the Define Crosstab dialog box
- Format the display of the entire crosstab

Generating a default crosstab

You can generate a default crosstab from the Form Design window:

1. Inspect the entire undefined crosstab object.
2. Choose Define Crosstab from the properties menu.
3. Choose the table of a single-table data model or the master table of a multi-table data model (detail tables will be dimmed) from the menu that appears.

Paradox chooses fields from the table automatically to supply the column headings, row categories, and summary data:

- The unique values of the first non-BLOB field of the table become the crosstab's column headings.
- The unique values of the second non-BLOB field of the table become the crosstab's row categories.
- The values of the first non-BLOB field after the first and second fields of the table are summarized and become the summary data of the crosstab.

Note If there are only two fields in the table, Paradox creates a 1D crosstab.

Opening the Define Crosstab dialog box

You might find it easier to choose fields in the Define Crosstab dialog box than by inspecting objects in the Form Design window. In the Define Crosstab dialog box, you can choose more than one field at a time from the field menus of the tables in the data model. By contrast, you can only choose one field at a time from object properties menus.

To open the Define Crosstab dialog box from the Form Design window,

1. Inspect the entire crosstab object.
2. Choose Define Crosstab from its menu.
3. Click the ellipsis (...) at the top of the Define Crosstab menu to open the Define Crosstab dialog box.

See "Using the Define Crosstab dialog box" earlier in this chapter for complete details about how to use its features.

Formatting the entire crosstab

Besides generating a default crosstab or opening the Define Crosstab dialog box, you can customize the display of the entire crosstab by inspecting it and choosing other options from its menu.

Inspecting column, row, and summary field objects

When you place a new crosstab object on a form in the Form Design window, the first column field, first row field, and first summary field each say "Undefined Field." Inspect these field objects and choose Define Field from their menus to define one field at a time.

You can choose the ellipsis (...) at the top of each Define Field menu to open the Define Field Object dialog box. See Chapters 11 and 12 for details.

Inspecting the column area

You can inspect the column area (anywhere in the first row of the crosstab object except the column field object) to choose a field for the column headings or to format the display of the column area. Handles don't appear around the column area when you select it.

This is because you can't move it. You can, however, resize it by dragging the grid lines surrounding it.

Inspecting the row area

You can inspect the row area (anywhere in the first column of the crosstab object except the row field object) to choose fields for the row categories or to format the display of the row area. Handles don't appear around the row area when you select it. This is because you can't move it. You can, however, resize it by dragging its borders.

Inspecting the summary area

You can inspect the summary area (anywhere in the data area of the crosstab object except the summary field object) to choose fields and summary operations or to format the display of the summary area. Handles don't appear around the summary area when you select it. This is because you can't move it. You can, however, resize it by dragging its borders.

Generating the crosstab

In "Generating a default crosstab" earlier in this chapter, you learned how to create a default crosstab from the Form Design window, letting Paradox choose the fields defining the crosstab for you. If you've defined all of the elements of the crosstab yourself and want to see the result, view the form as you would any other form:

- Click the View Data SpeedBar button
- Press *F8*
- Choose Form | View Data

Crosstab errors

Paradox runs a query to calculate a crosstab's summary information. The process might fail if the resulting *Answer* table contains too many fields, or if you have inadequate disk space for the query. When the crosstab fails, an empty grid appears in its place.

What is a graph?

Paradox graphs display information from your tables in a powerful visual format. Their visual impact makes graphs an important analytical tool; you can use graphs to draw conclusions quickly and see relationships in your data that you might otherwise miss. You can also view different kinds of graphs along the way as you work with your data.

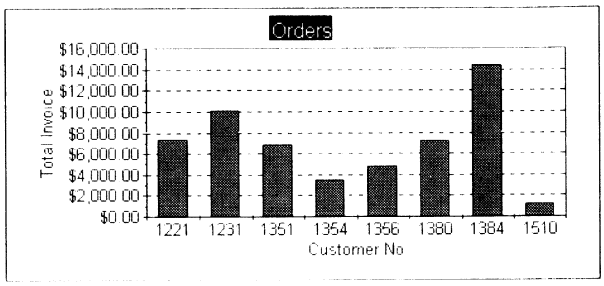
When you create a graph, Paradox first cross-tabulates the data before it generates the visual representation of it. You should understand how crosstabs work before you work with graphs. See "What is a crosstab?" and "Designing a crosstab" earlier in this chapter.

A tabular graph

Paradox's default graph type is tabular. A tabular graph measures the values in one numeric field within each category represented by the unique values in another field. Figure 14-10 shows a tabular graph of the *Orders* table.

Note The tabular graph is the only type of graph available in reports.

Figure 14-10 A tabular graph

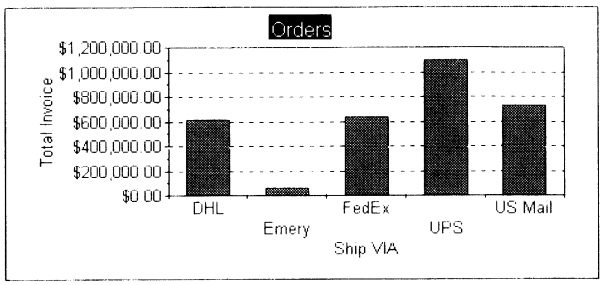


In this graph, the x-axis consists of unique Customer No values, from lowest to highest (not all are visible in this figure). The y-axis is a measure of the sum of the Total Invoice field, broken into equal portions from 0 to the next equal portion increment above the maximum Total Invoice value. The values of the Total Invoice field for each customer are displayed (graphed) according to the y-axis measure, thus representing the data of the graph.

A one-dimensional summary graph

A one-dimensional summary graph differs from a tabular graph, in that Paradox allows you to choose a type of summary operation to define the y-axis values. Figure 14-11 shows a one-dimensional summary graph of the *Orders* table.

Figure 14-11 A one-dimensional summary graph



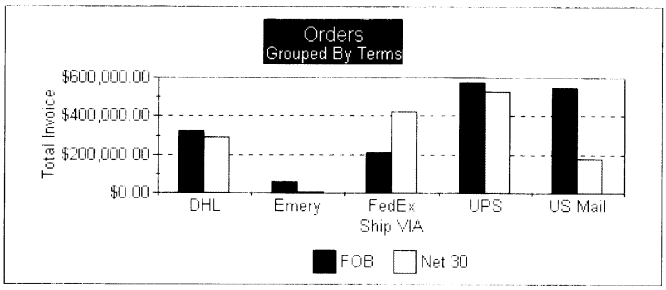
In this graph, the values of the x-axis are from the Ship Via field of *Orders*. The values graphed against the y-axis are the sum of values

in the Total Invoice field for each Ship Via category. The graph shows the total sum spent on each method of shipment.

A two-dimensional summary graph

A two-dimensional summary graph categorizes, or groups, the summary data being graphed by *two* fields' unique values. Figure 14-12 shows a two-dimensional summary graph of the *Orders* table.

Figure 14-12 A two-dimensional summary graph



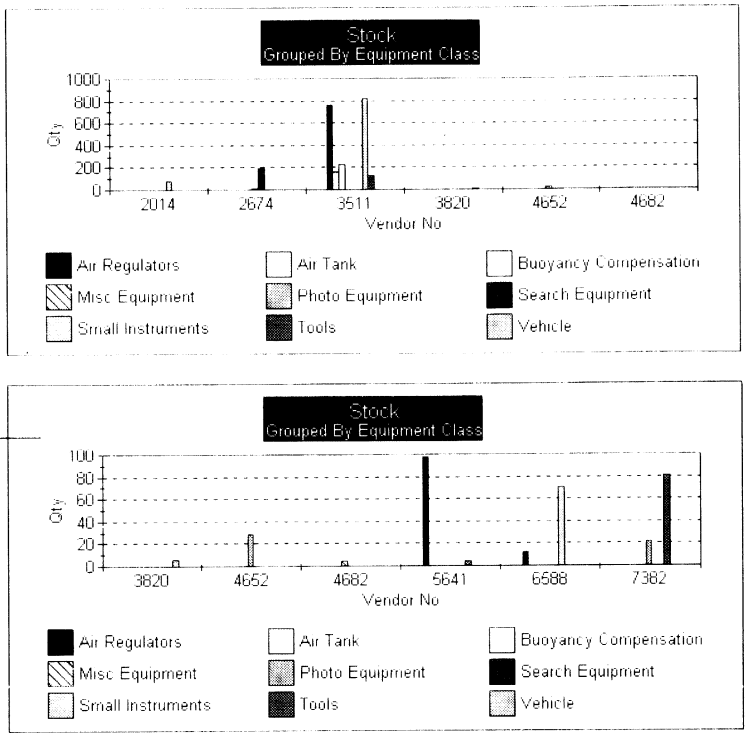
This graph is the same as the one of Figure 14-11, except summary values derived from the Total Invoice field are divided into groups of the unique values of the Terms field, as well as the Ship Via field.

Multi-table graphs

You can create a graph that takes its information from more than one table. Establish the data model you want. (See Chapter 10 for information on creating a data model.)

A graph can draw information from any number of tables that are linked in a *single-valued* relationship. For example, if you want to graph the number of items in stock by equipment class and by the vendor that supplies them, you can link the *Stock* and *Vendors* tables. You're then free to define the x-axis, y-axis, and summary data of the graph using any field from either table. Figure 14-13 shows a graph of data from the *Stock* and *Vendors* tables.

Figure 14-13 A two-dimensional summary graph based on two tables



This is the same graph as the preceding graph except that Vendor No 3511 has been scrolled out of view with ScalelAuto-Scale chosen from the Y-axis properties menu. The scale of the y-axis adjusts accordingly.

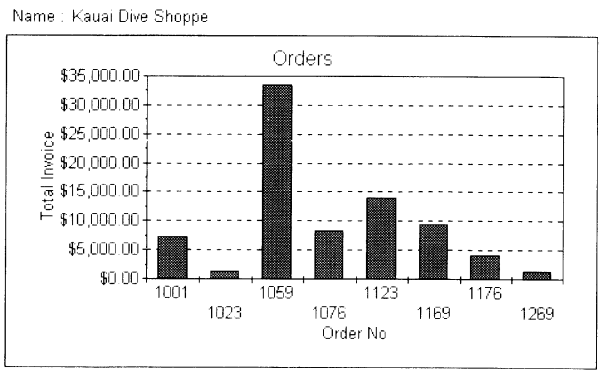
Note You can use fields from linked tables *only* if the link is single-valued. You can't graph information from fields of tables linked in multiple-valued (one→many) relationships.

Graphs of detail tables

You can create a summary graph based on data from a detail table in a multiple-valued (one→many) relationship. As long as you've defined the linked relationship in the data model for the form or report, you can create a form or report that groups detail records by master record. Place the linking field(s) of the master table on the form or report with the graph object. Because of the data model, Paradox knows that the information in the graph applies only to the current record of the master table.

Figure 14-5 shows a crosstab of the detail table *Orders* in a linked one-to-many relationship with the master table *Customer*. Figure 14-14 shows a graph of another subset of data from this one-to-many relationship between *Customer* and *Orders*. This graph of the detail table *Orders* shows the sums of the Total Invoice field by order number *for each customer.*

Figure 14-14 A two-dimensional summary graph based on a detail table



As you scroll through the *Customer* table, the graph is updated to show each customer's order information.

Creating a graph

Unlike crosstabs, you can create graphs in reports as well as forms. (You can place only tabular style graphs in reports.) You can create a graph in one of these ways:

- *Quick Graph*: Open the table from which you want to derive a graph and
  - Click the Quick Graph SpeedBar button
  - Press *Ctrl+F7*
  - Choose Table | Quick Graph
- *Undefined graph model in Form Design window or in Report Design window:* Create a new form or report for the table from which you want to derive a graph and, in the Form Design window or the Report Design window, click the Graph tool to place an undefined graph model on the form or report.

Note As with all SpeedBar buttons, you can specify prototype graph properties by inspecting the Graph SpeedBar button. See Chapter 10 for details.

Using Quick Graph

To create a graph quickly, follow these steps:

1. Choose File | Open | Table to open the table you want to use for your graph.

2. Click the Quick Graph SpeedBar button or press *Ctrl+F7* or choose Table | Quick Graph. The Define Graph dialog box appears (Figure 14-15).
3. In the Define Graph dialog box, specify the fields for the x-axis, y-axis, and, if you're creating a two-dimensional graph, for additional grouping. See "Using the Define Graph dialog box" later in this chapter for a description of how to do this.
4. Choose OK. Paradox calculates and generates the graph in a new Form window or Report window. From this Form window or Report window, you can

   - Click the Form Design SpeedBar button or click the Report Design SpeedBar button
   - Press *F8*
   - Choose Form | Design or Report | Design

   to modify the graph further in the Form Design window or Report Design window.

Using the Form Design or Report Design windows and Graph tool

To create a graph from the Form Design window or Report Design window, follow these steps:

1. Choose File | New | Form or File | New | Report. The Data Model dialog box appears.
2. Choose the table(s) you want to use for your graph. If you choose more than one table, define their relationship to one another. See Chapter 10 for details.
3. Choose OK. The Design Layout dialog box appears. Choose a blank layout.
4. Choose OK again. A new Form Design or Report Design window appears.
5. In either Design window, create a graph by clicking the Graph tool, then clicking the position on the form or report where you want to place the upper left corner of the graph object, and then dragging to the size and shape you want. An empty tabular graph object appears with undefined x-axis, y-axis, and graphed data (Figure 14-18).

Note You can place a graph in the record band of a report only if it is the detail in a 1→M data model, or if there is a table frame or multi-record object already in the record band.

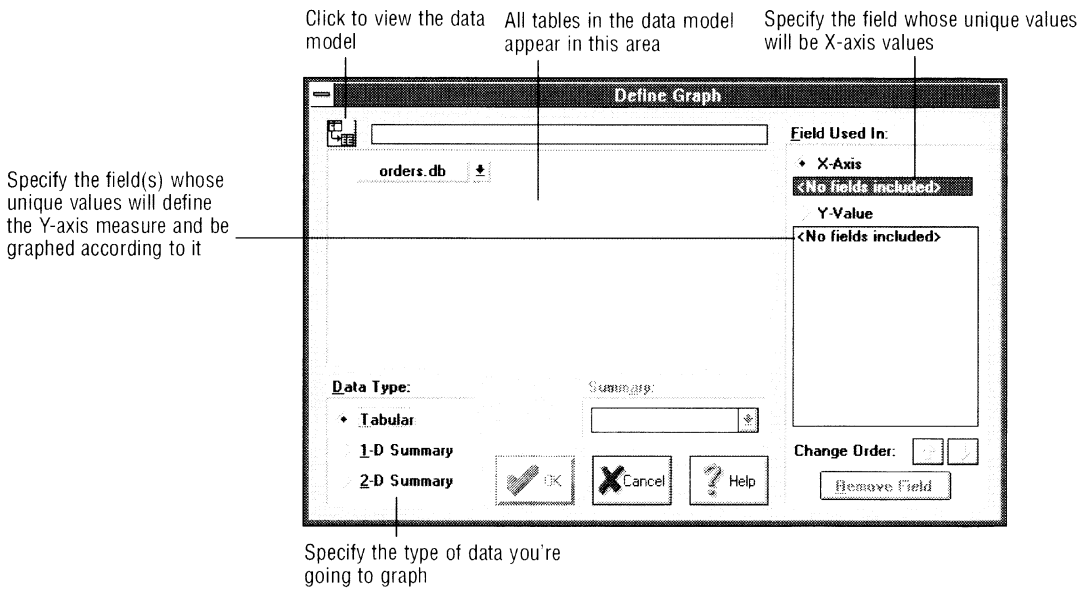
At this point, you can

- Inspect the various undefined objects, such as the x-axis, y-axis, title, series, and background, to define and format them
- Inspect the entire graph object to open the Define Graph dialog box and then define the graph in it

Using the Define Graph dialog box

Figure 14-15 shows the single-table data model of the *Orders* table in the data model area.

Figure 14-15 The Define Graph dialog box with Tabular selected



In the Define Graph dialog box, you can

- Choose which type of data you're graphing—tabular, one-dimensional summary, or two-dimensional summary
- Specify the field whose values you want to use as x-axis values
- Specify the field(s) whose values you want to graph against the y-axis (the different series of the graph)
- If you're creating a two-dimensional summary graph, specify an additional field whose values you want to group the graphed summary data by

- If you're creating either a one-dimensional or two-dimensional summary graph, specify the type of summary operation to perform on each Y-value field you choose

Choosing the graph's data type

In the lower left corner of the Define Graph dialog box, select the data type of the graph:

- Tabular (the default)
- 1-D Summary
- 2-D Summary

The Field Used In area on the right side of the dialog box changes, depending on which data type you choose.

Tabular

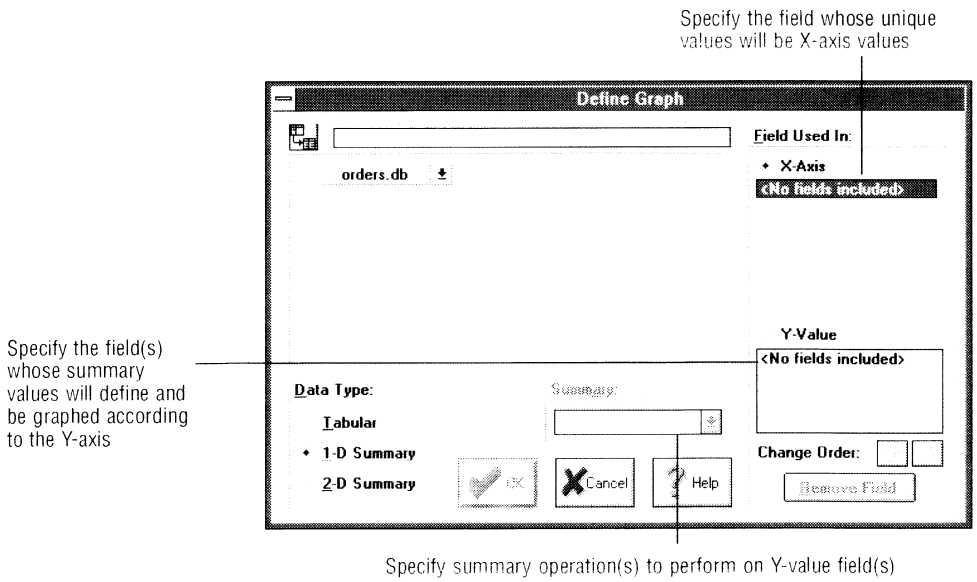
When Tabular is selected, the Define Graph dialog box looks like Figure 14-15. For a tabular graph, you can specify

- One field for x-axis values
- As many remaining available fields as you want to define the y-axis, each representing a series in the graph

One-dimensional summary

When 1-D Summary is selected, the Define Graph dialog box looks like Figure 14-16.

Figure 14-16 The Define Graph dialog box with 1-D Summary selected



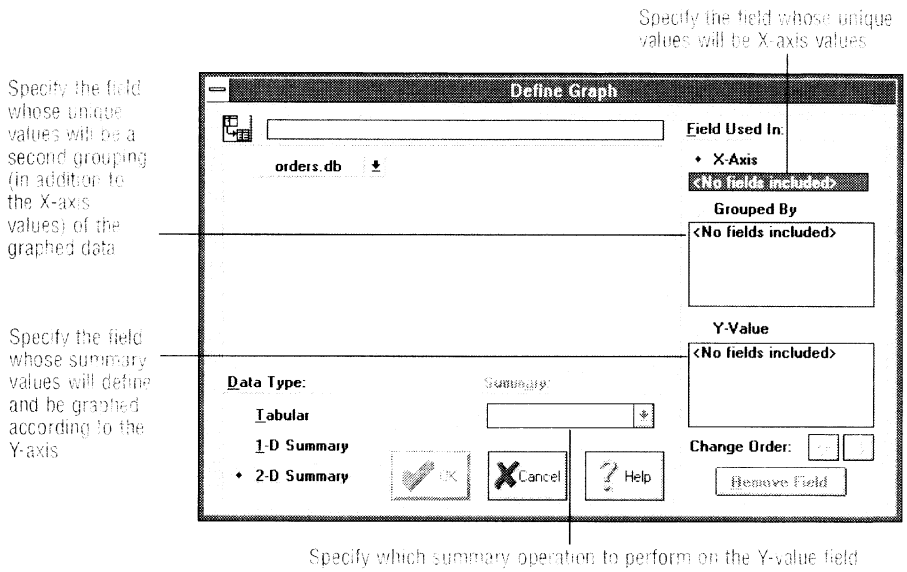
For a one-dimensional summary graph, you can specify

- One field for x-axis values
- As many remaining available fields as you want, the values of which are summarized, to define the y-axis, each group of summary values representing a series in the graph
- The summary operation to perform on each Y-value field

Two-dimensional summary

When 2-D Summary is selected, the Define Graph dialog box looks like Figure 14-17.

Figure 14-17 The Define Graph dialog box with 2-D Summary selected



For a two-dimensional summary graph, you can specify

- One field for x-axis values
- One other field, the values of which are summarized, to define the y-axis
- One other field to group by

Specifying x-axis values

When you first open the Define Graph dialog box, X-Axis is selected by default in the Field Used In area. With X-Axis selected, choose a field from the drop-down menu of the table whose unique values you want to be the x-axis values. You can only choose one field to

supply x-axis values for all three data types—tabular, one-dimensional summary, and two-dimensional summary.

Specifying the y-axis

With Y-Value selected, choose the field(s) from the drop-down menu of the table whose values you want to define and be graphed according to the y-axis measure. (You can't choose the same field for x-axis values and Y-value data. If you've already chosen a field from this table to supply the x-axis values—or additional grouping values if you're creating a two-dimensional summary graph—that field will be dimmed in the menu.)

Tabular y-axis

If the data type of the graph is tabular, you can choose only numeric fields to define the y-axis. Fields of the table that aren't numeric will be dimmed in the field menus.

One-dimensional summary y-axis

If the data type of the graph is one-dimensional summary, you can choose any and as many of the table's available and valid fields to define the y-axis. When you choose a y-axis field, Paradox automatically couples it with a default summary operation.

Paradox chooses by default to sum numeric field data, to count unique alphanumeric (including dBASE character and logical) field data, and to count unique date field data. These default summary operations appear in the Summary drop-down list to the lower left of the Field Used In area when you highlight each field in the Y-Value panel.

If you don't want the default summary operation Paradox chooses by default, select the summary field in the Y-Value panel whose summary operation you want to change. Then, choose one of the available summary operations for that field from the Summary drop-down list. Tables 14-1 and 14-2 earlier in this chapter list the summary operations allowed by each Paradox and dBASE field type, respectively.

Two-dimensional summary y-axis

If the data type of the graph is two-dimensional summary, you can choose any *one* of a table's available and valid fields to define the y-axis. When you choose the y-axis field, Paradox automatically couples it with a default summary operation. See "One-dimensional summary y-axis," the previous section, for a description of the default summary operations Paradox chooses for specific field types and how to change the summary operation.

Specifying an additional grouping field in a two-dimensional summary graph

If the data type of the graph is two-dimensional summary, you can choose any one of a table's available and valid fields to group the summary data by. The data is also grouped by the x-axis categories. With Grouped By selected, choose from the drop-down menu of the table (in the data model) whose field you want to group the summary data by. (You can't choose the same field for x-axis values, for Y-value data, and for an additional grouping. If you've already chosen fields from this table to supply the x-axis value and the y-axis value, those fields will be dimmed in the menu.)

Changing the order of tabular and one-dimensional summary Y-value fields

With tabular and one-dimensional summary graphs, you can choose more than one field to define the y-axis. These fields appear in the order you choose them in the Y-Value panel. Their order determines the series each will be in the graph. The first field's values will be the first series; the second field's values will be the second series; and so on.

If you want to change the order of these fields, thus changing their series number, use the Change Order arrows at the bottom of the Field Used In area. These arrows become active when you're defining a tabular or one-dimensional summary graph, when you have Y-Value selected, and when you have more than one field in the Y-Value box.

Removing fields

If you decide you want different fields than the ones you've chosen for X-Axis, Y-Value, and Grouped By, you can remove them with the Remove Field button. Select the field you want to remove in the X-Axis, Y-Value, and Grouped By panels and choose Remove Field.

Designing the graph from the Form Design or Report Design windows

A graph object in the Form Design window or the Report Design window is a composite object made up of

- An x-axis area
- A y-axis area
- Separate series areas
- A title area
- A background area

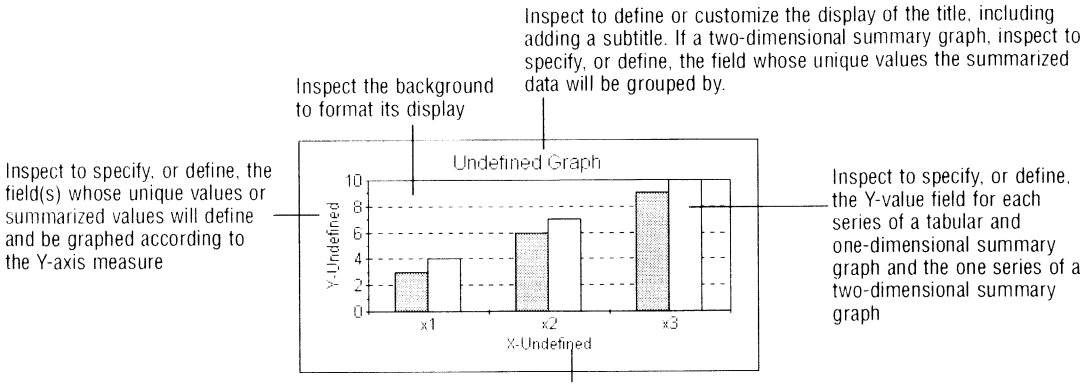
Additionally, certain graph types have

- Separate slice areas
- A legend area

- Walls

Each of these parts of the graph object has a unique properties menu. In addition, the graph object as a whole has a properties menu.

Figure 14-18 A new graph object



You can do all of the things you can do in the Define Graph dialog box and more by inspecting and choosing from each object's menu. To create a multi-table graph of a linked one-to-one relationship (like the one in Figure 14-4) from the Form Design or Report Design window, you must define the relationship with the data model first. Then, any object's menu that includes a Define Field choice will produce a menu including all valid fields from all tables in the relationship.

Inspecting the entire graph object

When you inspect the entire graph object, you can

- Change the data type of the graph
- Generate a default graph
- Open the Define Graph dialog box
- Format the display of the entire graph, including changing the graph type

Note Unlike when you select individual field objects in a form or report or when you select the entire graph object, handles don't appear around separate graph areas when you inspect them. This is because you can't move the individual components of the graph object.

Changing the data type

To change the data type of the graph from the Form Design or Report Design windows:

1. Inspect the entire undefined graph object.
2. Choose Data Type from its menu.
3. Choose the data type you want—Tabular, 1D Summary, or 2D Summary—from the Data Type menu.

Changing the data type causes the graph object to change. Choices on objects' menus change according to data type as well.

Generating a default graph

You can generate a default graph from the Form Design or Report Design windows:

1. Inspect the entire undefined graph object.
2. If you haven't already changed the data type and want a default one-dimensional or two-dimensional summary graph, choose Data Type and then 1D Summary or 2D Summary. Then inspect the entire undefined graph object again.
3. Choose Define Graph from the properties menu.
4. Choose the single table of a single-table data model or the master table of a multi-table data model (detail tables will be dimmed) from the menu that appears.
5. Click the View Data SpeedBar button or press *F8* or choose Form | View Data or Report | View Data to generate the default graph in a form or report.

Paradox automatically chooses fields from the table to supply the x-axis values, the values to define and be graphed according to the y-axis, and, if you chose a two-dimensional summary graph, the values to group by.

In a default tabular graph,

- The values of the first field of the table become the graph's x-axis values
- The values of all the numeric fields after the first field of the table
  - Define the graph's y-axis measure
  - Become the graph's first, second, and so on series, graphed according to the y-axis measure and divided into groups by the categorical values of the x-axis

In a default one-dimensional summary graph,

- The unique values of the first field of the table become the graph's x-axis values

- The values of all the fields (numeric, alphanumeric, and date, but not BLOB) after the first field of the table
  - Are summarized if they're numeric and counted if they're alphanumeric (including dBASE character or logical) or date
  - Define the graph's y-axis measure
  - Become the graph's first, second, and so on series, graphed according to the y-axis measure and divided into groups by the categorical values of the x-axis

In a default two-dimensional summary graph,

- The unique values of the first field of the table become the graph's x-axis values
- The unique values of the second field of the table become the graph's additional grouping values
- The values of the third field (numeric, alphanumeric, and date, but not BLOB) of the table
  - Are summarized if they're numeric and counted if they're alphanumeric (including dBASE character or logical) or date
  - Define the graph's y-axis measure
  - Become the graph's only series, graphed according to the y-axis measure and divided into groups by the categorical values of the x-axis and additional grouping field

Opening the Define Graph dialog box

You might find it easier to choose fields in the Define Graph dialog box than to inspect objects in the Form Design or Report Design windows. In the Define Graph dialog box, you can choose more than one field at a time from the field menus of the tables in the data model. By contrast, you can only choose one field at a time from object properties menus.

To open the Define Graph dialog box from the Form Design or Report Design windows,

1. Inspect the entire graph object.
2. Choose Define Graph from the properties menu.
3. Click the header area of the Define Graph menu to open the Define Graph dialog box.

See "Using the Define Graph dialog box" earlier in this chapter for complete details about how to use its features.

Customizing the entire graph

Besides changing the data type, generating a default graph, or opening the Define Graph dialog box, you can format the display of the entire graph by inspecting it and choosing other options from its menu. In particular, you can choose the type of graph you want. See "Graph types" later in this chapter.

Inspecting the x-axis

When you place a new graph object on a form or report, the x-axis says "X-Undefined." Inspect the x-axis area and choose Define X-Value from its menu to choose one field to supply x-axis values.

Besides choosing the field whose values you want to be the x-axis values, you can format the x-axis' title and ticks (and scale for xy graphs) by inspecting the x-axis area and choosing these options from its menu.

Inspecting the y-axis

When you place a new graph object on a form or report, the y-axis says "Y-Undefined." Inspect the y-axis area to choose a field or fields, depending on the data type of your graph.

Tabular or one-dimensional summary y-axis values

While the data type of the graph is tabular or one-dimensional summary, the Y-Axis menu contains Define New Y-Value. Choose Define New Y-Value to choose as many fields as are available and valid and whose values you want to define and be graphed according to the y-axis.

If you're creating a tabular graph, you can choose only numeric fields for the Y-value. If you're creating a one-dimensional summary graph, you choose the type of summary operation you want applied to a Y-value field at the same time you choose it. Each type of summary operation allowed by each field type is coupled with the field in the menu. If a field's type allows more than one type of summary operation, each summary operation appears with that field in the menu.

Two-dimensional summary y-axis value

While the data type of the graph is two-dimensional summary, the Y-Axis menu contains Define Y-Value. Choose Define Y-Value to choose one field whose values you want to define and be graphed according to the y-axis.

Title, scale, and ticks

Besides choosing the field(s) whose values you want to define the y-axis, you can format the y-axis' title, scale, and ticks by inspecting the y-axis area and choosing these options from its menu.

Inspecting series

When you place a new graph object on a form or report, undefined series appear in the undefined object. Inspect these series separately

to choose a field to define them and to format their display. To choose a field, choose Define Y-Value from the series' menu.

Tabular or one-dimensional summary y-axis values

While the data type of the graph is tabular or one-dimensional summary, you can add more series to the original undefined ones by inspecting the y-axis area, choosing Define New Y-Value from its menu, and choosing additional fields from the Define New Y-Value menu.

Two-dimensional summary y-axis value

While the data type of the graph is two-dimensional summary, you can only choose one field for the single series allowed for this data type.

Formatting the series, including type override

Besides choosing the field whose values you want to be the particular series' values, you can format that series' display by choosing display options from its menu. In particular, you can choose Type Override with some graph types to make one series another type, such as line and marker, than the other series, which might be bar, for example.

Inspecting the title area

When you place a new graph object on a form or report, the title is "Undefined Graph." Inspect the title area to

- Generate a default graph
- Open the Define Graph dialog box
- If you're creating a two-dimensional summary graph, choose a field whose values you want to group the summary values by
- Define a title
- Define a subtitle
- Format the display of the title area

To generate a default graph or open the Define Graph dialog box, inspect the title area and choose Define Graph from its menu. See "Inspecting the entire graph object" earlier in this section for the effect of the Define Graph menu's choices.

Choosing a field to group by for a two-dimensional summary graph

While the data type of the graph is two-dimensional summary, the title area's menu contains Define Group. This choice isn't on this menu when the data type is tabular or one-dimensional. If you're creating a two-dimensional summary graph, choose Define Group to choose one field whose unique values you want to group the summary data by. The summary data is also grouped by the categories of the x-axis values.

Title, subtitle, and display format

You can define the title and a subtitle and format the display of the title area by inspecting it and choosing these options from its properties menu.

Inspecting the background

Inspect the background of the graph to format its display. Choose display options from its properties menu.

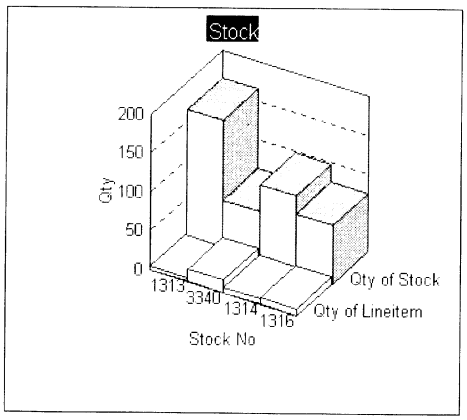
Graph types

This section shows you several graph types, using data from the sample tables. Some graph types are appropriate for the data they contain, and a few show you inappropriate uses of certain graphs.

Quantitative comparisons

The 3D step graph of Figure 14-19 appropriately compares the Qty in *Stock* to the Qty in *Lineitem*, showing supply and demand for the MAST Company's products.

Figure 14-19 A 3D step graph



By contrast, the 2D line graph in Figure 14-20 of the same data inappropriately implies a time sequence that doesn't exist.

Figure 14-20 An inappropriate use of a 2D line graph

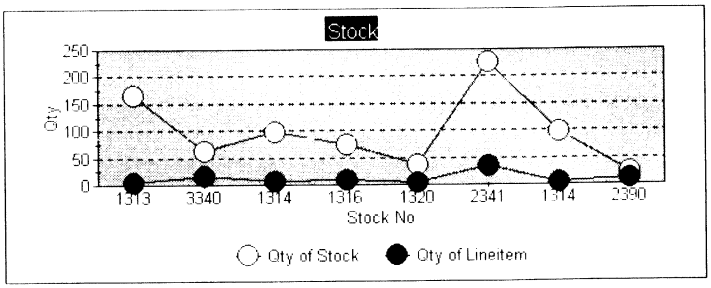
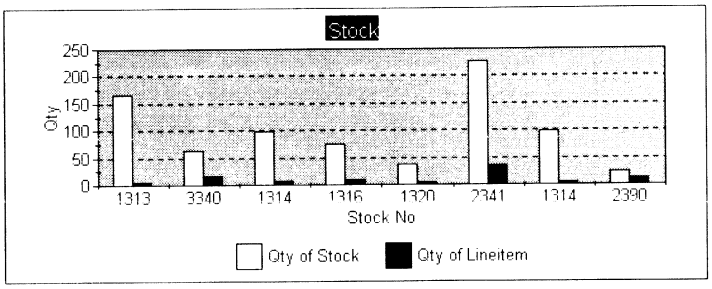


Figure 14-21 shows another appropriate graph of the same data, a 2D bar graph that combines the Qty fields from both the *Stock* and *Lineitem* tables.

Figure 14-21 A 2D bar graph



Time-line graphs

In contrast to Figure 14-20, Figure 14-22 shows an appropriate use of a line graph to chart a value over time. To make this graph, we added a Month No field to the *Orders* table and entered in it the numerical values of each month in the Month field. The graph uses the Month No field instead of the Month field for its x-axis values so that the months are in chronological, not alphabetical, order. The connecting line therefore appropriately charts orders over a period of time. The y-axis value is a count of order numbers.

Figure 14-22 A 2D line graph

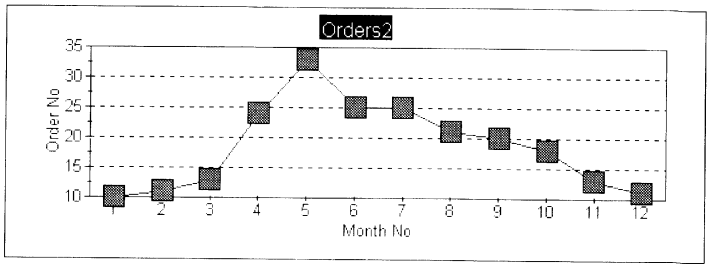
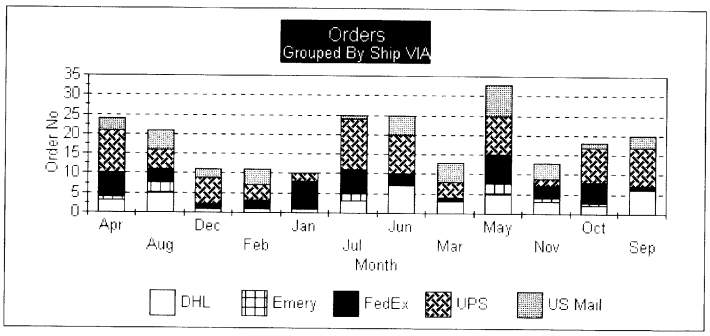


Figure 14-23 shows a 2D stacked bar graph of the *Orders* table. It plots the Month field against the count of order numbers placed during that month. The results are grouped by the Ship Via field.

Figure 14-23 A 2D stacked bar graph



The 3D bar graph of Figure 14-24 charts the number of orders per month. Notice here that the x-axis values are taken from the Month field of Orders instead of from the new Month No field. Thus, the months are in alphabetical, not numerical, order. For clarity, the graph shows only six months.

Figure 14-24 A 3D bar graph that charts volume by month

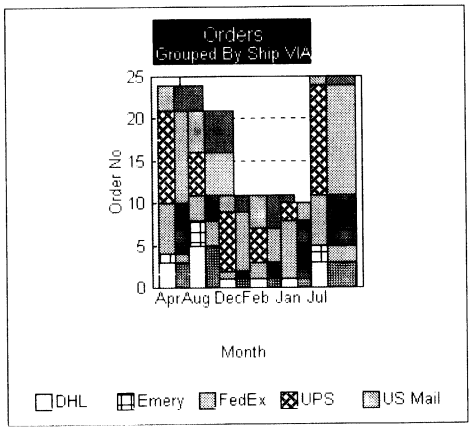


Figure 14-25 shows a 3D area graph of the same data as Figure 14-24, except the x-axis values are taken from the Month No field to show the volume of orders over time effectively. Had the graph used the Month field for x-axis values, it would have been meaningless.

Figure 14-25 A 3D area graph that charts volume by month

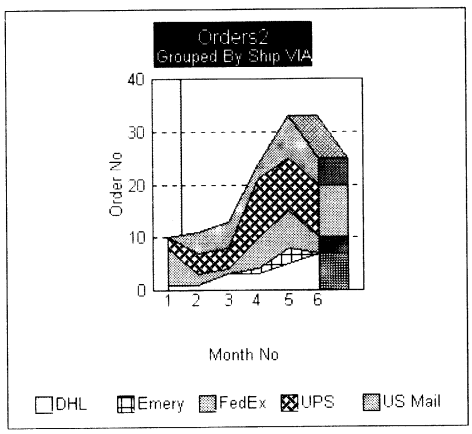
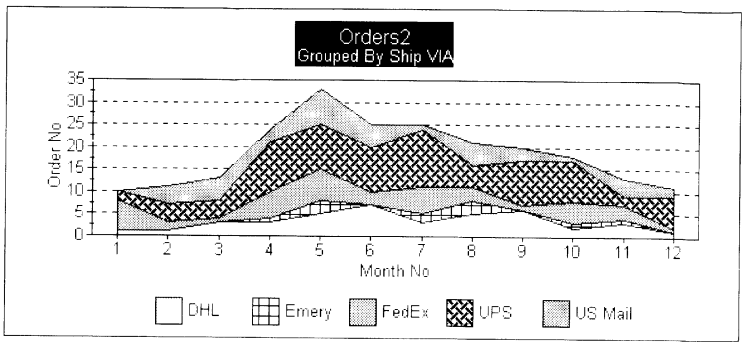


Figure 14-26 shows a 2D area graph of the same data as Figure 14-25.

Figure 14-26 A 2D area graph that charts volume by month

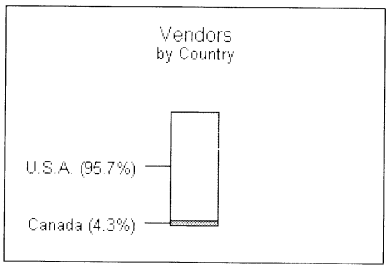


Percentage graphs

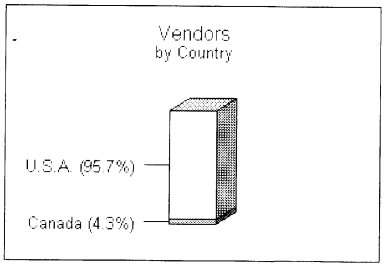
The graphs of Figure 14-27 show vendors by country, using data from the Country field of the *Vendors* table. Each graph has a subtitle in addition to a title to clarify the data it contains.

Figure 14-27 Graphs for graphing percentages

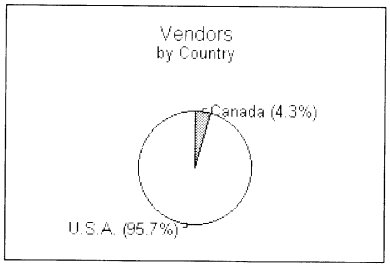
A 2D column graph



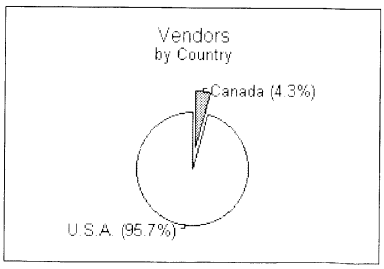
A 3D column graph



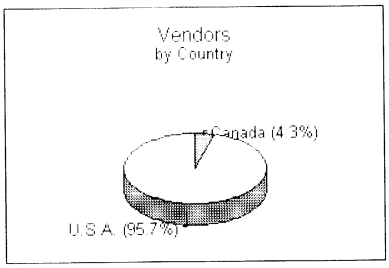
A 2D pie graph



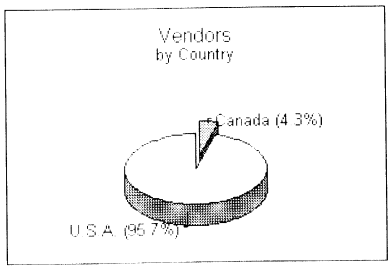
A 2D pie graph with one slice exploded



A 3D pie graph



A 3D pie graph with one slice exploded



Placing graphs in reports

This section shows appropriate ways to incorporate graphs in reports. For example, Figure 14-28 shows a graph placed in a group band. The report is based on a one-to-many data model of the *Customer* table and *Orders* table, in which *Customer* is the master and *Orders* is the detail. The report is grouped by Customer No, and the graph shows orders (Order No) placed by each customer and the values for Total Invoice, Amount Paid, and Balance Due. Because the graph is in the group band with the Customer No field, the graph that applies to each customer will appear with its customer number when the report is generated. Figure 14-29 shows the generated report.

Figure 14-28 A graph in a report group band

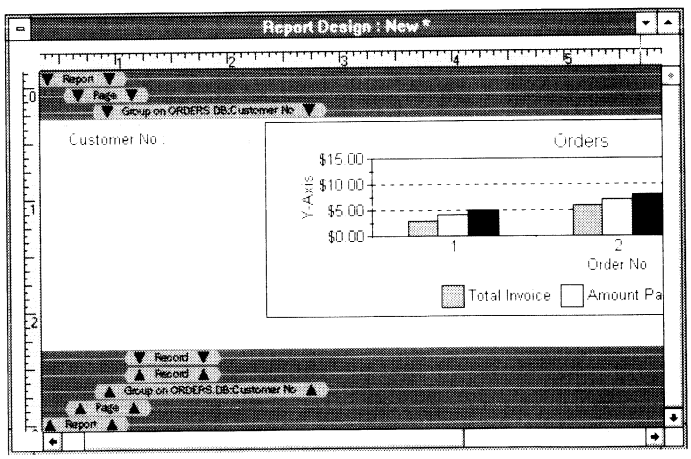
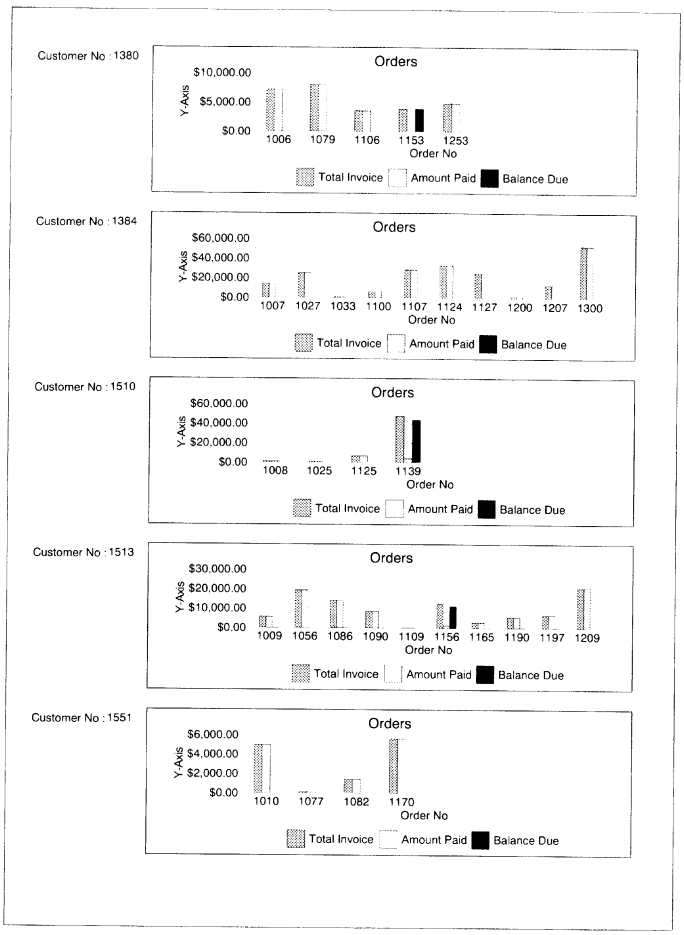


Figure 14-29 A report containing a graph



PART IV

Advanced topics

This part discusses advanced topics. It contains one chapter:

- Chapter 15, "Exchanging data," discusses how to use Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE) to create links between existing data in other applications and your Paradox tables.

CHAPTER 15

Exchanging data

Paradox provides two easy ways for you to access data from other Windows applications: Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE).

The application that is the source of the data to be exchanged is called the *server*. The application that receives the exchanged data is the *client*. Paradox is capable of being both a DDE server and a DDE client. Paradox is an OLE client only.

Use DDE to maintain a link between fields in a Paradox table and data in other applications.

Use OLE to embed entire files from an OLE server into Paradox. When you place data into Paradox using OLE, you can then access the OLE source application directly from Paradox to make any changes you want.

Using DDE

You can use DDE to place data into a Paradox query. An active link from the source data causes the query to run each time the data is updated.

You can place data from Paradox tables into another application (the DDE client). An active link from Paradox updates the DDE client whenever the Paradox data changes.

Using Paradox as a DDE server

When you take data from Paradox and place it in another application, you are using Paradox as a DDE server.

Note You can use Paradox as a DDE server only from a Table window.

Suppose you have a spreadsheet that performs a series of calculations on a value. The value on which you want to perform the calculations is in a field of a Paradox table.

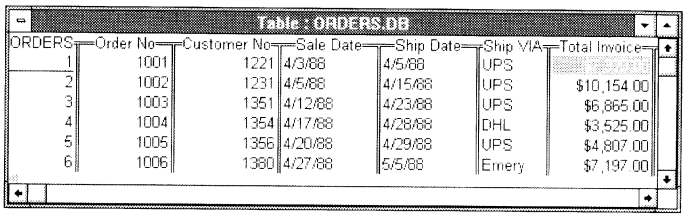
Copy a field from a Paradox table to the Windows Clipboard. Then, in the DDE-client spreadsheet, use Paste Link to place the field in the appropriate spreadsheet cell. You don't place an actual value in the spreadsheet; you use DDE to tell the spreadsheet where to look for the value.

As you move through the records of your Paradox table, the values in the spreadsheet change because the value in the field is different for different records. The spreadsheet displays the field value for the selected Paradox record.

Example 15-1 Using Paradox as a DDE server

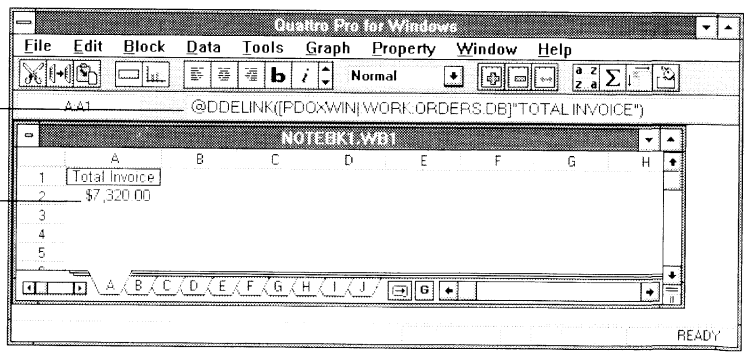
You can use DDE to place a Paradox field's value in a cell in a Quattro Pro for Windows spreadsheet.

1. In Paradox, open the *Orders* table. Select the first record's Total Invoice value.



2. Click the Copy to Clipboard SpeedBar button. Paradox places the value on the Windows Clipboard.

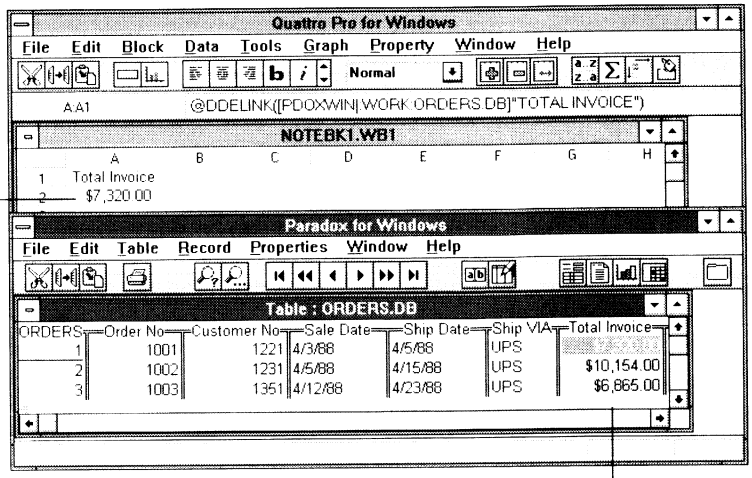
3. Open Quattro Pro for Windows. Select a notebook cell and choose Edit|Paste Link.



Quattro Pro stores information about the DDE link

The field name and the selected field value appear in notebook cells

4. To see how DDE works, place your Paradox window and your Quattro Pro window together on the screen.



The notebook cell shows the value that you select in the Paradox table. As you move through values in Paradox, DDE updates the notebook cell.

Select the Total Invoice field in Paradox and press the ↓ and ↑ arrows to move through invoice values. Notice how the value shown in the notebook cell in Quattro Pro changes to display the Total Invoice value in the currently selected Paradox record.

In Quattro Pro, you can create calculations that use the value from Paradox. As the DDE value is updated, the calculated result is updated along with it.

Note You can use DDE to place Paradox fields in any type of application that is a DDE client. Not only spreadsheets, but word processors, and a wide variety of other applications can accept Paradox field values through DDE.

You can link multiple fields using DDE.

You don't have to limit yourself to linking one field at a time to a DDE client. You can use Edit | Select All, followed by Edit | Copy in Paradox and Edit | Paste Link in the DDE client, to link an entire table to a DDE client.

Disconnecting a link

When you use Paste Link to link a DDE value into an application, Paradox checks the Table | Notify On command. When Table | Notify On is checked, the link is "live." This is why, when you select a different value in the Paradox table, DDE can update the DDE client.

To disconnect the link, uncheck Table | Notify On. You can then move through the table's records without activating DDE. You can reconnect at any time by checking Table | Notify On.

When you link an entire table to a DDE client, the client is refreshed every time you change a record in the table. Uncheck Table | Notify On if you want to make several changes without notifying the client.

As soon as you check Table | Notify On again, the DDE client is updated with all the changes.

Using DDE in queries

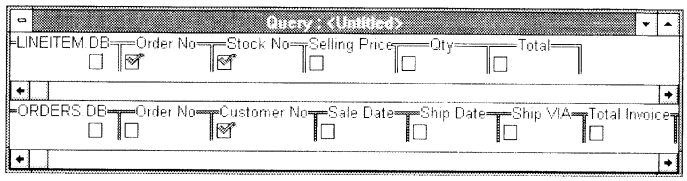
A common use of Paradox as a DDE client is to use values from another application and perform queries on them in Paradox.

You can also use a Paradox table as a DDE server and a Paradox query as a DDE client. For example, a linked field can run a query (the DDE client). When the field value changes in the source table (the DDE server), Paradox generates an updated *Answer* table.

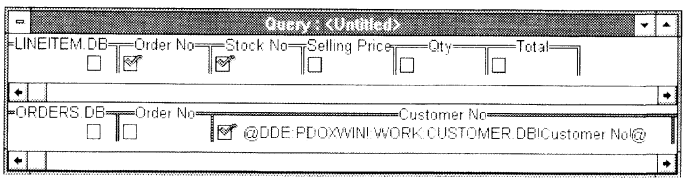
Example 15-2 Using DDE in a query

Suppose you want to run a separate query for each customer in the *Customer* table.

1. Open the Query window and add the *Orders* and *Lineitem* tables to it.
2. Construct a query that looks like this:



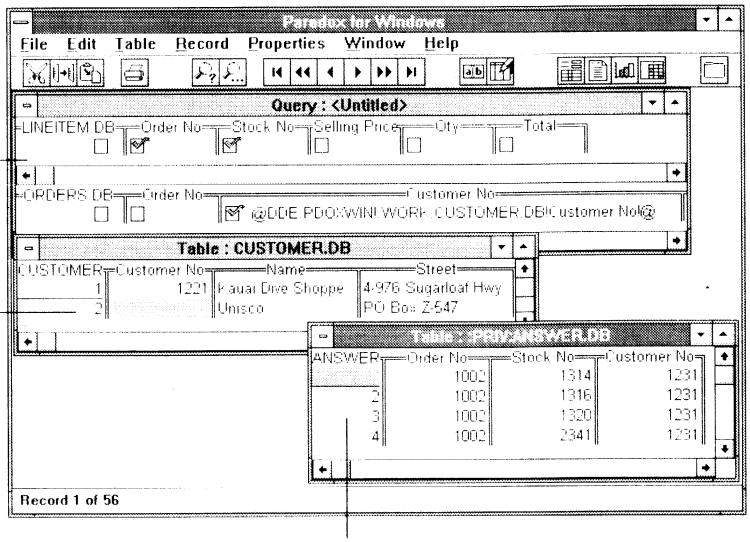
3. Open *Customer* in a Table window.
4. In *Customer*, select Customer No 1221 and click the Copy to Clipboard SpeedBar button.
5. In the Query window, position the insertion point in the Customer No field of the *Orders* table. Choose Edit|Paste Link. Link information from the *Customer* table appears in the field.



6. Click the Run Query SpeedBar button. Paradox creates an *Answer* table listing all of Customer No 1221's ordered items.
7. Click the Query window's title bar to activate the window. Choose Query|Wait for DDE.
8. Click the *Customer* table's title bar to activate the window. Select Customer No 1221. Press ↓ to move to Customer No 1231. When you select the new value, Paradox activates the DDE link and runs the query again, updating the *Answer* table with the new value's data.

The query uses DDE to get a value from the selected record in the *Customer* table

As you move through records in the *Customer* table, Paradox updates the DDE link information in the query



The *Answer* table shows only the current customer's ordered items

If you want to scroll quickly through the *Customer* table without running a query on each record's value, you can uncheck Query|Wait for DDE in the Query window or uncheck Table|Notify On in the Table window.

Using Paradox as a DDE client

When you use Paradox as a DDE client, you place link information about a value from another application into an alphanumeric field in a Paradox table.

Copy the value you want to use from the DDE server. In Paradox, select the alphanumeric field where you want to place the DDE value, and choose Edit|Paste Link. You'll see link information like **@DDE-QPW!|C:\QPW\NOTEBK1.WB1!AD$2!@**. This is a string that tells Paradox where to look for the DDE value. (This particular string tells Paradox to look for a Quattro Pro for Windows file located on C:\QPW in Notebook 1, page A, cell D2.)

In Paradox, you view only the link information, not the DDE value. To access the DDE server, select the field and press *Shift+F2*. Paradox opens the DDE server with the correct file.

Using OLE

Use OLE when you want to store data from different applications in your Paradox tables, and you want the ability to view the tables and access the power of the OLE server to work with them directly from Paradox. DDE gives you the power to access the source application,

but it stores only the location of the source value. OLE, on the other hand, stores and displays an entire object. You can place a hundred-page document in a single OLE field, and view it from Paradox.

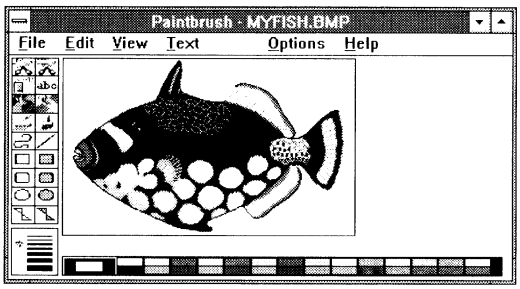
Paradox is an OLE client only. You cannot use OLE to place Paradox field values in other applications. You can place OLE values in Paradox OLE fields, and in OLE design objects in forms and reports. Once you place an OLE value in Paradox, you can access its source application directly from Paradox to make any changes you need.

Placing an OLE value in a field

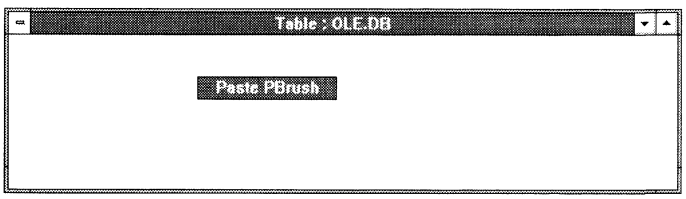
You can place a value in an OLE field in a Table or Form window.

To place an OLE value,

1. Open the OLE server. Copy the value you want to place into Paradox. The following figure shows a .BMP file open in Paintbrush.

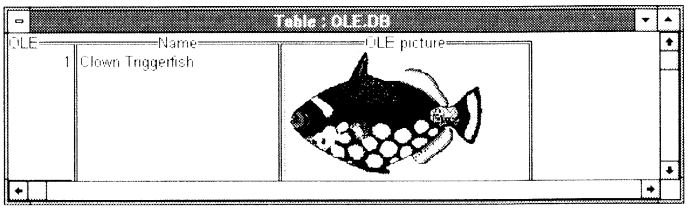


2. In Paradox, select the OLE field. Enter Edit mode. If you're working in a Table window, enter Field View. Right-click the selected OLE field.



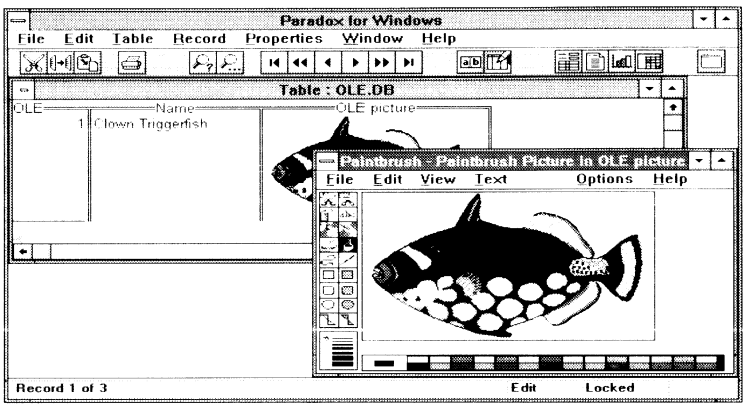
   Because the value on the Clipboard is from Paintbrush, Paste PBrush is available on the OLE field's menu. (The Paste menu changes depending on what is available from the Clipboard.)

3. Choose Paste PBrush. The OLE object appears in the field.

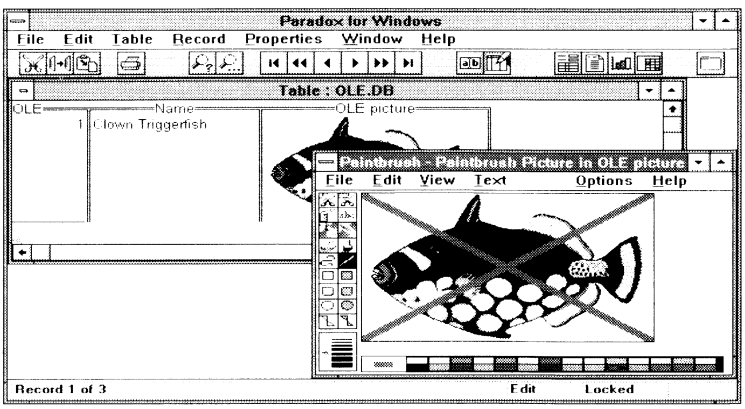


This may look like an ordinary graphic in a field, but Paradox maintains a link to the OLE server.

4. To make a change to the OLE value, either double-click the field or select the field and press *Shift+F2*. This launches the OLE server and opens the correct file.



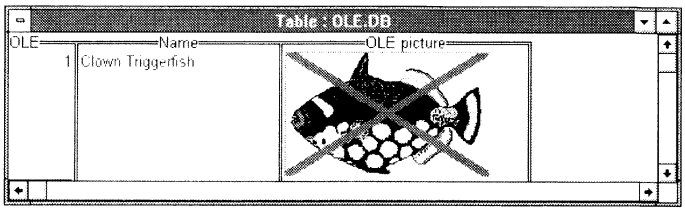
5. In the OLE server application, make any changes you want to the file.



6. Save the file and close the OLE server.

Note How you save the file depends on the OLE server you're using. For example, when you paste a value from Paintbrush using OLE, you use the Paintbrush File | Update command to save changes. Refer to your OLE server's documentation for details.

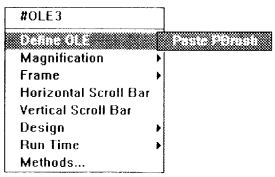
When you close the OLE server, the OLE object in Paradox reflects the changes you've made. (Depending on the OLE server, you may be prompted to confirm that you want to update the OLE value in Paradox.)



Placing an OLE value in an OLE object

You can place a value in an OLE object in the Form Design or Report Design window.

To place an OLE value,

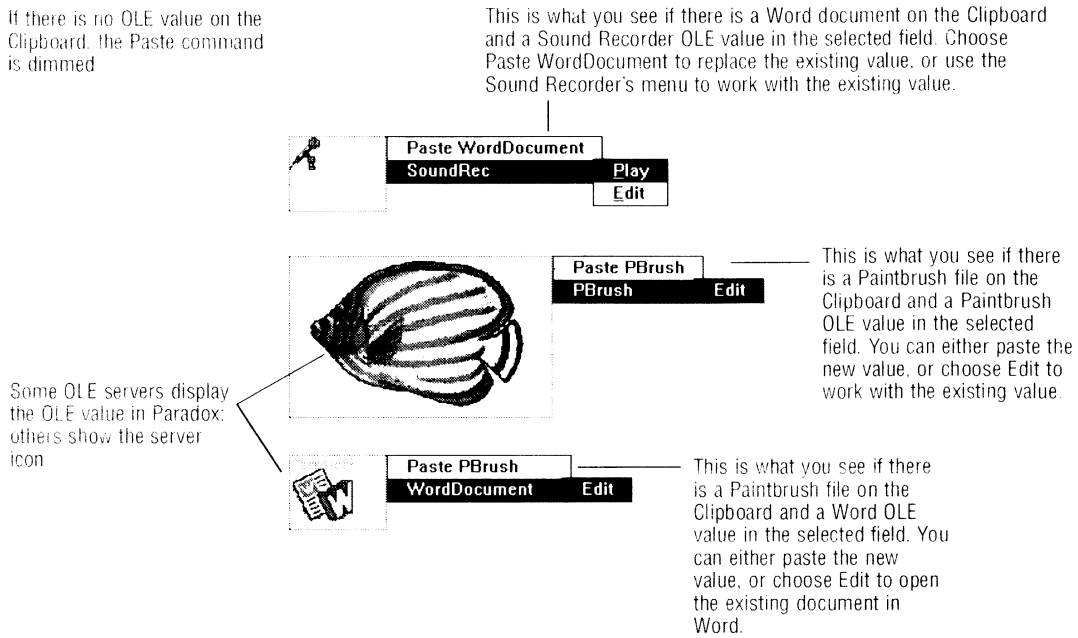


1. Open the OLE server. Copy the value you want to place into Paradox.
2. In Paradox, inspect the OLE object. Choose Define OLE. You'll see the Paste command, followed by an OLE server name. The OLE server name reflects the current contents of the Clipboard. If the application you used to place a value on the Clipboard is not an OLE server, the Paste command is dimmed.
3. Choose the Paste command to paste the contents of the Clipboard into the OLE object.
4. Once you've pasted the object, you can double-click it to launch the server and make any changes to the OLE value.

Inspecting an OLE value

After you've placed an OLE value in Paradox, you can inspect it. What you see on the properties menu depends on the capabilities of the OLE server. Figure 15-1 shows some sample menus from inspected OLE field values.

Figure 15-1 Inspecting defined OLE field values



APPENDIX A

Using the keyboard

Most Paradox mouse actions also have keyboard equivalents. This appendix summarizes keyboard operations.

If you use the keyboard extensively, look for the keyboard icon in the left column of this manual. Keyboard equivalents or shortcuts are often marked with this icon.

Function keys

Table A-1 lists all actions you can perform using the function keys.

Table A-1 Function keys

Key	Action in a table	Action in a form	Action in a query
F1	Help	Help	Help
F2	Field View	Field View	Field View
Shift+F2	Memo View (&DDE/OLE)	Memo View (&OLE)	
Ctrl+F2	Persistent Field View	Persistent Field View	Persistent Field View
F3		Super Back Tab	Up Image
Shift+F3		Page Back	
F4		Super Tab	Down Image
Shift+F4		Page Forward	
F5	Lock Record	Lock Record	Example
Shift+F5	Post Record	Post Record	
Ctrl+F5	Post/Keep Lock	Post/Keep Lock	
F6	Object Inspector	Object Inspector	Checkmark (✓)
Shift+F6	Inspect All	Penetrating Properties	Cycle checks (✓, ✓+, ✓↓, ✓**G**)

Function keys

Key	Action in a table	Action in a form	Action in a query
F7	Quick Form	Table View	
Shift+F7	Quick Report		
Ctrl+F7	Quick Graph		
F8		View/Design	Run Query
F9	Edit/End Edit	Edit/End Edit*	
F10	Menu	Menu	Menu
F11	Previous Record	Previous Record	
Shift+F11	Previous Set	Previous Set	
Ctrl+F11	First Record	First Record	
F12	Next Record	Next Record	
Shift+F12	Next Set	Next Set	
Ctrl+F12	Last Record	Last Record	

* If you press *F9* in the Form Design window, Paradox opens the form in Edit mode. This is a shortcut to pressing *F8* (View Data) followed by *F9* (Edit Data).

What is super tab?

Use super tab to jump from one multi-region area to another. For example, in the Create Table dialog box, the field specification area is one multi-region area. You use *Tab* to move from column to column. The rest of the dialog box—its list boxes and buttons—is another multi-region area. Press super tab *F4* to move to another region, then *Tab* to move within the region.

Another use for super tab and super back tab is to move between tables or multi-record regions in a multi-table form. You press *Tab* to move within one table, then super tab to move to the next table.

Table A-2 Using super tab

Key	Action
F3	Super Back Tab
F4	Super Tab

Menu shortcuts

Most of Paradox's menu commands have keyboard shortcuts. Table A-3 lists these shortcut keys.

Table A-3 Menu shortcuts

Key	Action in a Table window	Action in any design window
Alt+Backspace	Undo	
Ctrl+A	Locate Next	Locate Next
Ctrl+D	Ditto (repeat last entry)	Ditto (repeat last entry)
Ctrl+F	Field View	Field View
Ctrl+G	Inspect Grid	
Ctrl+H	Inspect Heading	
Ctrl+Ins	Copy	Copy
Ctrl+Shift+H	Inspect All Headings	Inspect All Headings
Ctrl+L	Lock Record	Lock Record
Ctrl+Shift+L	Post Record	Post Record
Ctrl+M	Inspect Field	Object Inspector
Ctrl+Shift+M	Inspect All Fields	
Ctrl+R	Rotate Columns	Rotate Columns (on table object)
Ctrl+T	Memo View	Memo View
Ctrl+Z	Locate Value	Locate Value
Ctrl+Shift+Z	Locate and Replace	Locate and Replace
Del	Clear or Delete (as appropriate)	Clear or Delete (as appropriate)
Shift+Del	Cut	Cut
Shift+Ins	Paste	Paste

Navigation and selection keys

Table A-4 shows keys you can use to navigate within and select data.

Alt keys have the same record and field navigation functionality whether or not you're in Field View.

Note Be sure *Num Lock* is *off* when you use *Alt* in combination with a keypad key.

Table A-4 Navigation and selection keys

Key	Non-Field View	Field View
PgUp	Up one set of records	Up one set of records
Ctrl+PgUp	Left one screen	Left one screen
PgDn	Down one set of records	Down one set of records
Ctrl+PgDn	Right one screen	Right one screen
Home	First field of record	Beginning of field
Shift+Home	Select to first field of record*	Select to beginning of field
Ctrl+Home	First field of first record	First field of first record
Alt+Home	First field of record	First field of record
End	Last field of record	End of field
Shift+End	Select to last field of record*	Select to end of field
Ctrl+End	Last field of last record	Last field of last record
Alt+End	Last field of record	Last field of record
←	Left one field	Left one character
Shift ←	Select left one field*	Select left one character
Ctrl ←	First column	Left one word
Ctrl+Shift ←	Extend selection left one word	Extend selection left one column
Alt ←	Left one field	Left one field
→	Right one field	Right one character
Shift →	Select right one field*	Select right one character
Ctrl →	Last column	Right one word
Ctrl+Shift →	Extend selection right one column	Extend selection right one word
Alt →	Right one field	Right one field
↑	Up one field	Up one line in multi-line field or up one record in single-line field
Shift ↑	Select up one field*	Select up one line within multi-line field or up one record in single-line field
Alt ↑	Up one field	Up one field
↓	Down one field	Down one line within multi-line field or down one record in single-line field
Shift ↓	Select down one field*	Select down one line within multi-line field or down one record in single-line field
Alt ↓	Down one field	Down one field

* You can select multiple fields only in tables, not in forms.

Keys to use while editing

Table A-5 shows keys to use while editing. (Entering Field View does not change the action of these keys.)

Table A-5 Keys to use in Edit mode

Key	Action
Ins	Insert record
Shift+Ins	Paste
Ctrl+Ins	Copy
Del	Delete selected text
Shift+Del	Cut
Ctrl+Del	Delete record
Backspace	Delete character to the left or delete selected text
Ctrl+Backspace	Delete word to left
Alt+Backspace	Undo record edit
Esc	Undo field edit
Tab	Post value and move to next field
Shift+Tab	Post value and move to previous field
Enter	Post value and move to next field

Table A-6 shows keys to use while editing a memo or formatted memo.

Table A-6 Keys to use in Memo View

Key	Action in Memo View
PgUp	Up one screen
Ctrl+PgUp	Left one screen
PgDn	Down one screen
Ctrl+PgDn	Right one screen
Home	Beginning of line
Shift+Home	Select to beginning of line
Ctrl+Home	Beginning of memo field
End	End of line
Shift+End	Select to end of line
←	Left one character
Shift ←	Select left one character
Ctrl ←	Left one word
→	Right one character

Key	Action in Memo View
Shift →	Select right one character
Ctrl →	Right one word
↑	Up one line
Shift ↑	Select up one line
↓	Down one line
Shift ↓	Select down one line
Shift+Ins	Paste
Ctrl+Ins	Copy
Del	Delete selected text
Shift+Del	Cut
Backspace	Delete left character
Ctrl+Backspace	Delete left word
Alt+Backspace	Undo memo edit
Esc	Undo memo edit
Tab	Insert tab character in text
Enter	Insert carriage return in text

Using the keyboard in the Data Model dialog box

Chapter 10 shows you how to create a multi-table data model for a form or report using the mouse in the Data Model dialog box and the Define Link dialog box. If you prefer to use the keyboard, follow these steps:

1. Open the Data Model dialog box. (Choose File | New | Form or File | New | Report.)
2. Either type the name of the table you want to add to the data model in the File Name text box, or
   - Press *Tab* to select the File Name list.
   - In the File Name list, use the up and down arrow keys to select the table you want.
3. Press *Alt+A* to add the selected table to the data model panel.
4. Repeat the process to add any other tables you want included in the data model.
5. Press *Tab* until you select the data model panel.
6. Press any arrow key to change the pointer into the linking tool.
7. Press an arrow key to point the linking tool to the master table.

8. Press *Shift* with an arrow key to draw a line from the master to the detail table.

   If you've established referential integrity between the two tables, Paradox creates the link for you. Choose OK to accept it and close the Data Model dialog box.

   If there is no automatic link, Paradox opens the Define Link Dialog box.

9. In the Field list, use the up and down arrow keys to select the field you want.

10. Press *Alt+A* to add the field to the link diagram panel.

11. Press *Alt+X* to select the Index list.

12. Use ↑ and ↓ to select the index you want.

13. Press *Alt+I* (Index) to add the index to the link diagram panel.

    Paradox creates the link between the field from the master table and the index from the detail table you've chosen. Choose OK to accept the link and return to the Data Model dialog box.

    To break the link and start again, press *Alt+U*.

Glossary

active The object or window to which the next keystroke or mouse action will apply.

alias A name you assign to a directory path.

alphanumeric field A field containing letters, numbers, or a combination of both.

***Answer* table** A temporary table used to store the results of a query. *See also* temporary table.

arithmetic operators The operators (+, –, ( ), *, and /) used to construct arithmetic expressions in queries and calculated fields.

arrow keys The four arrow keys (←, →, ↑, and ↓) on your keyboard.

ascending order A sort order: alphabetical order in alphanumeric fields (most often A to Z case sensitive, but the order depends on the language driver you are using); low to high in numeric fields; and earliest to latest in date fields.

asymmetrical outer join A query in which an inclusive link is specified for only one of the tables involved. *See also* inclusion operator, inclusive link, outer join.

axis The horizontal or vertical line that defines the range of values plotted on a graph. The x-axis is the horizontal line. The y-axis is the vertical line.

band A repeating horizontal section of a report design. The Report Design window shows the report band, page band, and record band by default. Group bands are optional.

binary field A field used to store data Paradox cannot interpret. A common use of a binary field is to store sound.

bind To associate a form or report with one or more tables. The document then takes its data from the tables to which it is bound.

blank field A field that does not contain a value.

BLOB Acronym for binary large object. Field types that can contain BLOBs include binary, memo (both Paradox and dBASE memos), formatted memo, graphic, and OLE.

borrow To copy the structure of one table to a new table.

box A design object you can place in Paradox forms and reports.

braces The symbols { }.

Browser A window that uses icons and text to identify Paradox objects. (The Browser filters by object type.) You can select objects and change directories from the Browser.

button An object you can place in Paradox forms. You can assign ObjectPAL code to buttons to define their actions.

calculated field A field containing values calculated from one or more other fields. The calculation is based on an expression that tells Paradox what to do with the values provided.

cascade (1) To use referential integrity to update child tables when a value changes in the parent table.

(2) A way in which open windows are arranged, one on top of the other, with the title bar of each visible.

cascading menu A menu that is displayed as a result of choosing a command on another menu.

character field A dBASE field type that can contain any printable character (including blank spaces).

check box A box you can check or clear to set an option. You can check more than one check box in a set.

checkmark The symbol ✓ used in query statements to indicate that a field is to be displayed in the *Answer* table.

child table In a referential integrity relationship, the table that refers to the key field of a different table (the *parent* table) for a valid value. *See also* parent.

click To press and release the left mouse button.

client *See* DDE client, OLE client.

Clipboard A temporary area used by Windows applications to copy and paste information from one location to another.

Color palette The tool you use to apply colors to Paradox objects.

column A vertical component of a table that contains one field.

command A word on a menu or button that you choose to perform an action.

comparison operators In a query, the operators (<, >, <=, >=, and =) you can use to compare two values.

composite index An index on two or more fields of a Paradox table.

composite key A key comprised of two or more fields of a Paradox table which, together, provide a unique value for the table. *See also* key.

concatenate To combine two or more alphanumeric values using the + operator.

constant A specific, unchanging value used in calculations.

container object An object that completely surrounds all objects within it. When you move a container, its contained objects also move, and when you delete a container, its contained objects are also deleted.

copy To place a duplicate of selected information on the Windows Clipboard.

crop To trim the edges of a graphic, leaving only a portion visible.

crosstab An object that lets you summarize the data in one field by expressing it in terms of two other fields, presenting it in a spreadsheet-like structure.

current record marker In a Table window, an optional onscreen indicator of the selected record.

currency field A field which contains numbers, formatted to display decimal places and a currency symbol.

cut To remove selected information from the workspace and place it on the Windows Clipboard.

data The information Paradox stores in a table.

data integrity The assurance that the values in a table are protected from corruption.

data type The type of data a field can contain. *See also* field type.

database An organized collection of information.

date field A field that can contain only dates.

DDE Acronym for Dynamic Data Exchange. A way for two or more Windows applications to share data.

DDE client The application that receives data through DDE. *See also* DDE, DDE server.

DDE server The application that sends data through DDE. *See also* DDE, DDE client.

default action The action that Paradox performs unless otherwise specified.

default form The form that Paradox automatically creates from a table.

default properties The properties Paradox applies to an object upon creation.

default value In validity checks, the value automatically entered in a field if no other value is entered.

define To attach a design object to data from a table. For example, you define a field object in a form as a field in a table.

descending order A sort order: reverse alphabetical order in alphanumeric fields (most often Z to A case sensitive, but the order depends on the language driver you are using); high to low in numeric fields; and latest to earliest in date fields. *See also* ascending order, sort order.

design document A form or report that you create or modify in a design window.

design object An object you can place in forms and reports. You create design objects using SpeedBar tools. *See also* object.

design window The window where you create or modify the design of a form or report.

Desktop The main window in Paradox.

detail table In multi-table relationships, the table whose records are subordinate to those of the master table. *See also* master table.

dialog box A box that requests or provides information. Many dialog boxes present options to choose among before you can perform an action. Other dialog boxes display warnings or error messages.

double-click To press and release the mouse button quickly twice.

drag To move an object across the screen by holding down the mouse button while moving the mouse.

drop-down list box A single-line text box that opens to display more choices when you click a downward pointing arrow.

edit To change the information in a table.

Edit mode The Paradox mode in which you can edit data.

example element A character or group of characters that represents a value in a field of a query.

exclusive link In a query, the use of an example element to retrieve from one table only those records that match the records in another table.

field An item of information in a table. A collection of related fields makes up one record.

field type The type of data a field can contain. Paradox field types are alphanumeric, number, currency, date, short number, memo, formatted memo, binary, graphic, and OLE. dBASE field types are character, float number, number, date, logical, and memo.

field value The data contained in one field of a record. If no data is present, the field is considered blank.

Field View A mode that lets you move through a field character by character. Use this mode to view field values that are too large to be displayed in the current field width, or to edit a field value.

float number field A dBASE field that contains numeric data in a binary floating-point format.

font A design applied to all characters. *See also* typeface.

Font palette The tool you use to apply typefaces, font sizes, styles, and colors.

footer Information that appears at the bottom of every page of a report. Footers are created in the page, report, and group bands of Paradox reports. *See also* band, group band, header, page band, report band.

form A window for displaying data and objects. A multi-table form can display data from several tables at once.

formatted memo field A Paradox memo field that can contain formatted text (different typefaces, styles, colors, and sizes) and formatting preferences (such as tabs, line returns, and justification). *See also* memo field.

function keys The 12 keys across the top of the keyboard labeled *F1* through *F12*. (Some keyboards have 10 function keys at the far left of the keyboard.) These keys provide fast access to Paradox operations.

graphic A picture you can place in a graphic field or in a graphic object on a form or report.

graphic field A field that contains graphics (pictures).

grid (1) A network of horizontal and vertical lines available in all design windows as aids for placement of objects. You can show or hide the grid, as well as resize it.

(2) The lines that separate rows and columns in a table or crosstab.

group (1) In a report or query, a set of records that have the same value in one or more fields, fall within a range of values, or are displayed in a fixed number of records.

(2) To collectively identify various objects as a single entity.

group band The section of a report that defines the group and repeats for every group of records. *See also* band, group.

GroupBy operator In a query, the operator (indicated by the checkmark ✓**G**) that groups records by a field without displaying the field's values in the *Answer* table.

header Information that appears at the top of every page of a report. Headers are created in the page, report, and group bands of Paradox reports. *See also* band, group band, footer, page band, report band.

Help The Paradox online Help system. You can press *F1* at any point in Paradox to display information about the current operation.

highlight To select by dragging the mouse across a line or lines of text.

hot zone An area in which your mouse pointer changes shape to indicate that a special operation is possible.

icon A graphical representation of an object.

inclusion operator The symbol ! used in conjunction with an example element to include a complete set of records in the *Answer* table, whether or not they match records in another table. *See also* inclusive link, outer join.

inclusive link A query whose answer includes all the values in a field of one table, whether or not there are matching values in the linked field of another table. *See also* inclusion operator, outer join.

index A file that determines the order in which Paradox can access the records in a table. The key field of a Paradox table establishes its primary index. *See also* key, secondary index.

insert mode An editing mode in which characters that are placed at the insertion point push aside characters that are already there. *See also* overwrite mode.

insertion point The place where text is inserted when you type. The insertion point is usually represented by a flashing vertical bar.

inspect To view or change an object's properties. To inspect an object, either right-click it or select it with the keyboard and press *F6*. The object's menu appears. Choose from the menu the property you want to change.

key A field or group of fields in a Paradox table used to order records or ensure referential integrity. Establishing a key has three effects: the table is prevented from containing duplicate records, the records are maintained in sorted order based on the key fields, and a primary index is created for the table. *See also* primary index, secondary index.

link (1) To establish a relationship between tables by linking corresponding fields.

(2) A logical association between tables based on values in corresponding fields.

See also exclusive link, inclusive link, link specification.

list box A list of selectable items in a dialog box.

lock A device that prevents other users from viewing, changing, or locking a table while one user is working with it.

logical field A dBASE field type that contains a value representing true or false (yes or no).

logical operator One of three operators (AND, OR, or NOT) that can be used in queries.

lookup table A table that assures a value entered in one table matches an existing value in another table.

Main menu The menu bar across the top of the Paradox Desktop.

master table In a multi-table relationship, the primary table of your data model. *See also* detail table.

memo field A Paradox or dBASE field that contains text that is variable in length and of unlimited length. *See also* formatted memo field.

Memo View A mode that lets you view an entire memo field and move through it character by character. Use this mode to insert carriage returns with the *Enter* key and tabs with the *Tab* key.

menu A display of the choices or options available.

menu choice A command chosen from a menu.

message A string expression displayed in a message window or on the Desktop's status bar.

method ObjectPAL code attached to an object that defines the object's response to an event.

multi-record object A design object that displays several records at once in a form or report.

multi-select To select more than one object at a time.

multi-table form A form that displays the data from two or more tables.

normalized data structure An arrangement of data in tables in which each record includes the fewest number of fields necessary to establish unique categories. Rather than using redundant fields to provide all possible information within a single table, normalized tables distribute information over many tables using fewer fields.

number field A field that can contain only numbers, a sign, and a decimal point.

object A table, form, report, query, library, or script. All entities that can be manipulated in Paradox are objects. *See also* design object.

Object Inspector A feature that lets you view an object's menu when you right-click the object. *See also* inspect.

ObjectPAL The Paradox for Windows Application Language.

OLE Acronym for Object Linking and Embedding. Use OLE to insert files from OLE servers into Paradox tables or OLE objects.

OLE client The application that receives data in an OLE relationship. Paradox is an OLE client. *See also* OLE, OLE server.

OLE field A field that contains OLE data. *See also* OLE.

OLE server The application that sends data in an OLE relationship. *See also* OLE, OLE client.

one-to-one (1→1) A linked table relationship where, for each record in one table, there is one corresponding record in another table. *See also* link, one-to-many.

one-to-many (1→M) A linked table relationship where, for each record in one table, there are one or more corresponding records in another table. *See also* link, one-to-one.

operator A symbol that represents an operation to be performed on a value or values. For example, the + operator defines addition, and the * operator defines multiplication.

outer join A type of query that uses the inclusion operator (!) to retrieve all records in a table, whether or not they match records in another table. *See also* inclusion operator.

overwrite mode An editing mode in which characters that are placed at the insertion point overwrite characters that are already there. *See also* insert mode.

page band The section of a report that contains data to be printed at the top and bottom of each page. *See also* band.

palette A visual representation of property choices. Palettes show you, rather than describe to you, available properties for an inspected object.

parent table In a referential integrity relationship, the table whose key field contains data that a different table (the *child* table) refers to. *See also* child table.

password A word that must be given to Paradox before a password-protected table can be used.

penetrating properties The group of all property choices that Paradox could apply to any object in a selected group *and* to any objects contained by a selected object.

Persistent Field View A mode that lets you remain in Field View when you move from field to field. *See also* Field View.

picture A pattern of characters that defines what you can type into a field during editing or data entry.

point To position the mouse pointer over an object or area.

pointer A visual marker that indicates the mouse location onscreen.

precedence The order in which multiple operations are executed in queries and calculations.

primary index An index on the key fields of a Paradox table. A primary index determines the location of records, lets you use the table as the detail in a link, keeps records in sorted order, and speeds up operations. *See also* key, secondary index.

primary key *See* key.

production index In dBASE tables, the index that is automatically maintained by Paradox. The production index uses the table's name and the .MDX extension as its file name. *See also* index.

prompt Instructions displayed on the screen. Prompts ask for information or guide you through an operation.

properties The attributes of an object. You right-click an object to view or change its properties. *See also* inspect.

prototyping A process of application development in which small parts or the general structure of an application are designed and tested interactively. These models are then used as the basis for building the finished system.

QBE *See* query by example.

query A question you ask Paradox about information in your tables.

query by example (QBE) The method of asking questions about data by providing an example of the answer you're looking for.

query statement One or more filled out query images in the Query window.

record A horizontal row in a Paradox table that contains a group of related fields of data.

record band The section of a report that contains the records of the table you are reporting on. *See also* band.

record number A unique number that identifies each record in a Paradox table.

referential integrity A way of ensuring that the ties between like data in separate tables cannot be broken.

relational database A database designed in accordance with a set of principles called the *relational model*. Data in a relational database must be organized into tables.

report Information from tables printed on paper or previewed onscreen.

report band The section of a report that contains data to be printed at the beginning and end of the report. *See also* band.

reserved words The names of commands, keywords, functions, system variables, and operators. These words may not be used as ObjectPAL variables or array names.

restructure To change the structure of an existing table. You can change the field names, field types, field order, keys, indexes, validity checks, referential integrity, password protection, table language, and table lookup.

right-click To press and release the right mouse button.

row A horizontal component of a table, called a record in Paradox.

script A standalone method (program) written in ObjectPAL.

scroll lock A way of locking one or more columns so they don't scroll horizontally as you move through other columns of a table.

secondary index An index used for linking, querying, and changing the view order of tables.

server *See* DDE server, OLE server.

set In a query, a specific group of records about which you intend to ask questions.

set comparison operator One of the reserved words (ONLY, NO, EVERY, or EXACTLY) used to compare a defined set of records to other records.

short number field A Paradox field type that can contain numbers from -32,767 through 32,767 with no decimal values.

sidebar The vertical bar along the left side of the Report Design window. Use the sidebar to insert page breaks.

sort order The way in which characters are arranged alphabetically. Paradox supports several different sort orders. *See also* ascending order, descending order.

special field A field (placed in a design document) that contains information about a table or design. Special fields include Today, Now, and Page Number.

SpeedBar The set of buttons and tools for frequently performed tasks. The SpeedBar is under the menu bar and changes according to the window you're using.

string An alphanumeric value, or an expression consisting of alphanumeric characters.

structure The arrangement of fields in a table.

summary field A field in a form or report that results in computed values; for example, the total number of items ordered.

summary operator One of the operators (AVERAGE, COUNT, MAX, MIN, or SUM) that answers questions about groups of records in queries.

table A structure made up of rows (records) and columns (fields) that contains information.

table frame A design object you can place in a form or report to represent a table.

temporary palette A palette that appears onscreen until you choose one of its options.

temporary table A table that certain Paradox operations create, that lasts only until you change your private directory or end the Paradox session.

text object A design object you can place in a form or report to display text.

typeface A design of a set of type. A typeface is one attribute of a font.

validity check A constraint on the values you can enter in a field.

wildcard operators Special characters Paradox uses to match patterns in queries or when locating values.

zoom To change the scale of a design screen. You can zoom out (decrease the scale and see a larger area) or zoom in (increase the scale and see part of the design up close).

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