

dBASE IV[®]

Version 2.0

Using dBASE IV

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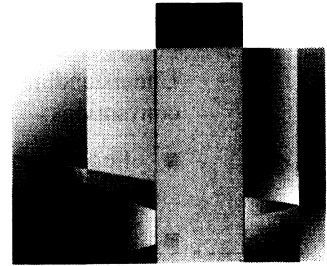
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Introduction

Introduction

Basics of the Menu System

Introduction



The Purpose of This Book

Using dBASE IV is your guide to the dBASE IV® Control Center and full-screen commands. It provides information you'll need whether you use the Control Center or dot prompt.

The first 16 chapters of this manual show you how to create database files, design formats for your data, print reports, make labels, and use tools such as the dBASE IV editor. The remaining four chapters of the manual describe how to create a data management application using the dBASE IV Applications Generator.

The Applications Generator is an easy-to-use tool that frees you from programming while providing you with the flexibility to create customized applications. It shortens development time by automatically generating dBASE® program code you'd ordinarily have to write. The ability to add dBASE code to your applications means you also have access to all the power of the dBASE language itself.

Using dBASE IV is your day-to-day reference for using the Control Center and most of the screens and menus in dBASE IV. dBASE IV screens not described in this book are shown in Table I-1.

Table I-1 Screens described in other books

Screen	Described in
Debugger	Programming in dBASE IV, Chapter 15
Settings	Language Reference, Chapter 3

If you are not familiar with dBASE IV, first read the Exploring dBASE IV section of *Getting Started With dBASE IV*, which provides an introduction to the material this manual covers in detail. Even if you are an experienced dBASE product user, you may find this a useful introduction to the dBASE IV interface.

Conventions in This Manual

Understanding the information in this manual is easier when you know the following conventions:

- Function keys (in the dedicated keypad on your keyboard) are shown with their assigned functions, as in the following example: **F1 Help**.
- Commands or entries that you type are in a different typeface.
- The RETURN or ENTER key is represented by the ↵ symbol.
- Menu names and items, messages you receive from the program, and other on-screen references are in bold type.
- Variable information that you provide appears between left and right angle brackets. For example, <INI> indicates that you type in your own initials. (Certain on-screen prompts may also appear between angle brackets, such as the <create> marker.)

Sample Files

A set of sample files is included with dBASE IV to supplement this and other manuals. You may have copied these files when you installed dBASE IV.

Some of these sample files appear in the Control Center, while others are designed to be used from the dot prompt. You will also find an application program named Business.prg.

To use the business application, type `do business` at the dot prompt or select the **BUSINESS** file from the **Applications** panel in the Control Center. You can run the Business file as an example of how dBASE IV can be used to create a system of programs.

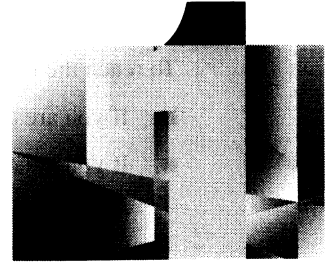
If you did not copy the sample files when you installed dBASE IV, you can do so by following the directions for Menu-Driven Install in Chapter 1 of *Getting Started with dBASE IV*. After you copy the sample files, you can use them by changing to the Samples directory (entering `SET DIRECTORY TO C:\DBASE\SAMPLES`) and typing `dbase`, or simply by typing `dbsample`.



NOTE

This book can be used in two ways. If you are using this book and the dBASE IV sample files to continue a step-by-step learning path from Exploring dBASE IV, the examples shown will have outcomes based on these sample files. If you are using this book as a reference, the results you receive when performing the tasks described in this book will depend upon the data you are using.

Basics of the Menu System



dBASE IV provides an extensive set of screens, menus, and prompts to give you control over dBASE IV without working at the dot prompt. These screen components are known collectively as the menu system. This chapter introduces the menu system, including some of the fundamental tasks you can accomplish with it, such as:

- Selecting, creating, and deleting files
- Navigating in the menu system
- Using the Help system

The Control Center

For many first-time users, your first contact with dBASE IV will be with the Control Center. The Control Center is the navigational center of the dBASE IV menu system. From it, you can do any of the following:

- Create database files
- Use a database file or view
- Display and edit specific data
- Create view and update queries
- Design and use data entry forms
- Prepare and print reports and mailing labels
- Design and run applications
- Manage your files

Reaching the Control Center

To reach the Control Center:

- If you are at the dot prompt, press **F2 Assist**.
- If you are at the operating system prompt, type `dbase` and press `↵`.

(If the dBASE dot prompt appears, press **F2 Assist**. If you want the Control Center to be the default screen, put the statement `COMMAND =ASSIST` into your `Config.db` file.)

The Control Center

Figure 1-1 shows the parts of the Control Center screen.

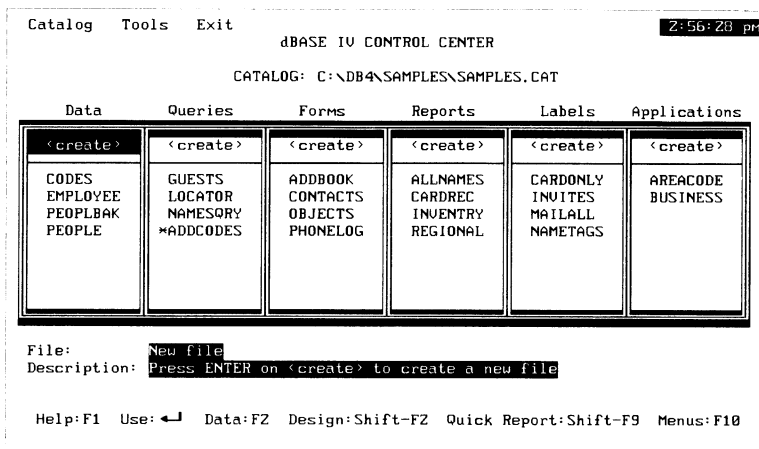


Figure 1-1 Control Center screen

Menu bar

The Control Center has three menus:

- The **Catalog** menu contains options to create and modify catalogs.
- The **Tools** menu contains options to aid in file management and to change the screen appearance.
- The **Exit** menu contains two options: **Exit to dot prompt** takes you from the Control Center to the dot prompt. **Quit to DOS** takes you out of dBASE IV entirely, to the operating system.

Catalog Name

A catalog provides a way to group files that belong together. The information to the right of CATALOG: shows the path and the name for the catalog in use. For example, Figure 1-1 shows the path *C:\DB4\SAMPLES* and the catalog name *SAMPLES.CAT*.

For more information about catalogs, see Chapter 3, “Organizing Your Database Files.”

Panels

The six panels in the Control Center represent the types of files that you can create with dBASE IV. The <create> marker in each panel is used to create that type of file. The names within each panel are filenames. Each panel can contain up to 200 filenames. Figure 1-2 shows the screens that can be branched to from each of the panels.



NOTE

To see a picture of each major dBASE IV screen with an explanation, refer to Appendix D.

File Information

Two lines near the bottom of the Control Center screen show the name and description of the file highlighted in one of the panels.

Navigation Line

The navigation line at the bottom of the screen shows some of the keystrokes currently available for performing important actions such as getting help, using the selected file, and displaying different parts of the menu system.

Selecting Files

To select a file, use the arrow keys to highlight the filename and press ↵.

If Instruct is ON (to turn it OFF, see the **Tools** menu), a prompt box appears, as shown in Figure 1-3. Make a selection by pressing the first letter of the option or by highlighting the option and pressing ↵.

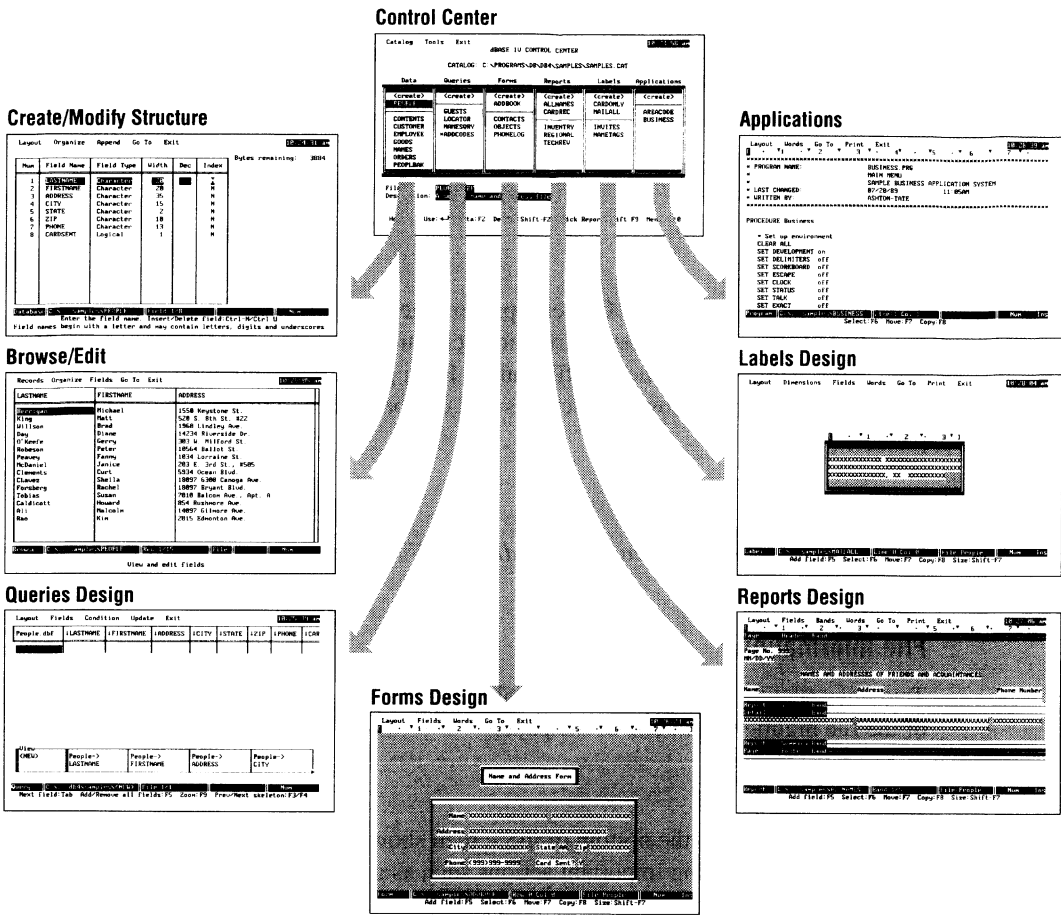


Figure 1-2 Screens accessed via the Control Center panels

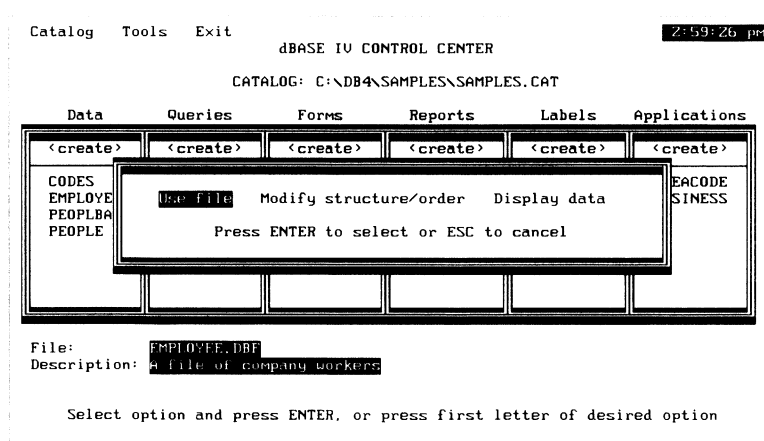


Figure 1-3 Using the prompt box

If the Instruct option is OFF and you press \downarrow , the prompt box does not appear. Instead, certain actions are executed automatically depending upon the type of file selected. Table 1-1 describes what occurs.

Table 1-1 Instruct OFF automatic actions

Type of File	Action when Instruct is OFF
Database	Open or close this database file as the data source
View query	Open or close this view as the data source
Update query	Perform this update
Form	Display the underlying data as a form
Reports	Print this report
Labels	Print this label
Applications	Run this application

If the selected design (form, report, or label) file is not associated with the database file or view currently in use, a prompt box appears, as shown in Figure 1-4. Choose to use the file with the current database file or view, or with the database file or view normally associated with the selected design file. This prompt box appears whether Instruct is ON or OFF.

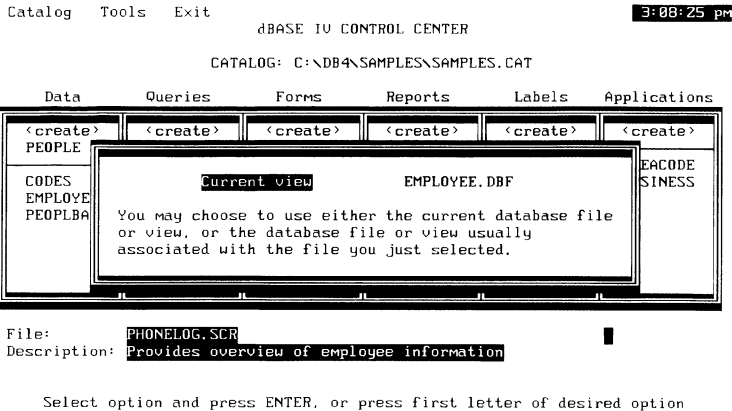


Figure 1-4 Choosing the file to use

Displaying Relations among Files

When you select a database or query file, that filename and the filenames associated with the selected file move above the line in their respective panels. This occurs because each file created through the Control Center is associated with at least one database file or view.

For example, when the People database file (see Figure 1-5) was selected from the **Data** panel, dBASE IV moved the filenames of the forms, reports, and label files associated with People above the line in their panels.

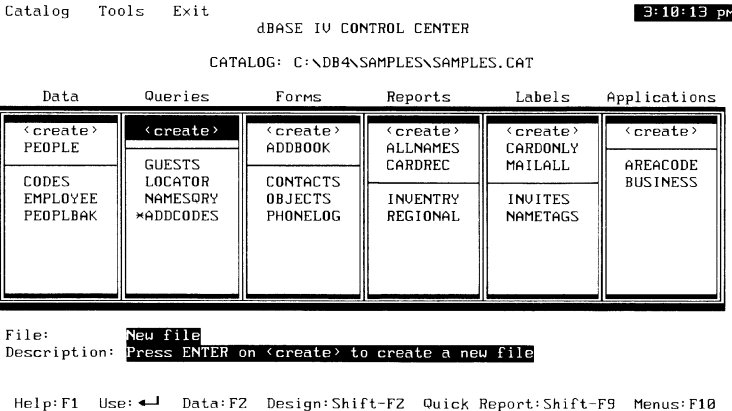


Figure 1-5 Related files above the line

Note that if a report, label, or form file is selected, and its underlying database file or view has been removed from the catalog, dBASE IV will use the current database file or view. If no current database file exists, you are prompted to name one.

Creating New Files

Highlight the **<create>** marker for the type of file you want to create and press ↵. The design screen for this type of file appears. If you are creating a form, report, or label, the new file points to the most recently used source of data, called the *current* database file or view.

When you select the **<create>** marker from the **Applications** panel, you can choose between writing a dBASE IV program or working with the dBASE IV Applications Generator. If you choose to write a dBASE program, the dBASE IV program editor appears. If you have chosen a different editor with the TEDIT statement in your Config.db file, that editor appears instead (see TEDIT in *Language Reference*).

The program editor is described in Chapter 15, “Using the Program Editor.” The Applications Generator is described in Chapters 17, 18, 19, and 20 of this manual.

Deleting Files

To delete a file:

1. Highlight the file to be deleted.
2. Press **Del** or choose the **Remove highlighted file from catalog** option from the **Catalog** menu.
3. Choose **Yes** (or type **y**) to continue.
4. Choose whether or not to delete the file from the disk as well as from the catalog.



WARNING

Deleting a file from the catalog just removes it from the list of files in the catalog. The file still exists, and it can again be added to a different catalog or returned to the current catalog. Deleting a file from the disk, however, physically erases it and it cannot be retrieved.



NOTE

You can not delete a database or view that is in use (displayed above the line in its panel). Deleting a form (.scr) file doesn't delete its auxiliary files (.fmt or .fmo).

Navigating in the Menu System

The following sections describe how to use the menus, where to find information on the cursor and function keys, and how to read the status bar.

Using Menus

At the top of every dBASE IV screen is a menu bar listing the menus available for that screen. These menus contain options for performing certain actions. The message line at the bottom of the screen explains the currently highlighted option (see Figure 1-6).

For a complete picture of the dBASE IV menu system, see Appendix A.

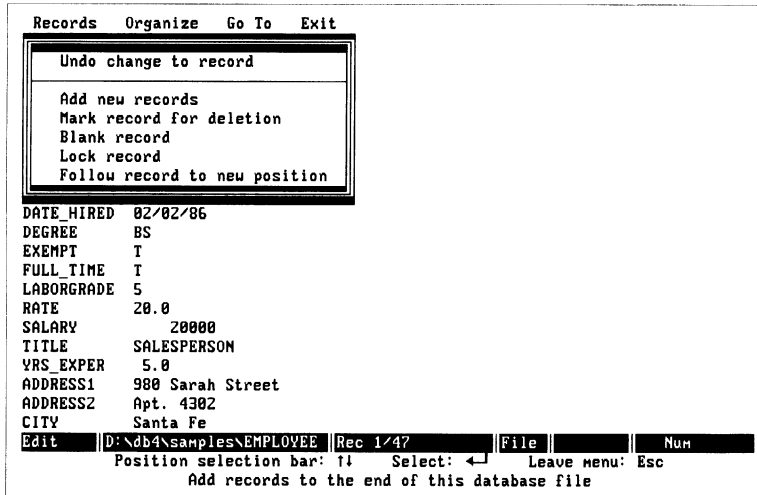


Figure 1-6 **Records** menu on the Edit screen

Use the keys described in Table 1-2 to open and close menus, choose menu options, and navigate among the menus and options.

Table 1-2 Using menus

Key	Action
F10 Menu	Move highlight to the menu bar; open the last menu used
Alt and first letter of menu name	Pull down a particular menu
→ or ←	Open a neighboring menu
↓ or ↑ to highlight option, then ↵ or press first letter of option	Select a menu option
Esc	Back out of a menu or list of choices
Ctrl-End	Accept certain fill-in menus
Tab, Shift-Tab, ↵	Move between columns in lists of choices
End	Move to bottom of menu or list of choices
Home	Move to top of menu or list of choices
PgDn	Display next section of choices
PgUp	Display previous section of choices

Using the Cursor Navigation Keys

Use the cursor navigation keys (→, ↑, **Tab**, and so on) to move around menu system screens. Navigation procedures differ slightly for different screens, because each screen is used to carry out different jobs. This manual is written in step-by-step form, so you will be told throughout which cursor keys to use.

For a complete list of all the cursor navigation keys and their uses on the various screens, see Appendix C.

Using the Function Keys

Use function keys to perform certain tasks quickly, such as getting help, editing data, displaying menus and screens, and printing Quick Reports. Understanding how function keys work will speed your ability to accomplish tasks and navigate through dBASE IV.

Two particularly important function keys for navigating are **F2** and **Shift-F2**. Figure 1-7 shows how to use **F2** and **Shift-F2** to navigate to the Browse/Edit screens or queries design screen from within various dBASE IV screens.

For a complete list of function keys and their uses, see Appendix B.



NOTE

You can reprogram function keys at the dot prompt (see Language Reference). However, this manual always refers to the default assignments of the function keys.

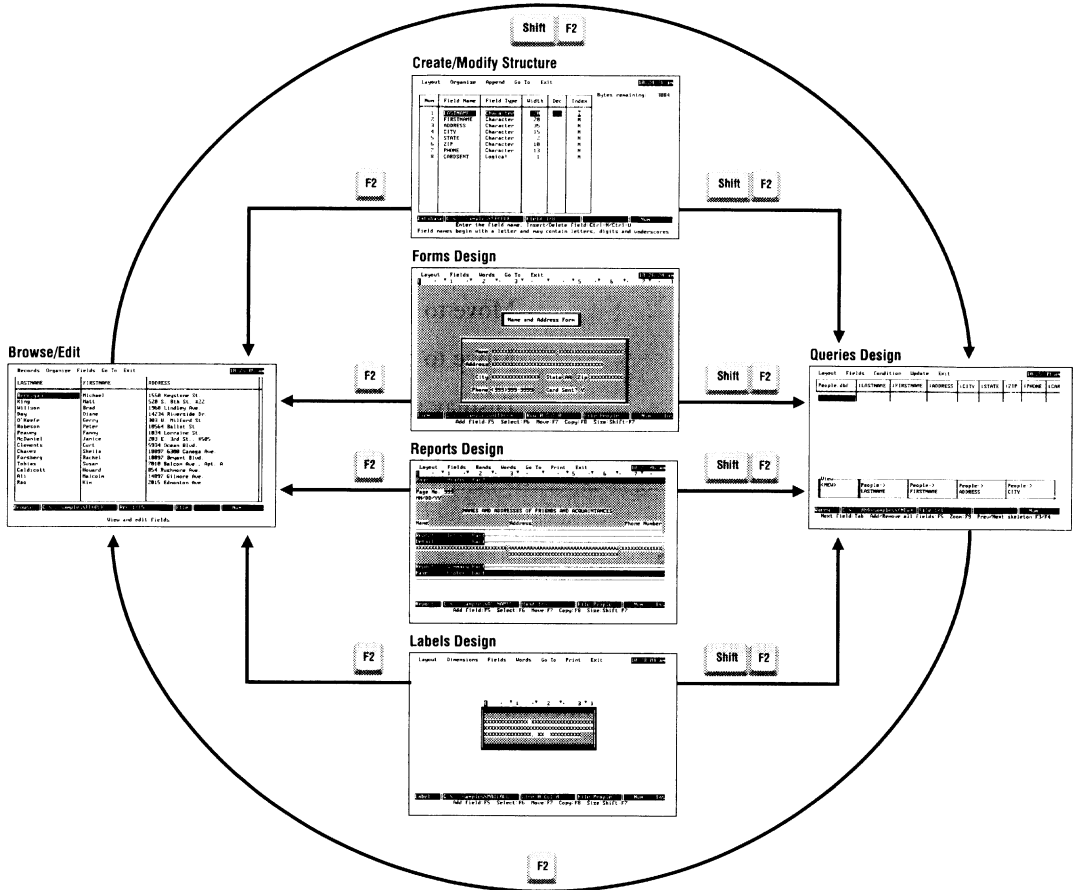


Figure 1-7 Navigating from screen to screen

Reading the Status Bar

A status bar appears near the bottom of each of the dBASE IV design screens and the Edit and Browse screens. The status bar has five sections:

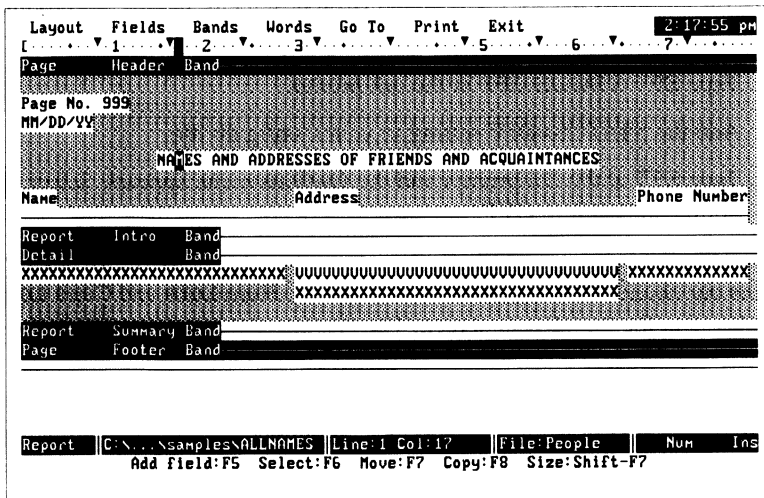


Figure 1-8 Typical status bar

- The first section shows which dBASE IV screen is in use. The status bar in Figure 1-8 says **Report** to indicate that a reports design screen is in use. When a program is running, this section of the status bar shows the name of the program.
- The second section describes the dBASE IV file with which you're working. First is the letter of the current disk drive, followed by an abbreviated path and the filename without the extension. The report in Figure 1-8 is named **ALLNAMES**. It resides on drive C, with a directory path of **\DBASE\SAMPLES\ALLNAMES**. Its description in the status bar is **C:\...samples\ALLNAMES**.
- The third section describes the location of the cursor. This section displays different information depending on the type of screen in use. In Figure 1-8, the cursor is on Line 1, Column 17 of the report's detail band. *Line* is a horizontal position on the screen and *column* is a vertical position within the defined area or screen.
- The fourth section shows the database file or view that is the source of the underlying data. In Figure 1-8, that file is **People**. This section also shows multi-user information on the Browse and Edit screens, such as whether a record is locked.

- The fifth section has several indicators to provide information about the keyboard and the current record. **Num** indicates the **Num Lock** key is set, **Caps** shows that the **Caps Lock** key is set, and **Ins** shows that Insert is on. On the Browse and Edit screens, **Del** tells you the current record has been marked for deletion.

Turn off the status bar for the Edit and Browse screens and the dot prompt in any of the following ways:

- Type **SET STATUS OFF** at the dot prompt.
- Add the **STATUS=OFF** setting to your Config.db file.
- Type **SET** at the dot prompt and the **Options** menu appears. Select the **Status** option and set it to **OFF**.

When the status bar is turned off, the information normally shown at the right of the status bar about deletions, insert status, and the **Num Lock** and **Caps Lock** keys is displayed at the top of your screen. The display of this information in the top right corner of your screen is called the *scoreboard*.

You can turn off the scoreboard by typing **SET SCOREBOARD OFF** at the dot prompt or by typing **SET** at the dot prompt and setting the **Scoreboard** option in the **Options** menu to **OFF**.

Using the dBASE IV Help System

Use the dBASE IV Help system to answer questions. The Help system is *context-sensitive*, which means dBASE IV gives help for current situations.

Many questions can be answered directly from the screen. You can also explore related topics to learn more about particular aspects of dBASE IV.

Reaching the Help System

You can reach the Help system in several ways:

- Press **F1 Help**.
- Type **help** at the dot prompt.
- Type **help** at the dot prompt, followed immediately by the name of a specific command or item of interest.
- Type a command at the dot prompt, then press **F1 Help**.
- Choose the **Help** button from an error box.

What the Help System Looks Like

When you ask for help in dBASE IV, a Help box appears, like the one shown in Figure 1-9.

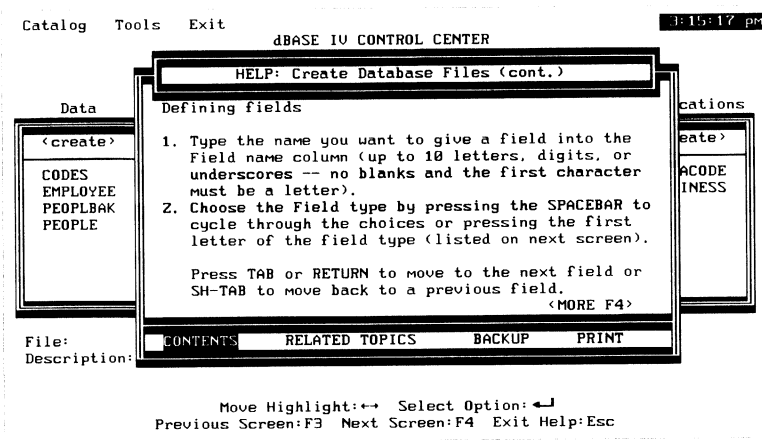


Figure 1-9 Help box

The Help box contains either text about a particular topic or a table of contents for choosing other available topics.

Each Help box title indicates the current topic. The text information is organized like pages in a book, so you can browse through screen by screen. **F3 Previous** shows the previous screen, while **F4 Next** displays the next screen in the sequence of Help screens.

You can use the buttons at the bottom of the Help box to choose different help functions. To move the highlight to a button, press →, ←, **Spacebar**, or **Backspace**. When the desired button is highlighted, press ↵. Pressing the first letter of a button's name also selects that button. Pressing **Esc** takes you out of the Help box, back to where you called Help. The buttons perform the following functions:

- **CONTENTS** changes the Help display to one of the nested Tables of Contents for the Help screens, as in Figure 1-10.

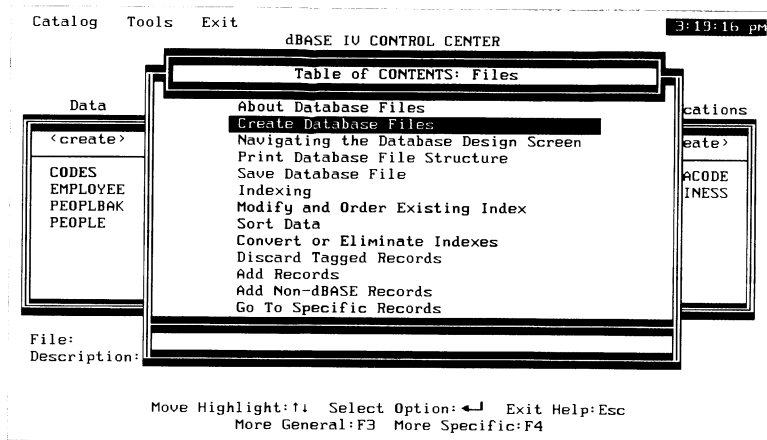


Figure 1-10 Help Contents screen

To navigate in the Contents screen, use the keys described in Table 1-3.

Table 1-3 Contents navigation keys

Key	Action
F3 Previous	Reach a broader level of topic detail
F4 Next or ↵	Reach a more detailed description of topics
↓ and ↑	Move the cursor up and down in the list of topics
PgUp and PgDn	Move through the list of items a box at a time
Home and End	Move to the top and bottom of the list

- **RELATED TOPICS** lists topics related to the current one. The topics are displayed to the right of the Help box, as in Figure 1-11. When you pick a new topic, the Help box shows a text information screen for the new topic. To select a new topic from **Related Topics**, use the same cursor keys as those used by **Contents**.

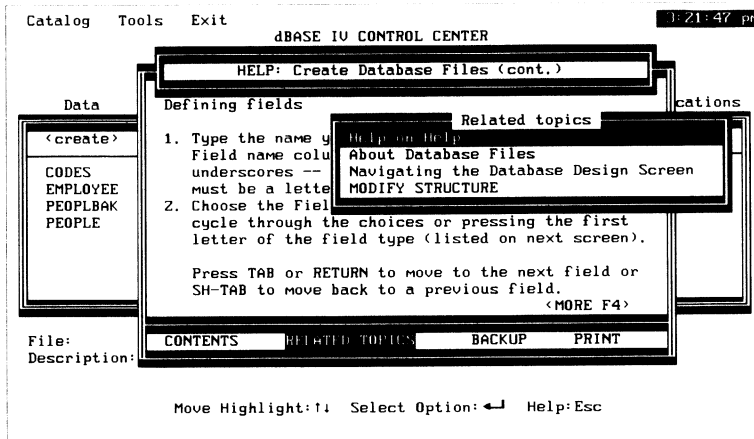


Figure 1-11 Using Related Topics

You can also use the **Related Topics** button to display a list of editing keys, function keys, or other relevant navigation keys. This list of keys is located under the topic *Help on Help*.

- The **BACKUP** button lets you return to previously displayed Help screens. It skips over any Contents or Related Topics screens you may have used to reach the current page of Help information.
- The **PRINT** button prints the current screen of help information.

Database Files

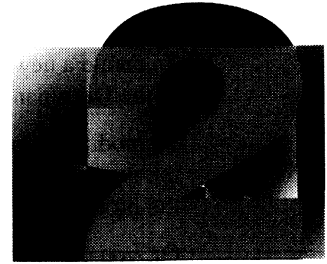
Designing Databases

Organizing Your Database Files

Displaying, Adding, and Modifying Data

Organizing Your Data

Designing Databases



At the core of dBASE IV is the *database file*. Database files contain the data used by dBASE IV. They are also the raw material for views, which in turn support reports, labels, and forms.

Before you can begin to enter data into a database file, you must define the *structure* of the file in the database design screen. This is where you define names, types, widths, and other factors for each field in your database file.

This chapter explains:

- Moving to and within the database design screen
- Designing a database file structure
 - Choosing a field name
 - Specifying a field type
 - Entering the field width
 - Entering decimal places
 - Indexing a field
- Saving changes and continuing

Reaching the Database Design Screen

You can reach the database design screen from both the dot prompt and the Control Center.

From the Dot Prompt

To display the database design screen from the dot prompt to create a new database file, type `CREATE <filename>`.

To change an existing database file, type `MODIFY STRUCTURE`. If no file is in use, dBASE IV prompts you for the name of the file you want to change. If the file doesn't exist, an error box appears.

From the Control Center

To create a new database file from the Control Center, highlight the **<create>** marker in the **Data** panel and press ↵. The database design screen appears.

To modify an existing database file structure (when SET INSTRUCT is ON), highlight the name of a file and press ↵. Then select the **Modify structure/order** option from the prompt box.

Or, you can highlight the name of an existing file in the **Data** panel and press **Shift-F2 Design**. **Shift-F2 Design** displays the database design screen for the selected database file.



NOTE

*You can also use **Shift-F2 Design** to bring up queries, forms, reports, or labels design screens from their respective Control Center panels. You can even use it to modify the code in an application file.*

If the database file already exists, dBASE IV automatically opens the **Organize** menu when you arrive at the database design screen. Press **Esc** to clear away the menu. If you are creating a new database file, you see the entire database design screen, with the cursor already in the first **Field Name** column.

Moving Within the Database Design Screen

Table 2-1 describes the ways of moving within the database design screen.

Table 2-1 Moving in the database design screen

Key	Action
Press ↵ or Tab	Move to the next column.
Press Shift-Tab	Move to the previous column.
Press ↑ or ↓	Move up and down rows.
Press ← or →	Move left or right within a column.
In the Go To menu, select Top Field	Move cursor to first field.
In the Go To menu, select Last Field	Move cursor to last field.
In the Go To menu, select Field Number and type position number of field	Move the cursor to a particular field. The Num column contains the position number of the field in the database file structure.

Designing Database Files

Notice in the database file shown in Figure 2-1 that the database design screen consists of a table. Each row in this table represents a field in the current database file. The columns show each field's attributes. You define these attributes to create a database file structure.

Num	Field Name	Field Type	Width	Dec	Index
1	LASTNAME	Character	15		N
2	FIRSTNAME	Character	18		N
3	ADDRESS	Character	28		N
4	CITY	Character	14		Y
5	STATE	Character	2		N
6	ZIP	Character	5		Y
7	PHONE	Character	13		N
8	BUSINESS	Logical	1		N

Database: D:\db4\samples\NAMES Field 1/8 Num Ins
Enter the field name. Insert/Delete field: Ctrl-N/Ctrl-U
Field names begin with a letter and may contain letters, digits and underscores

Figure 2-1 Database design screen

Each unique piece of information in a database file should have its own field. For example, don't try to define a field that combines last name, first name, and Social Security number information.



TIP

When designing your own database, don't combine all of your information into one large database file. Divide information into logical groupings that go in different database files. Connect these database files using a common field (for information on common fields, see Chapter 6).

Choosing a Field Name

Use the **Field Name** column to give each field a unique name (within that database file). Once you type the field name, press ↵ to advance to the field type attribute.

Field names must follow these rules:

- Field names can contain up to a combined total of ten letters, digits, and underscores.
- The first character must be a letter.
- Punctuation marks, blank spaces, and other special characters are not permitted.



TIP

A rule of good database file design is that each unique piece of information should have its own field. Many problems accessing or searching for data would be caused, for instance, by having one field called LnFnSS that included last name, first name, and a Social Security number. Each of these three pieces of information should have its own field.

Specifying a Field Type

Use the **Field Type** column to specify the data type of the data that will be entered in the field. When the cursor is in that column, press **Spacebar** to cycle through the choices, or type the first letter of the desired field type. After specifying the field type, press ↵.

The six field types are described in Table 2-2.

Table 2-2 Field types

Field Type	Description
Character	Can contain up to 254 ASCII characters or digits.
Numeric	Can be from 1 to 20 spaces wide. Numeric fields are stored as <i>fixed</i> numbers. Use fixed numbers when you want an exact number of digits. These numbers have a fixed number of decimals and are useful for counting items or doing budgets that must balance to the penny. Fixed numbers also allow you to do addition and subtraction quickly. They are often called <i>binary coded decimal</i> . These numbers are the type you use most often in dBASE IV.
Float	Can be from 1 to 20 spaces wide. Float fields are stored as <i>floating point</i> numbers, which are typically used in scientific applications. They can speed up operations involving frequent multiplying and dividing, especially when you work with numbers that are very large or very small.

(continued)

Table 2-2 Field types (continued)

Field Type	Description
Date	Uses eight spaces in the database structure to hold a year, month, and day. You can adjust the way dates are presented on your screen or in your reports (see the Changing Settings section of Chapter 14). Normally, the date for Independence Day would appear as 07/04/76 (the form mm/dd/yy is the default). It is possible to do date arithmetic on a date field, such as adding a specified number of calendar days to the date.
Logical	Uses one space to indicate either True or False. You can indicate True or False by entering <i>T</i> , <i>F</i> , <i>t</i> , or <i>f</i> . You can also enter <i>Y</i> , <i>N</i> , <i>y</i> , or <i>n</i> for Yes or No. Internally, dBASE IV stores values in logical fields as either <i>T</i> or <i>F</i> .
Memo	Can contain up to ten characters. You can use memo fields to write large documents, limited only by your available memory. A memo field is really a pointer to where the text is stored in a special memo file (the memo field itself doesn't contain the data.) This file has the same name as its associated database file, but has an extension of .dbt rather than .dbf. The .dbt memo file is created automatically when you create the memo field.



NOTE

When you work with memo fields, dBASE IV keeps track of the .dbt file associated with a .dbf file. When you are working outside of dBASE IV, you are responsible for keeping the .dbf file and its .dbt file together.

For example, if you use the COPY command to copy a .dbf file containing memo fields, be sure to copy the .dbt file that goes along with the database file. Otherwise, the material you entered in the memo fields will not appear.

*If you try to use a database file (.dbf) without its memo file (.dbt), a message appears asking if you want to discard the links to the memos. If you have a .dbt file for this database file, choose **No** and copy the .dbt file into the directory that contains the .dbf file. If you choose **Yes**, the old .dbt file can no longer be used with the database file.*

Further details about field types are available in Chapter 2 of *Language Reference*.

Entering the Field Width

Use the **Width** column to define the number of characters or digits that can be stored in the current field. You do not have to enter widths for date, logical, or memo fields because dBASE IV sets these widths automatically.

As described in Table 2-2, character fields can contain up to 254 characters, while fixed and floating fields can be up to 20 digits wide. Date fields are eight positions wide, logical fields one position wide, and memo fields ten positions wide.

A dBASE record takes up space whether or not its fields are blank.



TIP

Unnecessarily large field widths increase the size of your database file. Try not to overestimate the width of your fields.

Entering Decimal Places

Use the **Dec** column to define the number of decimal places for each fixed or floating field. You can use 0 to 18 decimal places in numeric and floating fields. The number of decimal places assigned to numeric and floating fields must be at least two less than the width of the field. These two spaces allow for the decimal point and a possible minus sign.

Indexing a Field

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With an index on a field you can order the file by that field. You can toggle between Y and N by pressing **Spacebar**. If you put a Y in a row of the **Index** column, dBASE IV creates an index tag based on the value of the field described by that row. See Chapter 5 for more information about indexes.

Index tags are stored in an index file with an .mdx extension and the same name as the database file. For example, if you create a database file called *Names.dbf* and place a Y in the **Index** column for the *Lastname* field, a file named *Names.mdx* is created to contain an index tag called *Lastname*.

For most efficient processing, put index tags only on those fields that you will use most frequently.



NOTE

*You cannot index a memo or logical type field by putting a Y in the **Index** column.*

Adding a Database Description

To add or modify the description of the current database file, use the **Edit database description** option on the **Layout** menu. This description appears in the **Description:** field of the Control Center.

If you came to the database design screen from the dot prompt and there is no catalog in use, this option is dimmed and unavailable.

Adding and Deleting Fields

To insert a field in a file structure, place the cursor on the field following the line where you want to put the new field and press **Ctrl-N**. To delete a field, place the cursor on the field you want to remove and press **Ctrl-U**.

Saving Changes and Continuing

You must save or abandon changes before leaving the database design screen. You can then return to the Control Center or dot prompt to do other work, add data to your new file, create a query (or filter) of the file's data, or print the database structure.

Saving Changes as You Work

To save changes without leaving the database design screen, use the **Save this database file structure** option on the **Layout** menu. After you choose this option, add, accept or modify the name for the database file and press **↵**. You can also use this option to make a copy of a file, giving it a different name. When you use this option, it copies the .dbf, .dbt, and .mdx files.

When you modify a database file structure, a backup database file is created and saved in the same directory. (Refer to MODIFY COMMAND/FILE in *Language Reference*.)



WARNING

When you change the structure of a database file, dBASE IV creates a new database file structure and fills it with data from the old structure. dBASE IV knows where to copy the data by finding either the names of the fields or their position in the database file structure. If you change field names and also rearrange field positions at the same time, dBASE IV cannot find the correct fields in the new structure.

Do not do any of the following:

- *Change a field name and its width at the same time.*
 - *Add a field and rename another field at the same time.*
 - *Change a field width and add a field at the same time.*
-

Saving Changes and Exiting

Use the **Save changes and exit** option on the **Exit** menu to save a new or modified database structure. When you are saving a new database structure for the first time, dBASE IV prompts you to name it.

When there is any data in the existing database file and you change the name of a field, dBASE IV asks if you want to copy your data from the existing version of this database file to its new structure. To preserve your data in the field with the new name, choose **Yes**.



TIP

Save the database structure each time you change a single field name. Each time a field name is changed, you can then specify whether to copy data from the previous field or start over with no data.

If you have not already saved your changes to the existing database structure, a prompt appears asking you to verify that you want to save your changes.

If you came to the database design screen from the Control Center, you return to the Control Center. If you came from the dot prompt or a program, you return to the dot prompt or program.

Abandoning Changes and Exiting

To abandon changes to the database design screen, use the **Abandon changes and exit** option in the **Exit** menu, or just press **Esc**. Choose **Yes** when prompted to indicate that you want to abandon changes. If you came to the database design screen from the Control Center, you return to the Control Center. If you came from the dot prompt or a program, you return to the dot prompt or program.

Moving to the Browse or Edit Screen

Once you have created the structure for a database file, you can enter data into the file through the Browse or Edit screen.

To leave the database design screen and go to the Browse or Edit screen to enter data, do one of the following:

- Press **↵** when the cursor is inside the first empty **Field Name** column after the last defined field. You can then choose to input new data from the Browse or Edit screen.

- Press **Ctrl-End** from anywhere on the work surface. You can then choose to input new data from the **Browse** or **Edit** screen.
- Press **F2 Data**. If there are unsaved changes to the database file structure, you hear a beep and receive an error message. You need to first save these changes. If there are no unsaved changes to the structure, the **Browse** or **Edit** screen appears.

For information on the **Browse** and **Edit** screens, see Chapter 4.

Moving to the Queries Design Screen

You can create queries, or filters, for viewing specified portions of the data in a database file. Create queries in the queries design screen.

To leave the database design screen and go to the queries design screen, press **Shift-F2 Design**. If there are unsaved changes to the database file structure, you hear a beep and an error box appears. You need to first save these changes. If there are no unsaved changes to the structure, the queries design screen appears.

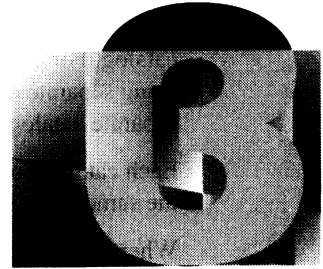
For information on queries and the queries design screen, see Chapters 6 and 7.

Printing the Database Structure

After creating a database file structure, you may want to print what this structure looks like. To do so, use the **Print database structure** option on the **Layout** menu of the database design screen. For information about the **Print** menu that appears when you activate this option, see Chapter 13.

If you change the current database file's structure, this option is unavailable until you save the new structure.

Organizing Your Database Files



Now that you have some information about creating a database file structure, you also need to know how to organize your database files. You can do that in the dBASE IV catalog.

This chapter discusses:

- What a catalog is and how it organizes files
- How to work with catalogs
- How to work with files in a catalog

What is a Catalog?

A catalog is the means by which you group related files. All of the files that are in the current catalog appear in the six panels of the Control Center, as shown in Figure 3-1.

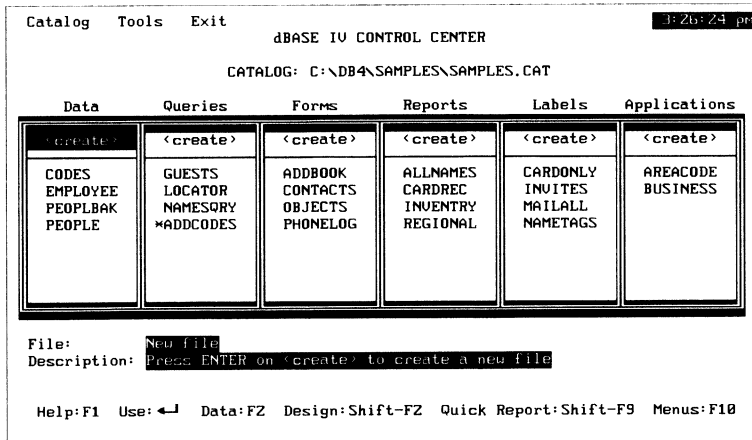


Figure 3-1 Files in the current catalog

In a sense, files are independent of catalogs. One file can be included in more than one catalog. For example, the personnel and payroll departments of a corporation might be using separate catalogs, yet both might use the same database file in each of their separate catalogs.

Each catalog contains its own description of the files listed in it. This is useful when the same file is used for different purposes in different catalogs.

When you create a file, that filename is added automatically to the catalog in use. This applies to database files, forms, label formats, and other types of files.

You can have as many catalogs as you want. One of the purposes of catalogs is to simplify the lists of files displayed in the Control Center or other file lists. Catalogs can eliminate extraneous files from your working environment, letting you concentrate on those files currently needed. They can also show which files are associated (that is, if a database (.dbf) file works with a report (.frm), label (.lbl), or form (.scr) file).

How Catalogs Differ from Directories

Catalogs and directories are both used to organize files, but in different ways.

Directories contain the files on your disk, like drawers in a filing cabinet. Each file is in a particular directory, and if you delete a file from a directory, it is permanently erased from the disk.

Catalogs, on the other hand, are simply lists of filenames, like grocery lists. They do not contain the files, and removing a filename from one catalog removes it only from that particular list of names in that catalog. The file remains on the disk.

Figure 3-2 shows filenames with paths to where the files actually reside (in directories on disk). It also shows files in a catalog where they are organized for optimal use.

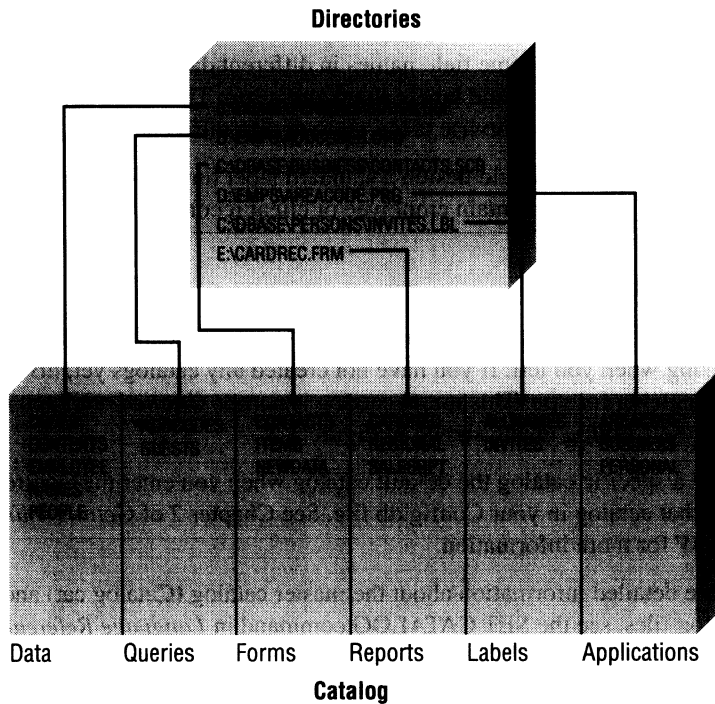


Figure 3-2 Catalogs and directories

Listing a File in Multiple Catalogs

As you develop catalogs, you must strike the right balance between listing the same file in several catalogs and creating separate copies of a file for each catalog. The following guidelines may be helpful:

- Try to share database files between catalogs, rather than making individual copies for each catalog.

Database files are usually large, and it's better to store your data in only one place. For example, if you have employee information stored in several different database files, you must edit all the copies whenever the information changes.

- Consider making distinct views for each catalog.

Views take up little disk space, and work best when tailored to the needs of an individual catalog. By not sharing your views with other catalogs, you can modify them without worrying how your changes might affect other catalogs. For more information about views, see Chapter 6.

- Use the same field names in database files or views. Try to be consistent in the way you name fields.

When you use the same field names in different database files, you can use the same forms, reports, and labels again and again. This helps save disk space and the time it would otherwise take you to design different forms, reports, and labels.

For example, you could design a standard label format to apply to all your database files that contain employee or client records.

Choosing the Initial Catalog

When you enter the Control Center, dBASE IV automatically loads the catalog you were using when you left. If you have not created any catalogs yet, dBASE IV creates the first catalog for you. This initial catalog is named *Untitled* until you rename it through the **Catalog** menu, shown in Figure 3-3.

To make a specific catalog the default catalog when you enter the Control Center, specify that catalog in your Config.db file. See Chapter 2 of *Getting Started with dBASE IV* for more information.

For more detailed information about the master catalog (Catalog.cat) and the structure of catalog files, see the SET CATALOG command in *Language Reference*.

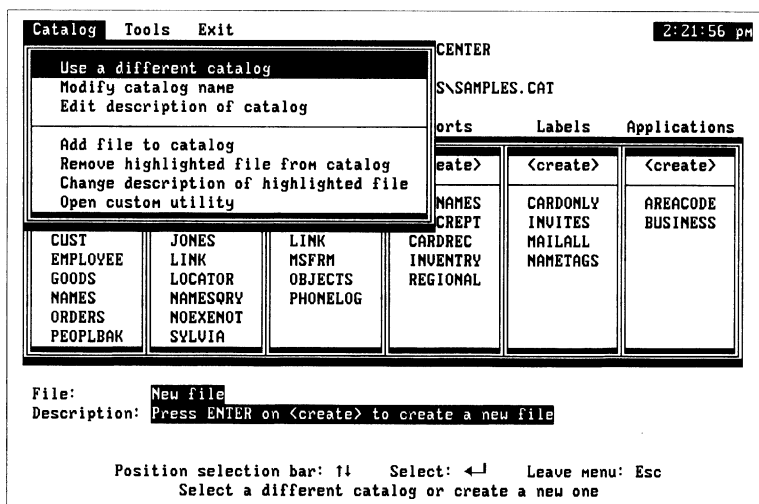


Figure 3-3 Catalog menu

**NOTE**

*For information about using the **Open custom utility** option of the **Catalog** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.*

Working with Catalogs

You can create catalogs, change the name or description of a catalog, and add or remove files from a catalog. Use the **Catalog** menu to work with catalogs.

Changing Catalogs

To change to a different catalog, select the **Use a different catalog** option in the **Catalog** menu. A list of other catalogs appears. Highlight the catalog you want and press ↵.

**NOTE**

*If the catalog you want is in the default directory but its name is not listed, follow steps 1 through 4 in the **Creating a New Catalog** section later in this chapter. However, in step 4, enter the name of the existing catalog. Then, follow the steps in this section to activate the catalog.*

Creating a New Catalog

When creating a new catalog, the following rules apply:

- Catalog names must be eight or fewer characters.
- Numbers can be used, but blanks and punctuation marks other than underscores (_) may not.
- When entering the catalog name, you may enter uppercase or lowercase, but dBASE IV converts the name to uppercase.

To create a new catalog:

1. Press **Alt-C** to open the **Catalog** menu.
2. Press **U** to activate the **Use a different catalog** option.
3. Highlight the **<create>** marker and press ↵. A prompt box appears.
4. Type in the name for the new catalog and press ↵. An empty Control Center panel appears.

Modifying the Catalog Name

To modify a catalog name, use the **Modify catalog name** option in the **Catalog** menu. When you are prompted for a new name, backspace over the old name and type in a new one.

Adding or Changing the Catalog Description

To add or change the catalog description, use the **Edit description of catalog** option in the **Catalog** menu. Type in the new description and press ↵.

Catalog descriptions appear when you choose the **Use a different catalog** option.

Understanding File Types

Each query, form, report, label, and program can be defined by up to three files: a design, a code, and a compiled file.

- *Design* files are created on design screens. An .scr file, for example, is the design file for forms.
- When you save design files, dBASE IV automatically creates *generated code* files, which consists of dBASE code. These files are useful if you want to customize the code in special ways. The .fmt files, for example, are the generated code files for forms.
- When you ask to use a query, form, report, label, or program, generated code files are turned into *compiled* files. Compiled files replace dBASE code with a command shorthand to run faster. When you use a query, form, report, label, or program, you're working with compiled files. The .fmo files are the compiled files for forms.

Table 3-1 shows the types of files and their extensions.

Table 3-1 File extensions

Type of file	Panel	Design	Code	Compiled
Database	Data	.dbf		
View query	Queries	.qbe	.qbe	.qbo
Update query	Queries	.upd		.upo*
dBASE III PLUS® view	Queries	.vue		
Form	Forms	.scr	.fmt	.fmo

(continued)

Table 3-1 File extensions (continued)

Type of file	Panel	Design	Code	Compiled
Report	Reports	.frm	.frg	.fro
Label	Labels	.lbl	.lbg	.lbo
Program	Applications		.prg	.dbo
dBASE SQL program	Applications		.prs	.dbo
Applications Generator file	Applications	.app	.prg	.dbo

*When an update query is performed, the compiled file is given a .dbo extension. You can rename these files to have .upo extensions so they can be added to the **Queries** panel and distinguished from compiled program files.

The file extensions in the Pick list column of Table 3-2 show the types of files you may add to the Control Center with the **Add file to catalog** option of the **Catalog** menu. For forms, reports, and labels, you can add design and compiled files but not the generated code files.

If you have both a design file and a compiled file for a report, form, or label, you only need to add the design file to the catalog, since dBASE IV creates the compiled file automatically. Compiled files are allowed in the file lists for queries, forms, labels, reports, and programs in case you do not have the design or generated code files. However, compiled files cannot be modified.

Table 3-2 Catalog file extensions

Type of file	Panel	Pick list
Database	Data	.dbf
View query	Queries	.qbe, .qbo
Update query	Queries	.upd, .upo
dBASE III PLUS view	Queries	.vue
Form	Forms	.scr, .fmo
Report	Reports	.frm, .fro
Label	Labels	.lbl, .lbo
Program	Applications	.prg, .dbo

(continued)

Table 3-2 Catalog file extensions (continued)

Type of file	Panel	Pick list
dBASE SQL program	Applications	.prs, .dbo
Applications Generator file	Applications	.app, .prg, .dbo
External programs	Applications	.exe, .com

Adding a File to the Catalog

Use the **Add file to catalog** option to add files to the current catalog. You can have up to 200 files in each of the panels in the Control Center.

To add a file to the current catalog:

1. Use the arrow keys to go to the panel of the type of file you want to add.
2. Press **Alt-C** to open the **Catalog** menu.
3. Type **A** to select **Add file to catalog**. A list of files that could be added to the catalog appears on the far right portion of the screen.
4. Highlight one of these files and press **↓**. You are prompted to edit the description of the file.
5. Add a description (this is optional) and press **↓**. dBASE IV adds the file to the current panel.

When you use this option, dBASE IV displays only those files that could go into the current panel (the one where the cursor is). For example, if the cursor is in the **Forms** panel when you choose the **Add file to catalog** option, your choice of files to add to the catalog is limited to form files.

Removing a File from a Catalog

To remove a file from a catalog (but not from the disk):

1. Highlight the file you want to remove from the catalog.
2. Press **Alt-C** and then **R** to select **Remove highlighted file from catalog**, or press **Del**. dBASE IV prompts for assurance that you want to remove this file from the catalog.
3. Type **Y** for Yes to remove the file from the catalog.
4. dBASE IV also asks if you want to delete the file from your disk. Type **N** for No.

**WARNING**

Remember that a file may be listed in other catalogs, so be cautious when deleting a file from the disk. Removing a file from your catalog is only temporary, and you can easily put it back later. Deleting a file from the disk is a permanent action that you cannot undo.

Note that a database file must be closed before you can delete it from the disk or remove it from the catalog.

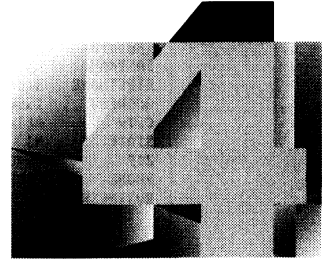
Editing a File Description

To edit the description of the current file, use the **Change description of highlighted file** option on the **Catalog** menu. The description appears to the right of the word **Description** near the bottom of the screen.

**NOTE**

To open a custom utility, refer to Chapter 17 of Programming in dBASE IV.

Displaying, Adding, and Modifying Data



The Browse and Edit screens are the two most basic ways for you to display, add, and modify data. This chapter explains how to use the Browse and Edit screens to:

- Select a database file
- Add new records
- Change how data is displayed in the Browse screen
- Edit data
- Delete records
- Save data
- Work with automatic record locking
- Enter and move text in memo fields
- Add records from the database design screen

About the Browse and Edit screens

The Browse and Edit screens provide two ways of looking at the same information from a database file. You can display, enter, edit, and delete data in both screens.

The Edit screen shows one record at a time and can extend to more than one screen. It is useful for finding or entering data in particular records. Figure 4-1 shows the default format for the Edit screen.

Records	Organize	Go To	Exit
LASTNAME	Lisbonn		
FIRSTNAME	Rick		
ADDRESS	1550 Keystone St.		
CITY	Atlantic City		
STATE	NJ		
ZIP	08401		
PHONE	(609)555-3344		
BUSINESS	T		

Edit	D:\db4\samples\NAMES	Rec 1/46	File	Num	Ins
------	----------------------	----------	------	-----	-----

Figure 4-1 Edit screen



NOTE

You can create a customized Edit screen, known as a form, to serve your special needs. Forms can contain boxes, lines, and other graphic characteristics that make the screen more attractive and easier to use. See Chapter 9 for more information about forms.

The Browse screen shows multiple records in a table, as shown in Figure 4-2. Each row shows one record. The Browse screen is useful for moving quickly through a number of records.

Records Organize Fields Go To Exit						
LASTNAME	FIRSTNAME	ADDRESS	CITY	STATE	ZIP	PHO
Lisbonn	Rick	1550 Keystone St.	Atlantic City	NJ	08401	<60
Garnett	Lena	520 S. 8th St.	Reno	NV	89504	<70
Kaufman	Lisa	1960 Lindley Ave.	Chicago	IL	60600	<31
Johnson	Jay	14234 Riverside Dr.	Louisville	KY	40202	<50
Collins	Sara	303 W. Milford St.	Portland	OR	97219	<50
Arlich	Kim	10564 Ballot St.	Manchester	NH	03100	<60
Montovan	John	1034 Lorraine St.	Boston	MA	02201	<61
Goreman	Vicky	203 E. 3rd St. S.	Mesa	AZ	85201	<60
Plimpton	Daniel	5934 Ocean Blvd.	Charleston	SC	29401	<80
Youngblood	Dick	7100 Fulton Pl.	Cincinnati	OH	45214	<51
Pope	Jan	101 Pierce St.	Harrisburg	PA	17101	<71
Zambini	Rick	100 Prairie	Idaho Falls	ID	83403	<20
Kotky	Linda	6300 Canoga Ave.	Buffalo	NY	14204	<71
Rodan	Bill	18097 Bryant Blvd.	Northampton	MA	01000	<41
Gelson	George	P. O. Box 6045	Eugene	OR	97401	<50
Daniels	Dominique	5601 Grand Ave.	Trenton	NJ	08601	<60
Rivera	Harry	7010 Balcon Ave.	Marietta	GA	30066	<40

Browse | D:\db4\samples\NAMES | Rec 1/46 | File | Num | Ins

Figure 4-2 Browse screen

Selecting a Database File

Because each catalog may contain more than one database file, you must choose the one you want before you can begin adding, viewing, or modifying information.

To select a file:

1. Make sure you are in the catalog containing the file you want to modify.
2. Use the arrow keys, **Tab**, or **Shift-Tab** to move to the **Data** panel. Move down the **Data** panel and highlight the file you want, as shown in Figure 4-3.

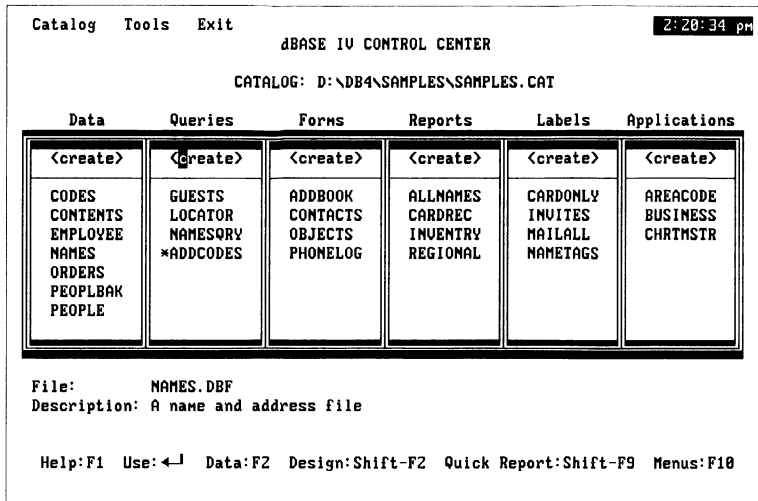


Figure 4-3 Highlighting a file

3. Press **F2 Data**. **F2 Data** takes you directly to either the Browse or Edit screen, whichever you used last.

A message at the bottom left of the status bar tells if you are on the Edit screen or the Browse screen. Press **F2** to toggle between the two.



NOTE

*If Instruct is ON (the default), you can also reach the Browse or Edit screen by moving the cursor to the name of a database file, query, form, report, or label and then pressing ↵. Choose **Display data** from the prompt box on your screen.*

*If you are working on the database design screen, pressing **F2 Data** shows the data, if any, in the current database file.*

Adding New Records

The procedure for adding new records to a database file is the same in Edit screens and Browse screens:

1. Press **Alt-R** to open the **Records** menu.
2. Type A to add new records. The cursor goes to the end of the current file and is positioned at the first field of a blank record.

3. Type in the data for each of the fields, pressing ↵ after completing each entry. When you type the full number of spaces accepted in a field, the cursor automatically moves to the next field.

Changing How Data Is Displayed in the Browse Screen

You can change how data is displayed in the Browse screen. The next two sections describe how to do so.

Keeping Important Fields in View

Often, a Browse work surface cannot fit all the fields in a record across a single screen. If you scroll to the right, the first few fields go off the screen to the left. However, these fields are often the ones that help you identify records.

To lock fields on the screen:

1. Press **Alt-F** to reach the **Fields** menu.
2. Press **L** to select the **Lock fields on left** option.
3. Type in the number of fields to remain stationary on the screen. and press ↵.



NOTE

*The use of the word lock here is different from the way lock is used in the **Lock record** option. The **Lock fields on left** option keeps certain columns on the screen. The **Lock record** option prevents data from being edited by other users in a multi-user environment.*

Changing the Width of a Field

A field may be more useful to you if it takes up less space on your screen. There are two ways to change the width of a field in Browse mode:

- Select the **Size Field** option on the **Fields** menu, adjust the size of the field with the arrow keys, and then press ↵; or
- Press **Shift-F7 Size**, adjust the size with the ← or → key, then press ↵.

These options only modify the field's width on the screen. The actual width of the field in its database file can only be changed from the database design screen. For example, if you have a character field that is 12 characters wide in the database file, you are not able to enter more than 12 characters in that field, even if you expand the size of its column on the Browse screen to 20.

Here are more facts about the width of columns:

- Most columns on the Browse screen can be made as narrow as the width of the field name at the top of each column (but the data can be sized even smaller, down to four characters).
- Only logical fields can be narrower than four characters, if they have a short name.
- You can expand most columns to 78 characters.
- You cannot decrease the size of a numeric or float field.
- If you make the column for a character field narrower than its actual field width in the database file, the data scrolls inside the display space.
- Memo fields and the field at the extreme right of a table cannot be sized on the Browse screen.
- Date fields cannot be made narrower than eight characters.

Editing Data

To edit data on the Browse or Edit screen, place the cursor in the field you want to change and enter new data or edit existing data.

Using Insert and Typeover Modes

Press the **Ins** key to toggle Insert mode on or off. When Insert is on, new characters are inserted at the current cursor position between existing characters. **Ins** appears in the status bar.

When Insert is off (often called Typeover mode), **Ins** disappears from the status bar and newly typed characters overwrite the characters at the current cursor position.

Deleting Data from a Field

To delete data from a field (Browse screen only):

1. Move to the field you want to change.
2. Press **Alt-F** to open the **Fields** menu.
3. Move the highlight to **Blank field** and press **↵**, or just press **B**. The field is now blank in this record.

You can delete all the text in a field that is to the right of the cursor (including the character under the cursor) by pressing **Ctrl-Y**.

Deleting Data from a Record

To delete all data from the current record, use the **Blank record** option on the **Records** menu. Blanking a record does not mark the record for deletion nor remove it from the database.

See also Deleting Records later in this chapter.

Editing Only One Field

To restrict the cursor to only one column at a time, use the **Freeze field** option in the **Fields** menu (located only on the Browse screen). When prompted, type the name of the field you want to use. All other fields cannot be edited until you remove the freeze field restriction.

To remove the freeze field restriction, select the **Freeze field** option and delete the name of the field. Then press ↵.

Undoing Changes to a Record

To undo any changes you made to a record or a field, use the **Undo change to record** option in the **Records** menu.

Once you move the cursor off the record you have changed, any changes made to that record are saved and cannot be undone.

Deleting Records

Deleting records while working in a database file is a two-phase process. First, you mark records for deletion. Second, you permanently delete the marked records. Deleting marked records is called *packing*.

Marking Records for Deletion

To mark a record for deletion:

1. Move to the record you want to delete.
2. Press **Alt-R** to open the **Records** menu.
3. Press **M** to select **Mark record for deletion**. The abbreviation **Del** appears on the right side of the status bar.

You can also mark a record for deletion by pressing **Ctrl-U** at any time during editing.

If you are using the Edit screen from the dot prompt or a program and you have **STATUS OFF** and **SCOREBOARD ON**, the **Del** indicator appears in the upper right corner of the screen when a record is marked for deletion.

Deleting Marked Records

To delete marked records:

1. Press **Alt-O** to open the **Organize** menu.
2. Press **E** to select **Erase marked records**. You are prompted to confirm that you want to delete the records.
3. Press **Y** to confirm Yes.



WARNING

Once you've pressed **Y** to confirm your intention to delete marked records, the records are permanently erased from the database file and from your disk. You cannot recover the records using the **Organize** menu's **Unmark all records** option.

Unmarking Records Marked for Deletion

You can unmark any record marked for deletion as long as the file has not been *packed* (when a file has been packed, the marked records have been removed from the file).

To unmark a record, go to that record, open the **Records** menu, and use the **Clear deletion mark** option. The **Mark record for deletion** option on the **Records** menu toggles to the **Clear deletion mark** option. **Ctrl-U** also toggles between marking and unmarking a record for deletion.

You can also unmark *all* records marked for deletion. Use **Unmark all records** on the **Organize** menu to unmark records previously marked for deletion on the Browse or Edit screen, or use an update query (see Chapter 8).

Saving Data Entered in the Browse or Edit Screen

As soon as you move the cursor away from a record, dBASE IV saves changes made to that record. Whenever you leave the screen to toggle between Browse and Edit or transfer to a design screen, changes are also saved.

There are also several ways that you can save records and leave the Browse and Edit screens:

- Press **Esc**. All changes made to the file are saved, except for changes made to the current record (including the current record's memo fields). The previous data for the current record returns.

- Press **Ctrl-End**. All changes made to the database file are saved. If you have any unsaved changes to the queries, forms, reports, or labels design screen, that design screen appears. You can choose to save your modified design before returning to the Control Center or the dot prompt.
- Choose the **Exit** option from the **Exit** menu. All changes made to the file are saved, and dBASE IV returns to the Control Center.



NOTE

*If you have been working on a particular design screen and you pressed **F2 Data** to go to the Browse or Edit screen, you can then use the **Exit** menu on the Browse or Edit screen to return to that screen. The **Exit** menu will contain an option to return to that screen.*

Automatic Record Locking on a Network

Multi-user dBASE IV has an automatic record locking system, so that whenever you begin to change data in a record, the current record is locked as long as the cursor remains inside the record. The **Lock record** option is dimmed if you are not using multi-user dBASE IV.

The steps in the automatic record locking process are as follows:

1. You are on a record and you attempt to change that record.
2. dBASE IV notices that you are trying to change the record and gives you one of two messages:

If another user has already locked that record, you receive the message, **Record in use by another**. At this point, dBASE IV will attempt to lock the record continuously for you until the other user releases the record or you press **Esc**.

If no other user has locked that record and you are in Edit, dBASE IV locks the record for you and displays the message, **Record may have been changed (press Spacebar)**. This message is a reminder that another user may have changed the data in this record between the time it was displayed on your screen and the time dBASE IV locked it for you.

3. When you press **Spacebar** while in Edit, dBASE IV redisplay the record on your screen, including any changes that others have made, and puts the cursor at the beginning of the field.



NOTE

*With converted files, you are not required to press **Spacebar**. See Language Reference for more on converted files.*

If you are just looking at a record, you may want to use the **Lock record** option on the **Records** menu or press **Ctrl-O** to ensure that no data in that record is changed while you are looking. Here also **RecLock** appears in the status bar. Press **Ctrl-O** or select the **Unlock record** option on the **Records** menu to release the lock.

With both automatic record locking and the **Lock record** option, as soon as you move the cursor from the record, the record is unlocked.

If you are using multi-user dBASE IV and you have not opened the database file for exclusive use, dBASE IV automatically locks the record you have begun changing. While you have a record locked, other users can view the record, but they cannot change it, and they will not see changes you have made.

dBASE IV permits “dirty reads” of records. That is, you may view a record which is being changed by another user, even though the other user may update the record while you are still viewing it. To guard against collisions of data, dBASE IV automatically updates the record with its most recent changes as soon as any attempt to change the data on the screen is made.



NOTE

If you intend to design a networking system where dirty reads may be unsafe, such as a reservation system, it is the programmer's responsibility to ensure that the Browse screen is updated periodically without waiting for an attempted write from the user.

Using Memo Fields

When you work on a Browse or Edit screen, you can use the memo field to store large amounts of information in a free-form style. You can save as much as 64K of information in a memo field (if you enter more than 64K, you will need to delete some text before saving the memo field). Figure 4-4 shows how a closed memo field (DESCRIPT) appears on the Edit screen.



NOTE

For information on creating a memo field in the database file structure, see Chapter 2. For information on using memo fields in forms, see Chapter 9. This chapter contains information on using memo fields in the Browse and Edit screens.

Records	Organize	Go To	Exit
CATEGORY	CD		
NAME	Stomper's Hits #2		
MODEL			
SERIAL_NO			
STORE	Disc City		
DATE	02/13/86		
QUANTITY	1		
COST	12.50		
DESCRIPT	MEMO		

Edit	D:\db4\samples\CONTENTS	Rec 1/20	File	Num	Ins
------	-------------------------	----------	------	-----	-----

Figure 4-4 Memo field on the Edit screen

If the memo marker is in lowercase, the memo field is empty. If *MEMO* is in uppercase, that means the memo field contains data.

Entering Memo Fields

To enter or edit the text inside a memo field, you must first open the memo field. There are three ways to do this:

- Place the cursor on the memo field you want to enter or edit and press **Ctrl-Home**. The memo marker zooms open to fill the screen.
- Place the cursor on a memo marker and press **F9 Zoom**. The memo marker zooms open to fill the screen. If you are using a memo window, pressing **F9 Zoom** once takes you into the memo window. Pressing **F9 Zoom** again opens the window to full screen. For more information on memo windows, see Chapter 9.
- Move to the memo field with **F3 Previous** or **F4 Next**. When you use one of these keys to place the cursor on a memo field, the field automatically opens into its window.



NOTE

If you have used the WP command in your Config.db file to specify an editor other than the dBASE IV program editor, the specified editor is active while you are editing a memo field. For more information, refer to Chapter 2 of Getting Started with dBASE IV.

Moving, Copying, and Deleting Text in a Memo Field

To move or copy text in a memo field:

1. Move the cursor to the beginning of the text you want to move or copy.
2. Press **F6 Extend Select**.
3. Use the arrow keys to highlight the text you want to move or copy. Press **↓**.
4. Move the cursor to where you want to move or copy the text.
5. Press **F7 Move** or **F8 Copy**. The text is moved or copied to the spot where you placed the cursor.

To delete text in a memo field:

1. Move the cursor to the beginning of the text you want to delete.
2. Press **F6 Extend Select**.
3. Use the arrow keys to highlight the text you want to delete. Press **↓**.
4. Press **Del** and then answer yes (y) to the prompt, **Press y to perform block deletion**. To cancel an extended selection, press **Esc**.

Use **F6 Extend Select** to make quick selections. Press this key twice in a memo field to select a word. Press it three times to select a paragraph.

Exiting Memo Fields

There are several ways to leave a memo field:

- Press **Ctrl-End**. When the cursor is inside a memo field, pressing **Ctrl-End** closes the memo field, saves any changes to the text, and places the cursor on the memo field. You are still on the Browse or Edit screen.



NOTE

*If you use **Ctrl-End** to leave the memo field, but then, while still on the same record, you use **Esc** to leave the Browse or Edit screen, you will lose the change you have just made to the memo field. For this reason, it is a good habit to leave the Browse or Edit screen with **Ctrl-End** instead of **Esc**.*

- Press **F9 Zoom**. This has the same effect as pressing **Ctrl-End**.
- Press **Esc**. If you made changes to the memo field, you are asked to confirm that you want to abandon them.
- Choose one of the options from the **Exit** menu of the editor.

Adding Records from the Database Design Screen

From the database design screen, you can add or append records to the database file. Although you can use the Browse or Edit screen to add records field-by-field, use the **Append** menu to add groups of records all at once.



NOTE

*You can use the options on the **Append** menu only if you have saved all outstanding changes to the database structure.*

Appending Records from a dBASE File

To copy records from one dBASE file to another, use the **Append records from dBASE file** option in the **Append** menu on the database design screen. When you select this option, a list of dBASE files in the current directory appears. Select the file whose records you would like to add to the records in the current database file.

dBASE IV appends only the fields whose names are found in both files. You may append both dBASE IV and dBASE III® files.

If you want to append a file that is not in the list of files, you must add that file to the current catalog.

Adding Records One at a Time

To add new records field-by-field, use the **Enter records from keyboard** option in the **Append** menu. The Edit screen appears and the record pointer is positioned at the end of the file, ready to add a new record.

Copying Records from a Non-dBASE File or dBASE II File

To bring data into an existing dBASE IV file, select the **Copy records from non-dBASE file** option in the **Append** menu on the database design screen. dBASE IV displays a list of possible file types from which to pick.

The source files must have the same structure as the database file you want to hold the data. You can find out more about these restrictions in the APPEND FROM entry in *Language Reference*.

When you choose RapidFile®, dBASE II®, Framework II®, Lotus 1-2-3, or VisiCalc files, the file list shows only those files with the proper extensions (for example, .rpd, .db2, .fw2, .wks, .dif). If you want a dBASE II file to appear in this list, you must first replace its .dbf extension with a .db2 extension.

When you choose **Text fixed-length fields**, **Blank delimited**, or **Character delimited**, the list of available files shows only files with .txt extensions. If you want a delimited text file to appear in this list, rename it to have a .txt extension.

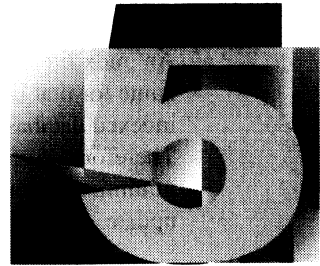
When you ask to append from MultiPlan files, you see all the files that have *no* extensions. You do not see any files that obviously belong to other applications (.rpd, .db2, .fw2, .crd, .dif, .wks), dBASE IV (.dbf, .fmt, .mdx), or the operating system (.bat, .ovl, .exe).



NOTE

*To bring in data from Lotus 1-2-3 version 2 files, which have a .wkl extension, use the **Import** option from the Control Center **Tools** menu. You can also use the **IMPORT** command at the dot prompt.*

Organizing Your Data



dBASE IV provides two primary ways to organize data within database files: *indexing* and *sorting*. Of the two, indexing is by far the most important and the one you will be using the most. In addition to organizing data, indexes can also be used for searching for data.

This chapter discusses:

- Indexing a database file
- Searching through a database file
- Sorting a database file

About Indexes

An index organizes data from a database file to display it in a specified order. This does not change the physical order of the records. You can add new indexes at any time to display data in different orders.

How dBASE IV Indexes Are Stored

dBASE IV stores indexes created through the menu system in a file with an `.mdx` extension. Each index is identified by the name, or *tag*, you assigned when you created the index. The `.mdx` file with the same name as its associated database file is the main, or *production*, `.mdx` file. When you create an index with the **Create new index** option, the index tag automatically becomes part of the open `.mdx` file associated with the current database file.

Previous dBASE product versions required separate files with `.ndx` extensions for each index expression (see the *Using Indexes from Earlier dBASE Product Versions* section later in this chapter). You can still create `.ndx` files from the dot prompt with the `INDEX ON` command described in *Language Reference*, but you cannot create them through the menu system. This chapter concentrates on creating and using indexes maintained in the `.mdx` index file. For more information about `.ndx` files, see *Language Reference*.

Number of Indexes per Database File

An .mdx file can contain up to 47 separate indexes with unique *tags* (the tag is the name for that index within the .mdx file). Whenever you modify or add records to an indexed database, dBASE IV automatically updates all indexes in the open .mdx file. Therefore, if you plan to update a large database file frequently, it is a good idea to minimize the number of indexes on that file. This reduces the time required for the update.

Using Indexes

You can create simple indexes that sort on one criterion, or complex indexes that sort on two or more criteria.

Creating a Simple Index

To create a simple index:

1. Go to the **Data** panel of the Control Center. Highlight the file you want to index and press **F2 Data** or **Shift-F2**. The Browse/Edit screen or the database design screen appears, depending upon which command you used. You can use either one because the **Organize** menu appears on both.
2. Select the **Organize** menu, highlight **Create new index**, and press ↵.

The submenu shown in Figure 5-1 appears.

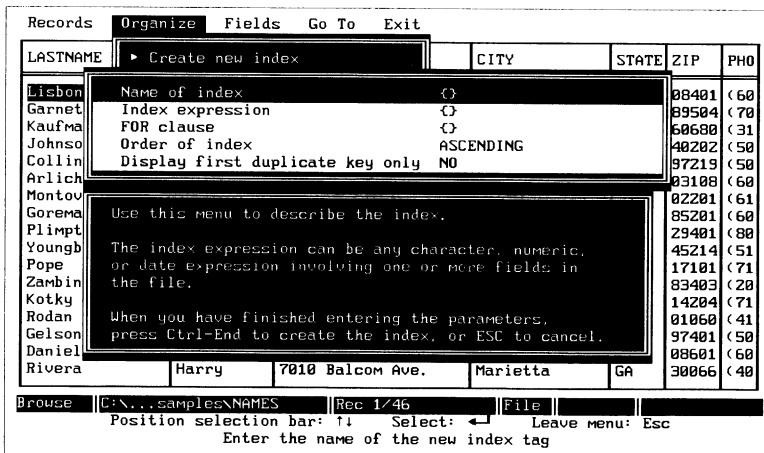


Figure 5-1 Create new index submenu

Naming the Index

To assign a name to the new index:

1. Highlight **Name of index** and press **↵**.
2. Type a name for the index, as shown in Figure 5-2, and press **↵**. Notice that the name of the index appears inside brackets. Index names can be up to 10 characters long and have the same restrictions as field names (see the Choosing a Field Name section in Chapter 2 for these restrictions). For simple indexes, it is good practice to use the field name for the name of your index.

Records	Organize	Fields	Go To	Exit	
LASTNAME	▶ Create new index	CITY	STATE	ZIP	PHO
Wizbon	Name of index	LASTNAME	08401	(60	
Garnet	Index expression	C	89504	(70	
Kaufma	FOR clause	C	60680	(31	
Johnso	Order of index	ASCENDING	40202	(50	
Collin	Display first duplicate key only	NO	97219	(50	
Arlich			03108	(60	
Montov			02201	(61	
Gorema			85201	(60	
Plimpt			29401	(80	
Youngb			45214	(51	
Pope			17101	(71	
Zambin			83403	(20	
Kotky			14204	(71	
Rodan			01000	(41	
Gelson			97401	(50	
Daniel			08601	(60	
Rivera			30066	(40	
		Harry	7010 Balcom Ave.	Marietta	GA
Browse	C:\...samples\NAMES	Rec 1/46	File	Cap	

Use this menu to describe the index.

The index expression can be any character, numeric, or date expression involving one or more fields in the file.

When you have finished entering the parameters, press **Ctrl-End** to create the index, or **ESC** to cancel.

Specify name for this index
Enter the name of the new index tag

Figure 5-2 Naming the index

Defining the Index

When defining an index, dBASE IV uses index expressions. The index expression determines how the database file will be organized when that index tag is used. Index expressions can be simply the name of a field or they can be created from field names, dBASE IV operators, and functions.

To define the expression used to make the new index:

1. Highlight **Index expression** and press **↵**.
2. Type in a valid dBASE IV expression, as shown in Figure 5-3. Or, press **Shift-F1 Pick** to display a list of possible field names and dBASE IV operators and functions. Highlight the item in the list that you want to use in your index expression, and press **↵**. The item appears on the index expression line.

If you need more room to enter the index expression, use **F9 Zoom** to open an edit box.

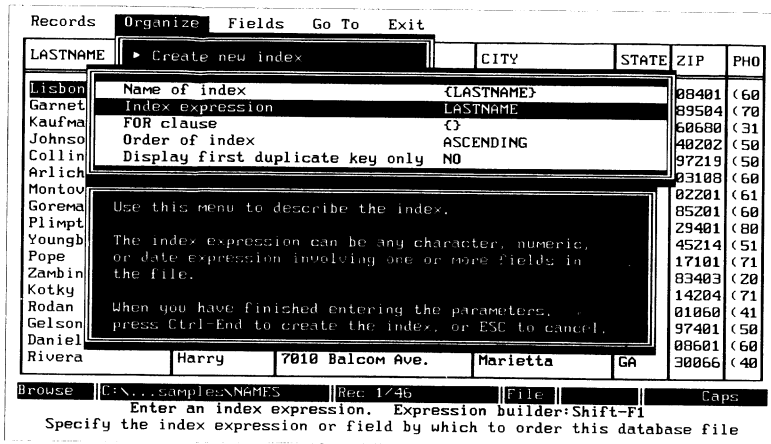


Figure 5-3 Defining the index

- When you have finished defining the index, press \downarrow . Your definition appears in brackets, and the highlight is now on the **FOR clause** option.



NOTE

Normally, an index expression cannot contain the name of a logical or memo field. However, you can use the IIF() function to organize records by logical values. For example, the index expression IIF(BUSINESS,0,1) places Names records for business contacts (Business=.T.) before records for non-business acquaintances (Business=.F.). The expression IIF(BUSINESS,1,0) does the opposite. Refer to Chapter 4 of Language Reference.

Ordering the Index

Use the **Order of index** option to specify whether the index should be in ascending order or descending order.

- Highlight the **Order of index** option.
- Press \downarrow or **Spacebar** to toggle the **Order of index** option between **ASCENDING** and **DESCENDING**.

When you create an ascending index on a character field, uppercase letters are put before lowercase letters. That is, *Zebra* would appear before *aardvark*. On the other hand, if you create a descending index on a character field, uppercase letters would come after lowercase letters. The word *aardvark* would appear before *Zebra*.

**TIP**

To override this approach, add the `UPPER()` or `LOWER()` function to your index expression. For example, you could use `UPPER(Lname)` for the index expression for an ascending order where the last name `aardvark` appears before `Zebra`.

Remember that this uppercase conversion will only apply to the way the file is indexed. The data still appears as you entered it.

Saving the Index

To save and activate the index, press **Ctrl-End**. Notice in Figure 5-4 that the file is now ordered by the `LASTNAME` field.

Records Organize Fields Go To Exit						
LASTNAME	FIRSTNAME	ADDRESS	CITY	STATE	ZIP	PHO
Arlich	Kim	10564 Ballot St.	Manchester	NH	03108	(60
Beman	Sandy	440 Chevy Chase Blvd	Beverly Hills	CA	90213	(21
Bicksby	Hank	4101 Peonia Rd	Flagstaff	AZ	86001	(60
Brendon	Kelly	12508 Robin Hood Ln.	New York	NY	10022	(21
Campbell	Linda	6700 Tyler St.	Paragould	AZ	86334	(60
Cohen	Larry	908 Glen Oaks Ave.	Decatur	IL	62526	(21
Collins	Sara	303 W. Milford St.	Portland	OR	97219	(50
Daniels	Dominique	5601 Grand Ave.	Trenton	NJ	08601	(60
DeBello	Todd	4564 Prytania	New Orleans	LA	70175	(50
Dean	Michelle	854 Rushmore Ave.	Baltimore	MD	21201	(30
Dickerson	Lori	14565 Collins Ave.	Phoenix	AZ	85041	(60
Drasin	Pedro	12804 Sunburst Ave.	Hartford	CT	06103	(20
Egan	Michelle	5670 Colorado Blvd.	Denver	CO	80249	(30
Garnett	Lena	520 S. 8th St.	Reno	NV	89504	(70
Gelson	George	P.O. Box 6045	Eugene	OR	97401	(50
Gilbert	Chuck	7619 O Street	Washington	DC	20002	(20
Goreman	Vicky	203 E. 3rd St. S.	Mesa	AZ	85201	(60

Browse | C:\...sample\NAMES | Rec 6/46 | File

Figure 5-4 Activating the index

**NOTE**

For information on creating indexes when setting up your database file structure, see Chapter 2.

Using an Index

When you create an index, that index is automatically activated. To choose a different index:

1. Press **Alt-O** to open the **Organize** menu.
2. Type **O** to select **Order records by index**. When you select this option, a list of the active index tags and active .ndx index filenames appears on the right of the screen.
3. Highlight the index tag or .ndx filename you want to use to order your database file. When you highlight an index tag, the index expression (or definition) is shown to the left. If you want the file to be displayed in the physical order in which the records were entered, select **Natural Order** at the top.
4. Press **↵** to activate the index that you have highlighted.

If you are on the database design screen, press **F2 Data** to look at the file ordered by the index you chose.

Creating a Complex Index

The previous section described how to create a simple index. You can also create complex indexes that use multiple levels of indexing.

For example, you might use a complex index expression that is defined as follows:

department + lastname + firstname + initial

In this example, sorting is done first by department, then by last name within the department, and so on. The initial sort criterion is the field name farthest to the left.

You might want to index on a subset of database records that includes just those records that meet a certain condition. You might want to index only unique records in your index, and hide all duplicates. These types of indexes also are complex indexes.

Using a Complex Index Expression

To create an index using a complex index expression:

1. Press **Alt-O** to open the **Organize** menu, and type **C** to create a new index.
2. Press **↵** and type a tag name for this index, as shown in Figure 5-5. Press **↵** again. The highlight moves to the **Index expression** option.

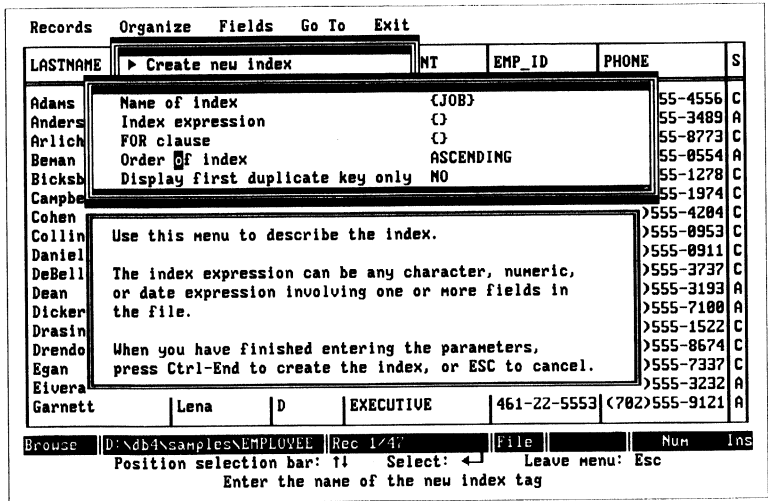


Figure 5-5 Naming a complex index

- Press **↓**. Either type in an entire index expression or use **Shift-F1 Pick** to choose the expression.

An example of a complex index expression is shown in Figure 5-6. In this expression, Title is the first criterion and Salary the second criterion for ordering. Because Salary is a numeric field, this example uses the STR() function to convert the data in Salary to character data type for indexing purposes. This is done so that it will match the data type of Title. Data types in a complex index expression must match.

If you use **Shift-F1 Pick**, a three-paneled list of field names, operators, and functions opens. Select the ones for your index expression by highlighting each and pressing **↓**. As you select each item, that item appears on the index expression line. You need to reopen by pressing **Shift-F1 Pick** to pick another item from the list.

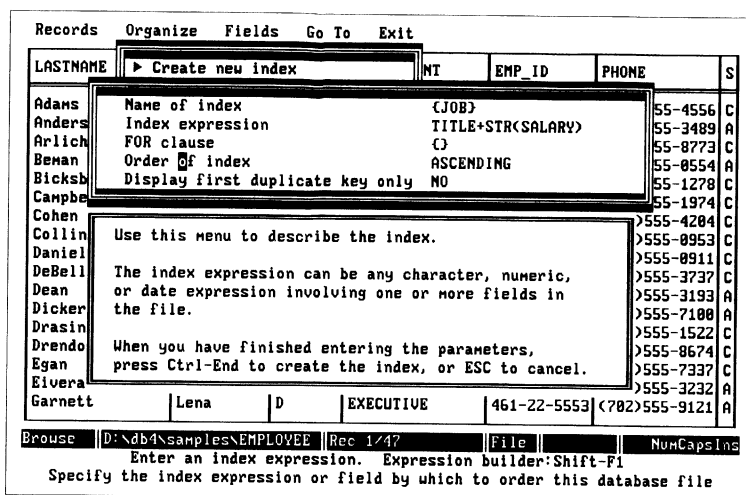


Figure 5-6 Entering a complex index expression

4. When you have finished entering the index expression, press \downarrow . The highlight moves to the **FOR clause** option. Move down to the **Order of index** option.
5. Toggle the order of the sort to either **ASCENDING** or **DESCENDING**.
6. Press **Ctrl-End** to save the index.

Character fields are combined with a + sign to become a single, complex expression. Connecting two numeric fields with a + sign will sum the two fields and index on the sum. For more information, see *Language Reference*.

Indexing on a Subset of the Records

Use the FOR clause to index on a subset of the records in the database file. Once you have a name for the index and an index expression:

1. Highlight the **FOR clause** option and press \downarrow .
2. Type the FOR clause you want to use (see Figure 5-7). You can also use **Shift-F1 Pick** to choose the field name, operator, and functions that you would like to use in the FOR clause. In the example in Figure 5-7, the file will be indexed on the LASTNAME field, but only those records where the FIRSTNAME equals *John* will be included.

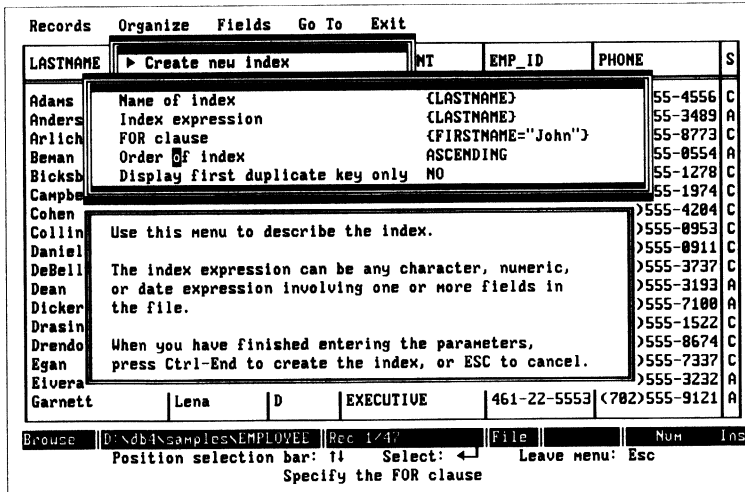


Figure 5-7 Using the FOR clause

3. Press **Ctrl-End** to save the index.

Hiding Duplicate Records

Normally, you create an index to see and use every record in the database. However, there may be times when you want to conceal records with duplicate indexed fields. For instance, if an employee database file is indexed by job title and then by salary, you might want to see only the unique examples of job titles plus salaries.

Figure 5-8 illustrates the concept. The sample file of 47 records now shows only the first record of a particular title and salary. All other instances of that title and salary are not displayed when **Display first duplicate key only** is set to **YES**.

Records Organize Fields Go To Exit									
DEGREE	EXEMPT	FULL_TIME	LABORGRADE	RATE	SALARY	TITLE		YRS_EXPER	AD
	T	T		2	0.0	10500	CLERK	3.0	70
	T	T		2	0.0	11500	CLERK	5.0	34
	T	T		2	0.0	12000	CLERK	2.0	95
BA	T	T		3	0.0	12100	SECRETARY	1.0	44
	T	T		2	0.0	12250	CLERK	3.0	52
	T	T		3	0.0	14500	SECRETARY	3.0	85
	T	T		3	0.0	16500	SECRETARY	5.0	60
BS	T	T		7	0.0	49000	MANAGER	3.0	14
MBA	T	T		6	0.0	52000	MANAGER	7.0	23
MBA	T	F		8	0.0	56000	VICE-PRESIDENT	3.0	P.
MBA	T	T		7	0.0	59000	VICE-PRESIDENT	1.0	20
MBA	T	T		9	0.0	79500	PRESIDENT	13.0	10
	T	T		5	0.0	15000	SALESPERSON	4.0	19
BS	T	T		5	20.0	20000	SALESPERSON	5.0	98
	T	T		5	0.0	22000	SALESPERSON	6.0	89
	T	T		5	20.0	25000	SALESPERSON	3.0	10
	T	T		6	5.0	45000	MANAGER	9.0	12

Browse D:\db4\samples\EMPLOYEE Rec 16/47 File Num Ins

Figure 5-8 Hiding duplicate records

To modify an index to hide duplicates of the index key:

1. Open the **Modify existing index** option on the **Organize** menu. The list of index tags appears.
2. Highlight the index that you want to use and press **↓**. The submenu appears.
3. Highlight **Display first duplicate key only** and use **Spacebar** or **↓** to set it to **YES**.
4. Press **Ctrl-End** to save the index.



TIP

One important application for the **Display first duplicate key only** option involves mailing lists. If you have a mailing list, you might construct an index defined as Lastname+Address. If you want to avoid printing labels for John Smith and Susie Smith, both of whom live at the same address, you could use the **Display first duplicate key only** option to include only the first of these two found in the database file.

See the INDEX command and its UNIQUE keyword in *Language Reference*.

Modifying an Existing Index

To change an existing dBASE IV index, select the **Modify existing index** option in the **Organize** menu on either the database design screen or on the Browse/Edit screen. A list appears in the upper right corner of the screen showing the index tag names in the active .mdx file. The box to the left of the list displays the index expression for the highlighted index tag.

Highlight the index you want to modify and press ↵. Change the settings and press **Ctrl-End** to save your changes.



NOTE

Change the index expressions for .ndx files at the dot prompt. See Language Reference for instructions.

Removing an Index

dBASE IV automatically maintains the indexes in your current .mdx file. You can improve processing speed by removing any indexes you no longer need.

To remove an index, select the **Remove unwanted index tag** option in the **Organize** menu. A list of index tags is displayed. Highlight the index tag you want to delete and press ↵. That index is removed from the .mdx file.

Using Indexes from Earlier dBASE Product Versions

You can use the .ndx files created with earlier dBASE versions with dBASE IV, but the .mdx files created in dBASE IV cannot be used by earlier dBASE versions.

You may want dBASE IV to maintain some .ndx files, particularly if you plan to use your database files with earlier dBASE versions.

Using the menu system, you can do the following with an .ndx file:

- Add it to the currently active catalog
- Activate it so that it is updated when you change the database file
- Order the records by it as you would any other index tag

Adding an .ndx File to the Current Catalog

If a catalog is open, the **Activate .NDX index file** option in the **Organize** menu shows only those .ndx indexes that belong to the current database file and are already in the current catalog. To add a new .ndx index to the current catalog, use the **Include .NDX index file** option.

When you choose the **Include .NDX index file** option, a list appears of all the .ndx files in the current directory. Select the name of any .ndx file that belongs to the current database file. This .ndx file then appears whenever you use the current database file and choose the **Activate .NDX index file** option on the **Organize** menu.

Note that when an .ndx index filename is added to the catalog with the **Include .NDX index file** option, dBASE IV activates it at the same time.

If you reach the database design screen from the dot prompt and no catalog is open, this option is dimmed and unavailable.

Keeping .ndx Files Up To Date

To keep .ndx files up to date, activate them before making changes to your database file. To activate .ndx files:

1. Choose the **Activate .NDX index file** option on the **Organize** menu. A list of .ndx files and their index expressions appears.

If a catalog is open, this list includes all .ndx files in the catalog that apply to the current database file. If no catalog is open, the list shows *all* .ndx files in the current directory, even those .ndx files not associated with the database file.

2. Highlight the name of the file you want to activate and press ↵. The .ndx file will now reflect changes made in the database file.

You may have a total of 10 .ndx and .mdx files open at one time, not counting the production .mdx file.



NOTE

Remember that .ndx indexes must be activated to be updated automatically. If you have .ndx files that were not open when changes were made to the database file, you can update them with the REINDEX command from the dot prompt.

Ordering Records with the .ndx Index File

Order records with an .ndx file in the same way you would with any other index tag. Select the **Order records by index** option in the **Organize** menu and press ↵. Then choose the applicable index file from the list that appears. Remember that the list will not contain the .ndx file until you activate it.

Reordering Records Automatically During Editing

When you edit the data for a field that is being used by the active index, you may also be changing the indexed location of the record in the database file or view. For example, if the records are ordered by last name, changing a name from Campbell to Johnson changes the indexed location of that record from the Cs to the Js.

To allow the cursor to move with the changed record to its new indexed location:

1. Press **Alt-R** to open the **Records** menu. If the **Follow record to new position** option is set to **YES**, just **Esc** from the menu.
2. If the **Follow record to new position** option is set to **NO**, type **F**. The option is now set to **YES**. The actual movement of the cursor to the new location takes place when you move the cursor off the record you just edited.

Set this option to **NO** if you want to keep the cursor in the same place where the newly modified record used to be.



NOTE

You can set the **Follow record to new position** option only when records are organized by an active index.

Searching for Records in the Browse and Edit Screens

You can choose from two methods of searching through a database file for a particular record:

- An index key search is the fastest because it takes advantage of an index.
- A forward or backward search through the database file can be done whether or not your database file is using an index.

Using an Index Key

If the data you are seeking is part of an index expression, consider doing an index key search. For instance, if you have an index tag that uses the index expression *lastname + firstname + initial*, you might want to do an index key search on the last name.

Rules for index key searches are as follows:

- Use the exact style of the index when entering the search string. For example, if you have an index expression on `UPPER(lastname)`, then you must enter *SMITH* as your search string (not *Smith* or *smith*) to find a person whose last name is *Smith*. This form is necessary because all entries in the index were converted to uppercase letters when making the index. You can tell how the index is constructed by looking at the index expression, shown in the prompt box.
- The index key search finds the first record that contains the index expression. The important part of the search string is the beginning because the index key search searches for a match from the left to the right of the string.

For example, to find San Francisco in a database file indexed on the City field, you could use these search strings: *San Francisco*, *San F*, or *San*. Of course, you might find *San Fernando* or *San Diego* first. You could then enter a more comprehensive search string, or simply move through these neighboring records until you find the one you want.

- Do not use the wildcards * and ? in the search string. These characters are interpreted literally as asterisks and question marks.

If you display data from a view made from more than one database file, the index key search may not be available.

To perform an index key search you first choose the index and then set up the search:

1. From the Control Center, highlight the file that you want to search and press **F2 Data**.
2. Open the **Organize** menu and type **O** to choose the **Order records by index** option.
3. Pick the index that you want to be the current, or master, index.
4. Press **Alt-G** to open the **Go To** menu, highlight the **Index key search** option, and press **↓**. A prompt box appears, as shown in Figure 5-9.

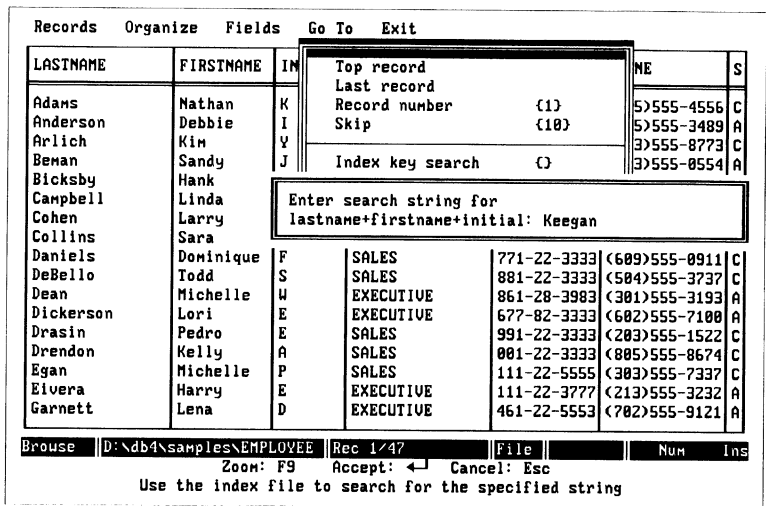


Figure 5-9 Index key search prompt box

5. Enter the *search string* and press **↓**. The highlight moves to the record containing the first instance of the search string.

Searching Forward or Backward for a Record

To search forward in a database file for a particular record, use the **Forward search** option in the **Go To** menu. This option finds the next record with data matching the search string.

Unlike the index key search, you can use the ***** and **?** wildcards in the search string. For example, to locate *123 Maple Avenue*, possible search strings include *123 Maple Avenue*, *1?? Maple **, or **Maple**. A search string of only *Maple* would not be complete enough to find *123 Maple Avenue*.

**TIP**

Although more flexible, the **Forward search** option is not as fast as **Index key search**. If you plan frequent searches on a certain field, consider making an index for this field so you can find data quickly.

To find a particular record with the **Forward search** option:

1. Place the cursor in the column of the field you want to use for the search.
2. Press **Alt-G** and then type **F** to choose the **Forward search** option.
3. When prompted for the search string, type it in. For example, to find the first instance of Chicago, type *Chicago*. (No quotes are needed, since search criteria are *strings*, not *expressions*.)
4. Press **↵**.

**NOTE**

To find records based on expressions (such as all the people whose income is over \$34,000), see Chapter 7.

To search for the next matching record, press **Shift-F4 Find Next**. You can continue pressing **Shift-F4 Find Next** until you find all the matching records. If you want to return to one of the records already found, press **Shift-F3 Find Previous**.

If you started your search from somewhere other than the beginning of the file, dBASE IV automatically searches to the end of the file and then goes back to the beginning, until it searches the entire database file.

Use the **Backward search** option to search backward.

**NOTE**

If the data that you are searching for using **Forward search** is unique, pressing **Shift-F4 Find Next** after finding the record will again find the same record. Be aware that you may not have found another record with the same data. When using **Forward search** in a large file, the slowness of the search may make it appear that your system is halted. For large files, use **Index key search** instead.

Capitalization and Searching for Records

To search for data without regard to its capitalization, set the **Match capitalization** option to **NO** in the **Go To** menu before doing a backward or forward search. For instance, if **Match capitalization** is set to **NO**, then a search string of *demille* finds *DeMille*, *DEMILLE*, or *Demille*.

If **Match capitalization** is set to **YES**, a search string of *DeQuincy* does not find *dequincy* or *DEQUINCY*. In this case, the search string must match the record exactly.

**NOTE**

Match capitalization does not work with the **Index key search** option. **Index key search** only finds text with capitalization exactly like that of the search string.

Sorting the Database File

As discussed at the beginning of this chapter, sorting is less useful than indexing. Unlike indexing, which uses the same copy of a database file in different indexed order, sorting creates a new, sorted database file. The original database file remains unsorted. If you have multiple copies that are merely sorted differently, confusion and disk clutter may result. Once you create a sorted database file, any change made to the original file is not made to the sorted file (and vice versa). You must then maintain two separate databases.

However, there are some occasions when you might want to sort the database file. For instance, you can do an ascending sort on one field and a descending sort on another field at the same time. (Using a complex index for this purpose isn't recommended.) You might also want to sort a database file that will never change.

To sort a database file:

1. At the Control Center, highlight the file you want to sort and press **Shift-F2 Design** or **F2 Data**.
2. Press **Alt-O** to open the **Organize** menu. Then type **S** to use the **Sort database on field list** option.
3. Press **Shift-F1 Pick** to show the possible field names that you can use to sort. Several of them, such as logical or memo fields, may be dimmed, and therefore are unavailable.
4. Move down the list with **↓** to the field that you want to be the initial sort criterion and press **↵**. The field you choose appears in the first position in the **Field order** column, as shown in Figure 5-10.

Records Organize Fields Go To Exit								
Field order	Type of sort	ID	PHONE	S				
SALARY	Ascending ASCII (0-9..A-Z..a-z)	22-3333	0505>555-4556	C				
		72-3777	<415>555-3489	A				
		22-6788	<603>555-8773	C				
		22-7773	<213>555-0554	A				
		02-3333	<602>555-1278	C				
		22-3333	<602>555-1974	C				
		22-3333	<217>555-4204	C				
		22-3333	<503>555-0953	C				
		22-3333	<609>555-0911	C				
		22-3333	<504>555-3737	C				
		28-3983	<301>555-3193	A				
		82-3333	<602>555-7100	A				
		Drasin	Pedro	E	SALES	991-22-3333	<203>555-1522	C
		Drendon	Kelly	A	SALES	001-22-3333	<805>555-8674	C
Egan	Michelle	P	SALES	111-22-5555	<303>555-7337	C		
Eivera	Harry	E	EXECUTIVE	111-22-3777	<213>555-3232	A		
Garnett	Lena	D	EXECUTIVE	461-22-5553	<702>555-9121	A		

Browse D:\db4\samples\EMPLOYEE Rec 1/47 File Num Ins
 Pick list:Shift-F1 Insert/Delete field:Ctrl-N/Ctrl-U Accept:Ctrl-End
 Field names begin with a letter and may contain letters, digits and underscores

Figure 5-10 Picking the initial sort field

5. Press **↓** again. The cursor moves to the **Type of sort** column.
6. Press **Spacebar** until you locate the type of sort you want to use on your initial field. Table 5-1 lists how each of the four sort types actually sorts.

Table 5-1 Sort types

Name	Example	Description
Ascending ASCII	0..9 A..Za..z	Case sensitive
Descending ASCII	z..aZ..A 9..0	Case sensitive
Ascending dictionary	0..9 Aa..Zz	Not case sensitive
Descending dictionary	zZ..aA 9..0	Not case sensitive

Dictionary sorts are not sensitive to letter case. For example, if you choose **Ascending dictionary**, all records beginning with the letters *a* or *A* appear before records beginning with the letters *b* or *B*. However, ASCII sorts are sensitive to case. In an **Ascending ASCII** sort, *Zebra* would come before *antelope* because capital letters come before lowercase in ASCII.

In general, when you sort character fields, you need to use dictionary sorts to protect against inconsistency of capitalization in the database.

7. To sort according to a second criterion, press **↓**. The highlight moves to the second sort line. Press **Shift-F1 Pick** to open the list, use **↓** to move to the second field you want to sort by, and press **↓**. That field name appears on the second sort line. Press **↓** again and the cursor moves to the **Type of sort** column.
8. Press **Spacebar** until the type of sort is set to what you want. Your screen should look similar to that shown in Figure 5-11.

Records				Organize	Fields	Go To	Exit
Field order		Type of sort		ID	PHONE	S	
SALARY		Ascending ASCII (0-9..A-Z..a-z)		22-3333	0505)555-4556	C	
VRS_EXPER		Ascending ASCII (0-9..A-Z..a-z)		72-3777	(415)555-3489	A	
				22-6788	(603)555-8773	C	
				22-7773	(213)555-8554	A	
				02-3333	(602)555-1278	C	
				22-3333	(602)555-1974	C	
				22-3333	(217)555-4204	C	
				22-3333	(503)555-8953	C	
				22-3333	(609)555-8911	C	
				22-3333	(504)555-3737	C	
				28-3983	(301)555-3193	A	
				82-3333	(602)555-7100	A	
Drasin	Pedro	E	SALES	991-22-3333	(203)555-1522	C	
Drendon	Kelly	A	SALES	001-22-3333	(805)555-8674	C	
Egan	Michelle	P	SALES	111-22-5555	(303)555-7337	C	
Eivera	Harry	E	EXECUTIVE	111-22-3777	(213)555-3232	A	
Garnett	Lena	D	EXECUTIVE	461-22-5553	(702)555-9121	A	
Browse				D:\db4\samples\EMPLOYEE	Rec 1/47	File	Num Ins
Pick list:Shift-F1 Insert/Delete field:Ctrl-M/Ctrl-U Accept:Ctrl-End							
Field names begin with a letter and may contain letters, digits and underscores							

Figure 5-11 Two sort criteria

9. Press **Ctrl-End** when you have finished (you can also press **↓** when the cursor is in an empty row of the **Field order** column). You are prompted for a name to give the new sorted file.
10. Type a name for the new file and press **↓**. Sorting begins and a new file is created. The original file, however, remains as the current file.
11. Type a file description for the new file and press **↓**.

Here is some more information about sorting:

- You can sort on a combination of up to 10 fields.
- To eliminate a field name from the sort list prior to creating the sorted file, highlight it and press **Ctrl-U**.
- The first field name in the sort list is the primary key. The second field name in the list is the secondary key, and so on.

- To change the position of a field name in the list, place the highlight on the field name you want to move and press **F7 Move**. Then highlight the correct position and press ↵.
- Press **Tab** and **Shift-Tab** to move between the **Field order** and **Type of sort** columns. In the **Type of sort** column, press **Spacebar** to cycle through the four sorting types.
- You cannot have duplicate field names in the sort list.
- You cannot sort on logical or memo fields.
- You cannot sort on expressions.
- You can sort on mixed data types (because sorting is different from indexing).

Design Tools

Queries: Creating a View

Queries: Filtering Data

Using Update Queries

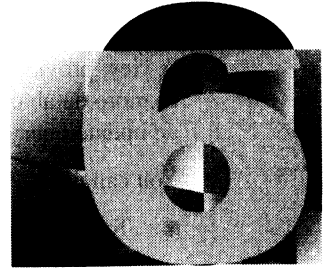
Designing and Using Forms

Creating Reports

Using Mailmerge

Creating Labels

Queries: Creating a View



This and the next two chapters discuss queries. A query is a set of instructions that specifies how dBASE IV should organize or change your data. You can create two kinds of queries: *view queries* and *update queries*.

View queries provide a view, or partial picture, of the data contained in one or more database files. You can use a view just as you would a database file to display, enter, and edit data. Or, you can use it to organize data for further work, such as producing reports and labels.

Update queries provide a way to make broad changes to a database file. With update queries, you can:

- Append new data from one or more databases
- Define groups of records to be deleted or undeleted
- Replace data in fields that meet a specified condition

This chapter discusses creating views to be used for data entry and for producing reports and labels. It explains how to:

- Choose the database file to be viewed
- Create single database views
- Add fields to the view skeleton
- Organize views with indexes
- Create and link multiple database views
- Use calculated fields in views

Chapter 7 discusses how to use a view to obtain particular information from one or more database files (such as a summary of the data or finding the data that meets a particular set of criteria).

Chapter 8 discusses how to use update queries to make large scale changes to a database file through replacing, appending, and deleting data.

What is a View?

A view provides a picture of one or more database files. Views can use fields from one or more database files to create a query file that has a .qbe extension. (When you save an update query, dBASE IV gives that file a .upd extension.)

You can use a view:

- To display data
- To enter data in a database file (unless the view or some of its fields are read-only: refer to the Limitations on Updating Views section later in this chapter).
- As a basis from which to produce forms, reports, labels, and mailmerge documents.
- To rearrange fields in a different order.
- To make changes to a database file (unless the view or some of its fields are read-only: refer to the Limitations on Updating Views section later in this chapter).
- To limit the fields that a user can look at or change, providing access only to the part of a database file that you want a particular user to have. For example, a personnel file can contain many fields, including one for employee salaries. You may want some employees to use this personnel file, but you don't want all employees to see salaries of their fellow employees. You can create a view which does not contain all the fields, as shown in Figure 6-1.

Employee database file

LASTNAME	FIRSTNAME	INITIAL	DEPARTMENT	EMP ID	PHONE	SPECIALTY	COMMENTS	AWARDS	DATE HIRED	DEGREE
Adams	Nathan	K	SALES	703-22-3333	(505) 555-4556	COMMERCIAL			02/02/86	BS
Anderson	Debbie	I	EXECUTIVE	118-72-3777	(415) 555-3489	ADMIN			04/04/86	
Arlich	Kim	Y	SALES	437-22-6788	(603) 555-8773	COMMERCIAL			03/06/85	
Berman	Sandy	J	EXECUTIVE	151-22-7773	(213) 555-0554	ADMIN			06/06/84	BA
Bicksby	Hank	F	SALES	899-02-3333	(602) 555-1278	COMMERCIAL			11/01/85	BA
Campbell	Linda	H	SALES	441-22-3333	(602) 555-1974	COMMERCIAL			12/01/86	
Cohen	Larry	A	SALES	551-22-3333	(217) 555-4204	COMMERCIAL			09/08/85	BA
Collins	Sara	H	SALES	661-22-3333	(503) 555-0953	COMMERCIAL			04/13/85	
Daniels	Dominique	F	SALES	771-22-3333	(609) 555-0911	COMMERCIAL		GOLD	11/11/84	BA
DeBello	Todd	S	SALES	881-22-3333	(504) 555-3737	COMMERCIAL			02/02/83	BS
Dean	Michelle	W	EXECUTIVE	861-28-3983	(301) 555-3193	ADMIN		SILVER	04/12/83	
Dickerson	Lori	E	EXECUTIVE	677-82-3333	(602) 555-7100	ADMIN		BRONZE	05/05/85	BS
Drasin	Pedro	E	SALES	991-22-3333	(203) 555-1522	COMMERCIAL			04/04/82	
Drendon	Kelly	A	SALES	001-22-3333	(805) 555-8674	COMMERCIAL			08/08/81	
Egan	Michelle	P	SALES	111-22-5555	(303) 555-7337	COMMERCIAL			07/07/81	
Eivera	Harry	E	EXECUTIVE	111-22-3777	(213) 555-3232	ADMIN			10/10/82	
Garnett	Lena	D	EXECUTIVE	461-22-5553	(702) 555-9121	ADMIN			03/05/83	

LASTNAME	FIRSTNAME	DEPARTMENT	EMP ID	DATE HIRED
Adams	Nathan	SALES	703-22-3333	02/02/86
Anderson	Debbie	EXECUTIVE	118-72-3777	04/04/86
Arlich	Kim	SALES	437-22-6788	03/06/85
Berman	Sandy	EXECUTIVE	151-22-7773	06/06/84
Bicksby	Hank	SALES	899-02-3333	11/01/85
Campbell	Linda	SALES	441-22-3333	12/01/86
Cohen	Larry	SALES	551-22-3333	09/08/85
Collins	Sara	SALES	661-22-3333	04/13/85
Daniels	Dominique	SALES	771-22-3333	11/11/84
DeBello	Todd	SALES	881-22-3333	02/02/83
Dean	Michelle	EXECUTIVE	861-28-3983	04/12/83
Dickerson	Lori	EXECUTIVE	677-82-3333	05/05/85
Drasin	Pedro	SALES	991-22-3333	04/04/82
Drendon	Kelly	SALES	001-22-3333	08/08/81
Egan	Michelle	SALES	111-22-5555	07/07/81
Eivera	Harry	EXECUTIVE	111-22-3777	10/10/82
Garnett	Lena	EXECUTIVE	461-22-5553	03/05/83

View using selected fields from the Employee database file.

Figure 6-1 View of the Employee database file

Views save disk space and help prevent the duplication of data. When you are through using a view, it no longer exists in memory. You can, however, save the query that defined the view and then use it to re-create the view. You can even save a view to a .dbf file (thus creating a new database file).

Where You Create Views: The Queries Design Screen

Use the queries design screen to create both view queries and update queries. Figure 6-2 shows the elements of the queries design screen.

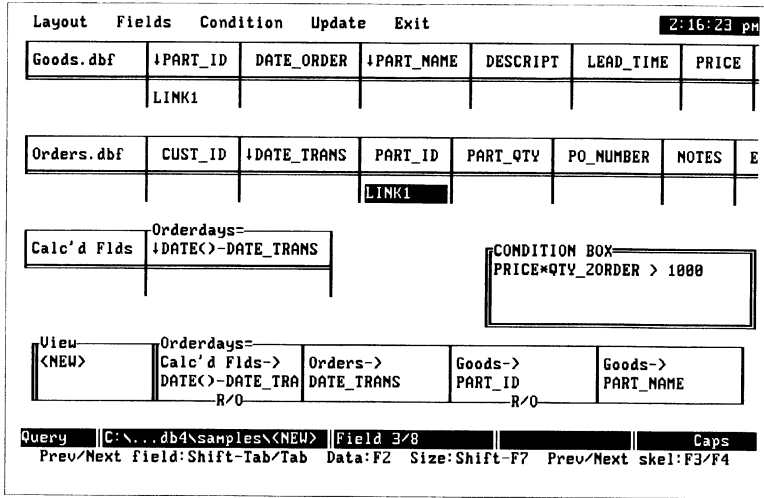


Figure 6-2 Queries design screen

This queries design screen contains four types of elements.

The first element is called a *file skeleton*. In Figure 6-2, the file skeletons are near the top of the screen. They are graphic representations of database files and show the names of all the fields in the database file. You can use the space below the field names to enter selection criteria, linking example variables, and other elements of view or update definition. You can use up to eight file skeletons on one queries design screen.

The second element is the *view skeleton*. The view skeleton is near the bottom of the screen and contains the fields from the file skeletons that you want to appear in your view.

The third element is the optional *calculated field skeleton*. It is located just below the file skeletons. Use it to create calculated fields for the current view.

The fourth element of the queries design work surface is the optional *condition box*. Condition boxes make it easy to enter complicated filter conditions that involve several fields. For more information on condition boxes, see Chapter 7.



NOTE

*The name of the file or view skeleton is located to the left of the file skeleton.
The name of a calculated field is located above that field.*

Reaching the Queries Design Screen

Table 6-1 shows how to reach the queries design screen.

Table 6-1 Ways to reach the queries design screen

From	Action
Control Center	Place the cursor on the <create> marker in the Queries panel and press ↵ or Shift-F2 Design .
Control Center	Place the cursor on the name of an existing view or query and press Shift-F2 Design .
Control Center	If INSTRUCT is ON , place the cursor on the name of an existing view or query and press ↵ . Then select the Modify query choice from the panel prompt box.
Browse or Edit screens	Press Shift-F2 Design or choose the Transfer to Query Design option from the Exit menu.
The design screens for database files, forms, reports, or labels	Press Shift-F2 Design .
Dot prompt	Enter CREATE VIEW <filename> or MODIFY VIEW <filename> .
Dot prompt	Enter CREATE QUERY <filename> or MODIFY QUERY <filename> .

Navigating on the Queries Design Screen

Table 6-2 shows how to navigate on the queries design screen.

Table 6-2 Navigation on the queries design screen

Keys	Movement
F3 Prev or F3 Next	Move up or down between the skeletons and the condition box.
← or →	Move within a column.
Tab or Shift-Tab	Move to the next or previous column. If a file or view skeleton has more fields than can fit across the screen at one time, press Tab to see the other fields scroll into view. Press Shift-Tab to move the cursor back.
End or Home	Move to the far left or far right of a skeleton. Notice that the name of the file remains in the left column when you scroll the other columns.
↑ or ↓	Move row by row up or down the rows of a field within a file skeleton.
Ctrl-PgUp and Ctrl-PgDn	Move quickly up and down the rows of a field within a file skeleton.
PgDn or PgUp	When you have more file skeletons than can fit on one page of the screen, you can move to the next page of file skeletons by pressing PgDn . Move to the previous page of file skeletons by pressing PgUp . When there are file skeletons below the ones currently displayed, a small arrow appears in the lower left portion of your screen. When file skeletons are above, the arrow appears in the upper left portion of the screen.

Creating a Single-Database View

The following sections describe how to create a single-database file view.

Choosing the Database File to be Viewed

1. Make sure the database filename from which you want to create this view is listed in the current catalog.
2. Highlight **<create>** in the **Queries** panel and press **↵**. The screen changes to the queries design screen with the **Layout** menu open as shown in Figure 6-3.



NOTE

*If a database file is already in use when you choose **<create>**, that database file's skeleton appears on the queries design screen (as does the view skeleton). The **Layout** menu is not open.*

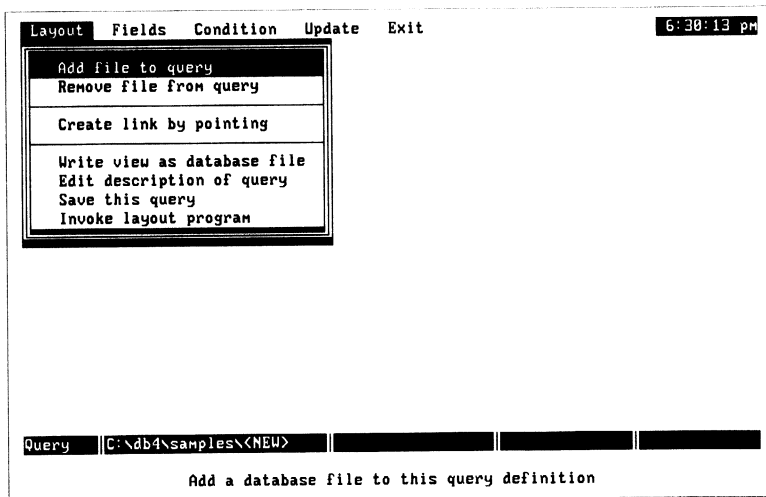


Figure 6-3 **Layout** menu

3. Select the **Add file to query** option. A list of the files in the current catalog appears. Use this list to choose database files.
4. Highlight the database file that will be the source from which you create your view. Notice that as you highlight the filenames in the list, dBASE IV displays the file description (if there is one), as shown in Figure 6-4. When you find the file you want, press **↵**.

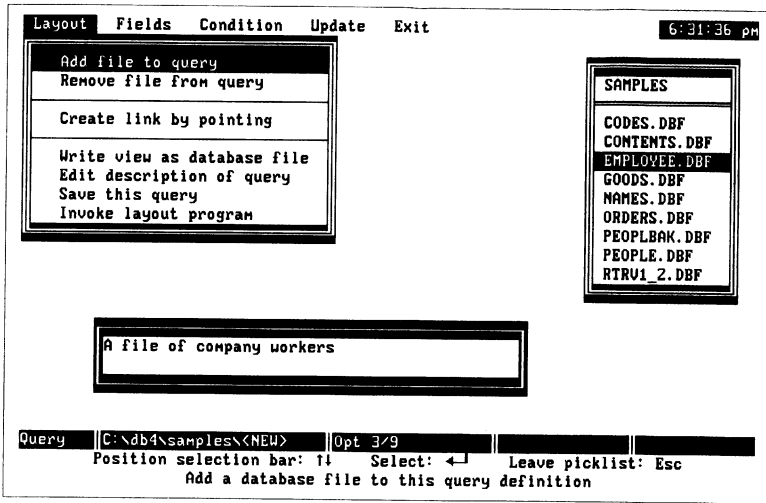


Figure 6-4 Choosing a file

The screen repaints and across the top of the screen the file skeleton appears. It shows the name of the database file on the left and the names of all the fields in the database file to the right. In Figure 6-5, the database file is named Employee.dbf. The fields in the file appear as column names to the right of the filename. You can view the rest of the fields by pressing **Tab** to move to the right and **Shift-Tab** to move to the left.

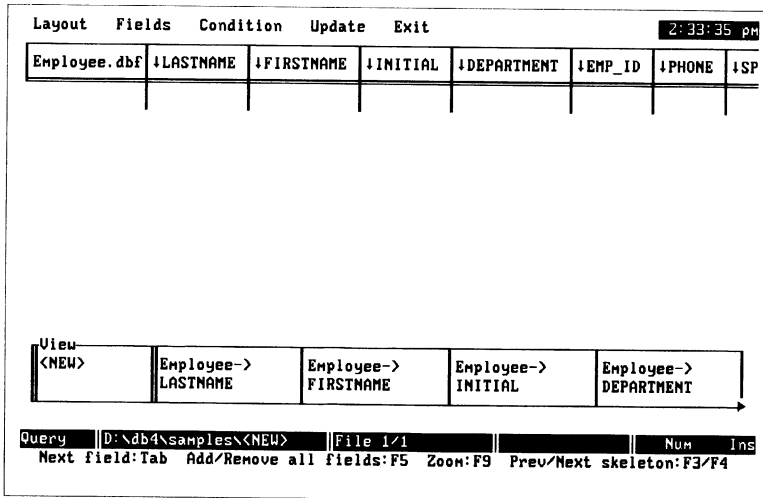


Figure 6-5 File skeleton

Adding the Fields to be Used in the View

In addition to the file skeleton at the top of the screen, you will create a view skeleton at the bottom of the screen. The view skeleton is a graphic representation of the fields that you decide to put into the view. There can be only one view skeleton.

Adding Fields One at a Time

To add a field to the view skeleton:

1. Use **Tab** and **Shift-Tab** to position the cursor in the field of the database file skeleton or calculated field skeleton, as shown in Figure 6-6. (For information on creating calculated fields, see the Using a Calculated Field in a View section later in this chapter.)

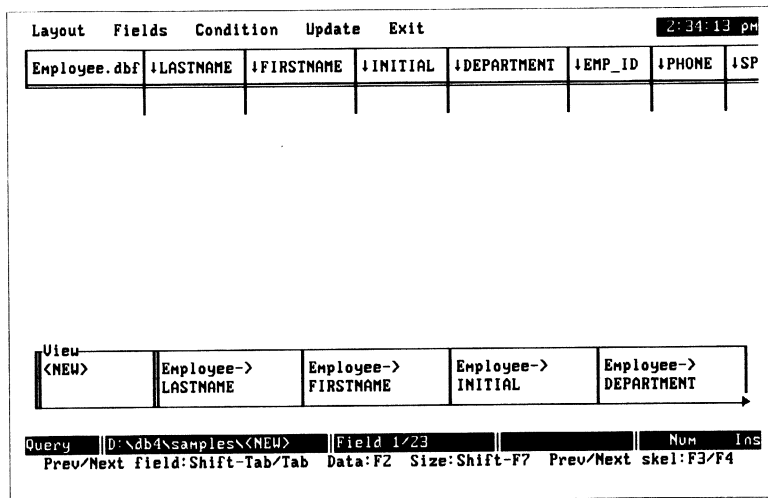


Figure 6-6 Positioning the cursor in the field

2. Press **F5 Field** or select the **Add field to view** option from the **Fields** menu. Notice that dBASE IV places a representation of the field you have chosen at the bottom of the screen, as shown in Figure 6-7. This is the first field in your view skeleton. The ↓ next to the field name in the file skeleton indicates that field has been added to the view.

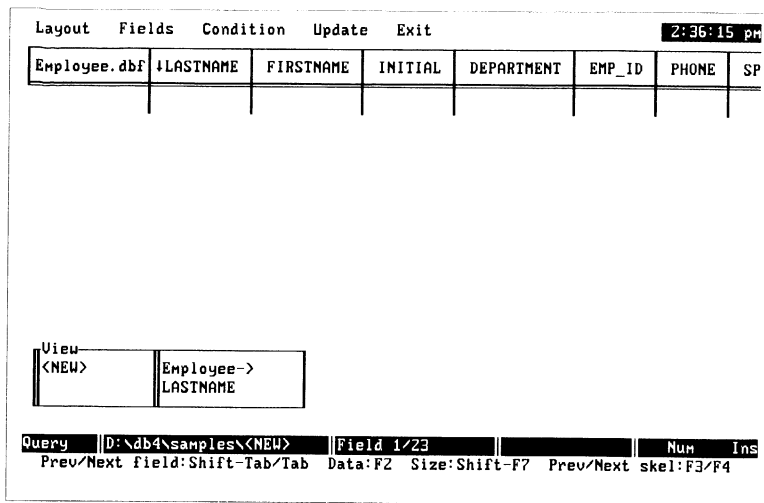


Figure 6-7 Selecting a field for the view

3. To continue adding more fields to the view, repeat steps 1 and 2 until all the fields you want are added to the view skeleton at the bottom of the screen.

Using Nearly All Fields in Your View

Sometimes you may want to place all the fields in a database file in your view. Rather than adding the fields that you want one-by-one, it is faster to put all the fields from the file skeleton into the view skeleton at once.

1. Position the highlight under the filename in the file skeleton.
2. Press **F5 Field**. If the file has no fields in the view skeleton, all its fields are placed in the view skeleton. If the file already has some fields in the view skeleton, the rest of the fields are placed there, as in Figure 6-8.



NOTE

To move between the file skeleton and the view skeleton, up and down the queries design screen, use **F4 Next** and **F3 Previous**.

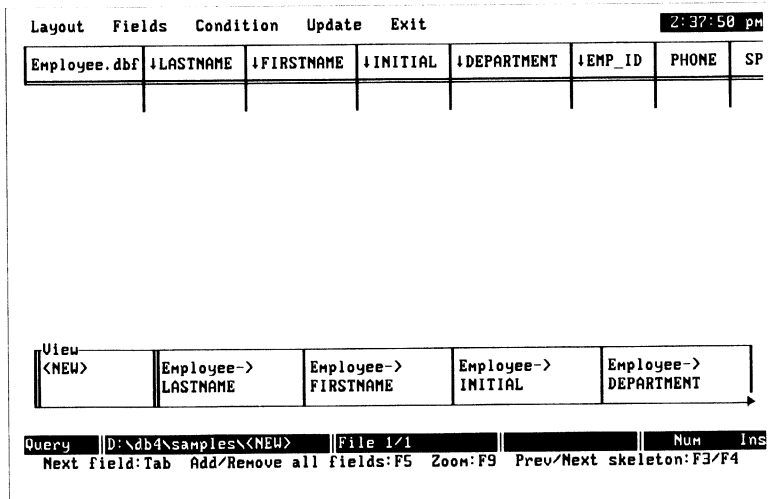


Figure 6-8 Using **F5 Field** to add all fields



NOTE

*If the file already has all its fields in the view skeleton, pressing **F5 Field** with the highlight under the filename removes all its fields from the view skeleton.*

Removing Fields from the View Skeleton

You can remove a field name from the view skeleton whether the highlight is on a field in the file or view skeleton:

1. In the file skeleton, place the highlight under the field name that you want to remove. In the view skeleton, place the highlight over the field name you want to remove.
2. When the highlight is on the field that you want to remove, press **F5 Field** or choose the **Remove field from view** option from the **Fields** menu. The image of the field disappears from the view skeleton.

Displaying the View Data

To see the results of the view query that you have just created on the queries design screen, press **F2 Data**. Return to the queries design screen by pressing **Shift-F2** or by selecting **Transfer to Query Design** from the **Exit** menu.

To see the data of a view that is listed in the Control Center, highlight the view name, then press **F2 Data**.



NOTE

View queries are listed in the Control Center in the **Queries** panel. All view queries have a *.qbe* extension, but some of the files listed in the **Queries** panel are not view queries. Some may be update queries, which have a *.upd* extension. In the **Queries** panel, the name of an update query is prefixed by an asterisk (*). What all items in the **Queries** panel have in common is that they were created on the queries design screen.

Moving Fields in a View

To change the order of the fields in a view:

1. In the view skeleton, highlight the field you want to move and press **F6 Select**. The entire field box is highlighted, as shown in Figure 6-9.

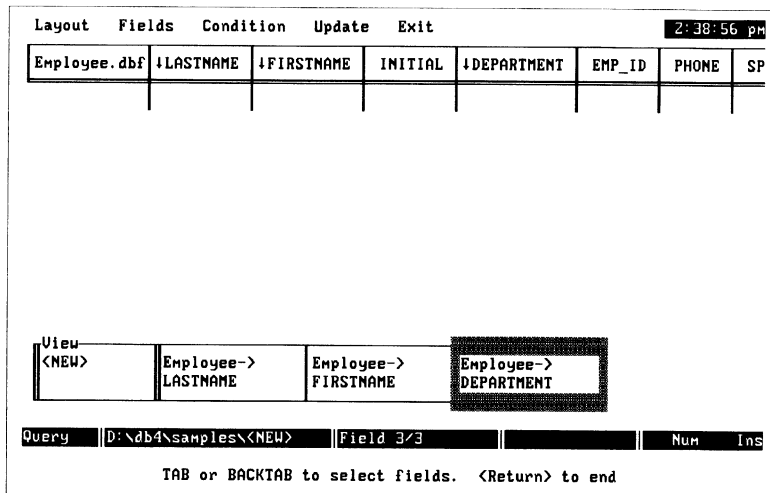


Figure 6-9 Choosing one field to move

2. Extend your selection over more fields by pressing **Tab** or **Shift-Tab**, as shown in Figure 6-10.

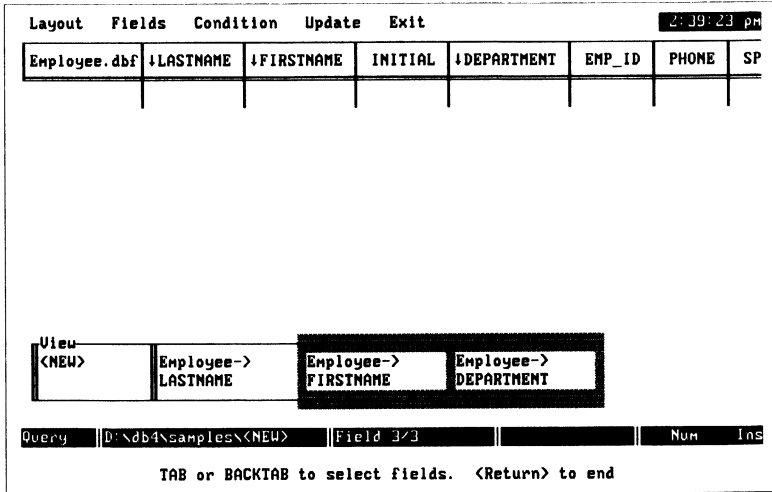


Figure 6-10 Choosing multiple fields to move

3. When you have selected the field or fields you want to move, press **↓**.
4. Press **F7 Move** and then **Tab** or **Shift-Tab** to move the field where you want it. Press **↓** to complete the move. Figure 6-11 shows the completed move.

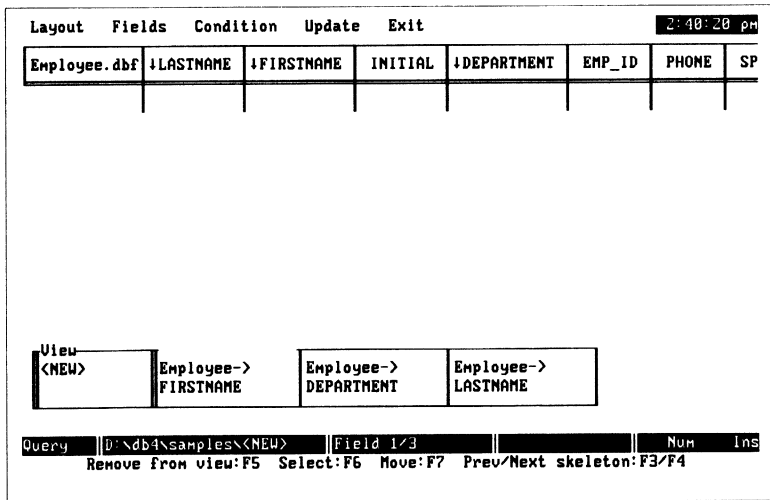


Figure 6-11 Completing the field move



NOTE

To move only one field, highlight that field, press **F7 Move**, move the field to where you want it to go, and press ↵.

Renaming a Field in a View

You may want to change the name of a field so that the view displays a different name than the one used in the database file. However, a renamed field cannot be edited in the Browse or Edit screen.

To rename a field in a view:

1. In the view skeleton, move the highlight to the field name that you want to rename.
2. Type **Alt-F** to open the **Fields** menu and then type **E** for the **Edit field name** option.
3. Type the new name for the field and press ↵. The new field name appears in the view skeleton, as shown in Figure 6-12.

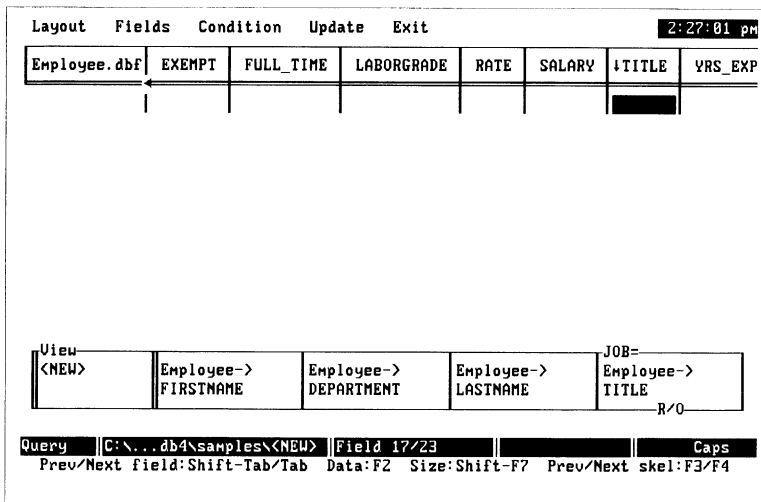


Figure 6-12 Renaming a field in a view



NOTE

- All field names in a view skeleton must be unique. If you try to add a field with a name matching that of a field already in the view skeleton, you are prompted to give this field another name. This can happen in multiple-database file views and calculated fields.
- Besides using the **Fields** menu, you can also move the highlight to a field in the view skeleton, type in a field name, and press ↵.
- A view cannot contain memo fields from different database files if those memo fields have the same name in both database file structures. This is because you cannot give an alias to a memo field on the queries design screen.
- Field names must be valid dBASE names, with a maximum of ten characters and no special characters.
- You cannot modify data in a view field that you have renamed. A renamed field is considered a calculated field and is read-only (tagged “R/O”), as discussed later in this chapter in the *Limitations on Updating Views* section.

Naming and Saving View Queries

To name and save a new query, but remain in the queries design screen:

1. Press **Alt-L** to open the **Layout** menu and then type **S** to save the query. A prompt box appears.
2. Type in a name for the view and press ↵. This name appears in the bottom left corner of the screen.

If the query already has a name, you can either accept this name by pressing ↵ or enter a new name before pressing ↵. dBASE IV automatically adds a .qbe extension to view filenames.

dBASE IV checks the completeness and accuracy of your view before saving it to disk. If the view contains an error, dBASE IV displays a message describing the problem before saving the view.



NOTE

To name and save view queries and exit the queries design screen, use the **Save changes and exit** option in the **Exit** menu or press **Ctrl-End**. Either of these will prompt you for the filename before saving and exiting.

Describing the View

It is good practice to enter a description of the view to remind you what is in the view. To describe a view:

1. Press **Alt-L** and then **E** to open the **Layout** menu and select the **Edit description of query** option.
2. Enter a description of the view and press **↵**.

You can also use this option to modify the present description. It is not available if there is no catalog open.

Organizing the Records in a View

The best way to organize the records in a view is with indexes. Although you can order the data without using indexes, there are restrictions editing the resulting data. Therefore, to order data, it is advisable to use the existing indexes or to create indexes for your database file. See the Limitations on Updating Views section later in this chapter for more information.

Organizing Views with Simple Indexes

To identify which fields in a file skeleton have indexes defined for them:

1. Place the cursor somewhere in the file skeleton and press **Alt-F** to open the **Fields** menu. Then highlight **Include indexes**. If **Include indexes** is set to **NO**, press **↵** to set it to **YES**. If it is already set to **YES**, leave it as is.

A symbol appears to the left of a field name that is used in a simple index tag. A simple index tag uses only the field name (for example, Lastname or State) as its index expression. These symbols are listed in Table 6-3.



NOTE

*The **Include indexes** option displays symbols only for index tags kept by the production .mdx file, and not an .ndx file.*

Table 6-3 Symbols for included indexes

Symbol	Meaning
▲	Up arrowhead: the tag is ascending ASCII
▼	Down arrowhead: the tag is descending ASCII
#	Number symbol: the field is used in two tags, one ascending ASCII, the other descending ASCII

2. Move to one of the fields that has an index on it with **Tab** or **Shift-Tab**, as shown in Figure 6-13.

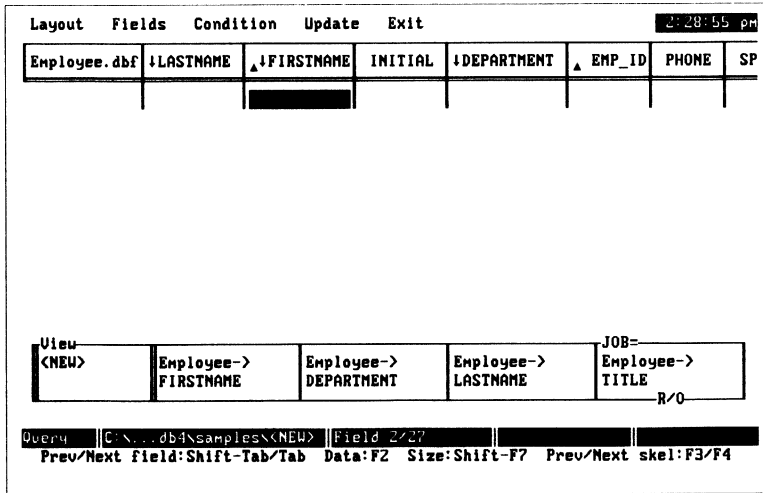


Figure 6-13 Choosing an indexed field

3. Type the abbreviation for one of the two types of sorts that are available for simple indexes, as shown in Figure 6-14. (The abbreviations and descriptions are shown in Table 6-4.) You can also use the **Sort on this field** option in the **Fields** menu to choose the type of sort.

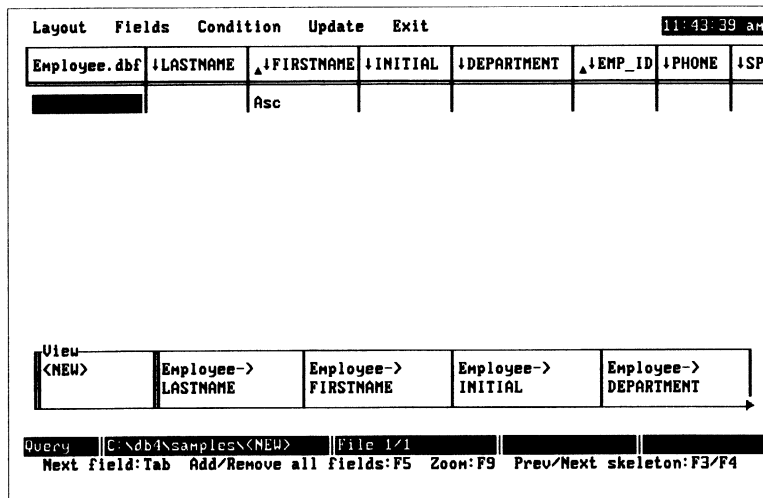


Figure 6-14 Specifying the type of sort

- To implement the sort of the data, press **F2 Data**. This takes you to the Browse screen with the view sorted according to your specifications.

Table 6-4 explains each of the different sort operators and shows their abbreviations.

Table 6-4 Sort operators

Abbreviation	Description
Asc<number>	Ascending ASCII sort. Starts from the beginning of the alphabet or from the smallest number. Uppercase letters are handled before lowercase letters (for example, <i>Zebra</i> comes before <i>aardvark</i>). <number> describes the order of precedence of this sort operator in relation to other sort operators (for example, Asc1).
Dsc<number>	Descending ASCII sort. Starts from the end of the alphabet or from the largest number. Lowercase letters are handled before uppercase letters (for example, <i>zebra</i> comes before <i>Aardvark</i>). <number> describes the order of precedence of this sort operator in relation to other sort operators (for example, Dsc2).



NOTE

- *If you are sorting with a single sort operator, you can skip the <number>.*
- *When creating a view that contains an ASCII sort operator, dBASE IV uses an existing index on the sort field. If no index exists, dBASE IV creates one if doing so would be faster than sorting the records. For more information about keeping or discarding such “speedup” indexes, refer to the Keeping Indexes Created by a Query section of Chapter 7.*

Organizing Views with Complex Indexes

When displayed in a file skeleton, a complex index field appears on the far right of the file skeleton, following normal fields. The complex index is further identified by its tag name, which straddles the line above the field.

As shown in Figure 6-15, a complex index is identified in one other way, depending on whether the index was defined with a complex index key or using a FOR, UNIQUE, or DESCENDING clause:

- Complex index key — by its index expression (for example, a compound expression such as Lastname+Firstname)
- FOR, UNIQUE, or DESCENDING clause — by its tag name, followed by its index expression and FOR, UNIQUE, or DESCENDING clause

Highlight the field and press **F9 Zoom** to see more of the index expression.



NOTE

As described in Chapter 5, you create an index using the **Create new index** option of the **Organize** menu of the database design, browse, or edit screen. You define a complex index expression using the **Index expression** option; a **FOR** clause using the **FOR clause** option; a **UNIQUE** clause using the **Display first duplicate key only** option; and a **DESCENDING** clause using the **Order of index** option.

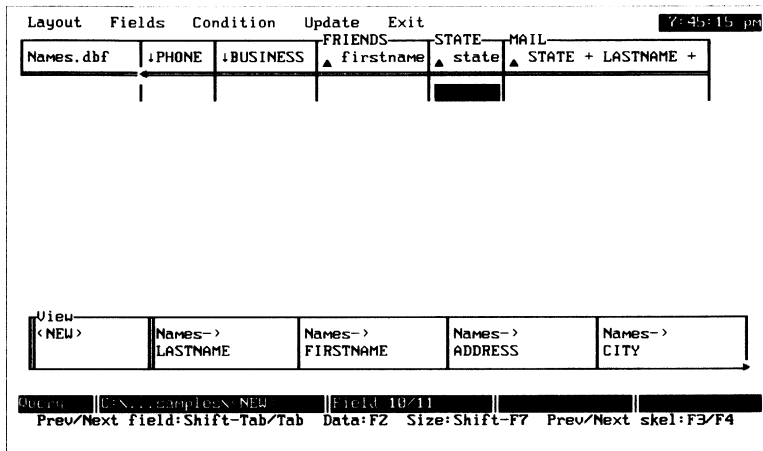


Figure 6-15 Complex index in file skeleton (before and after zoom)

Though the index expression is not a real field, it does look like one in the file skeleton. For this reason, it is sometimes called a *pseudo-field*. You can treat these complex indexes like other fields in the file skeleton for linking and sorting.



NOTE

When you sort on a complex index, you cannot place a sort operator in any other field.

About Indexes in General

When you toggle the **Include indexes** option to **NO**, all indications of indexes, simple and complex, are removed from the highlighted file. This lets you include indexes for some files and not others.

Fields that are already indexed usually allow faster sorting and linking. For this reason, any field that has an index is identified by one of the symbols shown in Table 6-3.

Sorting Records on More than One Field

You can sort a view's records on several fields, but the sorted view will be read-only. Do this by entering more than one sorting operator.

For example, suppose you want to organize a view's records by state, and then further organize them within each state alphabetically by city. The sorting operators are given priority according to the numbers after the sort operator abbreviation.

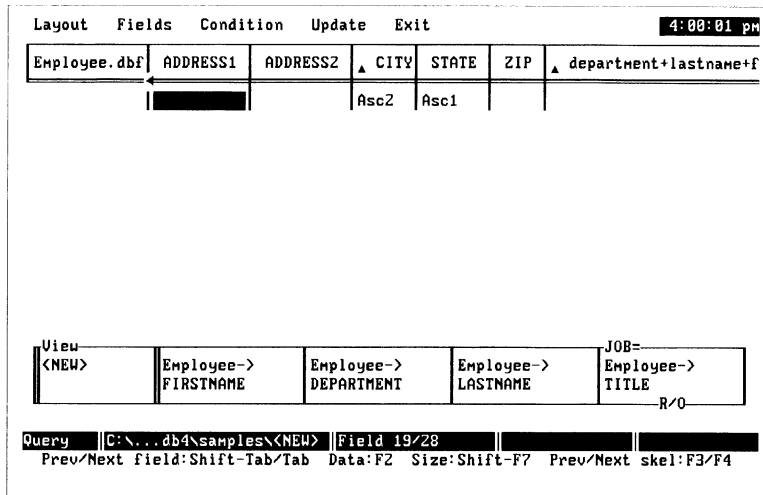


Figure 6-16 Establishing priority with sort operators

In Figure 6-16, the **STATE** column contains **Asc1** and the **CITY** column contains **Asc2**. This means that the primary sorting will be done by state, and within each state the records will be further sorted by city. The resulting view is shown in Figure 6-17.

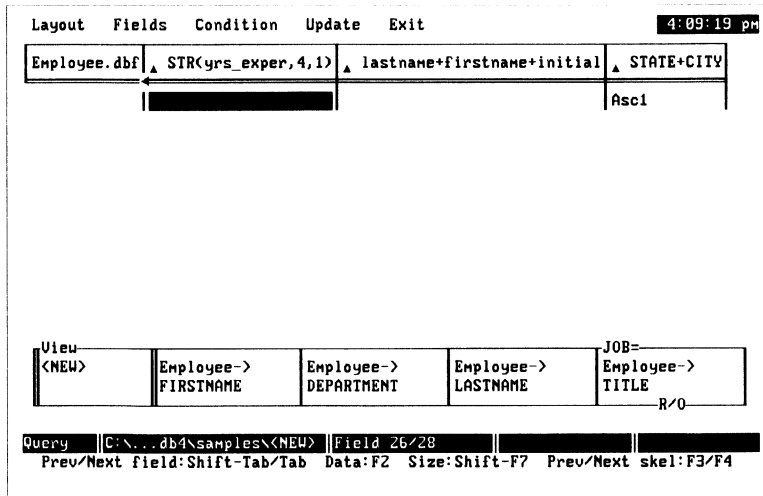


Figure 6-17 View sorted on two fields

As you add additional fields, give the sort operators ascending numbers. The third sort field, for example, might be Asc3. You can enter the sort operators in any order, but you cannot enter two with the same sort number.

You can avoid making a view read-only by sorting on a complex index instead of on several sort operators. For example, suppose that you have defined a complex index, *State+City*, on State and City fields. This index would be included in the file skeleton when you used the **Include indexes** option, as shown in Figure 6-18.

In this case, you would need only *one* sorting operator (**Asc1** in this example) in this column of the file skeleton. Because this index has already organized the records by State and City, performing the query will take less time. Even though this view is actually organized around two fields, because it uses a complex index, it will not be read-only.

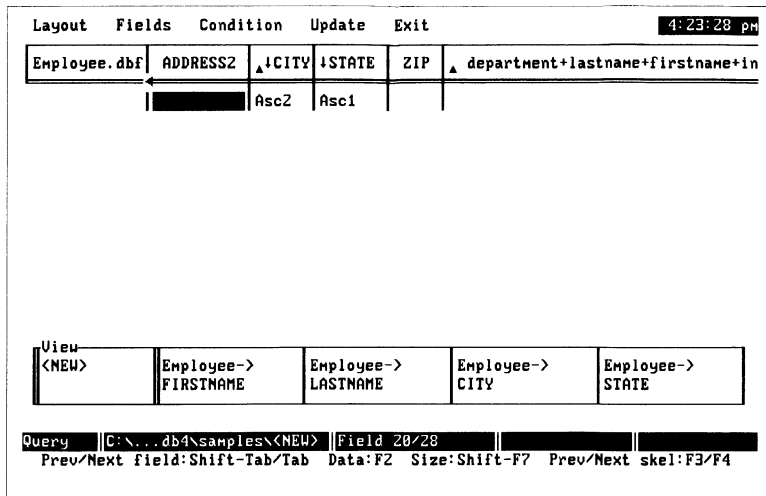


Figure 6-18 Query with one operator on complex index

For more information about read-only views, refer to the next section, Limitations on Updating Views.

Limitations on Updating Views

When you create a view, you can normally use Browse or Edit to change the data displayed by the view. This changes the data in the view's underlying database fields.

However, you can create a view that is *read-only* (that cannot be updated). To determine whether a view is read-only, look at the status bar or the scoreboard area of the Browse screen once you have processed the view.

You can use a read-only view to sort records on a non-indexed field, perform aggregate operations (refer to the Summarizing Data section in Chapter 7), sort a view on several fields (refer to the Sorting Records on More Than One Field section earlier in this chapter), and perform a dictionary sort (refer to the Sorting the Database File section of Chapter 5).

Some types of fields in a view cannot be edited because they are read-only. A read-only field is tagged in the view skeleton as "R/O."

The following types of fields are read-only:

- **Calculated** — a calculated field, discussed later in this chapter, is derived using an arithmetic operation.
- **Renamed** — a field that you have renamed, as described earlier in this chapter. A renamed field is handled in the same way as a calculated field.
- **User-specified** — a field that you have specified as read-only. You make a field read-only by highlighting it in the view skeleton and pressing **F8 Copy**. Pressing **F8 Copy** toggles a user-specified read-only attribute on and off.

Browsing and Editing a View

Even when you cannot change the data in a view, you can still use Edit or Browse to display the data. Moreover, you can use the data in the view to create reports and labels.

Pressing **F2 Data** when you are designing a view creates the view and displays the data. If you press **F2 Data** while designing an update query, dBASE IV displays the data in the target file without performing the update (see Chapter 8 for information on doing updates).

Using a Calculated Field in a View

You can add a calculated field to a view. For example, suppose you have a view with two fields, Quantity and Cost. You can create a calculated field to show the total price of every part sold. Define this calculated field as *Quantity * Cost*. By including this calculated field in the view skeleton, you would see the total price for each part in the view.

Although you can't use the calculated field to edit data in its underlying database fields (for example, Price or Taxrate), you can use these fields individually to edit data. As discussed earlier in this chapter, a calculated field is read-only (tagged "R/O").

Adding Calculated Fields

To add a calculated field to a view:

1. In the queries design screen, press **Alt-F** and then **C** to open a calculated field. The cursor appears in a new calculated field skeleton.

2. Enter a valid dBASE IV expression in the column heading of the calculated field skeleton, as shown in Figure 6-19.

You can either enter this expression manually or press **Shift-F1 Pick** to use the pick list of field names, operators, and functions. On the queries design screen, the pick list contains a fourth column containing operators that you can use only for views. You can also use example variables, discussed in Chapter 7, to enter a calculated field expression.

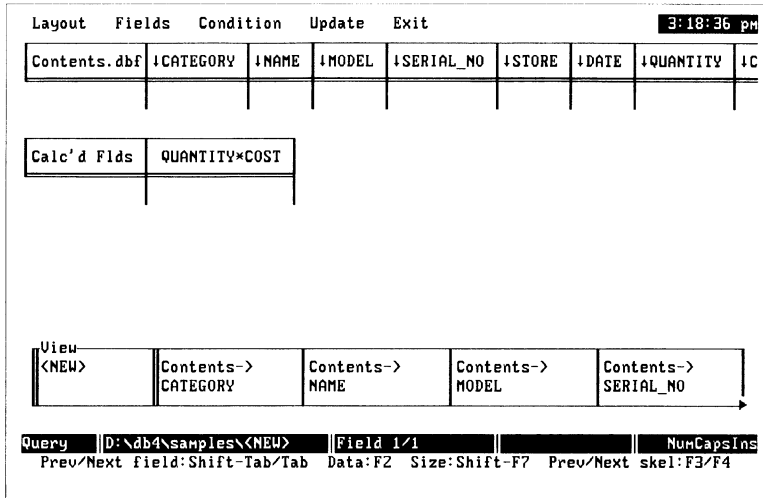


Figure 6-19 Entering a valid dBASE IV expression

3. Repeating steps 1 and 2, you may create up to 20 different calculated fields for each query. The additional calculated fields are added to the skeleton horizontally across the screen.
4. Next, name the calculated field. To do this, press **Alt-F**, highlight **Edit field name** and press **↓**. A prompt box appears.
5. Type in the name that you want to give the calculated field (do not include the = sign). Press **↓**. The name appears above the expression, as shown in Figure 6-20.

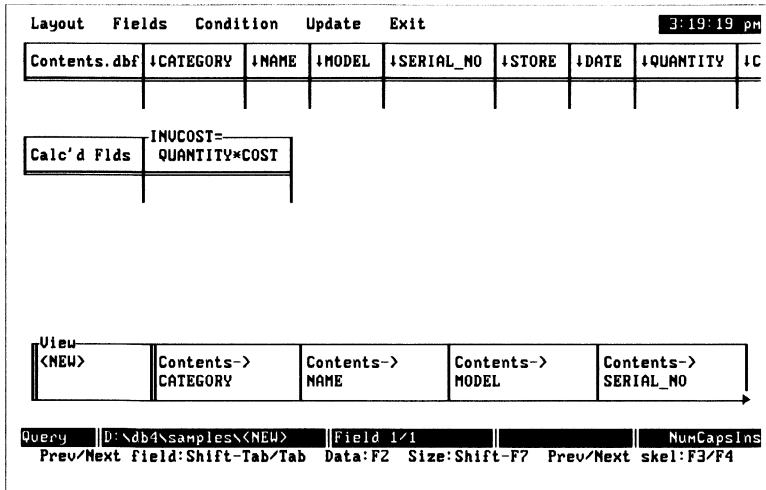


Figure 6-20 Naming a calculated field

In order to place the calculated field in the view skeleton, you must name it. Also, you may reference a calculated field in a condition box (see Chapter 7) and in other ways on the queries design screen. However, in a condition box, you can't refer to the calculated field by name; you must use an example variable, as explained in the Entering Conditions Using Example Variables section of Chapter 7.

6. To add the calculated field to the view, press **F5 Field** or use the **Add field to view** option on the **Fields** menu. (If you haven't named the calculated field, you are prompted to name it.)
7. Press **F2 Data** to process the view and see the results with the calculated field. When a view is built, dBASE IV computes the value of each calculated field. These computed values will appear just like the stored values from the database files. Calculated fields are evaluated from left to right and are always read-only.



NOTE

- *Calculated fields are read-only, but are immediately updated in a view if you change the value of the database field on which the calculated field is dependent (much like a spreadsheet). For example, suppose you have a calculated field called PQ that is defined as $PQ = Price * Quantity$. If you double the data in a field in the Quantity column, when you move the cursor off that field, dBASE IV recalculates the value of PQ for that record.*
- *If you use GROUP BY (see Table 7-1) or a sort operator (see Table 6-4) on a calculated field, you can't use another of these operators anywhere else in the query.*

Removing Calculated Fields

To remove all the calculated fields from the queries design screen (and from the view skeleton):

1. On the queries design screen, place the cursor in any of the calculated fields.
2. Press **Alt-L** to open the **Layout** menu.
3. Select the **Remove file from query** option.

To remove a single calculated field from the queries design screen (and from the view skeleton):

1. Place the cursor on the calculated field that you want to remove.
2. Press **Alt-F** to open the **Fields** menu.
3. Select the **Delete calculated field** option.



NOTE

*You can remove a calculated field from the view skeleton without removing it from the design screen by placing the cursor on the field and pressing **F5 Field**. You can change the expression in an existing calculated field to perform a different calculation.*

Relating Multiple Database Files to Form One View

When constructing database files, it is best to duplicate as little as possible. For example, if you keep customer names and addresses for an order entry system in one database file, then you only have to update one file when a customer's address changes. Moreover, eliminating copies of the same information saves disk space.

You might think that the way to avoid duplication is to create one large database file for all orders. Each order record would contain all information about the customer as well as about the ordered items.

However, this would foster duplication, because each order record for a customer would duplicate the same customer information. As customer information changed, you would have to change the information in each record.

It is much simpler to maintain one file for customer names and addresses and a separate file for customer orders. To obtain a report of what each customer has ordered, you only have to link the two files.

A view created by linking multiple database files is called a *join*. You can use a join to display data, to create reports, and to update the underlying files.



NOTE

If two files are linked on the queries design screen but fields in only one of the linked files are used in the view skeleton, this is considered a filter condition and not a join. Therefore, the fields used to link the files can be edited in the view. For information about filtering data, refer to Chapter 7.

Relating Multiple Databases: The Common Field

For two database to be related, the two files must share a *common field*.

A common field must uniquely identify each record in one of two linked database files. For example, if you are creating personnel and payroll database files, you might want to link some of the information in both files to create one report. You could use the employee Social Security number (a unique alphanumeric expression) as the common field between these two files.

Avoid using as your common field a field whose information could possibly be repeated. For example, it is unwise to use a person's last name as a common field. Common names such as Johnson or Smith, for instance, might link up to an incorrect matching record.

Figure 6-21 uses a unique identifier, `Part_ID`, as the common field.

Goods.dbf

PART_ID	DATE_ORDER	PART_NAME	DESCRIPT
C-111-6000	/ /	SOFA-6 FOOT	LEATHER-BROWN-HIGHBACK
C-111-6015	/ /	SOFA-6 FOOT	VELVET-GREY-FRENCH
C-300-6045	/ /	SOFA-6 FOOT	VELVET-BLUE-FRENCH
C-111-8000	01/11/87	SOFA-8 FOOT	LEATHER-BROWN-HIGHBACK
C-111-8045	/ /	SOFA-8 FOOT	VELVET-BLUE-FRENCH
C-222-1000	/ /	CHAIR-DESK	LEATHER-BROWN-HIGHBACK
C-222-1001	/ /	CHAIR-DESK	LEATHER-BROWN
C-222-2000	/ /	CHAIR-DESK	PLASTIC-BLACK-HIGHBACK
C-222-2010	/ /	CHAIR-DESK	PLASTIC-BROWN-HIGHBACK
C-222-2020	/ /	CHAIR-DESK	PLASTIC-GREY-HIGHBACK
C-222-3000	/ /	CHAIR-SIDE	PLASTIC-BLACK
C-222-3010	/ /	CHAIR-SIDE	PLASTIC-BROWN
C-222-3020	/ /	CHAIR-SIDE	PLASTIC-GREY
C-300-2020	/ /	BOOKCASE	WOOD-TEAK-2 SHELF
C-300-2040	/ /	BOOKCASE	WOOD-OAK-2 SHELF
C-300-4000	/ /	BOOKCASE	WOOD-OAK-4 SHELF
C-300-4010	/ /	BOOKCASE	WOOD-TEAK-4 SHELF

Each PART_ID in the Goods database file is unique. There is one record for each part number.

Common field

Orders.dbf

CUST_ID	DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES	EMP_ID	INVOICED
C00002	02/15/88	C-111-6000	1	4002	memo	661-22-3333	F
C00001	01/10/88	C-111-6015	1	49030	memo	991-22-3333	F
C00001	03/02/88	C-300-4010	5	55501	memo	991-22-3333	F
C00001	02/02/88	C-300-4010	1	51043	memo	111-22-5555	F
C00001	03/01/88	C-222-3000	1	54331	memo	111-22-5555	F
C00001	04/11/88	C-300-4010	1	57050	memo	111-22-5555	F
C00001	01/28/88	C-222-1000	7	49567	memo	111-22-5555	F
C00001	02/11/88	C-222-2000	2	53002	memo	991-22-3333	F
C00001	01/29/88	C-222-1000	4	50226	memo	111-22-3333	F
C00001	02/12/88	C-700-4030	5	53143	memo	111-22-3333	F
C00001	02/11/88	C-111-8000	10	53002	memo	111-22-3333	F
A10025	03/10/88	C-111-8000	1	46088	memo	771-22-3333	F
A10025	02/16/88	C-222-1000	5	43002	memo	771-22-3333	F
A10025	03/02/88	C-500-6050	15	44084	memo	771-22-3333	F
A00001	03/05/88	C-111-6000	5	70010	memo	661-22-3333	F
A00001	03/04/88	C-222-2010	3	70005	memo	661-22-3333	F

In Orders, PART_ID numbers can be repeated. This file contains a PART_ID for each item ordered, for many clients.

Figure 6-21 Using a common field

If the files you want to link don't have a common field, you can create one. (Or you can link using a calculated field, as discussed later in this chapter.) Go to the database design screen and add a field for each of the files. Then add the data for that common field in the records of each of the files.



NOTE

- You cannot link two files using either logical fields or memo fields.
- When you create a join on the queries design screen (as described in the *Creating a Related Multiple-Database-File View* section later in this chapter), a common field is tagged in the view skeleton as R/O (read-only). To allow a common view field to be edited on a Browse or Edit screen, highlight the common field in the view skeleton and press **F8 Copy** to toggle off the R/O tag.
- When you edit data using a join, you can't append or delete records.

Creating a Related Multiple-Database-File View

A multiple-database-file view takes parts of two or more database files and links them. If you attempt to display fields from two or more database files without linking the databases, you receive an error message.

Figure 6-22 shows a strategy for linking multiple database files.

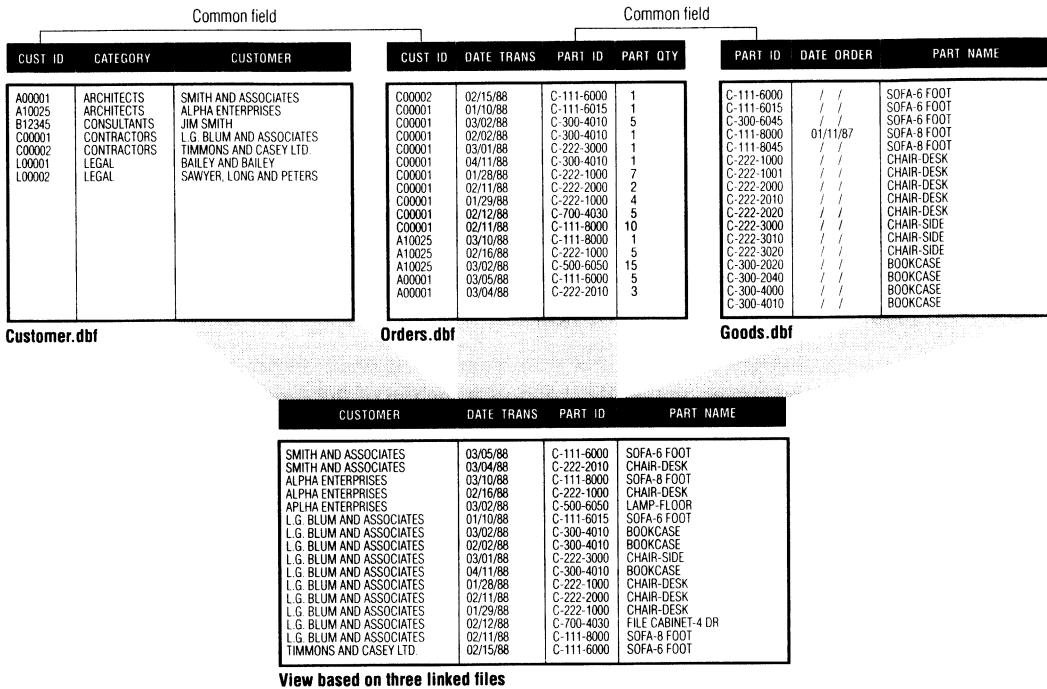


Figure 6-22 Linking multiple database files

To create a multiple-database-file view:

1. Highlight <create> on the **Queries** panel at the Control Center. Press **↵**.
2. Press **Alt-L** and then **A** to bring up the list of database files. Highlight the database file you want to add to the screen and press **↵**.
3. Repeat step 2 until you have all the database files on the queries design screen from which you want to obtain information, as shown in Figure 6-23. You may place up to eight database files on the screen.

Layout	Fields	Condition	Update	Exit				11:11:24 am
Cust.dbf	CUST_ID	CATEGORY	CUSTOMER	ADDRESS1	ADDRESS2	CITY	STAT	
Orders.dbf	CUST_ID	DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES	E	
Goods.dbf	PART_ID	DATE_ORDER	PART_NAME	DESCRIPT	LEAD_TIME	PRICE		

Query	D:\db4\samples\<NEW>	File 1/3	Num
Next field:Tab Add/Remove all fields:F5 Zoom:F9 Prev/Next skeleton:F3/F4			

Figure 6-23 Multiple files in a view

4. With the cursor on the file skeleton at the top of the screen, press **Alt-F** to open the **Fields** menu. If the **Include indexes** option is set to **NO**, highlight it and press **↓** to set it to **YES**. The indexes on this file have been included when a triangle or # symbol appears in each indexed field.
5. Use **F4 Next** or **F3 Previous** to move the cursor to the next file skeleton, and repeat step 4. Do this until the indexes for all the file skeletons on the queries design screen are included.
6. Find the common field to link on between two databases and type **LINK1** into the common fields, as shown in Figure 6-24. Actually, you could use any word in the common field, as long as the *example variable* (in this case **LINK1**) is the same in each linked database. This example variable shows **dBASE IV** which fields are common between databases.

You could also use the **Create link by pointing** option on the **Layout** menu to link the common fields. Place the highlight on the common field and select the **Create link by pointing** option. Then move the cursor to the common field in the other file and press **↓**.



NOTE

Example variables can be up to ten characters long.

Layout	Fields	Condition	Update	Exit				4:51:32 pm
Cust.dbf	▲ CUST_ID	CATEGORY	CUSTOMER	ADDRESS1	ADDRESS2	CITY	STAT	
	LINK1							
Orders.dbf	CUST_ID	DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES	E	
	LINK1							
Goods.dbf	▲ PART_ID	DATE_ORDER	PART_NAME	DESCRIPT	LEAD_TIME	PRICE		
Query	C:\...db4\samples\<NEW>	File 2/3					Caps	
	Next field:Tab Add/Remove all fields:F5 Zoom:F9 Prev/Next skeleton:F3/F4							

Figure 6-24 Linking two files with the example variable

7. Similarly, find the common field to link on between the third database file and one of the other database files, as shown in Figure 6-25, and place example variables (LINK2) there.

Layout	Fields	Condition	Update	Exit				4:53:59 pm
Cust.dbf	▲ CUST_ID	CATEGORY	CUSTOMER	ADDRESS1	ADDRESS2	CITY	STAT	
	LINK1							
Orders.dbf	CUST_ID	DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES	E	
	LINK1		LINK2					
Goods.dbf	▲ PART_ID	DATE_ORDER	PART_NAME	DESCRIPT	LEAD_TIME	PRICE		
	LINK2							
Query	C:\...db4\samples\<NEW>	File 3/3					Caps	
	Next field:Tab Add/Remove all fields:F5 Zoom:F9 Prev/Next skeleton:F3/F4							

Figure 6-25 Linking three files

8. Decide which of the fields in the file skeletons you want to put into the view. Move to those fields in the file skeleton and press **F5 Field** to add that field to the view skeleton. Repeat this step to add all the fields that you want to appear in the view. Use **F4 Next** and **F3 Previous** to move up and down the queries design screen to the file skeletons.



NOTE

You don't have to put the common field into the view skeleton. If you do put it in, you need only do so once.

9. Choose the fields on which you want to sort the view, as shown in Figure 6-26. In addition to the other fields, it is permissible to sort on one of the complex indexes (see the far right of the Cust or Orders file skeleton).

Move to the field on which you want to sort and do one of the following:

- Using the abbreviations listed in Table 6-4, type the sort that you want to use.
- Select the type of sort using the **Sort on this field** option of the **Fields** menu.

Layout	Fields	Condition	Update	Exit			
Cust.dbf	▲CUST_ID	CATEGORY	↓CUSTOMER	ADDRESS1	ADDRESS2	CITY	S
	LINK1, Asc1						
Orders.dbf	CUST_ID	↓DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES	E
	LINK1		LINK2				
Goods.dbf	▲PART_ID	DATE_ORDER	PART_NAME	DESCRIPT	LEAD_TIME	PRICE	
	LINK2						
View							
<NEW>	Cust-> CUST_ID	Cust-> CUSTOMER	Orders-> DATE_TRANS	Goods-> PART_ID			
	R/O			R/O			
Query	C:\...db4\samples\<NEW> Field 1/12						
	Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4						

Figure 6-26 Choosing the type of sort

10. If you are not satisfied with the order of the fields that you have put into the view skeleton, change their order now (see the Moving Fields in a View section earlier in this chapter).
11. Press **F2 Data** to process and display the view, as shown in Figure 6-27.

Records Organize Fields Go To Exit			
CUST_ID	CUSTOMER	DATE_TRANS	PART_ID
A00001	SMITH AND ASSOCIATES	03/04/88	C-222-2010
A00001	SMITH AND ASSOCIATES	03/05/88	C-111-6000
A10025	ALPHA ENTERPRISES	03/02/88	C-500-6050
A10025	ALPHA ENTERPRISES	02/16/88	C-222-1000
A10025	ALPHA ENTERPRISES	03/10/88	C-111-8000
C00001	L. G. BLUM AND ASSOCIATES	03/01/88	C-222-3000
C00001	L. G. BLUM AND ASSOCIATES	04/11/88	C-300-4010
C00001	L. G. BLUM AND ASSOCIATES	01/10/88	C-111-6015
C00001	L. G. BLUM AND ASSOCIATES	02/02/88	C-300-4010
C00001	L. G. BLUM AND ASSOCIATES	01/29/88	C-222-1000
C00001	L. G. BLUM AND ASSOCIATES	02/12/88	C-700-4030
C00001	L. G. BLUM AND ASSOCIATES	02/11/88	C-111-8000
C00001	L. G. BLUM AND ASSOCIATES	03/02/88	C-300-4010
C00001	L. G. BLUM AND ASSOCIATES	01/28/88	C-222-1000
C00001	L. G. BLUM AND ASSOCIATES	02/11/88	C-222-2000
C00002	TIMMONS AND CASEY LTD.	02/15/88	C-111-6000

Browse C:\db4\samples\<NEW> Rec 1/16 View ReadOnly

Figure 6-27 Displaying the linked view

Relationship Between Linked Files

The default relationship between two linked files is many to many. Every occurrence of common field value *x* in file 1 is matched with every occurrence of *x* in file 2, in every possible combination.

If file 1 has three records containing value *x* and file 2 has four records containing *x*, the view will contain 12 records with value *x*. Thus, in Figure 6-26:

- Cust_ID and Customer information is repeated for every record in the Orders database file.
- Date_Trans information is repeated for every record in the Orders file that matches a part record in the Goods file. Similarly, Part_ID and Part_Name information is repeated for every part record in Goods that matches a record in Orders.



NOTE

*If a view of linked files A and B contains fields only from file A, the two files are not linked as described in this section. Instead, the records in A are filtered by the records in B, as if you had placed the **First** operator before the linking variable in B's skeleton (refer to *Displaying One of Each Record When Linking* in Chapter 7). Therefore, the view displays only the first record in A that matches a record in B, not every matching record.*

Linking on a Calculated Field

If the files that you want to link don't have a common field, you can create a calculated field to link them. For example, suppose you want to link two address files on a name field to see whether there are common entries.

In Figure 6-28, the Names2 file contains the same fields as the Names file. However, instead of Lastname and Firstname fields, the Names2 file has a single field, Fullname, formatted as LASTNAME, FIRSTNAME. Linking on the calculated field allows dBASE IV to compare the values in two different fields.

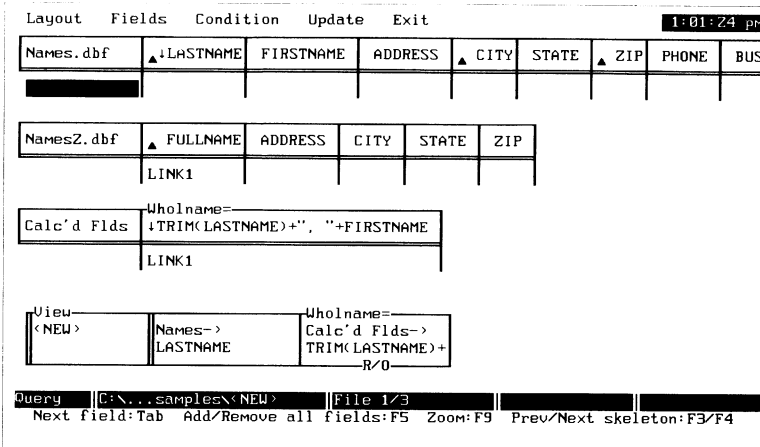


Figure 6-28 Linking on a calculated field

Creating a New Database File from a View

Most of the time you should not use the data in a view to create a new database file. You will have a more efficient database system if you leave your data in its original database files and use view queries and indexes to reorganize data. By *not* writing the data in a view to a new database file, you also avoid the problem of storing data on your disk that is already stored in other database files.

However, it is sometimes useful to write data from a view to a new database file. For example, a sub-facility needs information that can only be obtained from the main facility. The information is scattered among several databases. Instead of giving the sub-facility all the different databases and letting them figure out which fields they need, the main facility could create a view and write the result of that view to a single database file. This file would contain only the fields and the information the sub-facility needs.

**NOTE**

Because update queries (covered in Chapter 8) modify existing database files without creating views, update queries cannot be written to new database files.

To write a view to a database file:

1. Create the view.
2. Press **Alt-L** to open the **Layout** menu on the queries design screen.
3. Press **W** for the **Write view as database file** option. A prompt box appears.
4. You can either accept the current view name (if it has one) as the database filename, which will have the .dbf extension added automatically, or you can enter a new name for the new database file. The **Write view as database file** option makes a physical copy of filtered and selected data, similar to the way the **Sort** command produces a physical copy of a rearranged database file.

You cannot save a view with records longer than 4,000 characters or having more than 255 fields.

**NOTE**

*The file created with the **Write view as database file** option is a snapshot of the view that is, once created, unconnected to the underlying database files that created it. This means that you may need to maintain the data in both the snapshot file and the underlying files. If you want changes to your underlying database files to be automatically shown, it is better to use a view. In this way, when you perform the view query to recreate the view, the resulting data will automatically be up-to-date.*

Removing Database Files from a View

To remove a file skeleton from the queries design screen:

1. Place the cursor on the file skeleton you want to remove from the screen.
2. Press **Alt-L** and then **R** to activate the **Remove file from query** option.

**WARNING**

When you ask to remove a file from the queries design surface, it is removed without a confirming prompt box. Be sure the cursor is on the correct file skeleton before you choose this option.

dBASE IV Code Created by View Queries

When you create query instructions on the queries design screen, dBASE IV processes the design from the screen into a view query file. This file contains individual dBASE commands used to create the view. These are the same commands you could use to create a view from the dot prompt. To find out more about how views are created from the query file, refer to the following commands in *Language Reference*.

BROWSE [FIELDS]
CALCULATE
DO WHILE
EDIT [FIELDS]
INDEX [FOR]
SELECT
SET EXACT
SET FIELDS TO
SET FILTER
SET INDEX
SET KEY TO
SET ORDER
SET RELATION
SET SKIP
SORT
USE [AGAIN]



TIP

*If you want to see the dBASE IV code generated by a view query, examine it by entering the `TYPE <queryname>.qbe` command at the dot prompt. You can also use the **View** option from the **Operations** menu on the **DOS utilities** menu bar. Reach this menu bar from the **Tools** menu.*

If you are an experienced dBASE user, looking at the code may help you understand how the queries design screen does its work. However, if you want to modify the code that was generated, do not modify the .qbe file. Copy the file to a program (.prg) file and modify the copy.

Saving Views Without Exiting

To save a view without exiting the queries design screen:

1. Select **Save this query** from the **Layout** menu and press ↵, or press **Ctrl-↵**. A prompt box appears.
2. If this is a new view query, type in the name you want to give the view. If you are updating a previous view query, the view's current name appears in the prompt box (you can change it or leave it as is).
3. Press ↵ and the view is saved.

Exiting the Queries Design Screen

There are a number of ways to exit the queries design screen.

Saving Changes and Exiting

To save a new or modified query, use the **Save changes and exit** option on the **Exit** menu. If the query does not have a name yet, a prompt appears so you can name it.

If you came to the queries design screen from the Control Center, you return to the Control Center. If you came from the dot prompt or a program, you return to the dot prompt or program.

If you came to the queries design screen from the forms, reports, or labels design screen and you have any unsaved design changes, you are returned to that design screen and asked if you want to save the new material.

Abandoning Changes and Exiting

To leave the queries design screen without saving your changes, use the **Abandon changes and exit** option on the **Exit** menu. Once you select this option, you are asked to verify that you want to abandon your changes. If you confirm this, any unsaved changes to the query are abandoned.

If you came to the queries design screen from the Control Center, you return to the Control Center. If you came from the dot prompt or a program, you return to the dot prompt or program.

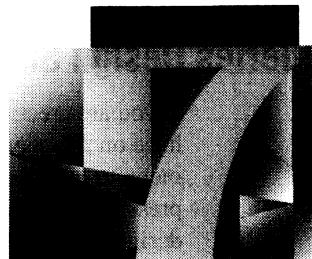
Returning to the Report/Form/Label Design Screen

If you came from the Control Center, dot prompt, database design screen, or a program, the **Return to Report/Form/Label Design** option will not appear in the **Exit** menu.

However, when you come to the queries design screen from the forms, reports, or labels design screen, the **Return to Report/Form/Label Design** option appears with the relevant destination. For example, if you are designing a report and come directly to the queries design screen, this option reads **Return to Report Design**. Choosing this option then returns you to the reports design screen.

You can also press **Shift-F2 Design** to return to the forms, reports, or labels design screen.

Queries: Filtering Data



When you filter data you are extracting only the data that you need. As with creating views, use the queries design screen to filter your file to display the data you want to see.

dBASE provides IQ!, an automatic Index Query optimization technology that selects the fastest method for processing your query.

This chapter includes:

- Entering query conditions
- Obtaining summaries
- Using comparison operators
- Using condition boxes

Moving to the Queries Design Screen

Before entering conditions for a query, you must display the queries design screen. If you are creating a new query, you first highlight **<create>** on the **Queries** panel and press **↵**. This takes you to the queries design screen.

If you want to change an existing query, highlight that query filename in the **Queries** panel and press **Shift-F2 Design**. This will also take you to the queries design screen.



NOTE

*To see the data that would result from processing an already existing query, highlight that query in the **Queries** panel and press **F2 Data**. Or, if you are in the process of creating a query, press **F2 Data** at any time.*

Adding File Skeletons to the Queries Design Screen

If you are creating a new query, you need to decide which file skeletons you want to have on the queries design screen. Select the **Add file to query** option on the **Layout** menu to obtain a list of files in the current catalog. Highlight the file that you want and press **↵**. That file skeleton appears. For more information on adding files to the queries design screen, see Chapter 6.

Once you have added files to the queries design screen, you can decide which fields you want to appear in your query result. If you prefer, you can wait until you have actually entered all the conditions of your query to decide. In any case, when you know which fields you want to appear in the view, highlight each field and press **F5 Field**. If the field is in the view skeleton at the bottom, it will appear in the resulting view. For more information on adding fields to the view skeleton, see Chapter 6.

Entering Conditions for a Query

The filter conditions you supply in a view query will determine the resulting data in the view. Enter filter conditions in the space beneath the field names. Enclose text to be matched in quotation marks, just as in other dBASE IV expressions. You may use the built-in arithmetic functions:

+, **-**, *****, **/**, ******, or **^**

You can also use dBASE IV functions such as **TIME()**, **DATE()**, and **TRIM()**. For a full list of available functions, operators, and field names, press **Shift-F1 Pick**.

Changing the Column Width

The width of the columns in the file skeleton is automatically set to two spaces longer than the field name. As you enter filtering information into the column, the column expands automatically up to 60 characters.

To fix the size of a column at a certain width:

1. Use **Tab** or **Shift-Tab** to move to the column that you want to size.
2. Press **Shift-F7 Size**. The entire column is highlighted.
3. Adjust the size of the column by using the **←** and **→** keys.
4. When the column is the desired width, press **↵**. The column is fixed at that size. If you attempt to enter filtering data longer than the size of the column, the text will scroll. If you have entered text that has scrolled so that you can't see all the text, you can press **F9 Zoom** to zoom open the column to fill the screen. To close the column back to normal size, press **F9 Zoom** again.

To return the size of a column to its default size and restore “elasticity” to the column, press **Shift-F7 Size** twice. The column returns to its default size or, if there is text already in the column that is wider than the default size of the column, the column is as wide as the text. In either case, text no longer scrolls within the column.

Processing Queries

When you have set up all the conditions of your query, press **F2 Data** to process it.

Querying Certain Types of Fields

The following sections tell how to filter information from character, date, and logical fields. Examples of filtering information from numeric fields are included in the Comparison Operators and AND and OR Conditions sections, later in this chapter.

Selecting Information on Character Fields

To query a character field, enter the filter conditions, surrounded by quotation marks, directly into the field, as in Figure 7-1. In this example, the view will display all records for employees that work in the Sales department.

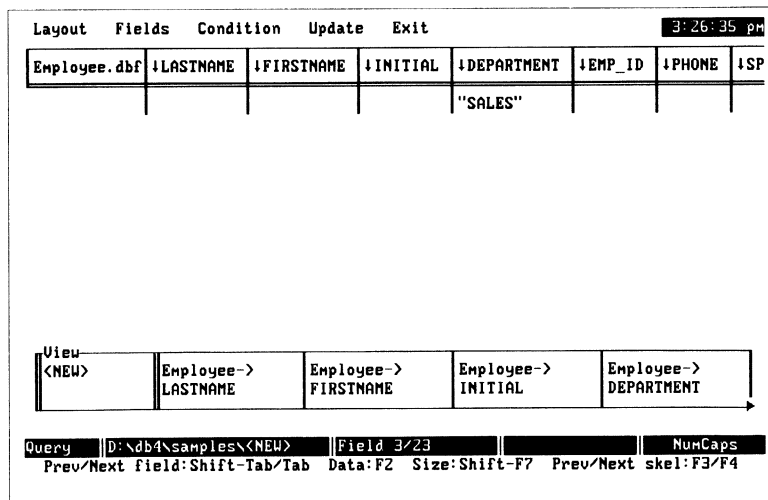


Figure 7-1 Querying a character field

When you have finished setting up your query and have selected the fields you want to display, press **F2 Data** to process the query. The records that match your filter condition appear in the result, as shown in Figure 7-2.

NumCaps						
LASTNAME	FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	PHONE	S
Adams	Nathan	K	SALES	703-22-3333	(505)555-4556	C
Arlich	Kim	Y	SALES	437-22-6788	(603)555-8773	C
Bicksby	Hank	F	SALES	899-02-3333	(602)555-1278	C
Campbell	Linda	H	SALES	441-22-3333	(602)555-1974	C
Cohen	Larry	A	SALES	551-22-3333	(217)555-4204	C
Collins	Sara	H	SALES	661-22-3333	(503)555-0953	C
Daniels	Dominique	F	SALES	771-22-3333	(609)555-0911	C
DeBello	Todd	S	SALES	881-22-3333	(504)555-3737	C
Drasin	Pedro	E	SALES	991-22-3333	(203)555-1522	C
Drendon	Kelly	A	SALES	001-22-3333	(805)555-0674	C
Egan	Michelle	P	SALES	111-22-5555	(303)555-7337	C
Gilbert	Chuck	H	SALES	111-22-6666	(202)555-9626	C
Hart	Paul	C	SALES	111-22-7777	(718)555-0059	C
Johnson	Jay	O	SALES	111-22-8888	(502)555-6784	C
Kaufman	Lisa	C	SALES	110-02-3030	(312)555-0300	C
Keegan	Keith	S	SALES	110-20-0303	(213)555-5922	C
Kotky	Linda	J	SALES	010-20-0333	(716)555-1100	C
Larson	Jill	O	SALES	101-02-3303	(402)555-9974	C

Figure 7-2 Results of querying a character field

Selecting Information on Date Fields

To use a specific date as a filter in a date field, enter the date inside curly braces. To create a query using a date field:

1. Press **Tab** to move the cursor to the date field you want to use to filter your data.
2. Type in the filter criteria in that field, as shown in Figure 7-3.

Layout	Fields	Condition	Update	Exit	6:06:09 pm		
Employee.dbf	PHONE	SPECIALTY	COMMENTS	AWARDS	DATE_HIRED	DEGREE	EX
					> {12/31/83}		
View							
<NEW>	Employee-> LASTNAME	Employee-> FIRSTNAME	Employee-> DEPARTMENT	Employee-> DATE_HIRED			
Query	C:\...db4\samples\<NEW> Field 8/23						
Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4							

Figure 7-3 Querying a date field



NOTE

Figure 7-3 uses the greater than (>) relational operator. For a list of dBASE IV relational operators, see the Using Operators in Queries section later in this chapter.

- 3. Press **F2 Data** to process the query and display the data.

Display records whose dates occur within a particular range by putting the range conditions in the date column on a single line, separated with a comma. For example, Figure 7-4 shows all employees hired after 12/31/83 and before 04/01/86.

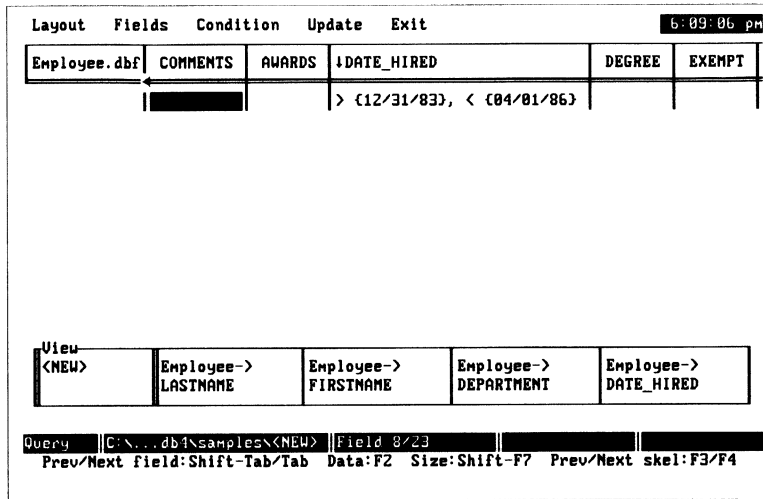


Figure 7-4 Dates within a range

You may want to search for records that have a date field that is blank, for example, so you can add dates to those fields. To display the records whose date field is blank, you do either of the following:

- Put {} (open and closed curly braces) in the file skeleton's date field.
- Put a condition in the form of <field name> = {} in the condition box, as in *Date_Hired = {}*.

You might also want to search for non-blank dates in a file. For example, you may want to find those people who have due dates. You need to be able to filter out non-blank dates. Use either of the following ways:

- Put the statement = {} = .F. in the file skeleton's date field.
- Put a condition in the form of .not. <field name> = {} in a condition box, as in *.not. Date_Hired = {}*.

Selecting Information on Logical Fields

To filter your data on a logical field, enter *.T.* for true or *.F.* for false in the column of a logical field (you can also enter *.t.*, *.Y.*, or *.y.* for true, and *.f.*, *.N.*, or *.n.* for false).

1. Move to the logical field.
2. Type your filter criteria, as shown in Figure 7-5.

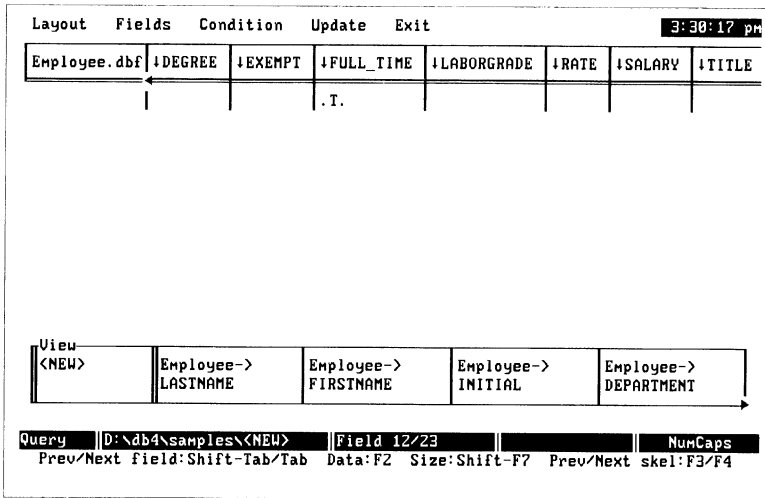


Figure 7-5 Querying a logical field

3. Press **F2 Data** to process the query.



NOTE

For more information on logical fields, see the Specifying a Field Type section in Chapter 2.

Using Query Operators

A number of query operators are discussed in Chapters 7 and 8. These operators are used both in filtering data and in updating databases. Table 7-1 describes each operator and tells you where to find more information about them.

Table 7-1 Query operators

Operator	Description
Unique	Defines a view in which duplicate records are ignored for an aggregate operation. See the Ignoring Duplicate Values section later in this chapter.
Find	Finds the first record of the database file according to a filter condition. See the Locating a Specific Record section later in this chapter.
First	When linking two database files, First displays only the first linked record. See the Displaying One of Each Record When Linking section later in this chapter.
Every	When linking two database files, Every displays all records in the file that the Every operator applies to, without regard to whether there is a match on the common field. See the Displaying All Records When Linking section later in this chapter.
Group By	Groups records with the same value for a selected field for an aggregate operation. See the Grouping Query Information section later in this chapter.
Append	An update operator. Use the Append operator to copy records from one or more database files to a target file. Put the Append operator underneath the target filename in the file skeleton. See the Appending Records section in Chapter 8.
Mark	An update operator. Use Mark to mark groups of records for deletion. Put the Mark operator underneath the target filename in the file skeleton. See the Marking Groups of Records for Deletion section in Chapter 8.
Unmark	An update operator. Use Unmark to unmark groups of records for deletion. Put the Unmark operator underneath the target filename in the file skeleton. See the Unmarking Groups of Records section in Chapter 8.
Replace...With	An update operator. Replace changes data from one state to another. Put the Replace operator underneath the target filename in the file skeleton. Put the With operator under the field name that you want to change along with an expression that describes how the data will change. See the Replacing Data section in Chapter 8.

Summarizing Data

To summarize your data using aggregate operators and filter conditions, and also to eliminate duplicate values, see the following sections.

Obtaining Summaries with Aggregate Operators

To summarize the values in certain fields and then display the results, use the *aggregate operators* AVG, SUM, MIN, MAX, and CNT. These apply arithmetic operations to the records in a database file. The aggregate operators are sometimes referred to as *summary operators*.

Table 7-2 shows the aggregate operators that you can use in each type of field.

Table 7-2 Aggregate operators

Type of field	Aggregate operator
Numeric	AVG, SUM, MIN, MAX, CNT
Float	AVG, SUM, MIN, MAX, CNT
Character	MIN, MAX, CNT
Date	MIN, MAX, CNT
Logical	CNT
Memo	(none available)



NOTE

Aggregate operators are not allowed in update queries and cannot be combined with the Find operator. See Locating a Specific Record later in this chapter.

Table 7-3 explains what each of the aggregate operators calculates.

Table 7-3 Calculation performed by each aggregate operator

Aggregate Operator	Calculates
AVG or AVERAGE	Divide the sum of all the values in a column by the number of records, according to the records that meet the selection criteria.
CNT or COUNT	The number of records that meet the selection criteria.
MAX	The highest value in a field.
MIN	The lowest value in a field.
SUM	The total of all values in a field.

To include a summary operation in a query:

1. Enter *SUM*, *AVG*, *MIN*, *MAX*, or *CNT* in the column of the field to which you want that operation applied, as shown in Figure 7-6. (You can use the word *COUNT* instead of *CNT* and *AVERAGE* instead of *AVG*.)

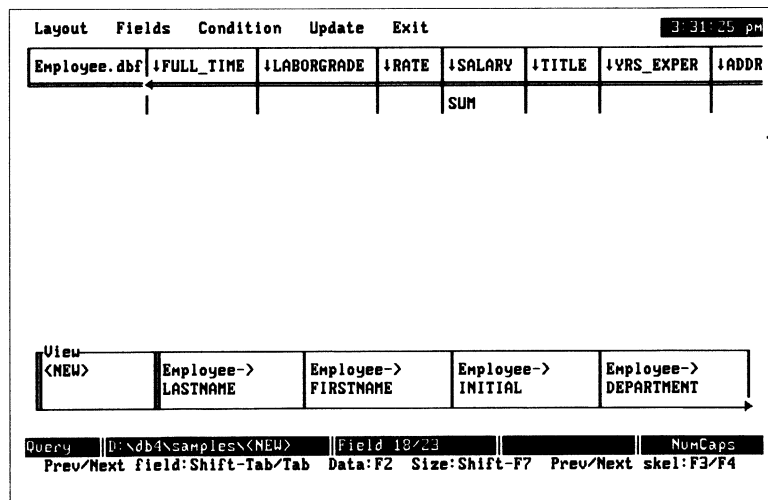


Figure 7-6 Using an aggregate operator

2. Make sure that the field to which you apply the aggregate operator is in the view skeleton, and press **F2 Data** to see the result of using the aggregate operator.

In the result shown in Figure 7-7, the Lastname, Firstname, and Department fields are blank. This is because using an aggregate operator to summarize information for records eliminates information for individual records. To organize information for individual records, use the sort operators shown in Table 6-4.

NumCaps ReadOnly			
LASTNAME	FIRSTNAME	DEPARTMENT	SALARY
			1164350

Figure 7-7 Result of using an aggregate operator

Queries Using Two Aggregate Operators

You may use two or more aggregate operators in a query, as shown in Figure 7-8.

Layout	Fields	Condition	Update	Exit			
Employee.dbf	FULL_TIME	LABORGRADE	RATE	↓SALARY	TITLE	YRS_EXPER	ADDR
				MAX		AUG	

View				
<NEW>	Employee-> LASTNAME	Employee-> FIRSTNAME	Employee-> DEPARTMENT	Employee-> SALARY

Query	D:\db4\samples\<NEW>	Field 14/23	ReadOnly	NumCaps
Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4				

Figure 7-8 Query with two aggregate operators

Notice that only the fields that use the aggregate operators contain results. The rest of the fields are blank, as in Figure 7-9.

NumCaps ReadOnly				
LASTNAME	FIRSTNAME	DEPARTMENT	SALARY	VRS_EXPER
			79500	3.7

Figure 7-9 Result of query with two aggregate operators



NOTE

When dBASE IV performs a query, it goes through one of the database files one record at a time, looking for matches with records in the other files, filtering records to meet specified conditions, and performing summary calculations.

Therefore, when you enter aggregate operators, you cannot filter records by a condition that requires dBASE IV to process all the records of the view first. For example, in a personnel file, you could not filter out all the records of employees who earn less than the average salary, because the average salary is the result of a computation that will be known only after all the records have been processed. That is, when the average is finally computed, all records have already been selected for the view and it is too late to compare to the average.

*To filter records using an aggregate result, create a query to perform the aggregate operation and save it as a new database file using the **Write view as database file** option of the **Layout** menu. Then, create a new query to filter records in the original database file by the aggregate results in the new database file.*

Queries Using Aggregate Operators and Filter Conditions

You can combine aggregate operators and filter conditions on the same field, as in the query shown in Figure 7-10. Note that the aggregate operator and the filter condition are separated by a comma.

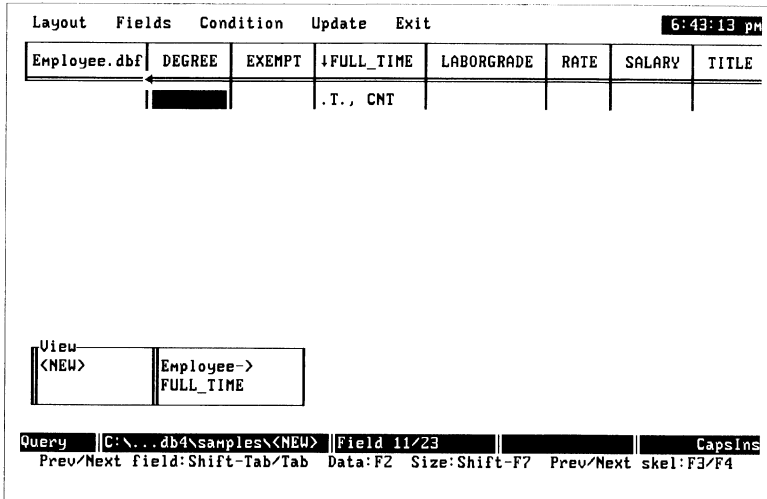


Figure 7-10 Combined aggregate operator and filter condition

In this example, you could have put CNT first and .T. second. Either way you would get the number of employees who are full-time.

Ignoring Duplicate Values

When you use an aggregate operator, you can ignore duplicate field values. Do this by adding the word *Unique* after the SUM, AVG, or CNT operators.

For example, suppose you want to know how many unique parts have been ordered in an order entry database file. If you enter the abbreviation *CNT* in the field containing the ordered item's part name, you would receive a count of how many orders have been made. To see how many distinct items have been ordered, you would instead enter *CNT Unique*, as in Figure 7-11.

Layout	Fields	Condition	Update	Exit	3:37:08 PM	
Orders.dbf	CUST_ID	DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES
			CNT Unique			

Query	D:\db4\samples\<NEW>	Field 1/8	Num
Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4			

Figure 7-11 Ignoring duplicate values



NOTE

When you use Unique, the query can contain only one aggregate operator.

Using Operators in Queries

You may use any of the operators in Table 7-4 when creating your queries.

Table 7-4 Relational and comparison operators

Operator	Description
>	greater than
<	less than
=	equal
<> or #	not equal
>= or =>	greater than or equal
<= or =<	less than or equal
\$	contains
Like	pattern match
Sounds like	Soundex match

See *Language Reference* for more information about the operators shown in Table 7-4. *Language Reference* also explains more about the *Like* and *Sounds like* operators in the sections about the LIKE(), DIFFERENCE(), and SOUNDEX() functions.

Comparison Operators

You can use the comparison operators >, <, =, >=, <=, <>, or # when you create queries. Move to the field you want to query, or to the condition box, and type in a filter using one of the comparison operators, as shown in Figure 7-12.



NOTE

When you are filtering for text or for a number with a single filter (as in Figure 7-12), you need not include an equal sign (=) operator. To do operations other than equal, you must include the operator.

Layout	Fields	Condition	Update	Exit			
Employee.dbf	FULL_TIME	LABORGRADE	RATE	SALARY	TITLE	YRS_EXPER	ADDR
				> 25000			

Query	D:\db4\samples\<NEW>	Field 14/23	Num
Prev/Next field: Shift-Tab/Tab Data: F2 Size: Shift-F7 Prev/Next skel: F3/F4			

Figure 7-12 Query using a comparison operator

Sound Searches

Use the *Sounds like* operator to search for a word whose spelling you do not know. For instance, to find all the people in a first name field whose name is *Sandi* or *Sandy*, you could enter *Sounds like "sandi"* (see Figure 7-13). The *Sounds like* operator uses a mathematical code (Soundex code) to describe how a given word sounds and attempts to match that sound to other words that may be spelled differently but sound the same.

Layout	Fields	Condition	Update	Exit	3:39:08 pm	
Employee.dbf	LASTNAME	FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	P
		sounds like "sandl"				

Query	D:\db4\samples\<NEW>	Field 2/23		Num
Prev/Next field:	Shift-Tab/Tab	Data:F2	Size:Shift-F7	Prev/Next skel:F3/F4

Figure 7-13 Using the Sounds like operator

Pattern Searches

Use the *Like* operator to search for a pattern. Your search string must be in quotes and can include wildcards (* and ?). The asterisk stands for zero or more characters, and the question mark stands for a single character. To find all the phone numbers beginning with the area code (213), for example, enter *Like "(213)*"*, as shown in Figure 7-14.

Layout	Fields	Condition	Update	Exit	3:40:32 pm	
Employee.dbf	DEPARTMENT	EMP_ID	PHONE	SPECIALTY	COMMENTS	AWARD
			Like "(213)*"			

Query	D:\db4\samples\<NEW>	Field 4/23		Num
Prev/Next field:	Shift-Tab/Tab	Data:F2	Size:Shift-F7	Prev/Next skel:F3/F4

Figure 7-14 Using the Like operator

Embedded Text Searches in a Character Field

Use the *contains* operator (\$) to search for a string anywhere within a character field. Place the quoted string after the operator, as shown in Figure 7-15.

Layout	Fields	Condition	Update	Exit	3:41:31 pm		
Employee.dbf	SALARY	TITLE	YRS_EXPER	ADDRESS1	ADDRESS2	CITY	STAT
				\$ "Vineland"			

Query	D:\db4\samples\NEW	Field 17/23	Num
Prev/Next Field: Shift-Tab/Tab Data: F2 Size: Shift-F7 Prev/Next skel: F3/F4			

Figure 7-15 Searching for embedded text

Figure 7-16 shows the resulting view.

Num			
LASTNAME	FIRSTNAME	PHONE	ADDRESS1
Keegan	Marilyn	<213>555-5922	6045 Vineland Blvd.
Keegan	Keith	<213>555-5922	6045 Vineland Blvd.

Figure 7-16 Results of embedded text search

Not-Equal Searches

Use the not-equal operator, either <> or #, to show all records except the one specified in the condition. Figure 7-17 shows an example of a not-equal query that returns all records where Department does not equal *Sales*.

Layout	Fields	Condition	Update	Exit	3:43:50 pm		
Employee.dbf	↓LASTNAME	↓FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	↓PHONE	SP
				# "SALES"			

View				
<NEW>	Employee-> LASTNAME	Employee-> FIRSTNAME	Employee-> PHONE	Employee-> ADDRESS1

Query	D:\db4\samples\<NEW>	Field 2/23		Num
Prev/Next field: Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4				

Figure 7-17 Using the not-equal operator

AND and OR Conditions

You can set up AND conditions and OR conditions on the queries design screen without actually using these words.

AND Conditions

If you place two or more conditions in the same row of a file skeleton, *all* the conditions must be met for a record to be included in the results. This is called an AND condition.

The query in Figure 7-18, for example, creates a view that lists employees who earn over \$50,000 *and* have over four years of experience.

Layout	Fields	Condition	Update	Exit			
Employee.dbf	RATE	SALARY	TITLE	YRS_EXPER	ADDRESS1	ADDRESS2	CITY
		> 50000		> 4			

View	Employee->	Employee->	Employee->	Employee->
<NEW>	LASTNAME	FIRSTNAME	PHONE	ADDRESS1

Query	D:\db4\samples\<NEW>	Field 15/23	Num
Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4			

Figure 7-18 Query in which both conditions must be met

AND conditions are used to select data from within a range of values, as in the query in Figure 7-19. With a range, as well as with multiple conditions, the two conditions must be separated by commas.

Layout	Fields	Condition	Update	Exit			
Employee.dbf	RATE	SALARY	TITLE	YRS_EXPER	ADDRESS1	ADDRESS2	
		> 50000, < 60000					

View	Employee->	Employee->	Employee->	Employee->
<NEW>	LASTNAME	FIRSTNAME	PHONE	ADDRESS1

Query	D:\db4\samples\<NEW>	Field 15/23	Num
Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4			

Figure 7-19 Searching for a range

The previous query selects employees who earn more than \$50,000 *but* less than \$60,000.

You cannot put two equal signs under one field because a field can't contain more than one value.

OR Conditions

If you place two or more conditions in different rows of a file skeleton, only *one* of the conditions must be met for a record to be included in the results. This is known as an OR condition.

To set up an OR condition:

1. Type a condition into one field of the file skeleton.
2. Move with **Tab** or **Shift-Tab** to another field.
3. Use the arrow key to move the highlight one row below the first condition, and type the second condition.

The query in Figure 7-20 illustrates an OR condition that will display employees who *either* earn more than \$50,000 *or* have over four years of experience.

Layout	Fields	Condition	Update	Exit			
Employee.dbf	RATE	SALARY	TITLE	YRS_EXPER	ADDRESS1	ADDRESS2	CITY
		> 50000		> 4			

View				
<NEW>	Employee-> LASTNAME	Employee-> FIRSTNAME	Employee-> PHONE	Employee-> ADDRESS1

Query	D:\db4\samples\<NEW>	Field 15/23	Num
Prev/Next field: Shift-Tab/Tab Data: F2 Size: Shift-F7 Prev/Next skel: F3/F4			

Figure 7-20 Query in which only one condition must be met

You may also create an OR query by putting two or more conditions in the same field but on different rows, as in Figure 7-21. This query returns all records that have a title equal to *PRESIDENT*, *VICE-PRESIDENT*, or *MANAGER*.

Layout	Fields	Condition	Update	Exit		
Employee.dbf	RATE	SALARY	TITLE	YRS_EXPER	↓ADDRESS1	ADDRESS2
			"PRESIDENT" "VICE-PRESIDENT" "MANAGER"			

View				
<NEW>	Employee-> LASTNAME	Employee-> FIRSTNAME	Employee-> PHONE	Employee-> ADDRESS1

Query	D:\db4\samples\<NEW>	Field 16/23			NunCaps
			Prev/Next field:Shift-Tab/Tab	Data:F2	Size:Shift-F7
			Prev/Next skel:F3/F4		

Figure 7-21 OR condition using the same field

Using AND and OR Conditions Together

You can use a query which employs both the AND and the OR conditions. For example, the query in Figure 7-22 asks for either clerks that earn between \$12,000 and \$20,000 or salespersons that earn between \$20,000 and \$30,000.

Layout	Fields	Condition	Update	Exit		
Employee.dbf	LABORGRADE	RATE	↓SALARY	↓TITLE	YRS_EXPER	
			> 20000, < 30000 > 12000, < 20000	"SALESPERSON" "CLERK"		

View				
<NEW>	Employee-> FIRSTNAME	Employee-> LASTNAME	Employee-> SALARY	Employee-> TITLE

Query	C:\...db4\samples\<NEW>	Field 14/23			Caps
			Prev/Next field:Shift-Tab/Tab	Data:F2	Size:Shift-F7
			Prev/Next skel:F3/F4		

Figure 7-22 AND and OR in the same query

Entering Conditions Using Example Variables

The examples in this chapter so far use specific filter conditions, such as > 2000 or “*CLERK*”. Using specific filter conditions works fine when you want to compare field values to some specific value. However, to compare the value of one field with the value in some other field requires a more algebraic approach, where words or letters represent field values.

For instance, the query in Figure 7-23 uses *example variables* to show all the stocks that closed within two points of their highest value.

Layout	Fields	Condition	Update	Exit	3:51:56 pm	
Stokpric.dbf	!SYMBOL	!DATE_ENTER	!PRICE_CLOS	!PRICE_HIGH	!PRICE_LOW	!VOLUM
			$\geq x - 2$	x		

View	Stokpric->	Stokpric->	Stokpric->	Stokpric->
<NEW>	SYMBOL	DATE_ENTER	PRICE_CLOS	PRICE_HIGH

Query	D:\db4\samples\<NEW>	Field 2/6	NUM
Prev/Next field: Shift-Tab/Tab Data: F2 Size: Shift-F7 Prev/Next skel: F3/F4			

Figure 7-23 Example variables in a query

The letter x in the Price_high field is a place holder for whatever value is in the Price_high field.

The Price_clos field contains a condition based on the value of the Price_high field. This condition $\geq x - 2$ includes a record in the query results if its closing price is within two points of its high price. Figure 7-24 shows the results of this query.

Num			
SYMBOL	PRICE_CLOS	PRICE_HIGH	DATE_ENTER
ASP	24.50	26.00	06/23/87
ASP	21.50	22.00	06/21/87
ASP	23.75	25.50	06/22/87
IDB	139.00	141.00	06/30/87

Figure 7-24 Results of a query that uses example variables

You can enter nearly any name for an example variable, as long as you use it consistently throughout the queries design screen. Instead of x and $\geq x - 2$, for example, you could enter $\geq \text{kumquats} - 2$ and kumquats , or $\geq \text{example1} - 2$ and example1 .

Example variables are especially useful for referencing calculated fields, which don't have names that you can conveniently use in expressions. In Figure 7-25, for example, the variable `product1` is used to reference one calculated field in creating another calculated field.

Layout	Fields	Condition	Update	Exit	
Fields.dbf	↓FIELD1	↓FIELD2	↓FIELD3	↓FIELD4	↓FIELD5
Calc'd Flds	FIELD1*FIELD2	FIELD5*product1			
	product1				
View	Fields-> FIELD1	Fields-> FIELD2	Fields-> FIELD3	Fields-> FIELD4	
Query	C:\...samples\FIELDS		File 1/2		
	Next field:Tab Add/Remove all fields:F5 Zoom:F9 Prev/Next skeleton:F3/F4				

Figure 7-25 Variable used to reference calculated field

Example variable names may be up to ten characters long. They must begin with a letter and cannot contain embedded blanks. Letters, numbers, and underscores are permitted.

Of course, you can use the name of a field to reference the field directly. In Figure 7-26, the field name is written into the expression without putting it underneath its own field in the file skeleton.

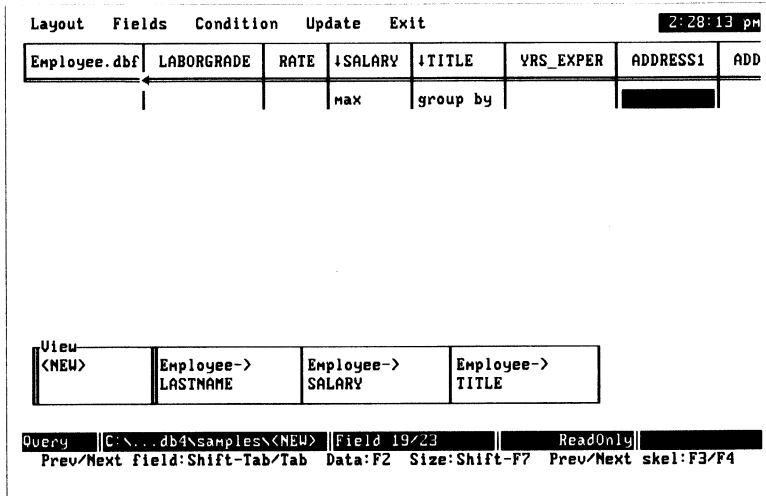


Figure 7-26 Field name used to reference a field

If there is more than one file skeleton with the same name for a particular field, you can still use the field name to reference the field directly by including the name of the file.

The example variable for the name of such a field takes the form

<filename>-> <field name>

For example, if there were another file skeleton on this queries design screen with a Price_high field, you would write the condition in Figure 7-26 as $\geq \text{Stokpric} \rightarrow \text{Price_high} - 2$.

Grouping Query Information

You can apply aggregate operators to groups of records with the **Group By** operator. **Group By** groups together all records that have matching values in a selected field. Then, on each group of records, dBASE IV applies the aggregate operators that you have chosen. For instance, the query in Figure 7-27 yields the maximum salary for each type of job title.

Records Organize Fields Go To Exit		
LASTNAME	SALARY	TITLE
	12250	CLERK
	52500	MANAGER
	79500	PRESIDENT
	25000	SALESPERSON
	16500	SECRETARY
	59000	VICE-PRESIDENT

Browse | C:\...db4\samples\<NEW> | Rec 1/6 | View | ReadOnly

Figure 7-27 Query with a **Group By** operator

The resulting view is shown in Figure 7-28.

Records Organize Fields Go To Exit	
TITLE	SALARY
CLERK	12250
MANAGER	53500
PRESIDENT	79500
SALESPERSON	25000
SECRETARY	16500
VICE-PRESIDENT	59000

Browse | C:\db4\samples\<NEW> | Rec 1/6 | View | ReadOnly

Figure 7-28 Results of a query with **Group By**

When you use the **Group By** operator, dBASE IV automatically does an ascending sort on the values in that field. If you want to sort the groups differently, you must include a different sort operator after the **Group By** operator, separated by a comma.

If you use a **Group By** operator in more than one column (for example, in Department and Title), dBASE IV groups the query result by values in the column that occurs first in the database file (Department). To change the ordering (by Title), use a sort operator (for example, group by, asc in the Title column).

If you have one column with a **Group By** operator and another column with a sorting operator, dBASE IV applies the **Group By** operator first. The single sorting operator is applied after the records have been filtered and grouped.



NOTE

When creating a view that contains a GROUP BY operator, dBASE IV uses an existing index on the GROUP BY field. If no index exists, dBASE IV creates one if doing so would be faster than sorting the records. For more information about keeping or discarding such “speedup” indexes, refer to the Keeping Indexes Created by a Query section later in this chapter.

Summarizing and Grouping Information Using Calculated Fields

You can apply aggregate operators and the GROUP BY operator to calculated fields. For example, to determine your total investment in different types of home furnishings, you could create the query shown in Figure 7-29.

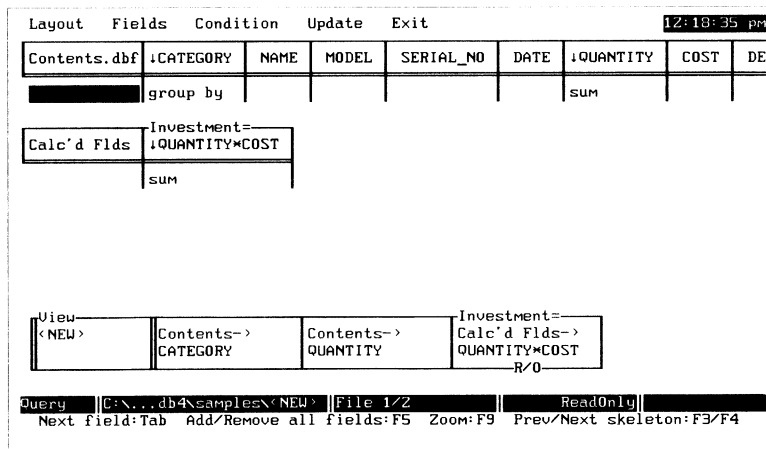


Figure 7-29 Aggregate operator in a calculated field

Use of GROUP BY in a calculated field is illustrated by an example database, Rsales, containing information about the number and value of sales for different sales regions. Each region has a four-digit number, the last two digits of which identify the region.

To display the number of sales in each region and their total value, you could create the query shown in Figure 7-30.

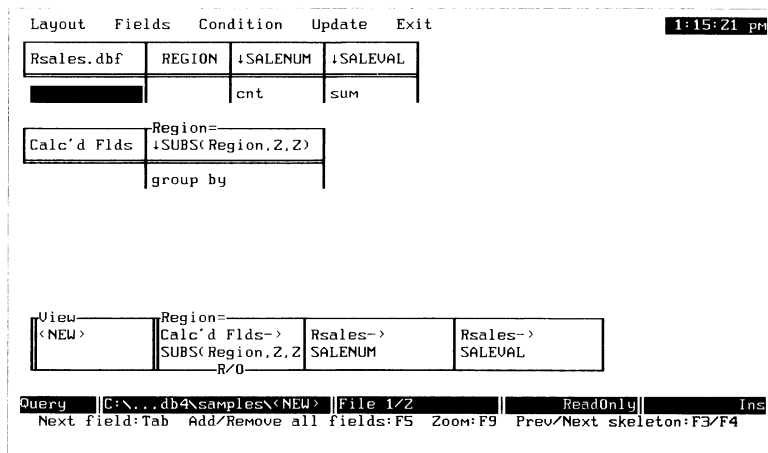


Figure 7-30 Grouping data by calculated field values

For information about the SUBSTR() function used in the query, refer to *Language Reference*.



NOTE

If you use GROUP BY or a sort operator (see Table 6-4) on a calculated field, you can't use another of these operators anywhere else in the query.

Summarizing and Grouping Information Using Complex Indexes

You can use aggregate operators and GROUP BY on complex indexes. (To display the complex indexes that have been defined for a database file in the file skeleton, press **Alt-F** and toggle **Include indexes** to **ON**.)

For example, suppose that you have a database containing the names of employees, their titles, specialties, and years of experience. To summarize years of experience for each job title and specialty, you could create the query shown in Figure 7-31.

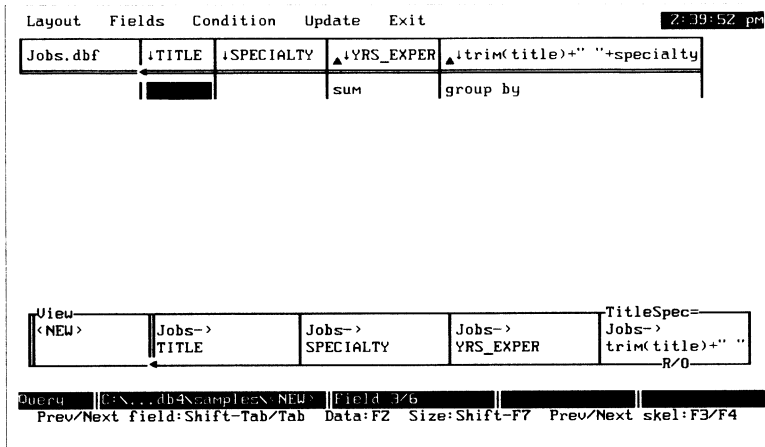


Figure 7-31 Grouping data by a complex index



NOTE

- When you add a complex index to a view, dBASE IV uses its tag name to name the field in the view skeleton. If the tag name conflicts with another field name in the view skeleton, dBASE IV displays the tag name and prompts you to change it for the view skeleton.
- If you use GROUP BY or a sort operator (see Table 6-4) on a complex index field, you can't use another of these operators anywhere else in the query.

Locating a Specific Record

To locate a record using a query, use the **Find** operator as follows:

1. Enter the search criteria under the relevant fields.
2. Type the word *Find* under the file skeleton's name, as shown in Figure 7-32.

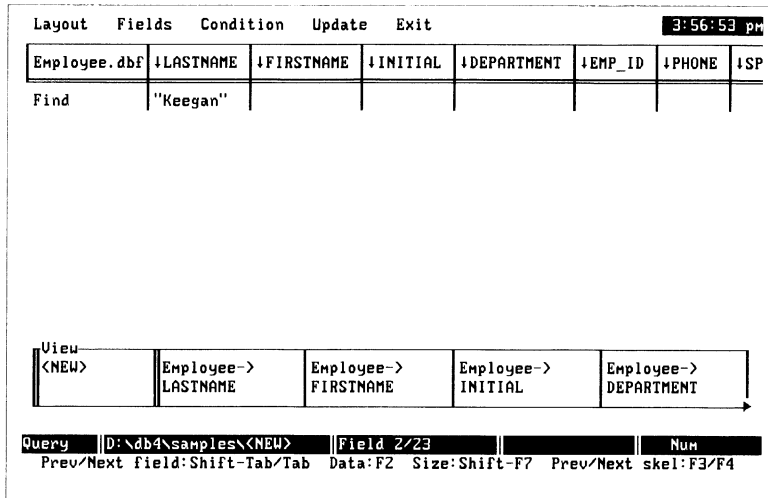


Figure 7-32 Using **Find** to locate a record

3. Press **F2 Data**.

dBASE IV displays the first record that matches the search criterion and the records following it. If Find fails to locate a record, dBASE IV displays the last record in the file.

Using the Condition Box

A condition box holds a condition that is applied to the query as a whole. dBASE IV only allows records into the view or update that satisfy the conditions defined in the condition box. Unlike conditions that are placed in a file skeleton column under particular fields, the conditions that you enter into the condition box can address more than one field. You must also enter full dBASE syntactic expressions into condition boxes.

To use a condition box:

1. After creating the view skeleton, press **Alt-C** to open the **Condition** menu.
2. Type **A** to add a condition box. The condition box appears on the lower right side of the screen.

3. Enter the condition. If your condition is long and you want to see the entire expression that you entered, press **F9 Zoom**.
4. Once you have entered any other conditions in the file skeletons under particular fields and have defined your view skeleton, press **F2 Data** to process the query.

You could have a condition such as the one in Figure 7-33 that uses fields from two different file skeletons. The condition box has been opened with the **F9 Zoom** key to fill the screen.

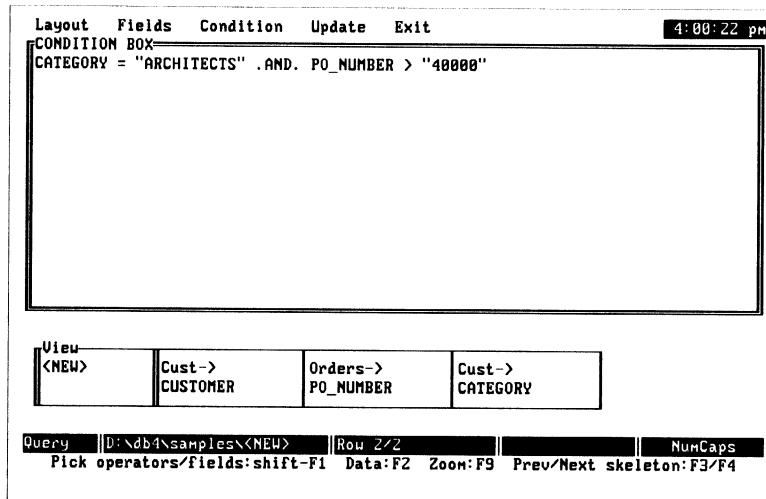


Figure 7-33 Condition box with complex query condition

Each line in the condition box must be a complete and unambiguous dBASE IV expression. If a field from one file skeleton has the same name as a field from a second file skeleton, you must give the field a unique identification in the condition box. You could include the filename, such as *Employee->Title*, or you could use an example variable that links the field in the file skeleton to the field in the condition box's expression.

It is permissible to use more than one condition in the condition box. In Figure 7-33 the dBASE IV logical operator *.AND.* is used to indicate that both conditions must be true. The expression *.OR.* could be used to indicate that either of the conditions must be true.



NOTE

Here are some additional facts to remember about condition boxes:

- *Only one condition box per query is allowed.*
- *Select the **Show condition box** option on the **Condition** menu to display or hide the condition box. This is useful when you have several file skeletons on the screen and would like to have the condition box out of the way. Setting **Show condition box** to **NO** while the cursor is on the box will not close the box until you move the cursor off it.*
- *To remove the condition box, use the **Delete condition box** option from the **Condition** menu.*
- *You can enter a condition by typing it directly or by pressing **Shift-F1 Pick** and choosing field names, operators, and functions from the resulting list.*
- *If you set the **Show condition box** option in the **Condition** menu to **YES**, the box is displayed at all times. If you set it to **NO**, the condition box marker is always displayed, but the box zooms open only when you move to it with **F4 Next** and **F3 Previous**.*
- *Conditions put on separate lines in a condition box are treated as an **AND** condition.*
- ***F9 Zoom** acts as a toggle switch in a condition box (as well as on other areas of the queries design screen such as a column in a file skeleton and a calculated field skeleton). Pressing **F9 Zoom** once opens up the condition box and puts the cursor at the end of the text. Pressing **F9 Zoom** again closes the condition box and puts the cursor at the end of the text.*

Using the Condition Box with Date Fields

To use Date functions in a query, you must use them in the condition box. The example in Figure 7-34 uses the Date functions YEAR() and MONTH() to define the query conditions.

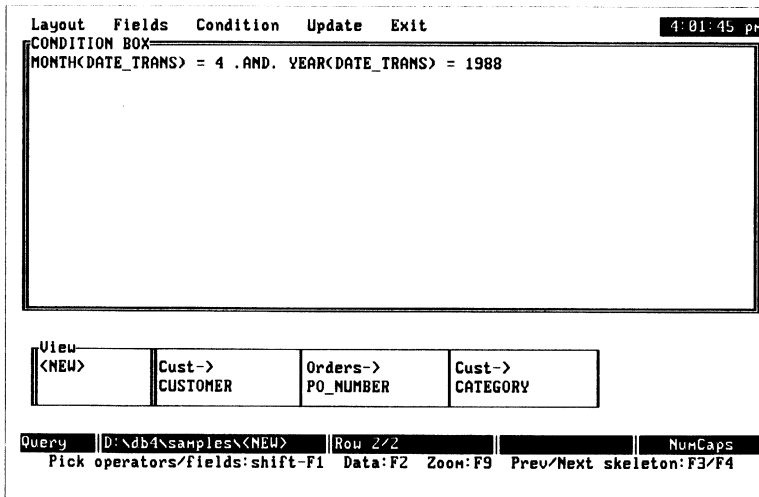


Figure 7-34 Date fields in a condition box

See also the Selecting Information on Date Fields section earlier in this chapter.

Using the Condition Box with Memo Fields

To find which memo fields use a specific word or phrase, use the \$ (contains) operator in the condition box, as in Figure 7-35.

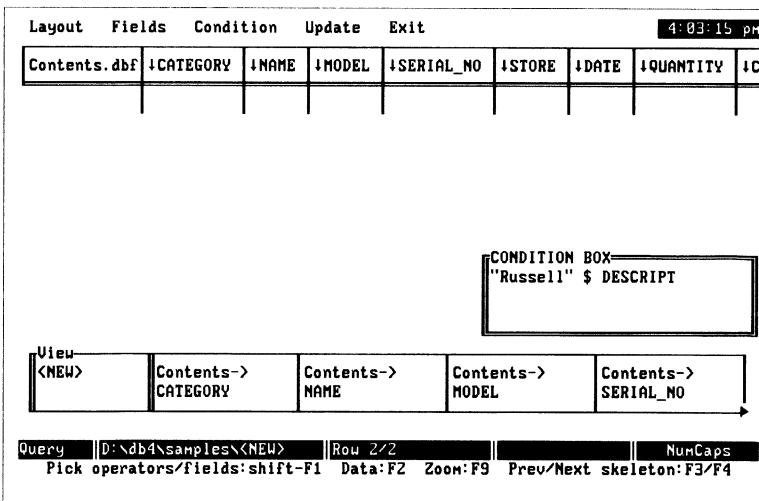


Figure 7-35 Using the contains operator in a condition box

This query displays only those records containing the word *Russell* in the DESCRIP memo field. The quoted string comes before the contains operator in a condition box. When using the contains operator in a non-memo field in a file skeleton, the quoted string goes after it, as described in the Embedded Text Searches in a Character Field section, earlier in this chapter.

Removing Old Query Conditions

You can set up a query, process it, and then set up a new query, deleting the old query conditions without exiting to the Control Center. Before entering new query conditions on the queries design screen, highlight the field where your old query condition is, position the cursor at the beginning of the condition, and press **Ctrl-Y**. This deletes the condition in that field. Each condition left over from the previous query must be deleted separately.

Special Queries on Linked Databases

You use the **First** and **Every** operators to display related records in linked files.

Displaying One of Each Record When Linking

You use the **First** operator in the skeleton of one file to display the first record in a lookup file that matches each record in a master file.

Layout	Fields	Condition	Update	Exit
Codes.dbf	CITY	!CODE		
	LINK1			
Names.dbf	!LASTNAME	!FIRSTNAME	ADDRESS	!CITY
				First LINK1, Asc1
STATE				
ZIP				
View				
<NEW>	Names-> LASTNAME	Names-> FIRSTNAME	Codes-> CODE	Names-> CITY
				R/O
Query	D:\db4\samples\<NEW>	Field 3/8		Num
	Prev/Next field:Shift-Tab/Tab	Data:F2	Size:Shift-F7	Prev/Next skel:F3/F4

Figure 7-36 Two linked files with the **First** operator

In Figure 7-36, the **First** operator requests dBASE IV to find the first record in Names (the lookup file) that matches the city in each Codes (the master file) record. If there is no match for a particular record in the master file, information for that record does not appear in the view. Additional Names records that match the same city record also do not appear in the view. The resulting view is shown in Figure 7-37.

Layout	Fields	Condition	Update	Exit			
Goods.dbf	↓PART_ID	DATE_ORDER	↓PART_NAME	DESCRIPT	LEAD_TIME	PRIC	
	Every LINK1						

Orders.dbf	CUST_ID	↓DATE_TRANS	PART_ID	PART_QTY	PO_NUMBER	NOTES
			LINK1, =''			

View	Goods->	Goods->	Orders->
NOMATCH	PART_ID	PART_NAME	DATE_TRANS
	R/O		

Query [C:\N...db4\examples\NEW] File Z/Z
 Next field: Tab Add/Remove all fields:F5 Zoom:F9 Prev/Next skeleton:F3/F4

Figure 7-37 Results of a query with the **First** operator



NOTE

- Using the **First** operator is the same as using the records in one linked file to filter the records in another. For example, if a view of linked files A and B contains fields only from file A, the view displays only the first record in A that matches a record in B. If fields from both files were contained in the view, every matching record would be displayed.
- The **First** operator creates views similar to dBASE III PLUS views. For this reason, when you import a dBASE III PLUS view, the **First** operator is automatically placed in the skeleton of the dependent database file. (The dependent file is the one named after the INTO keyword of the SET RELATION command in the dBASE III PLUS view.)

Displaying All Records When Linking

When matching records in two linked files, dBASE IV looks for all records in the lookup file that match a record in the master file. If there is no match for a particular record, information from the record isn't displayed.

You use the **Every** operator in the skeleton of the master file to display every record in that file, even if it doesn't match a record in the linked file. Missing field information is displayed as blank.

For example, the query in Figure 7-38 displays information about each item a company stocks, regardless of whether that item has been ordered.

Records Organize Fields Go To Exit		
PART_ID	PART_NAME	DATE_TRANS
C-111-8045	SOFA-8 FOOT	/ /
C-222-1001	CHAIR-DESK	/ /
C-222-2020	CHAIR-DESK	/ /
C-222-3010	CHAIR-SIDE	/ /
C-222-3020	CHAIR-SIDE	/ /
C-300-2020	BOOKCASE	/ /
C-300-2040	BOOKCASE	/ /
C-300-4000	BOOKCASE	/ /
C-400-2060	TABLE-END	/ /
C-400-2080	TABLE-END	/ /
C-400-5000	TABLE-COFFEE	/ /
C-400-5020	TABLE-COFFEE	/ /
C-400-5050	TABLE-COFFEE	/ /
C-500-6000	LAMP-FLOOR	/ /
C-600-5000	DESK-EXECUTIVE-5 FOOT	/ /
C-600-5050	DESK-SECRETARY-5 FOOT	/ /
C-600-6020	DESK-EXECUTIVE-6 FOOT	/ /

Browse C:\...db4\samples\NEW Rec 5/33 View

Figure 7-38 Query with the **Every** operator

In the query result, shown in Figure 7-39, Part_ID and Part_Name information is shown for each item in the Goods database. If the item hasn't been ordered, its Date_Trans and Cust_ID fields are blank.

Num ReadOnly			
DATE_TRANS	PART_ID	PART_NAME	CUST_ID
02/15/88	C-111-6000	SOFA-6 FOOT	C00002
03/05/88	C-111-6000	SOFA-6 FOOT	A00001
01/10/88	C-111-6015	SOFA-6 FOOT	C00001
/ /	C-111-6045	SOFA-6 FOOT	
02/11/88	C-111-8000	SOFA-8 FOOT	C00001
03/10/88	C-111-8000	SOFA-8 FOOT	A10025
/ /	C-111-8045	SOFA-8 FOOT	
01/28/88	C-222-1000	CHAIR-DESK	C00001
01/29/88	C-222-1000	CHAIR-DESK	C00001
02/16/88	C-222-1000	CHAIR-DESK	A10025
/ /	C-222-1001	CHAIR-DESK	
02/11/88	C-222-2000	CHAIR-DESK	C00001
03/04/88	C-222-2010	CHAIR-DESK	A00001
/ /	C-222-2020	CHAIR-DESK	
03/01/88	C-222-3000	CHAIR-SIDE	C00001
/ /	C-222-3010	CHAIR-SIDE	
/ /	C-222-3020	CHAIR-SIDE	
/ /	C-300-2020	BOOKCASE	

Figure 7-39 Results of a query with the **Every** operator

**NOTE**

A view query can contain only one **Every** or **First** operator for each linked pair of file skeletons. If two database files are linked by two common fields (rather than just one field), an **Every** or **First** operator placed before either of the example variables in either file skeleton is ignored.

Displaying Records with No Match

You can also use **Every** to display only records that have no match in the linked file. In this case, you also need to use a filter condition that looks for no records.

As illustrated in Figure 7-40, to display information for parts that have not been ordered:

1. Place the **Every** operator under the skeleton of the file for which you want to display unmatched records.
2. Place the filter condition under the other file skeleton, in a field that ordinarily contains data in every record (such as the linking field).

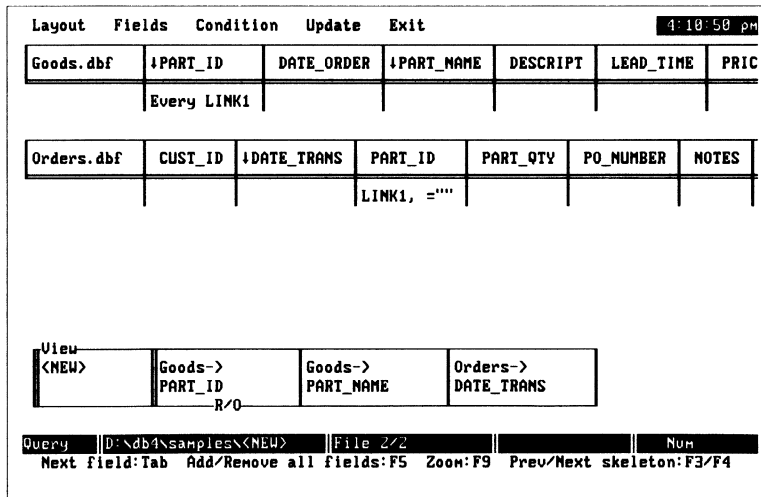


Figure 7-40 Query for finding non-matching records

The resulting view is shown in Figure 7-41. In this query, Goods records are matched with the blank end-of-file record (a placeholder rather than a true record) in Orders. Records that match the placeholder are used in the result.

Num		
PART_ID	PART_NAME	DATE_TRANS
C-111-8045	SOFA-8 FOOT	/ /
C-222-1001	CHAIR-DESK	/ /
C-222-2020	CHAIR-DESK	/ /
C-222-3010	CHAIR-SIDE	/ /
C-222-3020	CHAIR-SIDE	/ /
C-300-2020	BOOKCASE	/ /
C-300-2040	BOOKCASE	/ /
C-300-4000	BOOKCASE	/ /
C-400-2060	TABLE-END	/ /
C-400-2080	TABLE-END	/ /
C-400-5000	TABLE-COFFEE	/ /
C-400-5020	TABLE-COFFEE	/ /
C-400-5050	TABLE-COFFEE	/ /
C-500-6000	LAMP-FLOOR	/ /
C-600-5000	DESK-EXECUTIVE-5 FOOT	/ /
C-600-5050	DESK-SECRETARY-5 FOOT	/ /
C-600-6020	DESK-EXECUTIVE-6 FOOT	/ /
C-600-6050	DESK-SECRETARY-6 FOOT	/ /

Figure 7-41 Result of non-matching query

Self-Joins: Using One Field to Filter Other Fields

You can use one field in a database file to filter all the other records in that database file. You can do this to answer questions like these:

- Which employees live in the same neighborhood as some other employee?
- Which employees make more money than their supervisor?
- Which students are also the teachers for other students?

Questions like these are really double questions. The first one, for example, can be broken into two questions:

1. Which neighborhood does this employee live in?
2. Does any other employee live in this neighborhood?

To answer a question like this, each record in the database file must be compared to every other record in the same file. Place the database file's skeleton on the queries design screen twice. dBASE IV indicates the second copy of the file skeleton with a letter in the upper left corner of the file skeleton.

The queries design screen uses one file skeleton as the base from which a single record is chosen. This record is then compared to all the records represented by the other file skeleton.

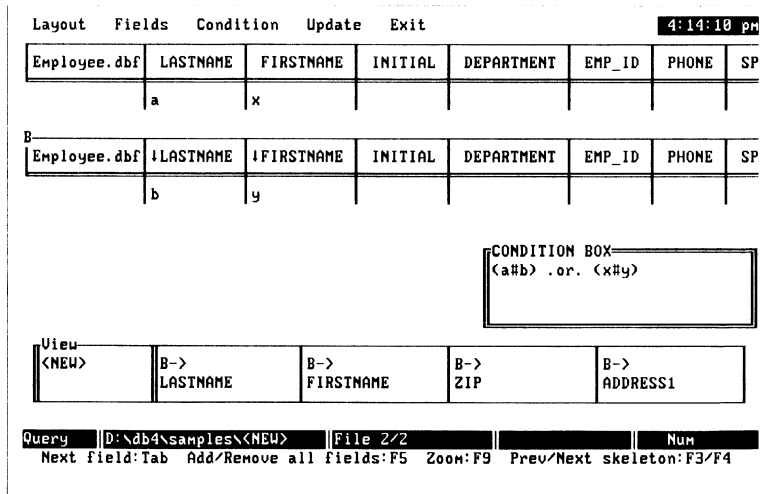


Figure 7-42 File linked to itself

Figure 7-42 shows two file skeletons for Employee.dbf linked on the Zip field (“zipcode” is the example variable). The view will show the last names, first names, zip codes, and addresses of all employees who live in the same zip code area. Example variables are used to compare Lastname and Firstname values in both copies of the file.

Choosing a Filter Method

When processing a query on the queries design screen, you can choose one of several methods of selecting records using the **Filter Method** option of the **Fields** menu.



NOTE

To use *IQ!* to automatically optimize your query, select the *OPTIMIZED* filter method.

1. Create your query.
2. Press **Alt-F** and then **F** to select the **Filter Method** option.
3. Press **Spacebar** or **↓** to select the filter method that you want to use.
4. Press **F2 Data** to execute the query.

The filter methods are summarized in Table 7-5.

Table 7-5 Filter methods

Method	Description
INDEX...FOR	dBASE IV creates a new index whose FOR clause selects records that match your query condition. The new index is saved or discarded, depending on the setting of the Keep speedup indexes option, discussed in the next section.
OPTIMIZED	dBASE IV chooses the best of the three filtering methods for your query. This is the default if you don't select a method.
SET FILTER	dBASE IV filters the records that match your query condition.
SET KEY	dBASE IV uses a key range, if your query condition qualifies as a key filter (refer to the SET KEY command in <i>Language Reference</i>).

The filter method that you choose depends on:

- Whether there is an index tag on the field that contains your query condition. For example, if you've entered the query condition:

```
>="97219"
<="97401"
```

in the Zip field and there is an index tag on Zip, you can use SET KEY.

- The query condition. For example, if you've entered the condition > "CA" in the State field, you can use INDEX...FOR. dBASE IV creates an index with the clause FOR State > "CA".
- The indexed distribution of records in the database file. In the Zip example above, you can use SET KEY because the zip codes 97401 and 97219 are grouped in a narrow range when records are indexed by Zip. If the query condition you are entering is:

```
>="01060"
<="98102"
```

using SET FILTER would probably be more effective because the range is broad enough to include most of the records in the database.

If most of the records in a large database will match the query condition, using **SET FILTER** is probably more efficient than using **INDEX...FOR**, which checks each record for the FOR condition. If records matching the query condition occur in a certain range of records, **SET KEY** is probably more efficient than **SET FILTER**.

If you're not certain which of the methods is more efficient, select **OPTIMIZED** and let dBASE IV decide. After you execute the query, the method used is displayed in the **Filter Method** option of the **Fields** menu.



NOTE

- *Once a query is executed using a filter method and then saved, the query uses the same filter method every time it is executed, regardless of whether you change the **Filter Method** before re-executing. To select a different filter method for a query, display the query on the queries design screen, change the filter method, and save the query again.*
- *When deciding whether to use **SET KEY** to optimize a query, queries design ignores any condition in a condition box.*

Keeping Indexes Created by a Query

If you plan to use a query often, you can speed its execution by keeping indexes that dBASE IV creates to execute the query. To do this, set the **Keep speedup indexes** option of the **Fields** menu to **YES** before executing the query.

The default for this option is **NO**. dBASE IV discards temporary indexes after executing a query and re-creates them each time it executes the query. This saves disk space and makes updating the underlying database records more efficient (because temporary indexes don't have to be updated). However, re-creating indexes each time a query is executed slows execution.

dBASE IV uses the convention QBE_TAGnnn to name the speedup indexes that it creates (nnn represents the smallest tag number that is not already in use).



NOTE

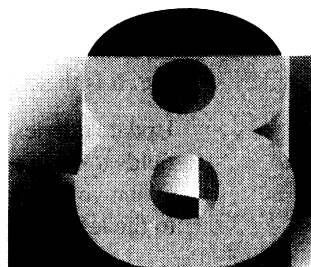
*If dBASE IV used an existing index to execute a query and the index doesn't exist the next time the query is executed, this index too is re-created each time the query is executed, even though it is not a speedup index. Setting **Keep speedup indexes** to **YES** before executing the query will also save this index, thus speeding subsequent execution.*

You can also re-create a query without such an index by displaying the query on the queries design screen and saving it again. dBASE IV re-creates the query without the deleted index.

Saving Queries

To save your query without exiting the queries design screen, use the **Save this query** option on the **Layout menu**, or press **Ctrl-J**. To save the query and exit, use the **Save changes and exit** option on the **Exit menu**. For more information, see the sections on saving views in Chapter 6.

Using Update Queries



Update queries provide a fast and powerful way to change selected fields and records in a single database file. This chapter describes how to create and perform update queries and includes information about the following topics:

- Replacing data
- Marking and unmarking records for deletion
- Erasing records marked for deletion
- Appending data

When you create an update query, nothing happens to your data until you *perform* the query. This ensures that you will not make unintentional sweeping changes. You can save update queries and return to the Control Center. The update query is still available for use in the future.



NOTE

When you make an update query, it is saved in a file with a .upd extension. When you perform an update query, dBASE IV compiles the .upd file and creates a separate .dbo file, which runs faster. You can rename the .dbo file to have a .upo extension. This makes it easier to distinguish compiled update queries from compiled program (.prg) files.

General Information about Updates

There are four update operators: **Replace**, **Mark**, **Unmark**, and **Append**. In general, you define the type of update query by placing an update operator in the file skeleton under the name of the file. Either type an update operator under the name of the database file you want to update, or choose the **Specify update operation** option from the **Update** menu.

Although you can have more than one file skeleton on the screen, normally only one of them contains an update operator. This file with the update operator is the *target* file. It is the database file that will be updated.

Update queries do not produce views. For this reason, if you previously selected some fields to be in a view, the view skeleton disappears when you enter an update operator. When you save update queries, they appear in the Control Center with an asterisk (*) to the left of their filename.

Replacing Data

Replacing data means changing the contents of a field to a new value. For example, you can increase the salaries of all clerks hired after a certain date by 10% or to add \$1.50 to the price of certain items.

Preparing the Replace Query

To replace data, first set up a query and save it. Then perform the query. To prepare the query:

1. From the Control Center, highlight **<create>** on the **Queries** panel and press **↵** to go to the queries design screen.
2. From the **Layout** menu, type **A** to select the **Add file to query** option.
3. Highlight the database file that has the data you want to replace and press **↵**. That database file skeleton appears on the queries design screen.
4. Move the highlight to the far left of the file skeleton by pressing **Home**, and press **F5 Field** to add all the fields to the view skeleton.
5. Type in the filter conditions for the records you want to change, as shown in Figure 8-1. Your filter conditions will determine what part of your database file will be updated. Records that do not match the filter condition will not be updated.

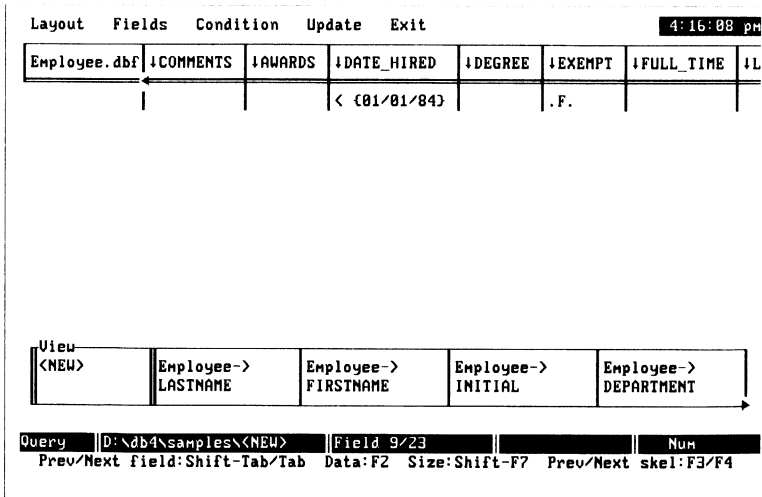


Figure 8-1 Entering the filter conditions

- Press **F2 Data** to verify that these are the records you want to change. The Browse screen appears, as shown in Figure 8-2.

Num						
LASTNAME	FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	PHONE	S
Drasin	Pedro	E	SALES	991-22-3333	(203)555-1522	C
Drendon	Kelly	A	SALES	001-22-3333	(805)555-8674	C
Hart	Paul	C	SALES	111-22-7777	(718)555-0059	C
Lucas	John	M	SALES	101-20-3003	(919)555-5842	C
Plimpton	Daniel	M	SALES	444-22-3333	(803)555-7150	C
Skye	Jim	D	SALES	888-22-3333	(401)555-3131	C
Youngblood	Dick	P	SALES	999-22-3333	(513)555-3228	C

Figure 8-2 Verifying the records



WARNING

Testing your filter conditions is very important because you must identify the actual records that you will be changing. If you do not verify that these are the records you want to change, you may unintentionally replace data in records you do not want to change.

The records that appear will change if you continue with the update. If these are not the records you want to update, alter your filter conditions when you return to the queries design screen, and repeat the test.

7. Press **Shift-F2 Design** to go back to the queries design screen.
8. Press **Home** to move the highlight underneath the database filename.
9. Type **Replace** underneath the name of the current file skeleton (this determines the type of update) and press **↵**. Your screen should look like Figure 8-3. Select **Proceed**.

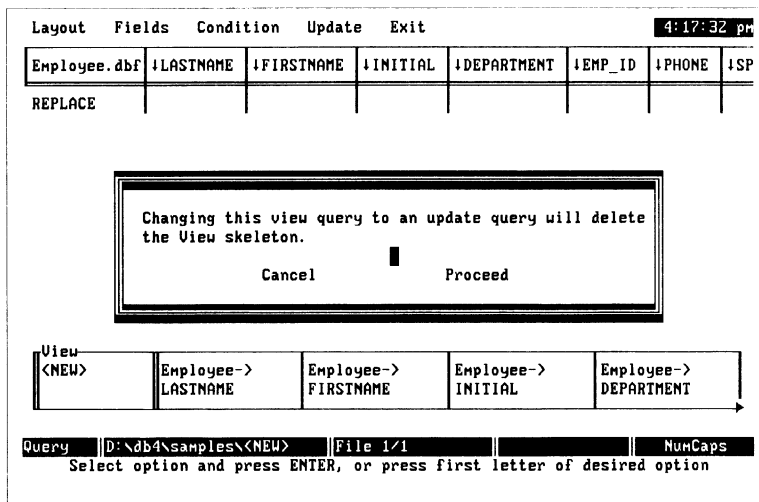


Figure 8-3 Entering the **Replace** operator

The view skeleton disappears and the word *Target* appears above the filename.

You could also press **Alt-U** to open the **Update** menu, type **S** to **Specify the update operation**, and type **R** to select the **Replace values** operation. When you choose an update operation through the menu system, the update operator name (such as **Replace**) appears under the name of the current file skeleton. This file then becomes the target file for the query, and the word **Target** is displayed in its file skeleton.



NOTE

- *If an operation already exists for the query, the newly chosen update operator replaces the old one in the file skeleton. If you change a view query to an update query, dBASE IV removes the view skeleton after giving a warning prompt to make sure you want to delete the view skeleton.*
- *In addition to changing the update operator through the menu system, you can move the cursor to the update operator and edit or delete it manually, thereby changing the type of query.*

10. The **Replace** operator requires a replacement instruction in the file skeleton. This instruction begins with the word *With*, followed by a dBASE expression. Tab to the field on which you want to update the data and type *With* and the replacement instruction.

The example in Figure 8-4 will raise salaries by \$1,000 for those records defined by the filter condition. Although you cannot see those conditions here, the records include those employees hired before January 1, 1984, that are not exempt.

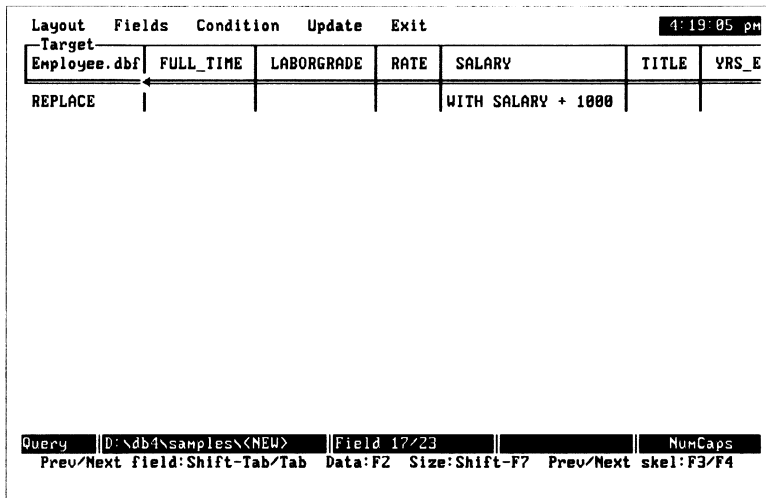


Figure 8-4 Using **With** and the replacement instruction

At this point, you have not yet changed the database file. All you have done is set up an update query to replace data. You can save this update query to replace data at a later time.

Saving the Replace Query

The steps to save an update query are as follows:

1. Press **Alt-L** to open the **Layout** menu and type **S** to activate the **Save this query** option. A prompt box appears.
2. Type a name for your update query. Do not type an extension because dBASE IV automatically assigns a *.upd* extension to update queries.

Performing the Replace Query

There are two ways to perform an update query using the dBASE IV menu system. The first is from the Control Center and the second way is from the queries design screen.

dBASE IV lists update queries in the **Queries** panel of the Control Center. As a warning device, dBASE IV places an asterisk before the update query to distinguish it from other types of queries. The name of the update query file is also shown underneath the control panels and has a *.upd* extension.

Performing an Update from the Control Center

To perform an update *from the Control Center*:

1. In the **Queries** panel, highlight the update query that you want to perform.
2. Press **↵**. A dialog box appears with three options. **Run update** performs the update. **Modify query** takes you to the queries design screen to change the query. **Display data** displays the data in the database file without updating it.
3. Highlight **Run update** and press **↵**. A prompt box asks whether you really want to run this update query.
4. If you want to run the update query, type **Y** for Yes. dBASE IV runs the update query and supplies information about how many records are affected.

Performing an Update from the Queries Design Screen

To perform an update *from the queries design screen*:

1. Press **Alt-U** to open the **Update** menu.
2. Highlight **Perform the update** and press **↵**.
3. When the update is complete, press any key to continue.

To look at the database file in which you have just updated records, press **F2 Data**.

Replacing Data Using Linked Databases

You can replace data using two linked databases.

For example, suppose you have a database file that tracks orders and another database file that keeps inventory information. You can use a **Replace** update query to update inventory information. You could use the query in Figure 8-5 to replace the data in the Qty_onhand field.

This **Replace** query works by subtracting the part quantity ordered in a particular transaction in Orders.dbf from the quantity on-hand in Goods.dbf. The **Replace** query would only do the subtraction if the given transaction date occurred before 03/01/88 and an invoice has been sent for the order. The two files are linked on the Part_id field.

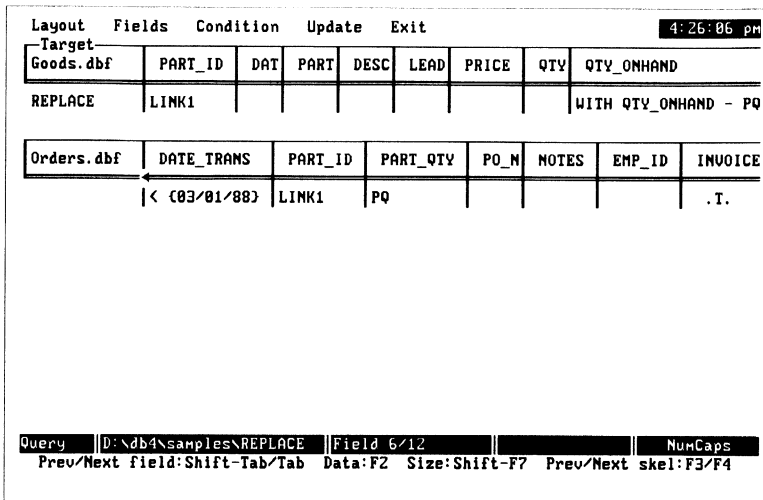


Figure 8-5 Replacing data using linked files



NOTE

Using a **Replace** query is similar to using the **UPDATE** command at the dot prompt. Refer to Chapter 2 of Language Reference.

Deleting Data

Deleting data in dBASE IV using the menu system is a two-step process. You first mark a record or group of records for deletion and then perform the actual deletion. This protects you from inadvertently deleting records.

Marking Individual Records for Deletion

You can mark for deletion one record at a time in the Browse or Edit screen. Go to the record you want to mark for deletion and press **Ctrl-U**. The abbreviation *Del* appears on the right side of the status bar on the lower portion of the screen. If you move to a record that is not marked for deletion, the word *Del* disappears.

You can also mark a record for deletion by opening the **Records** menu and selecting the **Mark record for deletion** option. This marks the current record for deletion.

To unmark a record while using Browse or Edit, place the cursor somewhere on that record. Press **Ctrl-U**, or open the **Records** menu, highlight **Clear deletion mark**, and press **↵**. The word *Del* disappears from the status bar.

Marking Groups of Records for Deletion

To mark groups of records for deletion, based on a filter condition, use the queries design screen instead of Edit or Browse:

1. Add the file from which you want to delete records to the queries design screen by opening the **Layout** menu, selecting **Add file to query**, and then selecting the file you want from the resulting list.
2. Type in the filter condition to determine which records will be deleted. For example, the filter condition on the `Date_last` field in Figure 8-6 includes records with a date before January 1, 1980.

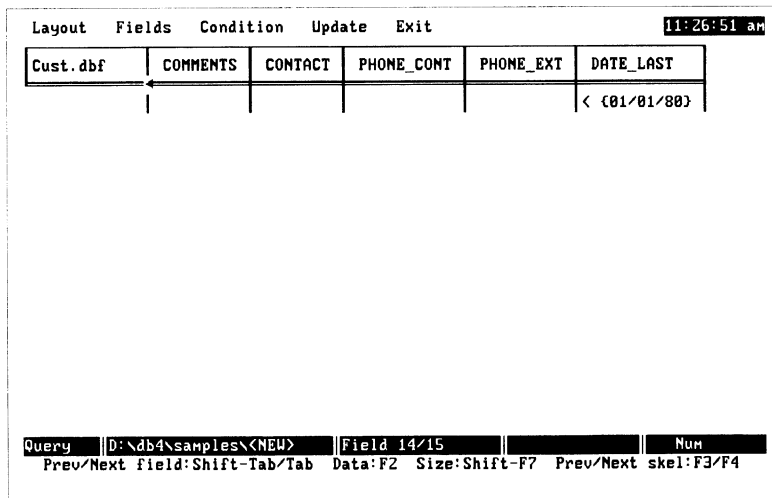


Figure 8-6 Enter the filter condition

3. Press **F2 Data** to test your filter condition. The Browse screen appears with the records that fit your filter condition. If these are the records you want to mark for deletion, press **Shift-F2 Design** and go on to step 4. Otherwise, press **Shift-F2 Design** and go back to step 2 to refine your filter condition.
4. Open the **Update** menu and select **Specify update operation**. A submenu appears.
5. Select **Mark records for deletion**. If you have a view skeleton, a prompt box appears explaining that the view skeleton will disappear if you proceed. Select **Proceed**. The word **Mark** appears under the filename in the file skeleton.



NOTE

*Instead of doing steps 4 and 5, you can type the word **Mark** into the column under the filename.*

When you use the **Mark** operator, dBASE IV uses the conditions you defined in the columns to select the records to be marked for deletion. If there are no conditions in the columns, all records are marked for deletion.

6. To cause the records to be marked for deletion, open the **Update** menu and select **Perform the update**.
7. A message appears indicating the number of records that will be marked for deletion. To affirm that you want to go ahead with marking these records for deletion, type y and ↵. (If you decide that you do not want to mark these records for deletion, type n and ↵.)



NOTE

*Records are removed from the file only when you issue a **PACK** command from the dot prompt or choose **Erase marked records** from the **Organize** menu on the database design screen or the *Browse or Edit* screen.*

8. When the update is complete, press any key to continue.

To look at the database file in which you have just marked records, press **F2 Data**. All records appear, marked for deletion or not.

Saving the Update Query

To save an update query:

1. Press **Alt-L** to open the **Layout** menu and type S to activate the **Save this query** option. A prompt box appears.
2. Type a name for the update query. Do not type an extension because dBASE IV automatically assigns a *.upd* extension to update queries.

Hiding Records Marked for Deletion

To display a database file without the records marked for deletion:

1. From the Control Center, press **Alt-T** to open the **Tools** menu.
2. Type **S** to activate the **Settings** option. Another screen appears with the **Options** menu open.
3. Highlight the **Deleted** option and press **Spacebar** to toggle the option to **ON**.
4. Press **Alt-E** and press **↓** to exit to the Control Center. If you open a file that has records marked for deletion, those records will not appear, though they still exist.

To have hidden records appear again, return to the **Options** menu and set the **Deleted** option to **OFF**.

Determining Records Marked for Deletion

Before actually erasing records, you may want to check the records that have been marked for deletion. To do this, use the **DELETED()** function in the condition box:

1. Select **<create>** from the **Queries** panel at the Control Center.
2. If the skeleton of the file you want to check is not on the queries design screen, add it now with the **Add file to query** option on the **Layout** menu. Press **F5 Field** to add the fields to the view skeleton.
3. Open the **Condition** menu and select the **Add condition box** option. A condition box appears on the screen.
4. Type **deleted()** in the condition box.
5. Press **F2 Data** to process the query and see which records are marked for deletion.

If you do not see records marked for deletion, go to the **Settings** option in the **Tools** menu and set the **Deleted** option to **OFF**. Then repeat steps 1–5.

Erasing Records Marked for Deletion

Once you have marked records for deletion, you can erase them using the database design screen or the Browse or Edit screen. Do the following:

1. In the **Data** panel of the Control Center, highlight the file with the marked records and press **Shift-F2 Design**. The database design screen appears.
2. Select the **Erase marked records** option in the **Organize** menu. A prompt asks if you really want to erase all the marked records.
3. Type **Y** for yes. Messages indicating changes to the database file appear.
4. Select **Save changes and exit** from the **Exit** menu.

Unmarking Groups of Records

When you unmark a group of records, you are telling dBASE IV that you do not want these records marked for deletion. To unmark multiple records:

1. Add the file with the records you want to unmark to the queries design screen by opening the **Layout** menu, selecting **Add file to query**, and then selecting the file you want from the list.
2. Press **F5 Field** in the column on the far left under the filename to add the fields to the view skeleton.
3. Type in the filter conditions that will determine which records will be unmarked, as shown in Figure 8-7. If you want to unmark all records marked for deletion, don't enter any filter conditions.

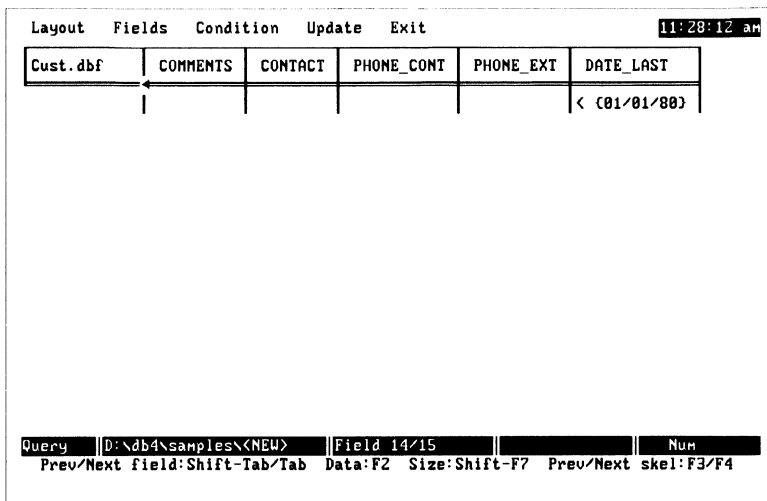


Figure 8-7 Enter the **Unmark** filter condition

4. Press **F2 Data** to test your filter condition. The Browse screen appears with the records that fit your filter condition. If you are satisfied that you want to unmark these records, press **Shift-F2 Design** and go on to step 5. Otherwise, press **Shift-F2 Design** and go back to step 3 to refine your filter conditions.
5. Open the **Update** menu and select **Specify update operation**. A submenu appears.
6. Select **Unmark records in <filename>** or type the word **Unmark** in the column under the filename and press **↵**. A prompt box appears explaining that the view skeleton will disappear if you proceed.
7. Select **Proceed**. The word **Unmark** appears under the filename in the file skeleton, if you chose the menu option.

8. To cause the records to be unmarked, open the **Update** menu and select **Perform the update**.

A message appears indicating the number of records that have been unmarked.

9. When the update is complete, press any key to continue.

To look at the database file whose records have just been unmarked, press **F2 Data**.



NOTE

*You can unmark all records in a database file by using the **Unmark all records** option in the **Organize** menu on the database design screen or the **Browse or Edit** screen.*

Appending Records

When you append, you are adding records to the end of the active database file. Appending is a powerful feature of the queries design screen. You can:

- Append records from one file to a target file
- Append records from two or more linked files to a target file
- Append from one or more files to a target file those records that meet a filter condition

Appending Records from One File

Doing an **Append** operation involves three steps. The first sets up the queries design screen. The second step, saving the **Append** update query, is optional. The third step performs the **Append** operation.

Setting Up the Append Operation

To set up an **Append** operation:

1. Select the **Add file to query** option on the **Layout** menu and select the file that will be your target file (this is the file to which records will be appended). The file skeleton is added to the queries design screen.
2. Select the **Add file to query** option on the **Layout** menu and select the file to be your source file (this is the source of the records that will be appended to the target file). The file skeleton is added to the queries design screen.
3. Use **F3 Previous** or **F4 Next** to move the cursor to the file skeleton to be your target file.

4. Press **Alt-U** to open the **Update** menu, select the **Specify update operation** option, and then select the **Append records to <filename>** option.
5. If you have a view skeleton on the queries design screen, a message appears saying the view skeleton will be deleted if you proceed. Select **Proceed**.
The **Append** operator appears in the column underneath the database filename. The word **Target** appears above the database filename.
6. Next, put matching example variables in both the source file and the target file. The example variables in the source file tell dBASE IV which fields in the source file to use. The matching example variables in the target file tell dBASE IV where to put the data in the records that will be appended to the target file. See Figure 8-8.

Layout	Fields	Condition	Update	Exit				
Target					11:39:36 am			
Employee.dbf	LASTNAME	FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	PHONE	SP	
Append	Ln	Fn						
<hr/>								
Names.dbf	LASTNAME	FIRSTNAME	ADDRESS	CITY	STATE	ZIP	PHONE	BUS
	Ln	Fn						
<hr/>								
Query D:\db4\samples\NEU Field 3/8 Nun Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4								

Figure 8-8 Adding example variables to an append operation

In Figure 8-8, the **Append** operation is set up so that data from the Lastname and Firstname fields in Names.dbf will be appended to the Employee.dbf target file when the **Append** operation is performed.

Saving the Append Update Query

Once you have set up the **Append** query, you can save it to use at a later time:

1. Press **Alt-L** to open the **Layout** menu.
2. Type **S** for the **Save this query** option.
3. Type in a name, as in Figure 8-9.

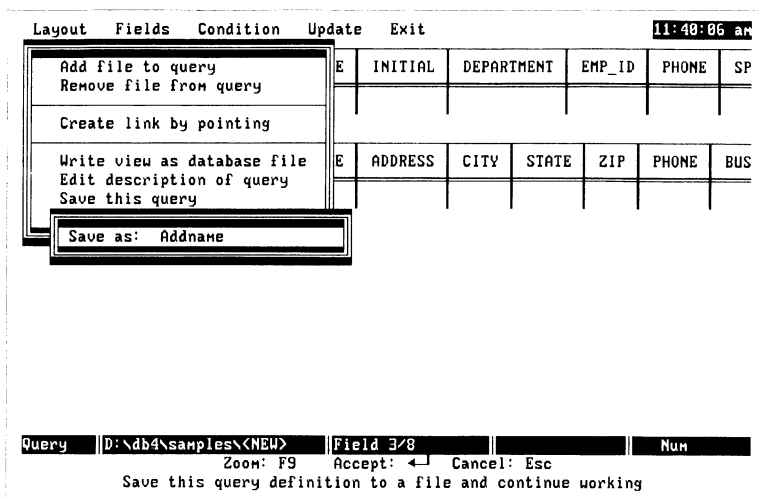


Figure 8-9 Saving an **Append** query

4. Press **↵**. This saves the **Append** query to a file. If you leave the queries design screen and look at the **Queries** panel in the Control Center, you will see that file. All update query files have an asterisk before their name in the **Queries** panel.

Performing the Update

There are two ways to perform the **Append** update. The first is from the queries design screen. With the **Append** query on the queries design screen, do the following:

1. Press **Alt-U** to open the **Update** menu.
2. Highlight **Perform the update** and press **↵**.
3. When the update is complete, press any key to continue.

To look at the target file with its appended records, press **F2 Data**. The new records may contain blank fields if there are fields where no data was appended from the source file (see Figure 8-10).

Num						
LASTNAME	FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	PHONE	S
Adams	Nathan	K	SALES	703-22-3333	0505>555-4556	C
Anderson	Debbie	I	EXECUTIVE	118-72-3777	<415>555-3489	A
Arlich	Kim	Y	SALES	437-22-6788	<603>555-8773	C
Beman	Sandy	J	EXECUTIVE	151-22-7773	<213>555-0554	A
Bicksby	Hank	F	SALES	899-02-3333	<602>555-1278	C
Campbell	Linda	H	SALES	441-22-3333	<602>555-1974	C
Cohen	Larry	A	SALES	551-22-3333	<217>555-4204	C
Collins	Sara	H	SALES	661-22-3333	<503>555-0953	C
Daniels	Dominique	F	SALES	771-22-3333	<609>555-0911	C
DeBello	Todd	S	SALES	881-22-3333	<504>555-3737	C
Dean	Michelle	W	EXECUTIVE	861-28-3983	<301>555-3193	A
Dickerson	Lori	E	EXECUTIVE	677-82-3333	<602>555-7100	A
Drasin	Pedro	E	SALES	991-22-3333	<203>555-1522	C
Drendon	Kelly	A	SALES	001-22-3333	<805>555-8674	C
Egan	Michelle	P	SALES	111-22-5555	<303>555-7337	C
Eivera	Harry	E	EXECUTIVE	111-22-3777	<213>555-3232	A
Garnett	Lena	D	EXECUTIVE	461-22-5553	<702>555-9121	A
Gelson	George	G	EXECUTIVE	445-22-3555	<503>555-2323	A

Figure 8-10 Target file with appended records

You can also perform an update query from the Control Center:

1. In the **Queries** panel, highlight the **Append** update query you want to perform (remember that update queries begin with an asterisk) and press ↵. A prompt box appears.
2. Highlight the **Run update** option and press ↵. A message appears asking whether you really want to run the update query.
3. Type Y. dBASE IV performs the append.

Appending Records from Two or More Files

Appending records from two or more source files to a target file is similar to appending records from one file. The main difference is that you need to link the source files together.

To set up an append with multiple source files:

1. Select the **Add file to query** option on the **Layout** menu and select the file to be your target file (this is the file to which records will be appended). The file skeleton is added to the queries design screen.
2. Select the **Add file to query** option on the **Layout** menu and select the file to be your source file (this is the source of the records that will be appended to the target file). The file skeleton is added to the queries design screen. Repeat this step until you have added all the files to be the source files.

3. Use **F3 Previous** or **F4 Next** to move the cursor to the file skeleton to be used as the target file.
4. Press **Alt-U** to open the **Update** menu, select the **Specify update operation** option, and then select the **Append records to <filename>** option.
5. If you have a view skeleton on the queries design screen, a message appears saying that the view skeleton will be deleted if you proceed. Select **Proceed**.
The **Append** operator appears in the column underneath the database filename. The word **Target** appears above the database filename.
6. Type in the example variables to link the source files, as in Figure 8-11. Like a multi-database file view, the source files must have a common field on which to link.

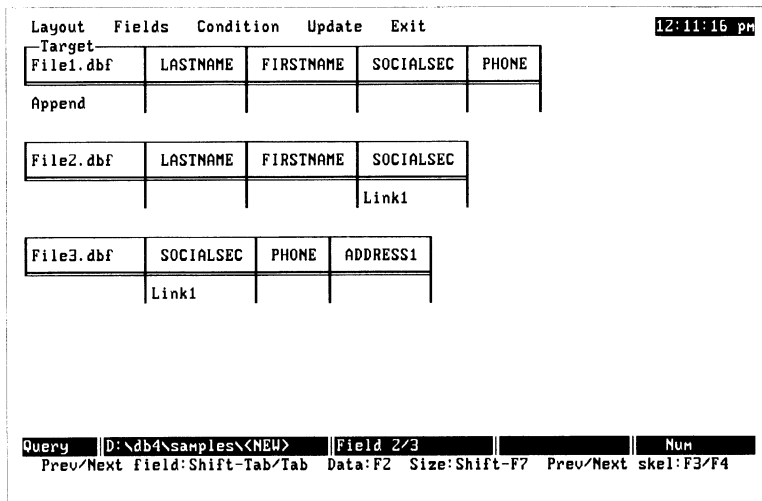


Figure 8-11 Linking the source files

When you perform the update, only the records that have a common field in both source files will be appended to the target file.

7. Next, put matching example variables in the source files and the target file (see Figure 8-12). The example variables in the source files tell dBASE IV which fields in the source files to use. The matching example variables in the target file tell dBASE IV where to put the data in the records that will be appended to the target file. For any field in the target file, there should be only one matching example variable in the source files.

Layout	Fields	Condition	Update	Exit
-Target-				
File1.dbf	LASTNAME	FIRSTNAME	SOCIALSEC	PHONE
Append	Ln	Fn	Soc	Ph
File2.dbf	LASTNAME	FIRSTNAME	SOCIALSEC	
	Ln	Fn	Link1, Soc	
File3.dbf	SOCIALSEC	PHONE	ADDRESS1	
	Link1	Ph		
Query	D:\db4\samples\NEW	Field 3/3		Num
Prev/Next field:Shift-Tab/Tab Data:F2 Size:Shift-F7 Prev/Next skel:F3/F4				

Figure 8-12 Adding example variables



NOTE

To learn how to save the **Append** update query, see *Saving the Append Update Query* earlier in this chapter. To learn how to perform the **Append** update, see *Performing the Update* earlier in this chapter.

Appending Records Using a Filter Condition

To set up an **Append** query that uses a filter condition:

1. Select the **Add file to query** option on the **Layout** menu and select the file to be your target file (this is the file to which records will be appended). The file skeleton is added to the queries design screen.
2. Select the **Add file to query** option on the **Layout** menu and select the file to be your source file (this is the source of the records that will be appended to the target file). The file skeleton is added to the queries design screen.
3. Use **F3 Previous** or **F4 Next** to move the cursor to the file skeleton to be used as the target file.
4. Press **Alt-U** to open the **Update** menu, select the **Specify update operation** option, and then select the **Append records to <filename>** option.
5. If you have a view skeleton on the queries design screen, a message appears saying that the view skeleton will be deleted if you proceed. Select **Proceed**.

The **Append** operator appears in the column underneath the database filename. The word **Target** appears above the database filename.

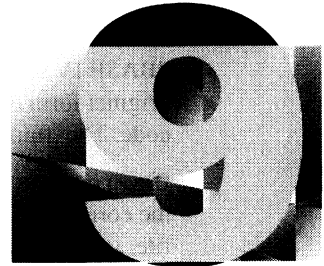
6. Next, put matching example variables in both the source file and the target file. The example variables in the source file tell dBASE IV which fields in the source file to use. The matching example variables in the target file tell dBASE IV where to put the data in the records that will be appended to the target file.
7. Add a filter condition to the source file. For example, in Figure 8-13, > "M" is used to indicate that records with last names beginning with A to M are not to be appended.

Layout	Fields	Condition	Update	Exit					12:16:55 pm
Target									
Names.dbf	LASTNAME	FIRSTNAME	ADDRESS	CITY	STATE	ZIP	PHONE	BUS	
Append	Ln	Fn	Add	Ct	St	Zp	Ph		
People.dbf									
	LASTNAME	FIRSTNAME	ADDRESS	CITY	STATE	ZIP	PHONE	CAR	
	Ln, > "M"	Fn	Add	Ct	St	Zp	Ph		
Query									
D:\db4\samples\<NEW>		File 2/2		Num					
Next field:Tab Add/Remove all fields:F5 Zoom:F9 Prev/Next skeleton:F3/F4									

Figure 8-13 Adding a filter condition

8. To perform the update, press **Alt-U** to open the **Update** menu and type P.

Designing and Using Forms



The Browse and Edit screens described in Chapter 4 provide standard formats for data entry and display. The Browse screen *always* displays a standard table format, where each row represents a separate record. The default Edit screen presents records one at a time, with each line representing one field.

However, through the forms design screen it is possible to design a custom form that is a special version of the Edit screen. By combining views and custom forms you can create data entry and retrieval systems that share the same underlying database file but appear quite different from one another on the screen.

This chapter describes how to use the forms design screen to customize your screen displays. It includes:

- Rearranging the fields on the Edit screen
- Adding boxes, lines, or color for emphasis
- Omitting certain fields to simplify the display
- Adding calculated fields
- Controlling the input through the form

What is a Form?

A form is a screen through which you can look at and modify the data in a database file or view. You create a form by using the forms design screen. Forms design files (.scr files), like reports design and labels design files, do not themselves contain data. Rather, they contain designs for forms.

Each form you create from the Control Center normally points to a database file or view for its data. When you use a form, it automatically points to the appropriate underlying data.

You can return anytime to the forms design screen to modify your form. You can also copy a form and adapt its design to display data from different database files or views. The names of all the forms in your current catalog appear in the **Forms** panel of the Control Center.

Form Files

dBASE IV stores each form in three different file types. The .scr files contain the original form design from the forms design screen. The .fmt files contain dBASE IV code. The .fmo files are compiled versions of the .fmt files.

If you copy an .scr file to another drive or directory, you may also want to copy either the corresponding .fmt or .fmo file. If you don't copy either file along with the .scr file, you won't be able to use the form for entering or displaying data.

To use a form without an .fmt or .fmo file, you must first modify it on the forms design screen and then save it using the **Save changes and exit** option of the **Exit** menu.

If you are distributing an application to users who do not need to redesign the form, you can give them either the .fmt or .fmo files, without the .scr file.

Planning Your Form

Forms give you flexible ways to organize your data. You can, for example, add calculated fields when you create a view, or you can wait until you design the form to add them. You can restrict the form's display of certain data, such as salary information, even though the fields containing that data are still part of the underlying database file or view. You can also assign special *picture functions* to fields on a form, making it easier to enter or display data.

There are five basic design elements on a form:

- Fields from an underlying database file or view
- New calculated fields not already in the database file or view
- Text
- Boxes
- Lines

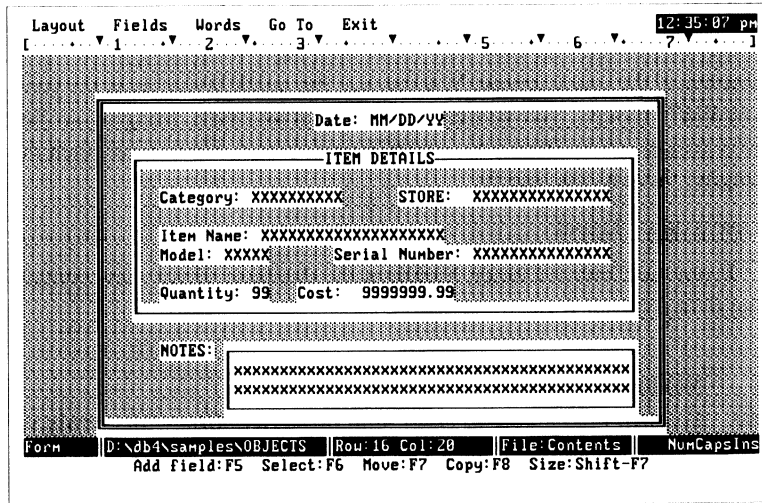


Figure 9-1 Forms design screen

The forms design shown in Figure 9-1 produces the finished form shown in Figure 9-2.

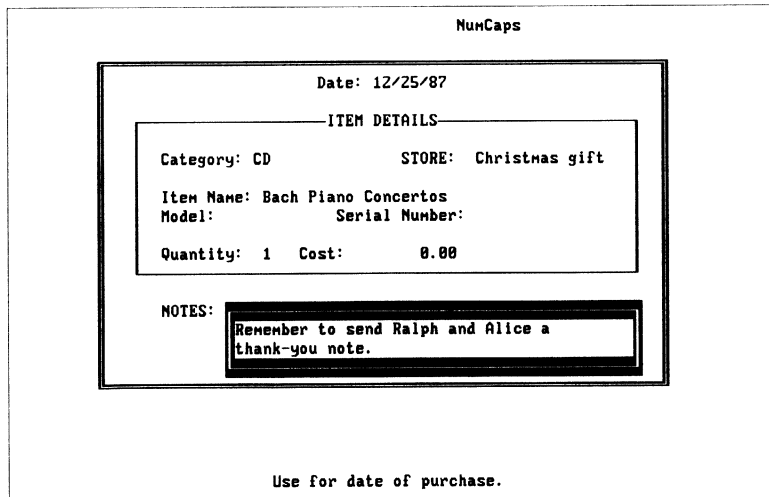


Figure 9-2 Final form

As you design a form, you can see how it will look with data by pressing **F2 Data**. To return to the forms design screen, press **Shift-F2 Design**. To save your form design, select the **Save this form** option on the **Layout** menu, the **Save changes and exit** option on the **Exit** menu, or press **Ctrl-W** or **Ctrl- J**.

Quick Layout

dBASE IV provides an easy way to set up a basic form design. This basic form design is known as the *quick layout*. You can use the quick layout as is for your form design. More likely though, you will use quick layout as a base, bringing *all* fields to the forms design screen from your underlying database file or view, then moving and changing them as you see fit.

To use a quick layout:

1. From the Control Center, highlight the database file or view containing the underlying data for your form.



NOTE

You will not be able to enter data through a form with certain views. See *Limitations on Updating Views in Chapter 6*.

2. If Instruct (in the **Tools** menu) is **ON**, press \downarrow twice to open the database file or view. If Instruct is **OFF**, press \downarrow only once to open the file. The database file or view should now be above the line in its panel.
3. Highlight **<create>** in the **Forms** panel and press \downarrow . This brings you to the forms design screen.
4. From the **Layout** menu, highlight the **Quick layout** option.
5. Press \downarrow . A quick layout of your underlying database file or view appears on the forms design screen, as shown in Figure 9-3.

```
Layout  Fields  Words  Go To  Exit
[.....▼ 1.....▼ 2.....▼ 3.....▼ 4.....▼ 5.....▼ 6.....▼ 7.....▼] 12:36:30 pm
-----
LASTNAME  XXXXXXXXXXXXXXXX
FIRSTNAME XXXXXXXXXXXX
INITIAL   X
DEPARTMENT XXXXXXXXXXXXXXXX
EMP_ID    XXXXXXXXXXXX
PHONE     XXXXXXXXXXXXXXXX
SPECIALTY XXXXXXXXXXXX
COMMENTS  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
AWARDS    XXXXXXXXXXXXXXXX
DATE_HIRED MM/DD/YY
DEGREE    XXX
EXEMPT    L
FULL_TIME L
LABORGRADE 9
RATE      99.9
SALARY    999999999
TITLE     XXXXXXXXXXXXXXXX
YRS_EXPER 99.9
ADDRESS1  XXXXXXXXXXXXXXXX
Form | D:\db4\samples\NEU> | Row:0 Col:0 | File:Employee | NumCapsIns
Add field:F5 Select:F6 Move:F7 Copy:F8 Size:Shift-F7
```

Figure 9-3 Quick layout on the forms design screen

This *default form* displays each field from a database file or view, devoting a line to each field. The field names appear flush left, with the field's *template* to the right. The field template represents the width and composition of the data entry and display areas for each field. The first line on the screen, line 0, is left blank to leave room on the form for the **Edit** menu bar. It is important to leave line 0 blank.



NOTE

*If you do not open a database file or view before you reach the forms design screen, the **Quick layout** option is dimmed, and the **Use different database file or view** option is highlighted. You can use this option to set your underlying data source.*

For information on saving a quick layout, see Saving the Form later in this chapter.

Customizing a Form

When you customize a form on the forms design screen, you can:

- Remove fields from the design screen
- Add fields from the underlying database
- Add text to the design screen
- Draw boxes and lines
- Define the information that can be entered using the form
- Assign colors to fields, text, and boxes

Removing a Field

To remove a field from the forms design screen:

1. Move the cursor to the field you want to remove. That field is highlighted.
2. Press **Del** or use the **Remove field** option from the **Fields** menu.

To remove a field while the cursor is not positioned on that field (or any other field):

1. Open the **Fields** menu and select the **Remove field** option. A list of all the fields appears on the screen.
2. Select the field you want to remove. That field's template is removed from the forms design screen.

If you pick a field from the list, dBASE IV removes every occurrence of that field from the forms designs screen.

Adding a Field

Instead of starting your customized form with a quick layout and removing any fields you don't need, you can add fields one at a time. This is useful when you have a large underlying database and you want to add only a few fields from it.

To add a field on the forms design screen:

1. Use the arrow keys to move the cursor to where you want the field to be added. As you move the cursor to different parts of the screen, the row and column numbers change in the status bar.
2. Press **F5 Field**. A list appears, as shown in Figure 9-4. The left column of the list contains fields from the underlying database. If this underlying data source is a view and has calculated fields, the calculated fields are included in the list.

The right column shows the field names of any calculated fields defined so far for this form. Choose the **<create>** marker at the top of this list to create a new calculated field (creating calculated fields in a form is discussed in the Adding a New Calculated Field section later in this chapter).

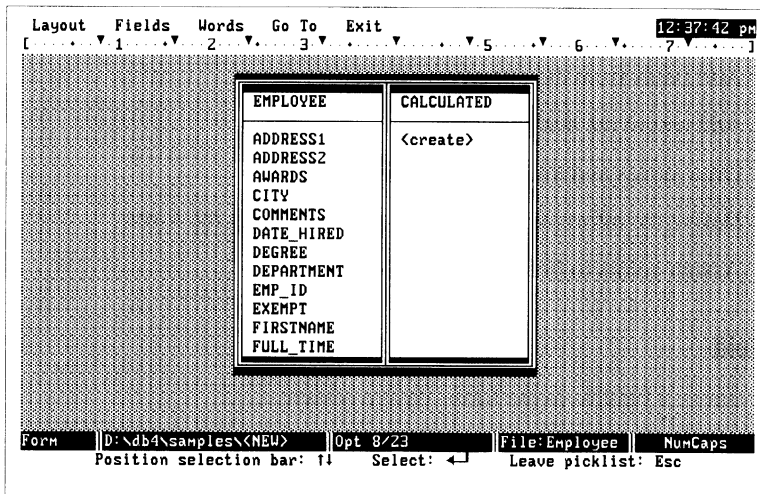


Figure 9-4 Adding a field

3. Highlight the field you want to put in your form and press **↓**. A new menu appears. The items above the line show the characteristics defined from the underlying database. This information cannot be modified from the forms design screen. You can use the items below the line to manage the display attributes and editing options for this field. These menu items are discussed later in this chapter.
4. Press **Ctrl-End**. A template for that field appears on the screen.

Identifying the Field

When you add a field to the forms design screen, the name of the field as defined in the underlying database file is not added to the design screen. To identify a field that you added, first move the cursor to that field template so that the field is highlighted. Then look at the bottom of the screen, two lines under the status bar. Figure 9-5 shows an example of the field information at the bottom.

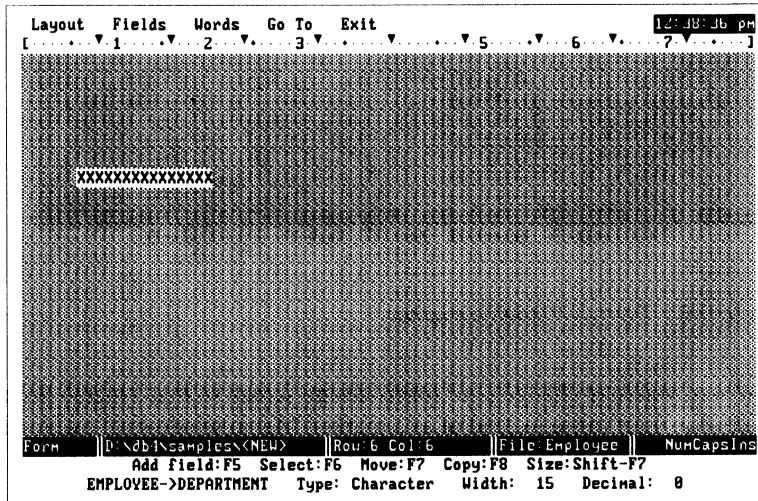


Figure 9-5 Identifying the field

In Figure 9-5, the bottom line of the screen shows the underlying database and the name of the field, the type of field, the width, and the number of decimals. In this case, the name of the field is *Department*, in the *Employee* database file. The field is Character type, with a width of 15 characters. Once you know what the field is, you can type explanatory text next to it to help the user of the form.

Adding a Memo Field

Memo fields hold variable amounts of text. You can add memo fields from an underlying database to the design screen just like any other field. However, memo fields have some special design properties.

dBASE IV initially displays memo fields on the forms design screen with the MEMO marker, as shown in Figure 9-6. You can leave memo fields as they are (as markers) if you like.

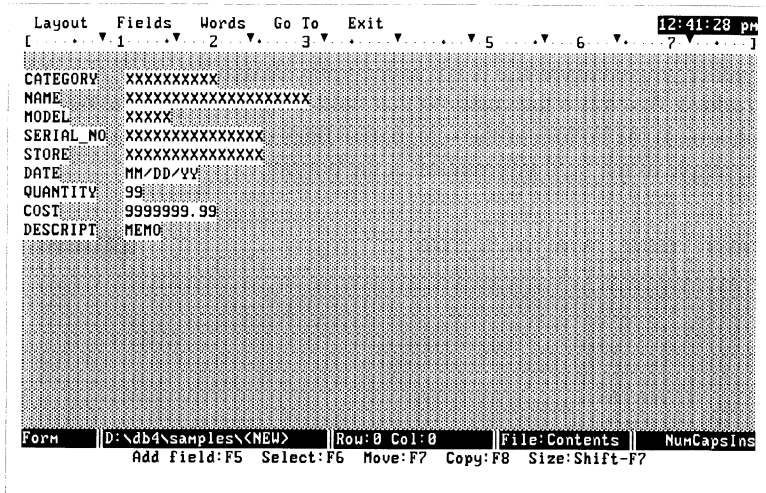


Figure 9-6 Form with memo marker

However, you may change your forms design screen so that a memo field appears as a *window* on your form, instead of as a marker. Memo windows allow you to edit the data inside memo fields without losing the context of the rest of the form. You can immediately see some of the information displayed in the memo window, as shown in Figure 9-7. A memo marker must be opened for you to see any of the data in the memo field.

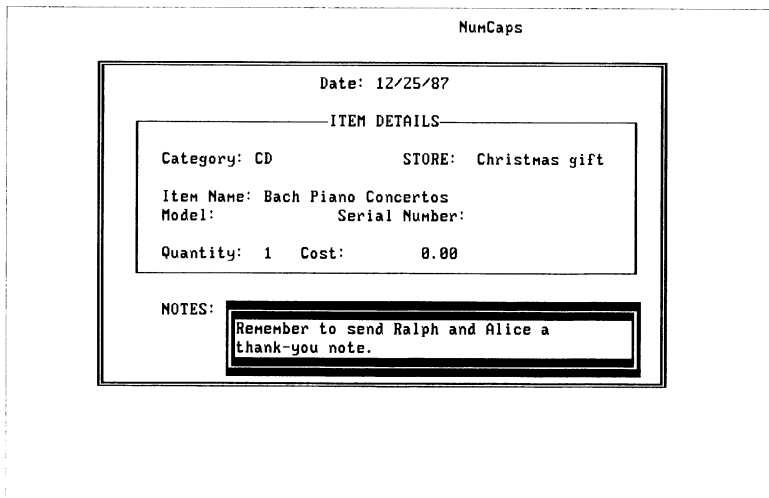


Figure 9-7 Form with memo window

Designing the Memo Window

There are three steps to change a memo field from a marker to a window: change the display format, select a border, and size the memo window:

1. Bring the cursor to the memo field marker on the forms design screen. The cursor must be on the first **M** in the word **MEMO**.
2. Press **F5 Field** to open the **Fields** menu.
3. Highlight the **Display as** option and toggle it to **WINDOW** with either **↓** or **Spacebar**.
4. Move down to the **Border lines** option and press **↓**. A menu of border options appears. If you choose the third border option, **Using specified character**, you can use any character from the resulting list to be your border.
5. Select your border.
6. Press **Ctrl-End**. A memo field window appears. This memo window has a border and is filled with Xs.

Sizing and Moving the Memo Window

Once you have placed a memo window on your forms design screen, you can size and move it. If the memo window is too large, it may obscure other field templates.

To size and move the memo window:

1. Move the cursor inside the memo window so that the window is highlighted. Press **Shift-F7 Size**.
2. Use the arrow keys to set the highlighted area to the desired size and press **↓**. The field shrinks to the defined size.
3. To move the window, press **F7 Move**. The cursor moves to the top left border of the memo window.
4. Move the memo window with the arrow keys and press **↓**.

Setting a Memo Field to be a Window and a Marker

To set a memo field to be both a window and a marker:

1. Starting from the forms design screen, move the cursor to the memo field marker and press **Ctrl-Home** to open the memo window.
2. To size the window, press **Shift-F7 Size**. Stretch the memo window to the size desired with the arrow keys and press **↓**.
3. To move the memo window, press **F7 Move**. With the cursor keys, move the memo window and press **↓**.
4. Press **Ctrl-End** to close the window and return to the field marker.
5. Save your form design using the **Layout** or **Exit** menu.



NOTE

You can also change the **Display as** option of the **Fields** menu to **WINDOW** to open the window, and to **MARKER** to redisplay the field marker.

Using a Memo Field that is Both Marker and Window

When you are displaying or modifying data with a form that has a memo field that is both a marker and a window, do the following:

1. Move the cursor to the memo field marker.
2. Press **F9 Zoom** and the memo field opens to a window. You can enter text immediately. You can also press **F9 Zoom** again to open the memo window to full screen.
3. To close the memo field, press **Ctrl-End**.

Adding Color to Memo Fields

Color styling of a memo field marker or window on the forms design screen only affects how the marker or window is displayed. The text inside the memo field is not affected. For information on coloring, see the Using Color section later in this chapter.

For information on using memo fields, see Chapter 4.

Adding a New Calculated Field

Calculated fields that are in your underlying view appear on the forms design screen when you bring up all the fields with the **Quick layout** option. However, you may choose to add a calculated field (or modify one that you have already created) that will display when you use your form. Calculated fields that you create on the forms design screen do not exist in your database file. They just show a calculation based on the data in your database file or view.

To create a calculated field for a form:

1. Move the cursor to the row and column where you want the calculated field to appear.
2. Press **Alt-F** to open the **Fields** menu, highlight the **Add field** option, and press **↓** or, as an alternative, just press **F5 Field**. A submenu appears showing the names of the fields in the underlying database file or view in the left column and a column for calculated fields on the right.
3. Press **→** once to highlight the **<create>** marker and press **↓**. (To modify one of the calculated fields already created for this form, choose the name of the calculated field.) A special calculated field submenu appears with the **Name** option highlighted.

- Press **↓**, type in a name for the calculated field, and press **↓** again (assigning a name is optional, but recommended). Your screen should look similar to the one shown in Figure 9-8.

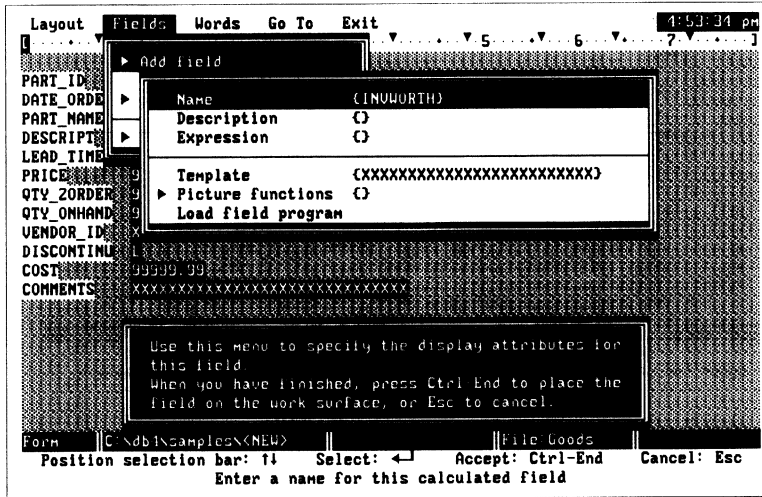


Figure 9-8 Assigning a name

- (This step is optional.) Highlight the **Description** option and press **↓**. Enter up to 80 characters of explanation about the calculated field. Press **↓** when you are done.
- Highlight the **Expression** option and press **↓**. Type in the expression to define the field. You can enter any dBASE IV expression (see *Language Reference* for a definition of a dBASE IV expression), including memory variable names (memory variables must be defined previously). You cannot make a calculated field without an expression.



NOTE

You cannot use a calculated field defined on the current form in the expression of another calculated field.

If you want assistance entering the expression, press **Shift-F1 Pick** to display the names of the fields in the database file or view, as well as the possible operators or functions.

- When you have finished entering the expression, press **↓**. Your screen should look similar to the one shown in Figure 9-9.

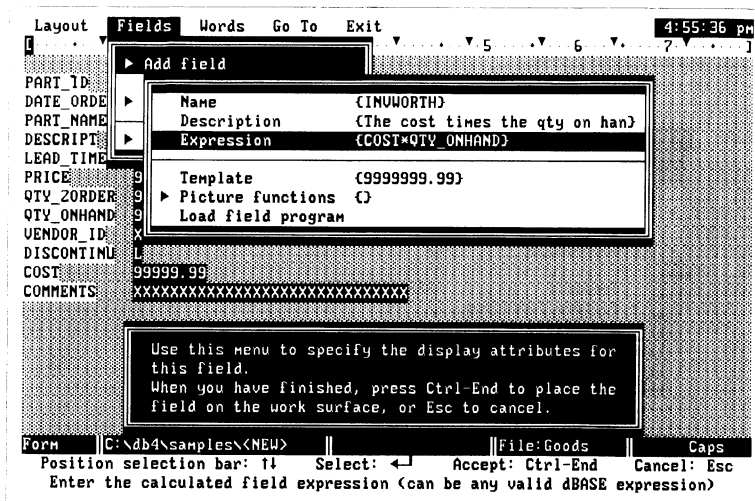


Figure 9-9 Entering the expression

8. Press **Ctrl-End**. dBASE IV places the calculated field on the form.

The calculated field template has no explanatory text next to it. See the sections about adding and moving text in this chapter for information about adding text next to a field template.

Using Calculated Fields on Forms

In a form, dBASE IV does not do recalculations of totals until you move off the record you are altering. If you change the data for a field used by a calculated field, you must move off the record and then back on to see the updated calculation.

Entering Text on the Forms Design Screen

The forms design screen uses what is called *layout mode*. Memo fields use *word wrap mode*. The principles of word wrap mode are discussed in Chapter 15. This section discusses entering text in layout mode (layout mode is also used in label and report design).

The Insert status affects how text is entered and deleted, as described in Table 9-1.

Table 9-1 Layout mode with Insert on or off

Activity	Insert On	Insert Off
Entering text	New characters push existing characters to the right.	New characters overwrite existing characters.
Cursor appearance	The cursor is taller. The status bar displays the letters Ins .	The cursor is smaller.
Using ↵	↵ creates a new line, pushing all text and fields below the current line down one line. Text or fields to the right of the cursor are placed in the newly created line starting at the left margin. The cursor is placed at the left margin	↵ moves the cursor to the left margin of the next line without affecting any text.
Using Del	Pressing Del deletes one character and closes up the text.	Pressing Del deletes one character and moves the cursor one space to the right.

In addition to creating a new line by pressing ↵ when Insert is on, you can also create a blank line by pressing **Ctrl-N** or by selecting the **Add line** option from the **Words** menu.

Defining Form Width and Height

A form cannot be wider than the screen, but it can be longer. Forms can be up to 80 columns wide. The height of a form is limited by the memory you have available. Scroll up and down a form with the cursor keys.

It is best not to put anything on row 0 of the forms design screen. Row 0 is reserved for the menus and will be overwritten by the menus at the top of the actual data entry form when you generate the form. If you want to suppress those menus, see the **NOMENU** option in the **BROWSE** and **EDIT** commands in Chapter 2 of *Language Reference*.

If the status bar is **ON** when you start to create or modify a form, rows 22-24 will be unusable. To use these rows, set the status bar **OFF** before you enter the forms design screen. To do so, enter **SET STATUS OFF** at the dot prompt.



NOTE

If a form design was created with the status bar ON, that form will have a status bar even if you attempt to change the status setting before using the form.

Setting Margins

If SET BELL is on, when you type past the right margin (indicated by the right bracket in the ruler line), you hear a beep. If you try to type or move the cursor past the right edge of the design screen, you hear a beep, and an error message appears.

Because text in layout mode does not wrap, you can use the margins on the forms design screen (set with the **Modify ruler** option in the **Words** menu) only for aligning text or determining where the cursor will go when you press ↵.

Text already on the design screen is not affected by changing the margins.

Aligning Text on a Form

To align text within the current margins, use the **Position** option on the **Words** menu. A submenu appears containing the options **Left**, **Center**, and **Right**.

Blank Spaces in Layout Mode

You can distinguish between space available on the forms design screen and actual blank characters. If nothing is typed onto the design screen, it looks grainy like the empty screen area. When you press **Spacebar**, a *blank character* which looks solid appears.

Moving and Copying Text and Fields

To move or copy text:

1. Place the cursor at the beginning of the text or field that you want to move or copy.
2. Press **F6 Extend Select**.
3. Use the arrow keys to highlight the characters or template symbols you want to move or copy. Make sure, if you are copying or moving a field template, that you highlight the entire template.
4. When you have finished highlighting, press ↵.
5. Press **F7 Move** to move the selected item or **F8 Copy** to copy it.
6. Use the cursor to move or copy the text. The outline of the text moves as you move the cursor.
7. Press ↵.



NOTE

To highlight a line, place the cursor on it and press **F6 Extend Select** twice. (Pressing **F6 Extend Select** a third time highlights the entire contents of the design screen.) To highlight a box, place the cursor on it. To highlight box contents, press **F6 Extend Select** three times.

Deleting Text

You can use the **Del** key to remove text on the forms design screen. To delete an area of text, do the following:

1. Move the cursor to the beginning of the area you want to delete.
2. Press **F6 Extend Select**.
3. Use the cursor keys to highlight the area you want to delete. When you are finished, press **↵**.
4. Press **Del** and the highlighted area is deleted.

Adding a Box

Boxes are excellent graphic tools for visually connecting related information and for emphasizing text and fields.

dBASE IV handles boxes independently of text and fields so that you can move a box without moving the text inside the box.

When you type text or move fields on top of a box, the border of the box is covered. If you enter a blank character with **Spacebar**, the border is covered by the blank character.

To add a box:

1. Open the **Layout** menu and select the **Box** option. A submenu appears with three options.
2. Choose to make your border from a single line, a double line, or a specified character. If you choose the **Using specified character** option, a list appears of possible IBM extended ASCII characters. Move the highlight to the character you want and press **↵**.
3. Place the cursor where you want the top left corner of the box and press **↵**.
4. Move the cursor where you want to place the bottom right corner of the box. As you move the cursor, a temporary box is drawn. When the lower right corner of the temporary box is where you want it, press **↵** and the box is complete.

You can use the **Display** option in the **Words** menu to modify the color of the box.

Moving a Box

To move a box without changing its shape:

1. Place the cursor somewhere on the box. The box is highlighted.
2. Press **F6 Extend Select** to select the box, and then press ↵.
3. Press **F7 Move** to move the box.
4. Use the arrow keys to move the box where you want it to be.
5. Press ↵ to complete the move.

Adding a Line

Lines are graphic devices used to emphasize text on your forms design screen.

To add a line:

1. Open the **Layout** menu and select the **Line** option. A submenu appears.
2. Select either a single line, a double line, or a line of characters.

If you choose the **Using specified character** option, a list appears of possible IBM extended ASCII characters. Move the highlight to the character you want and press ↵.

3. Place the cursor where you want to start the line. Press ↵ and use the arrow keys to draw the line in the direction you want. You can combine vertical and horizontal lines in the same connected line.

To delete part of a line while you are drawing, press **Backspace**.

4. When you are finished drawing, press ↵.

After you finish drawing a line it is treated as normal text, so you can edit it just as you do text.

You can press character keys to include text as part of a line, as in Figure 9-10.

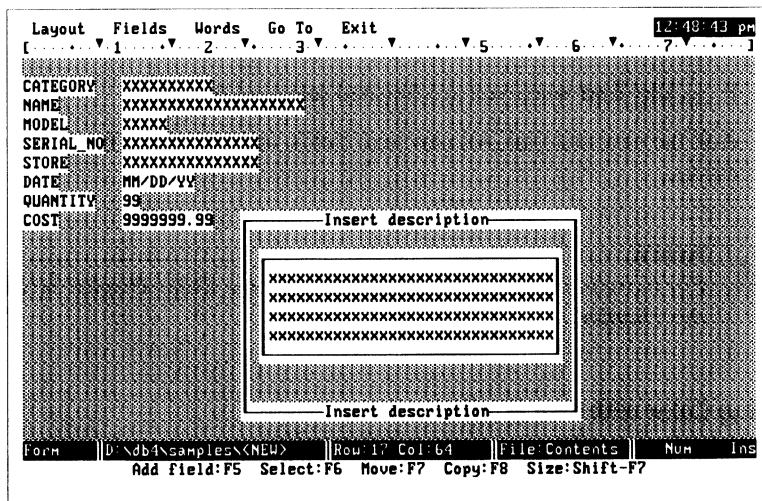


Figure 9-10 Including text as part of a line

If you are drawing a line down the screen, each letter you type appears below the previous letter. To change direction while typing text, press **Tab** (which prompts you for the direction), followed by the arrow key that points in the direction you want to go.

Using Color

You can assign colors to selected text, fields, or boxes. These colors appear when you use the form to enter or retrieve data. When you apply a display color to a field, all the data in the field is displayed in that color (except for memo fields, as explained earlier).

To assign colors, use the **Display** option in the **Words** menu. The **Display** menu works like the menu that customizes the overall colors of dBASE IV. (That menu is on the **Settings** menu bar from the **Tools** menu). See Chapter 14.

You can assign display colors to existing elements or to elements that you are about to create.

To assign colors to existing elements:

1. Select text, a box, or a field by placing the cursor on it. You can also assign colors to an extended selection made with **F6 Extend Select**.
2. Choose the **Display** option from the **Words** menu.
3. Assign the colors and press **Ctrl-End** when you are finished. When you move the cursor off the selected item, the new colors appear.

To assign colors for elements about to be placed on the forms design screen:

1. Select the color with the **Display** menu.
2. Press **Ctrl-End** when you are finished selecting the colors.
3. Add the new material. All new text, fields, and boxes will have the new display colors.



NOTE

For more information on using color, see the Color Display section later in this chapter.

Using Color with Two Monitors

If you have two monitors connected to your computer, you can choose one with a `DISPLAY=` command in your `Config.db` file or the `SET DISPLAY` command from the dot prompt. Read more about these commands in *Getting Started with dBASE IV* and in the “SET Commands” chapter of *Language Reference*.

If you need a single form that works on both monochrome and color screens, avoid using the **Display** option, because the form may not work as you expect on both types of screens.

There are separate **Display** menus for monochrome monitors and color monitors. dBASE IV automatically displays the correct menu for your monitor.

Monochrome Display

If you are using a monochrome monitor, use the **Display** submenu to assign an attribute to the currently selected item. The attributes available are **Intensity**, **Underline**, **Reverse video**, and **Blink**.

The **Intensity** setting establishes bold-faced characters. **Underline** underlines the selected item. The **Reverse video** setting switches foreground and background colors, so that instead of green letters on a black background, for example, you see black letters on a green background. **Blink** blinks the selected item on and off.

Color Display

If you are using a color monitor, use the **Display** submenu to assign foreground and background colors to the currently selected item. You can assign one of sixteen colors to its foreground, and one of eight colors to its background. You can also turn on the blinking attribute.

Choose your colors from an electronic palette by moving up and down the fields and leaving the cursor at a color. In the **Foreground** column, dBASE IV shows the name of each available color in its own color, against the current background color. The word **Blue**, for example, is always shown in blue letters.

In the **Background** column, dBASE IV uses the colors to form the background, while the name of the color is shown in the currently selected foreground color. Choose the background color in the same way as foreground (by moving the marker up and down the columns).

To move from background to foreground, use the ← and → keys.

To set foreground and background colors (in this example yellow and blue):

1. Press **Alt-W** to open **Words** and then type D to open the **Display** menu.
2. Use the ↓ key to move the cursor in the **Foreground** column to the word **Yellow**.
3. Now press → or ← , to move the cursor to the **Background** column.
4. To choose a blue background, press the ↓ key in the **Background** column until it is next to the word **Blue**.

The new color combination is displayed twice, once in the **Foreground** column and once in the **Background** column. With this electronic palette, you can quickly see many color combinations at one time.

5. Press **Ctrl-End**.
6. To see the colors on the selected item, move the cursor off the item. If you have used **F6 Extend Select**, press **Esc** to remove the highlight and see the actual colors.



NOTE

To toggle the **Blink** attribute on and off while in the **Display** menu, type the letter b.

Managing Data Input

You can restrict or modify what can be entered into the fields of a custom form by using field templates, picture functions, and edit options. Templates define the type of data you can enter for a given field. Picture functions add more control over input. Edit options set specific limits for acceptable data within a field.

Use the **Fields** menu to work with templates, picture functions, and edit options. There are three ways to specify a field to be modified and open the **Fields** menu:

- Place the cursor on a field template and press **F5 Field** or **Ctrl-Home**. This opens the **Fields** menu. If you have the same fields placed more than once on the design screen, only the one that you placed the cursor on will be modified.
- From anywhere else on the forms design screen except for a field template, press **Alt-F** to open the **Fields** menu. Highlight the **Modify field** option and press ↓. A list of fields from your customized form is displayed. Choose the field whose input you want to manage.

- From anywhere on the forms design screen except for a field template, press **F5 Field** to display a list of fields for your form. Highlight the field whose input you want to manage and press **↵**.

Figure 9-11 shows the **Modify field** submenu.

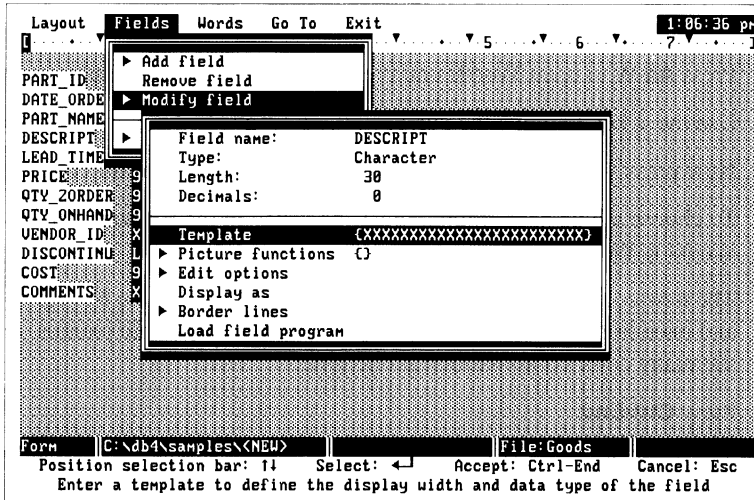


Figure 9-11 Modify field submenu



NOTE

For information about using the **Load field program** option of the **Modify field** submenu of the **Fields** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

Using Field Templates

A template shows the width of a field and the type of characters expected in each column. Use the **Template** option on the **Modify field** submenu to customize how a field accepts and displays data.

Here are some examples of templates:

1. The following field template would be useful for a telephone number. The parentheses, blank space, and dash are *literals*, which appear automatically on the screen. Only the numbers, represented by the nines, are accepted as data:

(999) 999-9999

2. The next field template accepts a digit, inserts a hyphen, and accepts three alphabetic characters:
 9-AAA
3. The next field template accepts any character, inserts a hyphen, and accepts five digits. If alphabetic, the character is converted to uppercase. An entry of b97856 would be converted to B-97856.

 !-99999

4. The next field template accepts up to 15 characters. If alphabetic, the first character is converted to uppercase.

 !XXXXXXXXXXXXXXXX

Table 9-2 lists template symbols and explains what data is accepted for each.

Table 9-2 Template symbols

Symbol	Accepts
9	Allows only digits (0-9) for character data, digits or signs (+ or -) for numeric data
#	A digit, a space, a period (.), or a sign
A	Alphabetic characters only
N	Alphabetic or numeric characters, including the underscore (_); no spaces or punctuation
Y	Y, y, N, or n. Converts y or n to uppercase
L	T, F, Y, or N
X	Any character
!	Any character, but converts alphabetic characters to uppercase
other	If you use any symbols other than the ones described in the Symbol column, these are inserted into the display literally unless the R picture function is used. R displays literal characters in the template, but doesn't include them in the field's contents.

Four other symbols that have meaning in numeric field templates are described in Table 9-3.

Table 9-3 Numeric template symbols

Symbol	Meaning
.	Shows position of decimal point
,	Displays comma if number is more than three digits
*	Displays leading zeros as *
\$	Displays leading zeros as \$ (depending upon the SET CURRENCY symbol)

It is important to make numeric templates large enough for the largest possible value. If the template is not large enough, the field will be filled with asterisks.



NOTE

*The **Template** option is not available for date fields, because they use the date format in effect when the form is used. You can change the way dates are displayed with the **Date order** and **Date separator** options from the **Settings** submenu of the **Tools** menu. The date format can also be changed with the **SET DATE TO** command at the dot prompt.*

To define the field template:

1. Move the cursor to the field template that you want to define.
2. Press **F5 Field**. The submenu appears.
3. Highlight **Template** on the **Modify fields** submenu and press ↵. The curly braces surrounding the characters disappear and the cursor is at the end of the template. A box on the screen displays the template characters you can choose for the current field.
4. Press **Home** to move to the first template character. Make sure Insert is off, and enter the template symbols you need.
5. Press ↵. The curly braces return.

You may continue on to work with the **Picture functions** or **Edit options** submenus if you need to do so.

6. Press **Ctrl-End** to save the changes when you are done.

Using Picture Functions

Picture functions provide you with more control over input for a particular field. To use picture functions:

1. Move the cursor to the field template that you want to control.
2. Press **F5 Field**. The submenu appears.
3. Type **P** for the **Picture functions** submenu.
4. Highlight the option that you want to change and press **↵**. **↵** toggles the option off and on.
5. Press **Ctrl-End** to exit the submenu. The picture function is displayed in curly braces.
6. Press **Ctrl-End** to save the change and return to the forms design screen.

There is a different menu for numeric and character fields. The following sections describe what you can do with picture functions for each of these types of fields.

Specifying How Numbers Display

Picture functions for numeric fields specify how numbers are displayed. The following describes what you can do with picture functions for numeric fields. All of these items appear in the **Picture functions** submenu on the **Modify fields** menu when they apply to the field you are modifying.

Display CR (credit) after a Positive Number

To display the letters *CR* after a positive number, turn the **Positive credits followed by CR** option **ON**. You can only turn this option on if the setting for **Editing Allowed** is **NO** on the **Edit options** menu for that field. The letter **C** appears in the **Picture functions** curly braces.

Display DB (debit) after a Negative Number

To display the letters *DB* after a negative number, turn the **Negative debits followed by DB** option **ON**. You can only turn this option on if the setting for **Editing Allowed** is **NO** on the **Edit options** menu for that field. The letter **X** appears in the **Picture functions** curly braces.

Enclose Negative Numbers in Parentheses

To display parentheses around negative numbers, turn the **Use () around negative numbers** option **ON**. You can only turn this option on if the setting for **Editing Allowed** is **NO** on the **Edit options** menu for that field. The character **(** appears in the **Picture functions** curly braces.

Display a Number with Leading Zeros

To display a number with leading zeros (such as 0000012.50), turn the **Show leading zeroes** option **ON**. The letter L appears in the **Picture functions** curly braces.

Display Blanks If the Value is Zero

To display a number without leading zeros (12.50 instead of 0000012.50), turn the **Blanks for zero values** option **ON**. The letter Z appears in the **Picture functions** curly braces.

Display a Currency Symbol Before a Number

To display a currency symbol before a number, turn the **Financial format** option **ON**. The dollar sign (\$) appears in the **Picture functions** curly braces.

Display a Number in Exponential Format

To display a number in exponential format (sometimes known as “scientific notation”), turn the **Exponential format** option **ON**. The ^ sign appears in the **Picture functions** curly braces.

Remove All Leading and Trailing Blanks

To remove all leading and trailing blanks, turn the **Trim** option **ON**. You can only turn this option on if the setting for **Editing Allowed** is **NO** on the **Edit options** menu for that field. The letter T appears in the **Picture functions** curly braces.

Left Align Data in the Template Width

To left align data within the template, turn the **Left align** option **ON**. You can only turn this option on if the setting for **Editing Allowed** is **NO** on the **Edit options** menu for that field. The letter B appears in the **Picture functions** curly braces.

Center the Data within the Template

To center the data within the template, turn the **Center align** option **ON**. You can only turn this option on if the setting for **Editing Allowed** is **NO** on the **Edit options** menu for that field. The letter B appears in the **Picture functions** curly braces.

Specifying How to Display Characters

Picture functions for character fields specify how to display characters. The following is a description of what you can do with picture functions for character fields. All of these items are in the **Picture functions** submenu on the **Fields** menu when they apply to the field you are modifying.

Accepting Only Alphabetic Input

To accept only alphabetic characters, toggle the **Alphabetic characters only** option **ON**.

This entry will not accept blank spaces, punctuation, or numbers.

Converting All Letters to Uppercase

To convert all lowercase letters to uppercase, toggle the **Upper-case conversion** option **ON**. When you use the form to enter or modify data, the entry is converted to uppercase (that is, *a7-bcd* will be changed to *A7-BCD*).

Literal Characters Not Stored in Database

To remove all literal characters from the data which will be stored, toggle the **Literals not part of data** option **ON**.

For example, one template often used for phone numbers is (999)999-9999. The parentheses and the hyphen are literals that you do not need to type in each time. Using this option saves disk space because the phone field can be smaller. Therefore, a phone number displayed as (301)555-3193 is stored as 3015553193.



WARNING

Changing this option will affect how existing data is stored and displayed.

Horizontal Scrolling Within the Template

The **Scroll within display width** option allows you to scroll within the confines of the database field length. For example, suppose you define the size of a field in your database structure as 85 characters. However, you have room on your design screen for a field template of only 50 characters for that field. Set the scroll width to 50. If you type in more than 50 characters in that field, the text scrolls to the left.

You can turn this option on only if the setting for **Editing Allowed** is **YES** on the **Edit options** menu for that field. The letter S appears in the **Picture functions** curly braces.

Setting Up a Multiple Choice

To set up multiple choice options for a particular field, use the **Multiple choice** option. This option sets a field where only certain entries are permitted. For example, you might have a Title field where the choices are limited to Clerk, Salesperson, Manager, and President. To set up a multiple choice field:

1. Place the cursor on the field you want multiple choice options for and press **F5 Field**.
2. Highlight **Picture functions** and press ↵. A submenu appears.
3. Highlight **Multiple choice** and press ↵.
4. Type each of the multiple choices exactly as you want them entered into the database. Each option is separated by a comma. For instance, you could enter *APPLIANCE,BOOK,CD,FURNITURE,PAINTING*. There are no blank spaces.
5. When finished, press ↵.
6. Press **Ctrl-End** twice. That saves your picture function entry.

To use a multiple choice field when entering data through the form, scroll through all the choices with **Spacebar** and press ↵ when you find the one you want; or else type the first letter of the entry you want and press ↵.

You can only turn this option on if the setting for **Editing Allowed** is **YES** on the **Edit options** menu for that field. The letter M appears in the **Picture functions** curly braces.



NOTE

*The **Trim** and **Center align** options are explained in the previous section, *Specifying How Numbers Display*. **Right align** is similar to **Left align**, which is also explained in *Specifying How Numbers Display*.*

Setting Limits for Values

Use edit options to set specific limits for acceptable values within a field. When you set a limit for a field with an edit option, the values you set remain in effect in both the Browse and Edit screens.

Setting Edit Options

To set an edit option:

1. Place the cursor on the field template to which you want to apply an edit option and press **F5 Field**.
2. Type E to open the **Edit options** submenu, as shown in Figure 9-12.

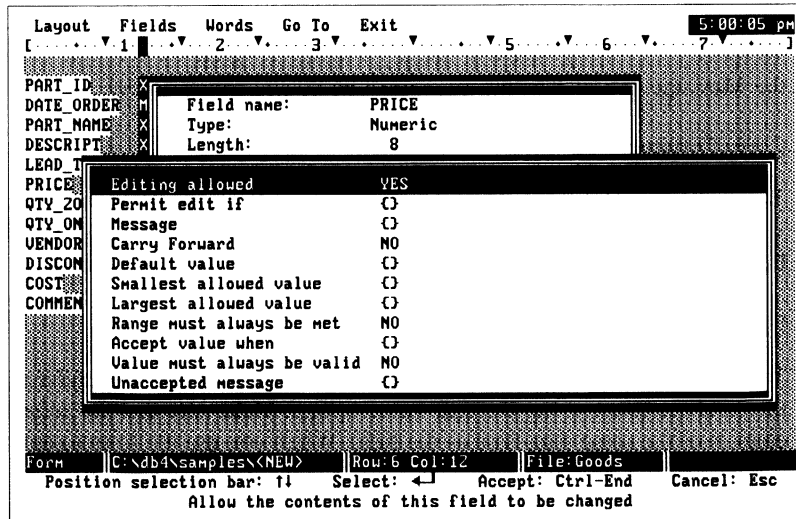


Figure 9-12 Edit options submenu

3. If the options are dimmed, press **Spacebar** to turn on the **Editing allowed** option (these options are available only if **Editing allowed** is **YES**).
4. Highlight the option you want to use and enter the data to set whatever limits are applicable.
5. Press **Ctrl-End** twice to save your entry and return to the forms design screen.

Edit Options Selections

The following selections are available for setting limits for acceptable values.

Editing Allowed

To mark fields as display-only, set the **Editing allowed** option to **NO**. This means that you can display the data but not enter new data.

Permit Edit If

To make fields conditionally read-only, allowing editing only if certain conditions are met, use the **Permit edit if** option. Enter a complete dBASE IV expression that will determine if the field can be changed. For instance, you could have *CATEGORY* = "APPLIANCE" as your expression (just entering "APPLIANCE" would not be enough). That field could not be edited unless the *CATEGORY* field had APPLIANCE as its entry.

This test is called a pre-processing evaluation because the test takes place prior to allowing the edit. A user-defined function (UDF) is an acceptable condition. See the **Accept value when** option for information on a post-processing evaluation.

Message

To specify a message that will display whenever the cursor is on the current field, use the **Message** option. The message must be 80 characters or less.

Carry Forward

To bring forward the data from the same field in the previous record to the new record, set the **Carry forward** option to **YES**. If **Carry forward** is set to **YES**, then the **Default value** will not work. **Carry forward** is used in appending records only.

Default Value

To specify the initial data that appears in this field when you append a new record to the database file, use the **Default value** option. Make sure that the default value you enter is of the same data type as the field. When you use the form to enter data, you can change the default data if necessary. If you are entering a date as the default value, use curly braces (as in {12/12/89}). It is common to choose *DATE()* as the default. If you are entering a logical field, use .T. or .F. as the default. Remember to put quote marks around a character default. The default expression cannot be based on another field in the same database.

Smallest and Largest Allowed Value

To define the range within which new values must fall, use the **Smallest allowed value** and **Largest allowed value** options, as shown in Figure 9-13. If a value outside this range is entered into a field, that value is not accepted and a message appears showing the acceptable range. Remember to use curly braces around dates (date ranges are allowed) and quote marks around character entries.

Range Must Always Be Met

To prevent checking for a range, set the **Range must always be met** option to **NO**. (This option allows you to turn on or off the **REQUIRED** keyword of the **RANGE** clause of the @...GET command.)

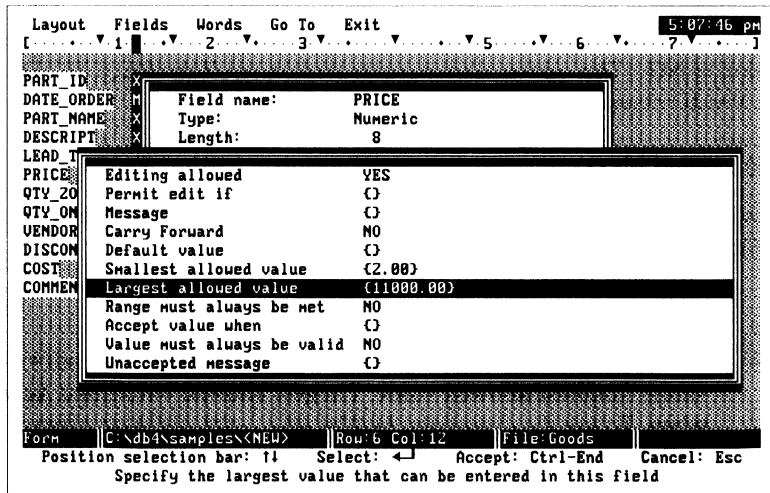


Figure 9-13 Smallest and largest allowed values

Accept Value When

To supply conditions that must be met before new data is accepted, use the **Accept value when** option. This test is called a post-processing evaluation because the test takes place after the value is entered. The conditions can be any valid dBASE IV expression that evaluates to .T. or .F., such as an = or <> (not equal) expression or a function that returns .T. or .F.. With the entry shown in Figure 9-14, the COST field will not accept any entry less than \$10.00.

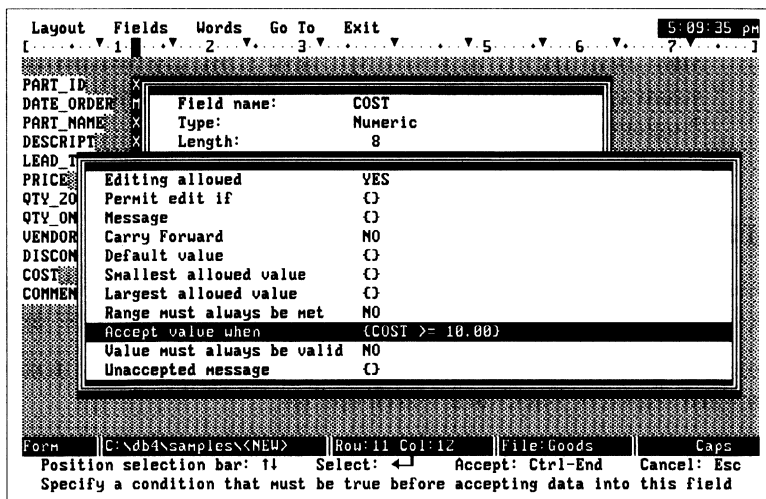


Figure 9-14 Accept value when

Value Must Always Be Valid

To prevent checking for the validity of a value, set the **Value must always be valid** option to **NO**. (This option allows you to turn on or off the **REQUIRED** keyword of the **VALID** clause of the **@...GET** command.)

Unaccepted Message

To set a message to appear when the **Accept value when** requirement is not satisfied, use the **Unaccepted message** option.



NOTE

*You may enter dBASE IV expressions or operators for **Permit edit if**, **Default value**, **Smallest allowed value**, **Largest allowed value**, and **Accept value when**. To use the expression builder when entering these expressions, press **Shift-F1 Pick**.*

Data Entry with Memory Variables

Use the **Insert memory variable** option on the **Fields** menu to place a memory variable on the form.

Choose the **Insert memory variable** option and adjust the menu entries. Change the memory variable type by pressing **↵**. Press **Ctrl-End** to finish. You must declare memory variables before using the form.

For more information about memory variables, see *Language Reference*.



NOTE

*This option is especially useful when the data for a form is contained in a SQL table. Data **SELECTed** from a SQL table is transferred one row at a time by means of memory variables. For more information, refer to Chapter 31 of Programming in dBASE IV.*

Searching and Replacing Text

To search for and replace text on the forms design screen, use the **Replace** option on the **Go To** menu. You are prompted for the text to search for and the replacement text.

To search for text on the forms design screen without replacing the text, use either the **Forward search** or **Backward search** options.

If you want to find text without regard to its capitalization, set **Match capitalization** to **NO** before you specify a search.

Entering a Form Description

Use the **Edit description of form** option on the **Layout** menu to add or change the description of the form displayed in the current catalog.

Saving the Form

Use the **Save this form** option on the **Layout** menu to save the current form under its present name or a new name and continue working. If you save it under a new name, the current form takes on the new name immediately. Remember that any changes you make on the forms design screen must be saved.

To save the form design and exit the design screen, use the **Save changes and exit** option on the **Exit** menu or press **Ctrl-J**.

Using STATUS and DISPLAY Settings

When you use the forms design screen, the form that is created respects the current settings for STATUS and DISPLAY.

For example, suppose that you have used an EGA screen in 43-line mode to design a form, and later switched to 25-line mode. When you use the form to display or enter data, the display is set to 43-line mode. When you exit the form, the display is reset to 25-line mode.

If STATUS was ON when you created the form, it will always be ON when you use the form. If you want to change this, reset the STATUS to OFF and then modify the forms design screen (you could make a change, then delete it and save).

For information about changing screen display mode and dBASE IV settings, refer to the Changing Settings section of Chapter 14.

Using an Existing Form as a Model

You can use an existing form as a model for making a new form. For instance, you could use one form only for displaying data and another form for entering data. You can make a copy of the first form and save it to a different name while working on the forms design screen.

Use an existing form as a model:

1. Select the existing form in the **Forms** panel of the Control Center and then select the **Modify Layout** option.
2. Open the **Layout** menu and select **Save this form**. A dialog box with the current name of the form opens, as shown in Figure 9-15.

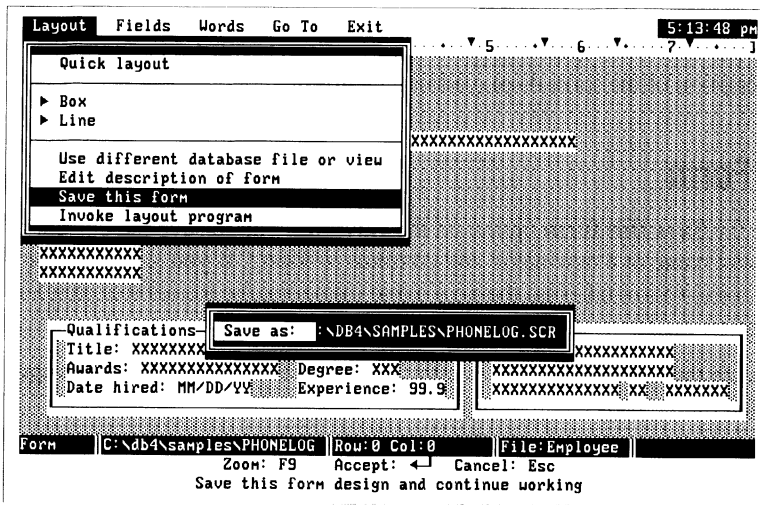


Figure 9-15 Dialog box with current filename

3. Delete the current name and type a new name, as shown in Figure 9-16, and press ↵. You do not have to type in the file extension.

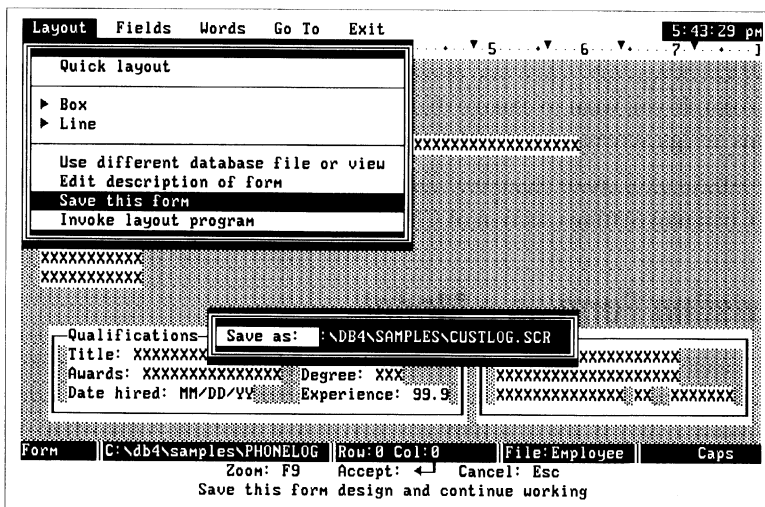


Figure 9-16 Saving the form with a new filename

Any changes you now make to the form on the design screen are saved to the new form, and the original form is left intact.

Using a Different Source of Data

When you create a form, you associate it with a specific database file or view. However, you may choose a different source of data to use with the form currently on your forms design screen. Being able to choose a different source of data is useful when you have database files or views with similar structures, and you want to modify an existing form to apply it to a different database file or view.

To change the underlying database file:

1. Open the **Layout** menu and select **Use different database file or view**. A list of database files and views in the current catalog appears.
2. Highlight the file or view that you want to be the underlying database and press ↵.

If the fields in the current database file or view do not match those already on the forms design work surface, a message appears listing the names of the fields not found in the current database file or view.

If you get this message, you may want to choose a different database file or view that has all the fields needed by the form. You could also remove those field templates from the design screen that do not exist in the database file or view you have chosen.



NOTE

*The file or view change remains in effect until you use the same option of the **Layout** menu to change the file or view.*

Opening the Form for Data Display and Entry

To open a form, highlight its filename in the **Forms** panel and press **F2 Data**. If a different database file or view is already in use, you can choose between it and the database file or view normally associated with the form. Type in data just the way you would on the standard Edit screen.



NOTE

*You sometimes cannot enter or edit data using a form whose underlying database is a view that links two or more files. Some views are read-only, or contain fields that are read-only. Refer to the *Limitations on Updating Views* section of Chapter 6 for information about read-only views and view fields.*

Displaying and Entering Data in Memo Fields

To expand memo fields to full-screen size, press **F9 Zoom** or **Ctrl-Home**. This opens the marker or window for data entry. Press **F9 Zoom** again to open the window to full screen size. Press **Ctrl-End** to close.

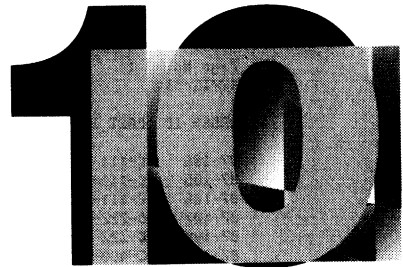
The memo field marker is shown as **MEMO** when the memo field contains text and as **memo** (lowercase) when it does not.

Using Forms with Protected Fields

If a form includes fields that were subsequently assigned an access level and privileges using the dBASE IV Protect data security system, you will receive an error when you try to use the form. In this case, you must redesign the form without the protected fields.

For information about protecting fields, refer to the Establishing a Field Access Level and Establishing Field Access Privileges sections of Chapter 14.

Creating Reports



This chapter describes many of the different ways that you can create reports and includes information about the following topics:

- Report types
- Planning your report
- Printing a Quick Report
- Creating a custom report
- Refining reports
- Saving a report format
- Viewing a report
- Printing a custom report

Report Types

There are two types of reports in dBASE IV: the Quick Report and the custom report. The Quick Report provides a fast and simple way to print all the data from your database file or view. With the custom report you can design a report with many special features.

Quick Report

A Quick Report option is the fastest and easiest way to print data from a database file or view. The Quick Report option prints data *as is*, adding only a page number and date at the top of each page. Quick Report column headers are the field names used in the database file. You cannot format a Quick Report in any way, not even to add an introduction or a footer. Figure 10-1 illustrates a Quick Report.

ORDER_ID	PART_ID	PART_NAME	ITEM_COST	QTY
87-105	C-111-6010	SOFA, 6-FOOT	1200.00	1
87-105	C-111-6015	SOFA, 6-FOOT	650.00	1
87-106	C-111-8050	SOFA, 8-FOOT	1200.00	1
87-107	C-222-1000	CHAIR, DESK	1250.00	1
87-108	C-222-1000	CHAIR, DESK	1250.00	1
87-109	C-400-2060	TABLE, END	250.00	1
87-109	C-500-6050	LAMP, FLOOR	165.00	1
87-110	C-700-2020	FILE CABINET, 2 DRAWER	75.00	1
87-110	C-700-4020	FILE CABINET, 4 DRAWER	100.00	1
87-111	C-222-1001	CHAIR, DESK	1000.00	1
87-112	C-222-3020	CHAIR, SIDE	350.00	2
87-113	C-300-2020	BOOKCASE	125.00	1
87-114	C-500-6000	LAMP, FLOOR	150.00	3
87-115	C-500-6050	LAMP, FLOOR	165.00	1
87-116	C-600-5000	DESK, EXECUTIVE 5-FOOT	1500.00	1
87-116	C-700-2030	FILE CABINET, 2 DRAWER	75.00	1
87-116	C-222-1001	CHAIR, DESK	1000.00	1
			10505.00	20

Cancel viewing: ESC, Continue viewing: SPACEBAR

Figure 10-1 Typical Quick Report

Each column is labeled with the name of the field from the database file or view. The columns print at least as wide as the field widths. If a field's name (including a space on each side) is longer than its width, dBASE IV makes the column wider to accommodate the field name. All numeric fields show totals in the last line of a Quick Report.

Custom Reports

With a custom report, you can choose the fields from the database file or view to appear in the report and rearrange the information any way you like. You can add graphic elements such as lines or boxes and create calculated fields that do not exist in the database file or view.

You can save a custom report format to use at another time. The name of a saved report appears in the **Reports** panel of the Control Center. You can create many different report formats from a single database file or view. Then you can print or view your information, formatted to your liking, with just a few keystrokes.

Printing a Quick Report

To print a Quick Report:

1. At the Control Center, highlight the database file (in the **Data** panel) or view (in the **Queries** panel) you want to print.
2. Press **Shift-F9 Quick Report**. The **Print** menu appears.
3. Change any of the print options and press **↵** to select **Begin Printing**.

While dBASE IV prints the report, press **Esc** to cancel printing or **Ctrl-S** to pause printing.

For more information on using the print menu, see Chapter 13.

About Custom Reports

Here is some of what you can do with custom reports:

- Add a report introduction, which prints only on the first page of the report.
- Add a page header, which prints at the top of each page.
- Add a page footer, which prints at the bottom of each page.
- Add a report summary, which summarizes fields and prints only at the end of the report.
- Delete or rearrange columns or fields.
- Add predefined fields, which display the current date, time, page, or record number.
- Add special fields, which display the results of calculations using data from your database file or view.
- Add column headers that are different from those in your database.
- Add lines and boxes to your report.
- Group data.

Column Layout

A report created with the **Column layout** option on the **Quick layouts** submenu of the **Layout** menu consists of rows and columns of data from the active database file or view, and can include a report introduction, page header, page footer, and report summary. A column layout displays all the fields in your underlying database file or view. In addition, you can delete columns that you do not want in your report, rearrange the order of the columns, and arrange data in groups with totals printed for each group. Figure 10-2 illustrates a column report.

```

Page No. 1
12/11/91

LASTNAME      FIRSTNAME  PHONE      CITY      STATE
Adams         Nathan    0505)555-4556  Santa Fe  NM
Anderson     Debbie    (415)555-3489  San Francisco  CA
Arlich       Kim       (603)555-8773  Manchester  NH
Benan        Sandy     (213)555-0554  Beverly Hills  CA
Bicksby     Hank     (602)555-1278  Flagstaff    AZ
Campbell    Linda    (602)555-1974  Paragould   AZ
Cohen       Larry     (217)555-4204  Decatur     IL
Collins     Sara     (503)555-0953  Portland    OR
Daniels     Dominique (609)555-0911  Trenton     NJ
DeBello     Todd     (504)555-3737  New Orleans  LA
Dean        Michelle (301)555-3193  Baltimore   MD
Dickerson   Lori     (602)555-7100  Phoenix     AZ
Drasin      Pedro    (203)555-1522  Hartford    CT
Drendon     Kelly    (805)555-8674  Santa Barbara  CA
Egan        Michelle (303)555-7337  Denver      CO
Eivera     Harry    (213)555-3232  El Segundo   CA
Garnett     Lena     (702)555-9121  Reno        NV
Gelson      George   (503)555-2323  Eugene      OR
Cancel viewing: ESC, Continue viewing: SPACEBAR

```

Figure 10-2 Typical column report

Form Layout

A report created with the **Form layout** option on the **Layout** menu consists of a vertical list of the field names followed by the field template on the same line. However, you can move text and fields anywhere. In the report shown in Figure 10-3, the data is not confined to columns and the original form layout has been changed.

```

Page No. 1
12/11/91

LASTNAME Adams          FIRSTNAME Nathan
CITY      Santa Fe          STATE      NM
                                     PHONE      0505)555-4556

LASTNAME Anderson       FIRSTNAME Debbie
CITY      San Francisco   STATE      CA
                                     PHONE      (415)555-3489

Cancel viewing: ESC, Continue viewing: SPACEBAR

```

Figure 10-3 Typical form report

Mailmerge

The mailmerge layout option is discussed in Chapter 11.

Choosing a Database File or View for the Report

Reports use either a database file or a view as the source for their data.



NOTE

If you want to create a report containing data from more than one database file, first create a view. In the case of a multiple-database file view, you must first link the databases. See Chapter 6 for detailed information about linking multiple-database files in a view.

To select the database file or view for the report:

1. From the Control Center, move the cursor to highlight the database file (in the **Data** panel) or view (in the **Queries** panel) you want to use. Press ↵.
2. Select **Use file** or **Use view**. The database file or view appears above the line in the Control Center.

Creating a New Report

After choosing the database file or view that will be the source of the data, follow these steps to create a new report:

1. Highlight **<create>** in the **Reports** panel and press ↵. The reports design screen appears with the **Layout** menu open.
2. Press ↵ to select **Quick layouts**.
3. Select **Column layout** or **Form layout**.

Choosing one of these layouts is usually the best way to begin creating a report (the **Mailmerge layout** option is discussed in Chapter 11). In Figure 10-4, the **Column layout** option is used. The page header band contains the page number, date, and the same column headings used in the database file or view. The detail band displays the fields. The summary band contains a summary field for each numeric field.

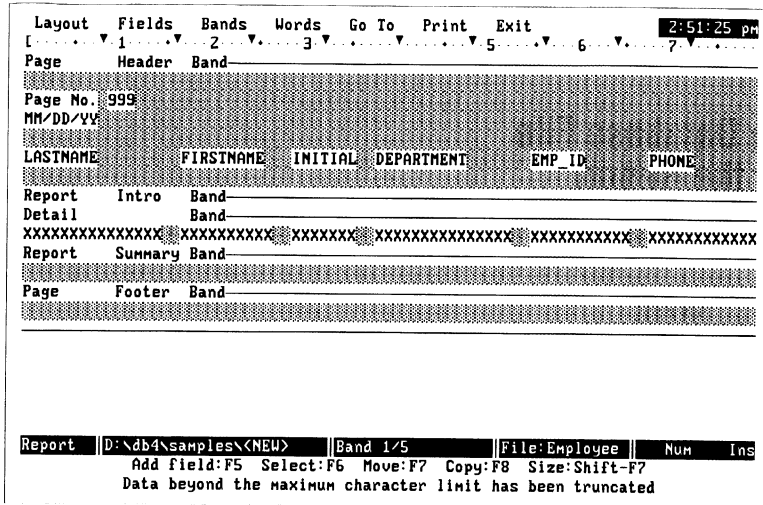


Figure 10-4 Reports design screen

Modifying an Existing Report

To modify an existing report, place the highlight on the name of the report in the Control Center's **Reports** panel. If **Instruct** is ON, press **↵** and the panel prompt box displays. Choose the **Modify layout** button, press **↵**, and the reports design screen appears.

You can also press **Shift-F2 Design** to display the reports design screen. **Shift-F2 Design** is the shortcut to the design screen and works whether **Instruct** is ON or OFF.



NOTE

If you choose to modify a report that does not normally use the current database file or view, a prompt box appears to let you choose between the current database file or view and the one normally associated with the report.

If you choose the current database file or view, you receive a warning if fields needed by the report cannot be found in this current database file or view.

Designing the Custom Report

Once you have set up the reports design screen with form or column layout, you can proceed to customize the report. Or, you can create a custom report without using the **Quick layout** option by adding fields and other attributes one-by-one with **F5 Field**. In either case, the following sections describe how to customize a report.

Reports Design Screen

The reports design screen uses report *bands*. These bands divide the report into horizontal areas consisting of one or more lines. Initially, five bands appear: page header, report intro, detail, report summary, and page footer. Information you enter in these bands prints in the specified location on the page, as shown in Figure 10-5.

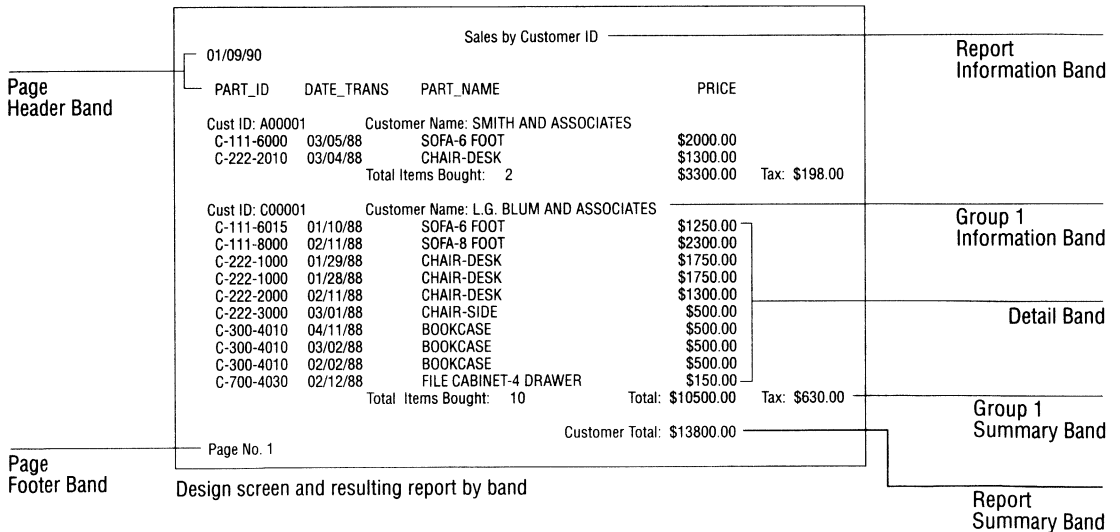
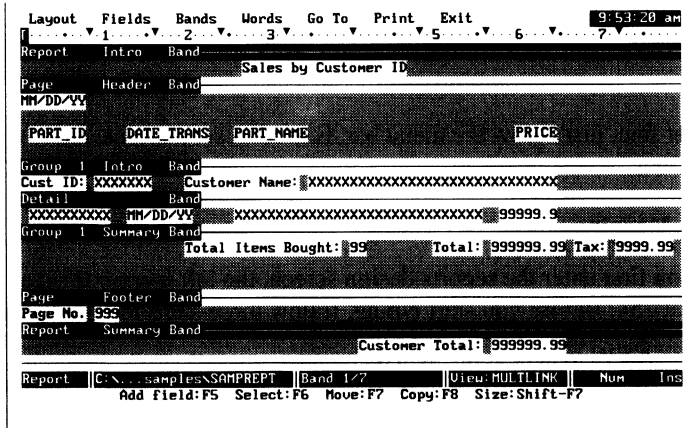


Figure 10-5 Bands and the resulting information

When a band is open, the information contained within that band prints. When the band is closed, the information in the band does not print. To close an open band:

1. Place the cursor on the border of the band.
2. Press \downarrow . The band closes.

To open a closed band, follow the same procedure.



NOTE

- *If you want only a summary report, you can close the detail band.*
- *When a band contains text or field templates, you cannot use **Ctrl-Y** to delete a blank line at the bottom of the band. To eliminate such a line, use **F6 Extend Select** and **F7 Move** to place the line immediately above on the blank line. Then, use **Ctrl-Y** to delete the blank line created above the line that you have moved.*

Using the Ruler

The ruler line, just below the menu bar, is used to set margins, tab stops, and paragraph indentations.

Setting Margins

When you first enter the reports design screen, the left margin is set at 0 and the right margin at 254. Before you start typing, follow these steps to reset the right margin:

1. Press **Alt-W** to access the **Words** menu.
2. Select **Modify ruler**. The cursor moves in the ruler line at the top of the screen.
3. Press **Tab** or **→** to position the cursor where you would like the right margin to be. Typically, you would place the margin between 65 and 75.
4. Type **]** to mark the right margin.
5. If you want to reset the left margin, type **[** where you would like the left margin.
6. Press **Ctrl-End** to save the setting.

To reset a margin, place the cursor on the bracket you want to reset and press **Del**.

For more information on setting margins, see Chapter 15.

Setting Tabs

For information on setting tabs, see Chapter 15.

Setting an Indent

For information on setting indents, see Chapter 15.

Rearranging the Page Header Band

The page header prints at the top of each page of your report. Initially, the page header band contains the page number, date, and column headings (if you did a column layout). You can delete, move, or change any of these fields. For example, the following steps delete the page number and date, and change the column headings:

1. Press ↓ to move inside the page header band.
2. Press **Ctrl-Y** three times to delete the blank line, page number, and date. You can also delete a line by moving the cursor to the line you want to delete and selecting **Remove line** from the **Words menu**.
3. Press ↓ to move the cursor to the line containing the field names.
4. Press → to move the cursor to the first field name. With **Insert** mode off, type over the current field name, giving the column a new name.
5. Repeat step 4 until you have renamed the fields to your satisfaction.

The height of a band determines the number of lines that print for the header. If you make the page header band three lines tall, the first three lines of the report will contain page header information.

You usually should not place calculated fields or fields from a database file or view in the page header band. If you do, realize that the printed data depends on whatever record is current when the page header prints. The current record is usually the record following the page break.

Adding a Report Introduction

A report introduction appears just once in a report, on the first printed page. The report introduction prints after all lines of the page header have printed. Most custom reports have an introduction, even if it contains only the title of the report. A more complex introduction might contain a full-page memo describing the report. You do not have to add a report introduction, but if you want one, follow these steps:

1. Move the cursor to the report intro band and press ↵.
2. Press ↓ to move the cursor inside the band.
3. Verify that **Insert** is ON. If the **Ins** indicator does not appear on the right side of the status bar, press the **Ins** key.
4. Press ↵ to insert a blank line. If you want your report introduction to start further down the page, insert as many blank lines as you want. Pressing **Ctrl-N** also inserts a blank line, even if **Insert** is OFF. (If you add too many blank lines, you can delete any line except the last line in the band by moving the cursor to the line and pressing **Ctrl-Y**.)
5. Type the text you want in the report introduction, as in Figure 10-6.

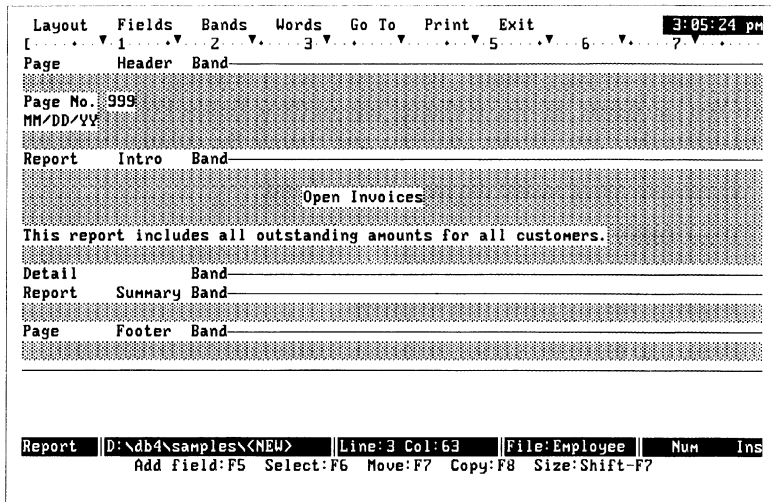


Figure 10-6 Adding a report introduction

6. If the text is a simple title, you might want to center it. Press **Alt-W** to access the **Words** menu and select **Position**. A menu appears. Select the **Center** option.
7. Add at least one blank line after your text to separate it from the detail lines that follow. Press the **End** key and then press **↵**.

Putting the Report Introduction on Its Own Page

To put the report introduction on a page by itself, add a page break at the end of the introduction, as in the following:

1. Move the cursor to the last line of the report introduction section.
2. Press **Alt-W** to access the **Words** menu.
3. Select the **Insert page break** option. A line appears on the screen, as shown in Figure 10-7.

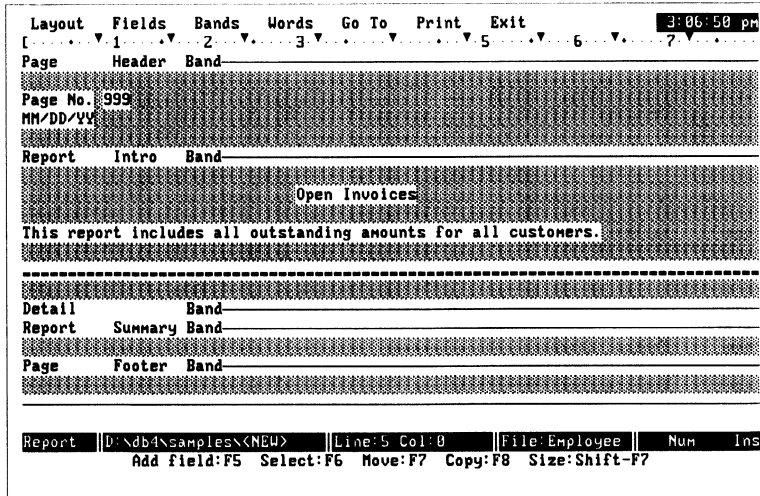


Figure 10-7 Report introduction with page break

You can make the report introduction span more than one page by putting page breaks into the band.



NOTE

*Page breaks that you insert using the **Words** menu may interact with page settings created by the report designer and cause unacceptable printed results. Therefore, except for a report introduction page, avoid inserting page breaks in your report. Instead, use the options of the **Print** menu to control page printing.*

Suppressing the Page Header in the Report Introduction

To suppress page header printing in the report introduction page, do the following:

1. Press **Alt-B** to open the **Bands** menu.
2. Select **No** for the **Page heading in report intro** option. The report intro band moves to the top, above the page header band, as shown in Figure 10-8.

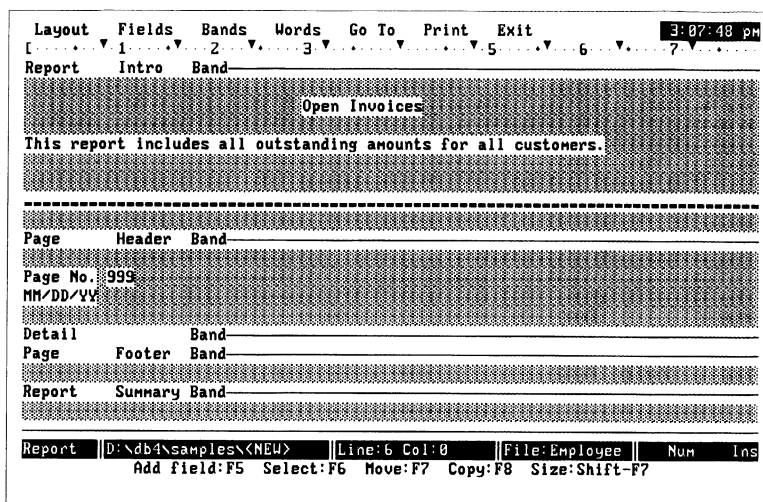


Figure 10-8 Report intro band moves to the top

When the report intro band moves over the page header band, dBASE IV prints the page header band after the report introduction page has been printed.

Changing the Detail Band

The detail band represents the format for the body of your report. dBASE IV prints every record in the database file or view according to the layout of the detail band. Initially, the detail band contains *field templates* taken from the active database file or view. *Field names* are in the page header band. Field names are the same names that appear as column headings in your database file or view. A field template shows the width of a field, where it will be printed, and the type of data it contains. For example, character fields display as a series of Xs (XXXXXXXXXX), date fields as MM/DD/YY, logical fields as Ys, and numerical fields as a series of 9s.

Changing a Column Layout

If you selected **Column layout** after selecting the **Quick layouts** option, dBASE IV displays field names and field templates in columns, as shown in Figure 10-9. The page header band contains the field names and the detail band contains the field templates.

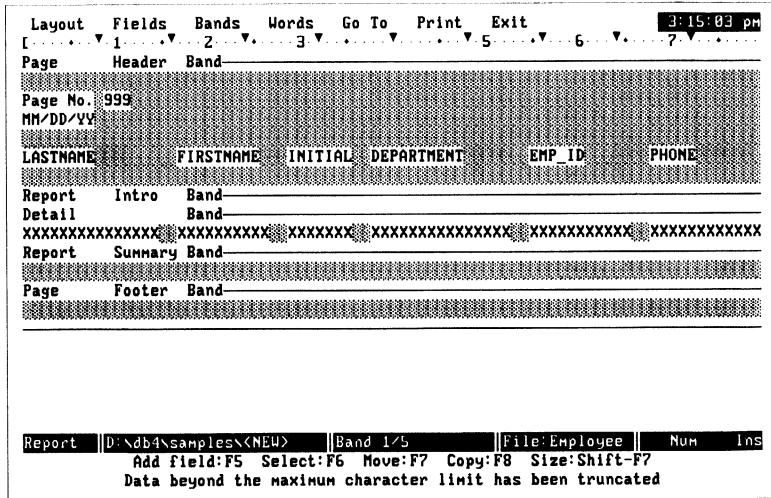


Figure 10-9 Field names and templates in a column layout

If you want to remove a column from your report, delete its field template from the detail band. For example, your database file or view might contain six columns, but you only need to print five of these columns in your report. You can delete the field template from the detail band of any column you do not want. Then delete the column's field name. The column and heading will not appear in the report.

To delete a column and column heading:

1. Move the cursor to the field template for the column you want to delete. The field template is highlighted.
2. Press **Del**. The field template disappears.
3. Move the cursor to the field name you want to delete.
4. Press **F6 Extend Select** and use the arrow keys to highlight the field name.
5. Press **Del**. The field name disappears.

When you delete a field template or a field name, the field template or field name to the right does not replace the deleted item. If you want to close up the space created by the deletion, move the field name and template as described in the section on Changing a Form Layout later in this chapter.

Notice that field templates and field names should be deleted in pairs. Readers of the report can be confused by a column without a heading or a heading without a column.

When you delete anything from a band, you change only the report. Your database file or view remains unaltered.

Changing a Form Layout

If you selected **Form layout** from the **Quick Layouts** submenu on the **Layout** menu, dBASE IV displays field names and field templates as shown in Figure 10-10.

The screenshot shows the dBASE IV interface with a menu bar (Layout, Fields, Bands, Words, Go To, Print, Exit) and a status bar (3:15:41 pm). The main window displays a form layout with the following fields and templates:

Page	Header	Band
Page No. 999		
MM/DD/YY		
Report	Intro	Band
Detail		Band
LASTNAME	XXXXXXXXXXXXXX	
FIRSTNAME	XXXXXXXXXX	
INITIAL	X	
DEPARTMENT	XXXXXXXXXXXXXX	
EMP_ID	XXXXXXXXXX	
PHONE	XXXXXXXXXXXX	
SPECIALTY	XXXXXXXXXX	
COMMENTS	XX	
AWARDS	XXXXXXXXXXXXXX	
DATE_HIRED	MM/DD/YY	
DEGREE	XXX	
EXEMPT	V	
FULL TIME	V	

Report D:\db4\samples\NE4 Band 1/5 File:Employee Num Ins
Add field:F5 Select:F6 Move:F7 Copy:F8 Size:Shift-F7

Figure 10-10 Field names and templates in a form layout

The detail band contains both the field names and field templates. The field names appear in a vertical column on the left side of the detail band and the field templates appear in a column to the right of the field names. From this starting position, you can move the field names and templates any place you like.

To move a field name or template, follow these steps:

1. Position the cursor on the field name or template you want to move.
2. Press **F6 Extend Select** to begin the selection. The field name or template is highlighted.
3. Press **↓** to complete the selection.
4. Move the cursor to the place where you want the field name or template to start.
5. Press **F7 Move**. A rectangle appears showing the new position.
6. Press **↓** to finish the move.

On text, you need to highlight the text with the cursor keys.

Field names should be placed directly above their associated template. If there are field names or templates to the right, you may also want to move them.

Several field names or templates can be moved at the same time by extending the selection. Press **→** to highlight items you want to move before pressing **↓** in step 3 above.

When you reposition a field template, it is a good idea to reposition its field name immediately afterwards. The field name tells the readers of your report what that data represents. In your finished report, each field template should have a field name above it or to its left.

Adding a Page Footer

You can include a page footer, which prints at the bottom of each report page. A page footer can include the date, time of printing, page number, and any text. The following steps create a simple footer consisting of a blank line and a second line containing the centered page number:

1. Move the cursor to the page footer band and, if the band is closed, press \downarrow to open the band. Closed bands do not print.
2. Press \downarrow to move inside the band.
3. Press \downarrow (if Insert is on) or **Ctrl-N** to insert a blank line.
4. Press \downarrow again to move the cursor to the next line.
5. Press **F5 Field**. A menu appears. Highlight **Pageno** under the **PREDEFINED** column. Press \downarrow .
6. Press **Ctrl-End**.
7. Press **Alt-W** to open the **Words** menu, and select **Position**.
8. Select **Center**. The page number template moves to the center of the footer within the specified margins. (If the right margin is set higher than column 80, the page number will move off the screen.)

If you want to delete a line from any band (for example, you added too many blank lines or you don't like a line you entered), move the cursor to the line you want to delete and press **Ctrl-Y**, or select the **Remove line** option from the **Words** menu.

You can use this band to print page totals by creating summary fields, but the summary fields must be reset after each page. See the Adding Group Bands section later in this chapter for information on resetting a subtotal to zero.

Adding a Report Summary

The report summary prints only once in a report, on the last page. Use the report summary to contain summary fields that print totals or summary text. You do not have to add a report summary, but if you want one, follow these steps:

1. Move the cursor to the report summary band and, if the band is closed, press \downarrow to open it.
2. Press \downarrow to move the cursor inside the band.
3. Verify that Insert is on. If the **Ins** indicator does not appear on the right side of the status bar, press the **Ins** key.

4. Press **↓** to insert a blank line. If you want your report summary to start several lines below the last detail record, insert as many blank lines as you want. Pressing **Ctrl-N** also inserts a blank line, even if Insert is off. (If you add too many blank lines, you can delete any line by moving the cursor to the line and pressing **Ctrl-Y**.)
5. Type the text you want in the report summary or add the fields you want.

Figure 10-11 shows a screen that uses the Report Summary Band. In that band is a field for totals of all customers. The detail band is closed.

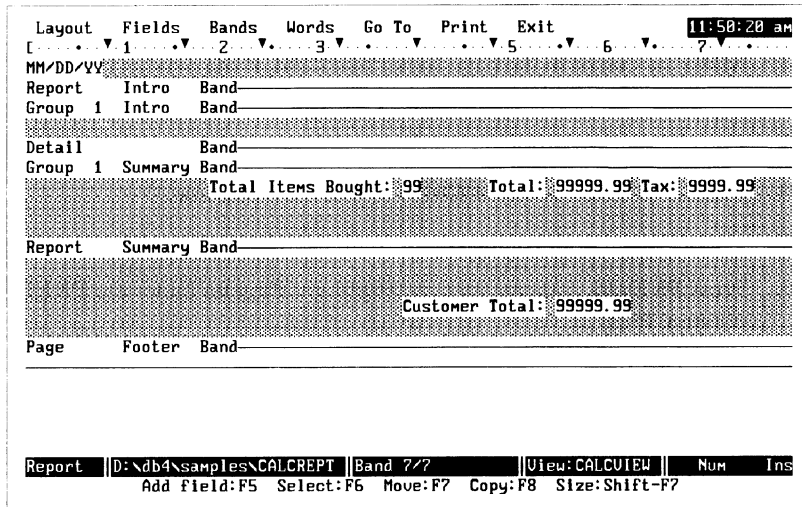


Figure 10-11 Report using Summary Band

Figure 10-12 shows the printout for the report design in Figure 10-11. The final customer total comes at the end of the report.

Sales by Customer			
Cust ID: A00001	Customer Name: SMITH AND ASSOCIATES	Total Items Bought: 2	Total: \$3300.00 Tax: \$198.00
Cust ID: A10025	Customer Name: ALPHA ENTERPRISES	Total Items Bought: 3	Total: \$4325.00 Tax: \$259.50
Cust ID: C00001	Customer Name: L.G. BLUM AND ASSOCIATES	Total Items Bought: 10	Total: \$10500.00 Tax: \$630.00
Cust ID: C00002	Customer Name: TIMMONS AND CASEY LTD.	Total Items Bought: 1	Total: \$2000.00 Tax: \$120.00
		Customer Total: \$20125.00	
Cancel viewing: ESC, Continue viewing: SPACEBAR			

Figure 10-12 Final totals

Adding Fields

You can add database, predefined, or calculated fields to your report design screen at any time.

Adding a Predefined Field

Predefined fields are special fields that display the current date, time, page, or record number. You can place a predefined field in any band.

1. Move the cursor to the location where you want the predefined field to go (you can change its position later).
2. Press **F5 Field** or select the **Add field** option from the **Fields** menu. dBASE IV displays a list like that in Figure 10-13.
3. Highlight the predefined field that you want to use and press **↵**. A menu appears on the screen.
4. Fill in the field definition menu. Each of the predefined fields allows you to specify different display options in the field definition menu.
5. Press **Ctrl-End** when you are finished. The predefined field is placed on the reports design screen.

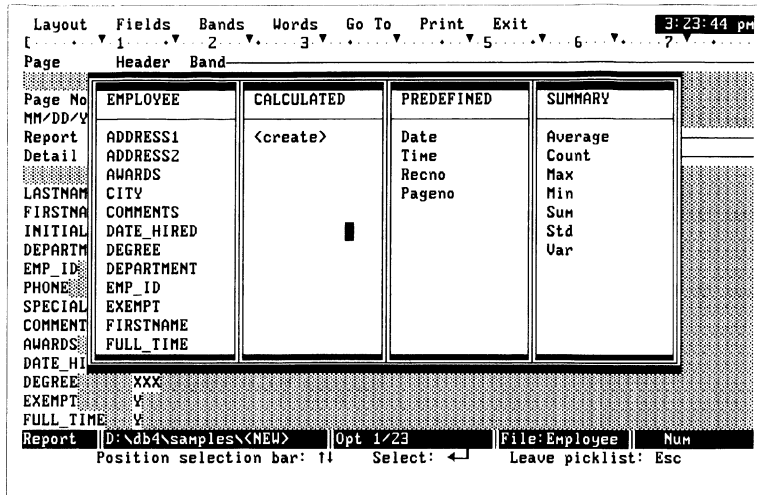


Figure 10-13 Fields list

Here is some more information about using predefined fields:

- The page number field should be placed in every report in either the page header band or the page footer band.
- Custom reports often have a date field in the page header or page footer band to display the current date on each page of your report. You can also place the date field in the report intro band.
- Use the record number field (Recno) in the detail band to display the current record number.
- When you do a quick form or column layout, the date and page predefined fields are automatically put into the page header band.

Adding a Calculated Field

In some situations, you might want to print a report that contains a new field (one that is not in the database file or view) which is the result of a calculation.

To create a calculated field:

1. Move the cursor to the place where you want the calculated field to start.
2. Press **F5 Field** or select the **Add field** option from the **Fields** menu. dBASE IV displays a list like that in Figure 10-13.
3. Highlight the **<create>** marker from the **CALCULATED** column. To modify one of the calculated fields already created for this form, highlight the name of the field and press **↵**.

4. A field description for calculated fields appears. A calculated field has special options in its field description, as shown in Figure 10-14.

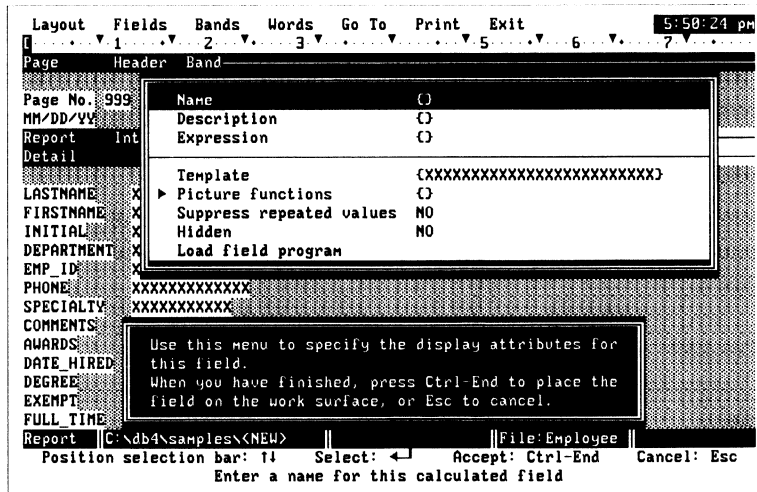


Figure 10-14 Field description menu for a calculated field



NOTE

For information about using the **Load field program** option of the **Add field** submenu of the **Fields** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

5. Since the calculated field is defined only for the reports design screen, it has no predefined attributes. You can change every option in its menu. If this field is going to be used in another calculation, highlight the **Name** option and press ↵. Enter a name for the calculated field and press ↵. If this field is not going to be used in another calculation, giving it a name is optional.
6. You can optionally enter up to 80 characters of explanation about the content or purpose of the calculated field in the **Description** option. Press ↵.
7. Highlight **Expression**. Here you specify the actual calculation that defines the field. You can enter any dBASE IV expression, including previously defined memory variable names and user-defined functions (UDFs). If you want help entering the expression, press **Shift-F1 Pick** to display the names of the fields in the database file or view, and possible operators or functions. Enter your expression and press ↵.

**NOTE**

A field does not have to be on the design screen to be used in the calculation.

8. Press **Ctrl-End**; the calculated field is placed on the work surface.

Note that the calculated field template has no name next to it. Move the cursor to where you want the name of the field to appear and type the name.

Using Calculated Field Types

There are several different types of calculated fields: named, unnamed, hidden, and summary. Table 10-1 describes the properties and uses of these types of calculated fields.

Table 10-1 Calculated field types

Type	Properties and Uses
Named	Named calculated fields are especially useful when you need a field that will be referred to by another calculated field. These fields are evaluated by dBASE IV in a left-to-right and top-to-bottom order within a band. That is, if you need to use the result of one calculated field within another calculated field within the same band, the first named calculated field must be to the left (if it is not above) of the second named calculated field.
Unnamed	Unnamed calculated fields cannot be referenced by any other calculated field. Unnamed calculated fields are calculated last, after named calculated fields and summary fields.
Hidden	Hidden calculated fields are always calculated first in a band. If you have more than one hidden calculated field in a band, dBASE IV calculates them in the order in which they were created.
Summary	Summary fields are fields that use aggregate operators such as Average, Count, Max, Min, Sum, Std, and Var. For more information, see the Parts of a Group Band section later in this chapter. These are calculated left to right, top to bottom, right along with the named calculated fields, <i>unless</i> the summary field is dependent on a calculated field, in which case it is calculated <i>after</i> all hidden and named calculated fields.

WARNING

If a calculated field is dependent upon an independent summary field (for example, if the summary field totals a value and the calculated field multiplies this value by a factor), be sure that the calculated field lies to the *right* of or *below* the summary field; otherwise it will be calculated on the basis of the old value of the summary field, not the new value (which will not have been calculated yet). If the calculated field is not referenced by another calculated field, you can remove its name to cause it to be calculated last.

The easiest way to understand how to use all four of these fields together is with an example, such as Figure 10-15. Suppose you want to set up an invoice which shows the total price of each item ordered by a particular customer and the total cost to the customer of all items ordered plus tax. The following sections use this situation to show how you might do this using hidden, named, and unnamed calculated fields, and a summary field. The view used in the example has three fields (CUST_ID, PART_QTY, and PART_ID).

The screenshot shows a report design interface with a menu bar (Layout, Fields, Bands, Words, Go To, Print, Exit) and a status bar (11:40:10 am). The report layout includes a Page Header Band, a Page No. field (999), a Report Intro Band, a Group 1 Intro Band, and a Detail Band. The Detail Band contains fields for CUST_ID (XXXXXX), PART_QTY (999), PART_NAME (XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX), and PART ID (XXXXXXXXXX). A calculated field ITEMTOTAL: 999999.99 is shown to the right of the PART ID field. Below the Detail Band is a Group 1 Summary Band containing a table with the following data:

TOTAL WITH TAX		TOTAL FOR ALL ITEMS	
999999999.99		9999999.99	
			TAX: 999999.99

At the bottom, a Report Summary Band shows the report name (D:\db4\samples\CALCREPT), line and column numbers (Line: 0 Col: 0), view name (CALCUIEW), and number of lines (Num: 1). The status bar also displays keyboard shortcuts: Add field:F5, Select:F6, Move:F7, Copy:F8, Size:Shift-F7.

Figure 10-15 Report design using calculated field

Using the Hidden Field

Hidden fields are calculated before anything else in a band. To set up the hidden field:

1. Place the cursor inside the band where you want the hidden field to be calculated.
2. Press **F5 Field**. A menu appears on the screen.
3. Move the cursor to **<create>** in the **CALCULATED** column.

4. Press **↓**. A menu to define the attributes of the calculated field appears on the screen.
5. Select the **Name** option and type a name for the hidden calculated field. In Figure 10-16 the hidden calculated field is named *ITEMPRICE*.
6. Optionally, select the **Description** option and enter a description for the calculated field.
7. Select the **Expression** option and enter an expression for the field, as in Figure 10-16.
8. Type **h** to toggle the **Hidden** option to **YES**.

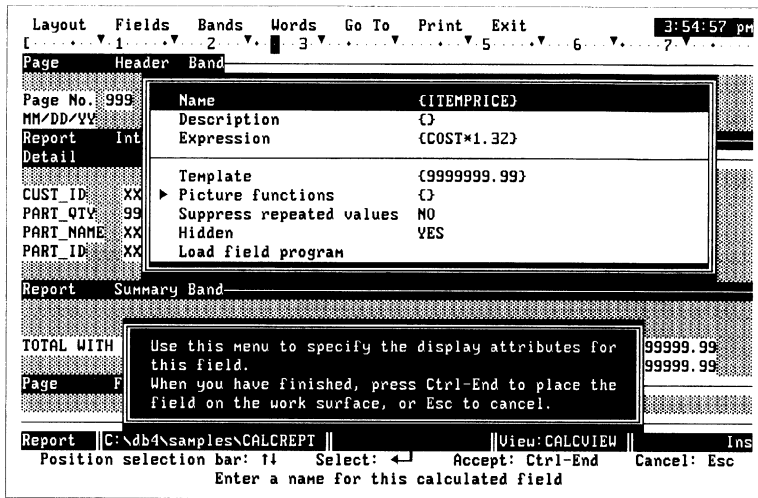


Figure 10-16 Using a hidden calculated field



NOTE

For information about using the **Load field program** option of the **Add field** submenu of the **Fields** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

9. Change the template and any of the picture functions as you see fit.
10. Press **Ctrl-End** to save the calculated field.

The hidden calculated field does not appear on the screen. It does calculate, however, before any other calculated field on the screen.

Using the Named Calculated Field

A named calculated field can reference the results of hidden calculated fields and other named calculated fields (as long as the named calculated fields are to the left or above it within the band). To create a named calculated field that references a hidden calculated field:

1. Move the cursor to where you want the named calculated field to be.
2. Create the calculated field just as described in the Adding a Calculated Field section earlier in this chapter. When you define the expression, reference the name of the hidden calculated field. For example, in Figure 10-17 the named calculated field, *TOTE*, references the hidden calculated field, *ITEMPRICE*.

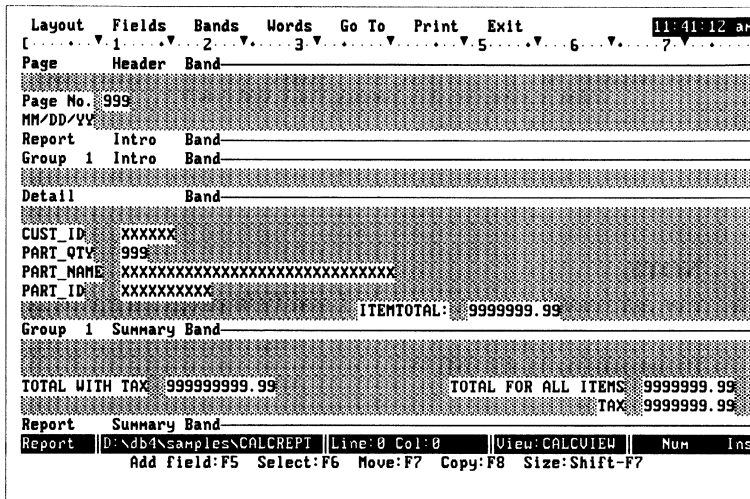


Figure 10-17 Referencing a hidden calculated field

3. When you have finished setting the options on the menu, press **Ctrl-End**.

Using the Summary Field with a Calculated Field

A summary field can reference a database field or a named calculated field. Summary fields may often be useful in a group band. For specific information about how to create a summary field in a group band, see the Adding Group Bands section later in this chapter. Figure 10-18 shows a summary field that references a named calculated field.

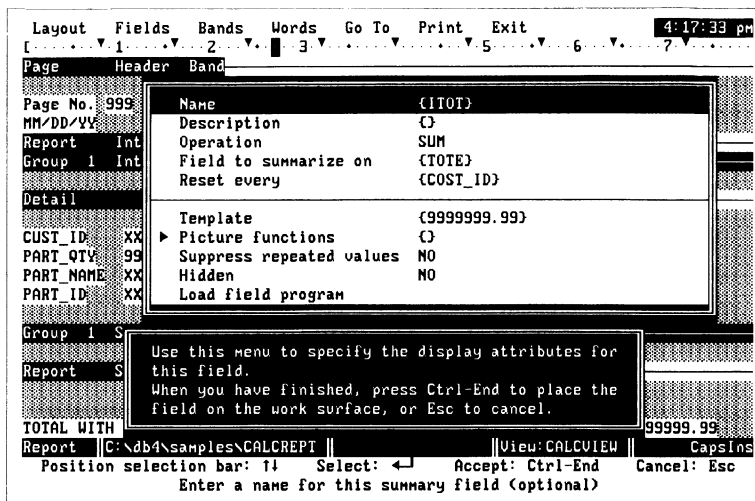


Figure 10-18 Summary field referencing named calculated field



NOTE

For information about using the **Load field program** option of the **Add field** submenu of the **Fields** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

In Figure 10-18, a SUM operation is performed on TOTE, a named calculated field in the detail band. Summing is reset for every customer ID. The name of the aggregate field is ITOT.

Using Unnamed Calculated Fields

Unnamed calculated fields are calculated after hidden fields, named calculated fields, and summary fields. Unnamed calculated fields can reference these three fields. However, an unnamed calculated field cannot be referenced by any of these (hidden, named, and summary), because there is no name for them to reference.

To use an unnamed calculated field:

1. Move the cursor where you want the calculation to appear in the report.
2. Create a calculated field as described in the Adding a Calculated Field section earlier in this section, except do not give the field a name, as shown in Figure 10-19.

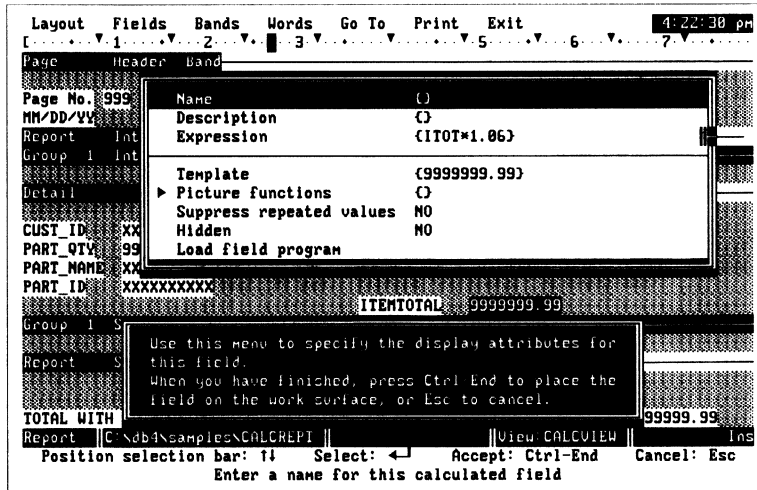


Figure 10-19 Unnamed calculated field



NOTE

For information about using the **Load field program** option of the **Add field** submenu of the **Fields** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

Figure 10-20 shows two unnamed calculated fields which reference a summary field within the Summary Band.

Layout	Fields	Bands	Words	Go To	Print	Exit	11:41:41 am
[1	2	3	5	6	7	
Page	Header	Band					
Page No.	999						
MM/DD/YY							
Report	Intro	Band					
Group 1	Intro	Band					
Detail	Band						
CUST_ID	XXXXXX						
PART_QTY	999						
PART_NAME	XXXXXXXXXXXXXXXXXXXXXXXXXXXX						
PART_ID	XXXXXXXXXX						
				ITEMTOTAL:	9999999.99		
Group 1	Summary Band						
TOTAL WITH TAX	999999999.99			TOTAL FOR ALL ITEMS	9999999.99		
				TAX	9999999.99		
Report	Summary Band						
Report	D:\db4\samples\CALCREPT Line: 3 Col: 68 View: CALCVIEW Num Ins						
	Add field:F5 Select:F6 Move:F7 Copy:F8 Size:Shift-F7						

Figure 10-20 Two unnamed calculated fields with a summary field

The name of the summary field is ITOT. The field that calculates total with tax and the field that calculates tax reference ITOT. However, as you can see from Figure 10-20, one is to the left of ITOT and one is below it. The calculation will be correct for both because the summary field ITOT is calculated before either of the unnamed calculated fields. If these two fields were named, they would have been calculated before ITOT and would have given an incorrect value.

Creating a Running Total

You can use unnamed calculated fields to print the current state of calculations (that is, running totals).

To do a running total:

1. In the detail band, place the cursor where you want the running total to be.
2. Press **F5 Field**.
3. Move the Summary column, highlight **Sum** and press **↵**.
4. Select the **Field to summarize on**.
5. Choose the field (numeric or calculated) on which to have a running total.
6. Press **Ctrl-End** to place the field on the work surface.

Creating Group Bands

In addition to the five bands that initially appear in the reports design screen, you can add *group* bands. These bands organize records by collecting them into groups. A group is defined by one of three qualities: record count, field value, or dBASE IV expression.

You can ask for a new group every so many records, for example, every 25 records. A new group can also start every time the value in some field changes. You might start a new group every time information in the *City* field changes. Finally, you can form groups by applying dBASE IV expressions. You could, for example, group people who have the same first three digits of their zip codes.

For groups to work properly, you need to index (or sort) the records in relation to the group expression (except if you are grouping by record number). For example, if you index a name and address file by *City* and then group on *City*, you create a report where all cities are grouped together correctly.

If this file is not indexed (or sorted) by *City*, the records for each city would be scattered throughout the report, fragmenting each city's records into separate groups.

One of the major reasons for grouping the records in a report is to show subtotals. You can also apply statistical functions to the members of the group. You could, for example, show the average salary for all your employees in Chicago.

There is no limit to the number of groups allowed.

Parts of a Group Band

Each group band is really two bands: the group's intro band and the group's summary band. The group intro band prints at the beginning of each group. Think of the group intro band as the first record in a group and think of the detail band as all of the records in the group. Group intro bands can contain headings for the columns of information in the detail band. Group intro bands can also display titles to clarify the grouping plan.

When printed, group intro bands usually contain information that remains constant combined with information that changes, depending on the data in the group. For example, in the situation described above, one group intro might print as *Name of city: Princeton*, while the next group intro prints as *Name of city: Prospect Heights*.

A report can both calculate and display statistical information for each group. This information is shown in the group summary band, which prints at the bottom of each group. Possible *summary* functions are given in Table 10-2.

Table 10-2 Summary functions

Function	Description
Average	Calculates the arithmetic mean of the values in a field.
Count	Counts the number of records.
Max	Determines the largest number in a field.
Min	Determines the smallest number in a field.
Sum	Determines the sum of the values in a field.
Std	Calculates the standard deviation of the values in a field. The formula for the standard deviation is the square root of the variance.
Var	Calculates the population variance of the values in a field.

For more information on summary functions, see **CALCULATE** in Chapter 2 of *Language Reference*.

Adding Group Bands

You add a new group by choosing the **Add a group band** option from the **Bands** menu. Groups are added inside (below) the current band. To create a group outside an existing group, place the cursor above the existing group's intro band before choosing the **Add a group band** option.

The following procedure adds group bands to a report and places a summary field in the group summary band:

1. On the reports design screen, move the cursor to the report intro band border.
2. Press **F10 Menus** and select **Add a group band** from the **Bands** menu. A menu appears.
3. Select **Field value** from the menu.
4. Select the field you want to group on. A new group band appears as shown in Figure 10-21.

The layout is . . .

Page	Header	Band			
Report	Intro	Band			
Group 1 Intro Band					
Below are the monthly sales of each item for XXXXXXXXXXXX.					
Group 2 Intro Band					
Detail		Pants	Shirts	Ties	Socks
		Band			
		99999	99999	99999	99999
Group 2		Summary	Band		
Group 1 Summary Band					
Report		Summary	Band		

By state

By state, with Repeat group intro on each page attribute

The printout is . . .

Below are the monthly sales of each item for CALIFORNIA:				
Pants				
Dec \$95,000	Jan \$10,000	\$30,000	\$25,000	\$90,000
	Feb \$15,000	\$19,000	\$38,000	\$19,292
Below are the For NEW JER		.	.	.
		.	.	.
Pants				
Jan \$10,000				
Feb \$15,000				

Figure 10-21 Group bands

5. Move the cursor into the group summary band.
6. Press **Ctrl-N** to insert a blank line.
7. Move the cursor across to where you want the summary field to start.
8. Press **F5 Field** and select **Sum** from the SUMMARY column.
9. Select **Name** and enter a name for the summary field.
10. Select **Field to summarize on** and then select the field you want to summarize.
11. Select **Reset every** and then select the field from your file that you are grouping on.
12. Select **Template**, if you want to revise the field template.
13. Press **Backspace**, if you wish to shorten the template.
14. Press **Ctrl-End** to save the field description and place the field on the screen.

Step 11 tells dBASE IV to reset the subtotal to zero each time it encounters a new group of the specified field. If you do not reset the field you are grouping on, a running total is created instead of a subtotal.

Sometimes you may want to make groupings within groupings. For example, you may need to group sales records by county, then by city. To do this, make a subgroup on City inside the major group by County. This is called *nesting* groups. You also need to index or sort your database file or view to put the records in this order.



TIP

You can use a view that contains sort operators to automatically order the data for your report.

The order of precedence for calculations is an important consideration when adding fields in a group summary band. The order of precedence is as follows:

- Hidden field
- Aggregate and calculated fields
- Aggregate fields with a dependency on a calculated field

Adding a Description

You can add a description for the report design format. The description appears on the Description line of the Control Center when you highlight the report name.

If you find it helpful to attach a description to the report format, follow these steps:

1. Press **Alt-L** from the reports design screen to select the **Layout** menu.
2. Select **Edit Description of Report**.
3. Type an appropriate description for this report. Press **↵**.
4. Save the report format as described in the Saving a Report Format section later in this chapter.

Refining Reports

This section describes report capabilities designed to refine your reports. Topics described include:

- Changing print styles
- Selecting fonts
- Adding lines and boxes
- Editing lines and boxes
- Correcting misaligned columns

Changing Print Styles

dBASE IV supports six print styles: plain, boldface, underline, italic, superscript, and subscript. You can change any text or field in a band from the current style to an alternate style. Simply select the text you want to change and specify the alternate style. You can also combine styles to create, for example, text that is boldface and underlined.

To change text or fields to another style, follow these steps:

1. Move the cursor to the start of the text or field you want to change.
2. Press **F6 Extend Select** to start the selection.
3. Press the → and ↓ keys to select any rectangular area that is inside the current band.
4. Press ↵ to complete the selection.
5. Press **Alt-W** to select the **Words** menu.
6. Select the **Style** option.
7. Move the cursor to the desired style and press ↵ to set the style **ON**.
8. Press ← to return to the **Words** menu.

You cannot change the style of words across band lines. Change the style of text or fields one band at a time.

Styles do not appear on your screen exactly as they will print. Bright characters indicate the boldface style on a monochrome monitor. All other styles appear in a different color on a color monitor. To determine the style of a section of text or a field, move the cursor inside the area and select the **Style** option. The styles assigned to that area are shown as **ON**.

Selecting Fonts

Underneath the **Lowered (Subscript)** option is a numbered list of additional potential options. These are for typefaces or *fonts*, such as Times Roman or Helvetica. If you have a laser printer, you can establish special fonts with settings in your Config.db file. See Chapter 2 of *Getting Started with dBASE IV* for more information.



NOTE

*Additional fonts are displayed only if you've already specified the printer using the **Printer model** option of the **Print** menu's **Destination** menu.*

Adding Lines and Boxes

Lines and boxes can improve the appearance of a report and the presentation of data. Lines help separate logical parts. Boxes add emphasis to important information.

Lines and boxes can be used in column and form layouts, but not in mailmerge layouts. This is because a mailmerge layout uses word wrap mode instead of layout mode. Word wrap mode, discussed in Chapter 15, doesn't support line or box drawing.

To add a line to a report, follow these steps:

1. Press **Alt-L** to select the **Layout** menu.
2. Select the **Line** option. A menu appears.
3. Select **Single line** or **Double line**.
4. Move the cursor to where you want the line to start.
5. Press **↵** to indicate the beginning of the line.
6. Press **→** to draw a horizontal line or **↓** to draw a vertical line.
7. Press **↵** to end the line.

While drawing a line in any direction, you can insert text by pressing character keys instead of the arrow key. After the last character, continue the line using the arrow key. To change direction while typing characters, press **Tab** and the arrow key indicating the new direction.

These are the steps to draw a box:

1. Press **Alt-L** to select the **Layout** menu.
2. Select the **Box** option. A menu appears.
3. Select **Single line** or **Double line**.
4. Move the cursor to where you want the top left corner to appear.
5. Press **↵** to indicate the beginning position.
6. Press **↓** and **→** to move the cursor towards where you want to place the bottom right corner of the box. A temporary box forms as you move the cursor.
7. Press **↵** to mark the ending position.

Lines and boxes can also be drawn with special graphic characters. Simply select **Using specified character** in step 3 above, move the cursor to select a character from the list that appears, and press **↵**.

Be aware that some printers cannot print boxes or special graphic characters.

Editing Lines and Boxes

After you have drawn a line or box, you can move, copy, resize, or delete it. Here's how:

1. Move the cursor to the line or box. It becomes highlighted.
2. Press **F6 Extend Select** and move the cursor to highlight the entire line or box.
3. Press **F7** to move the selected item, **F8 Copy** to copy it, **Del** to delete it, or **Shift-F7 Size** to resize it.

Correcting Misaligned Columns

The Adding Fields section earlier in this chapter describes how to place fields on a reports design screen. If your columns come out misaligned, you have embedded spaces between fields. Spaces appear dark in a band when compared to the shaded area around them. To make columns print straight, you must remove those spaces. Here's how:

1. Move the cursor to the embedded space between two fields.
2. If Insert is ON, turn it OFF by pressing **Ins**.
3. Press **Del**. The embedded space disappears.
4. Continue until you have removed all the embedded spaces.

Choosing Page Orientation (PostScript Printer Only)

With PostScript printers (such as the Apple LaserWriter), you can set the page orientation to either *portrait* (normal printing) or *landscape* mode (sideways printing along the length of the page). With most other printers, the only way to change page orientation is by changing to a different printer driver (see Chapter 13).

If you have an Apple LaserWriter (or compatible PostScript printer) installed, you can use *printer command macros*. The macros to change orientation to portrait or landscape are PORT and LAND, respectively. To change to landscape orientation:

1. Press **Alt-P** to select the **Print** option.
2. Select the **Control of printer** option. A submenu appears.
3. Select the **Starting control codes** option.
4. Type LAND. You *must* type a space after the macro. Use all uppercase, all lowercase, or first letter uppercase. Do not mix uppercase and lowercase. If you do not intend to type any other macro, press ↵.
5. Select **Ending control codes** and type PORT. Once again, be sure to end the control code with a space.

**NOTE**

- *To change from landscape to portrait mode, transpose LAND and PORT.*
- *In landscape mode, you must set **Length of page** to 45 lines. See the *Setting Page Dimensions* section in Chapter 13.*

Choosing Paper Length (PostScript Printer Only)

If you have an Apple LaserWriter (or compatible PostScript printer) installed, you can select between letter-sized paper (8 1/2 x 11 inches, the default) or legal-sized paper (8 1/2 x 14 inches). The command macros are LETTER and LEGAL.

To change paper length to legal size:

1. Press **Alt-P** to select the **Print** option.
2. Select the **Control of printer** option. A submenu appears.
3. Select the **Starting control codes** option.
4. Type LEGAL. You *must* type a space after the macro. Use all uppercase, all lowercase, or first letter uppercase. Do not mix uppercase and lowercase. If you do not intend to type any other macro, press ↵.
5. Select **Ending control codes** and type LETTER. Once again, be sure to end the control code with a space.

**NOTE**

- *To change from legal to letter size, transpose LEGAL and LETTER.*
- *In portrait mode, you must set **Length of page** to either 60 or 66 lines for letter-size paper, or to 78 lines for legal-size paper.*

Setting Lines Per Inch (PostScript Printer Only)

If you have an Apple LaserWriter (or compatible PostScript printer) installed, and you are printing in portrait mode on letter-sized paper, you can choose to print either six lines per inch (60 lines per page) or 6.48 lines per inch (66 lines per page, the default). The macros to be entered in the **Starting control codes** option are 60LPP and 66LPP, respectively.

**NOTE**

*If you use either macro to set lines per inch, you must set **Length of page** to the corresponding number, 60 or 66. See the *Setting Page Dimensions* section in Chapter 13.*

Multiple Command Macros (PostScript Printer Only)

You can type multiple command macros (for example, LAND LEGAL) into the starting and ending control code boxes. Separate macros by spaces, and be sure to type a space at the end before pressing ↵. Macros can be typed in any order.

Page Eject During Printing (PostScript Printer Only)

If you have an Apple LaserWriter (or compatible PostScript printer), you can ensure that report pages eject properly when printing by setting the **New Page** option in the **Control of Printer** submenu to **AFTER**, unless you have used the page footer band in your report. Use of the page footer band for page numbers, summary fields, printing the system date, or similar information will send the proper page eject codes to the printer.

Saving a Report Format

Always save any report format you create. The report format can then be used to print a report at another time, or you can modify the format to create a report with a different content or format. Follow these steps to save a report format:

1. Press **Alt-E** from the reports design screen to select the **Exit** option.
2. Select **Save changes and exit**. If this is the first time you have saved this file, continue with step 3. If you have saved this report format before and given it a name, the Control Center appears.
3. When dBASE IV displays the **Save as:** prompt, type a valid filename without an extension and press ↵. After a few moments, the Control Center appears, with the filename you entered displayed in the **Reports** panel and on the file information line (with an .frm extension).

Viewing a Report

You can view a report on the screen at any time. This feature is especially useful just before printing a report for the first time.

1. Press **Alt-P** to access the **Print** menu.
2. Select **View report on screen**.

You can press **Esc** to cancel the viewing of a report, or **Spacebar** to display the next full screen of data.

Writing a Report to a File

You can save a report format to a DOS file.

1. Press **Alt-P** to access the **Print** menu.
2. From the **Destination** submenu, select **Write to** and press **↵** to toggle on the **DOS FILE** option.
3. If desired, select **Name of DOS file**, change the path and name of the file, and press **↵**. (By default, dBASE IV creates the file in the current directory with the name of the underlying database file or view and a .prt extension.)
4. Press **Esc** to close the submenu.
5. Select **Begin printing**. dBASE IV creates the file.
6. Press **Esc** to remove the prompt box that appears.

Printing Custom Reports

You can print a custom report from the reports design screen or the Control Center. Follow these steps to print a report from the reports design screen:

1. Press **Alt-P** to access the **Print** menu.
2. Select **Begin Printing**.

To print from the Control Center, follow these steps:

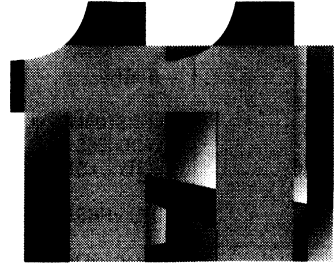
1. Highlight the name of the report in the **Reports** panel. Press **↵**.
2. Select **Print Report**.
3. Select **Begin Printing**.

If you want to see the report on your screen before printing, select **View report on screen** in step 3.

If a report is wider than the width available from your printer, what happens next depends on how your printer handles lines that are too wide. Some printers truncate lines and others wrap them. Design your reports so that they fit on your printer.

The **Print** menu contains many useful options. You can read about these in Chapter 13.

Using Mailmerge



Use the mailmerge facility to create documents to which dBASE IV merges information from a database file or view. For example, you can create a view containing the names of customers delinquent in their payments and use mailmerge to create a letter for each stating the amount they owe.

This chapter describes:

- Accessing a mailmerge layout
- Setting margins
- Entering text and fields
- Saving a mailmerge layout
- Viewing mailmerge documents
- Suppressing blank lines and trailing spaces
- Printing mailmerge documents
- Printing single sheets

Using mailmerge, you create a form document containing fixed text and variable *fields*, which dBASE IV replaces at print time with values from a specified database file or view. Figure 11-1 shows a sample mailmerge document.

```
<DATE>

<FIRSTNAME> <LASTNAME>
<ADDRESS>
<CITY>, <STATE> <ZIP>

Dear <FIRSTNAME>,

According to our records, we have not received payment on the goods shipped to
you on <SHIPDATE>. If payment has been mailed, please disregard this notice.

Sincerely,

J.B. Collector
Acme Nuts and Bolts
```

Figure 11-1 Conceptual form letter

When you print this letter, dBASE IV prints a separate page for each record in the specified database or view and substitutes a value for each field. The <DATE> field is a predefined field. It is replaced with the current date from your computer. dBASE IV replaces all other fields with values from a database file or view.

Figure 11-1 illustrates a single-page letter, but a mailmerge document can be a multi-page report.

Accessing a Mailmerge Layout

To access a mailmerge form:

1. From the Control Center, highlight a database name in the **Data** panel or a view name in the **Queries** panel. Press \downarrow and select **Use file** or **Use view**. The filename appears above the line.
2. Highlight **<create>** in the **Reports** panel. Press \downarrow . The reports design screen appears and the **Layout** menu opens, as shown in Figure 11-2.

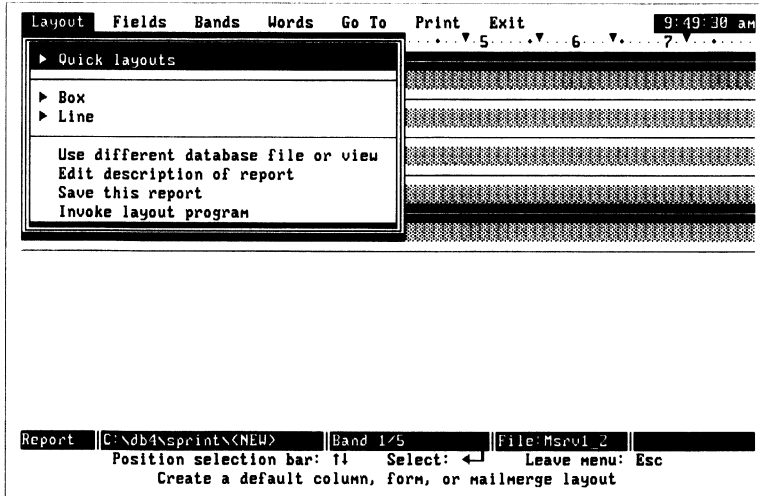


Figure 11-2 The **Layout** menu



NOTE

For information about using the **Invoke layout program** option of the **Layout** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

3. Select **Quick layouts**.
4. Select **Mailmerge layout**. The screen is available for entering text for the form letter, as shown in Figure 11-3.

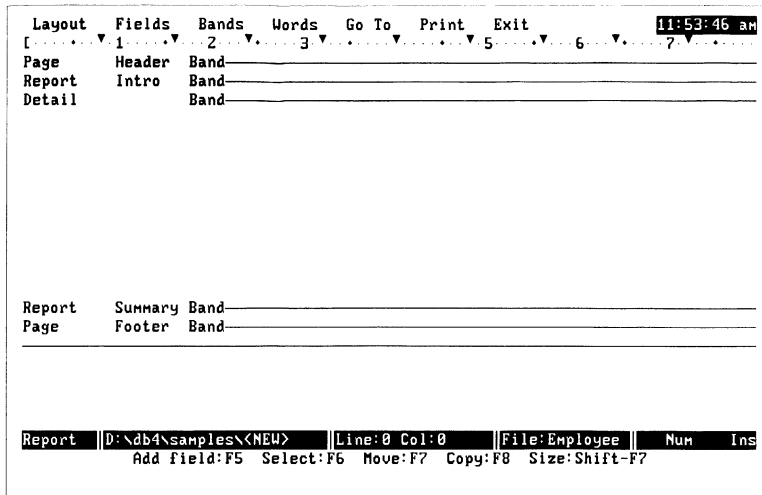


Figure 11-3 Mailmerge work surface

The mailmerge screen consists of several bands. All the bands are closed except the detail band. Although you can open and use the other bands, the detail band is the only band you must use when creating a mailmerge document. As you enter text, the detail band expands to accept all the text you enter.

Setting Margins

When you first enter the design band of a newly created form, the left margin is set at 0 and the right margin at 254. To reset the margins:

1. Press **Alt-W** to open the **Words** menu.
2. Select **Modify ruler**. The cursor moves into the ruler at the top of the screen.
3. Press **Tab** or **→** to position the cursor where you want the right margin.
4. Type **]** to mark the right margin.
5. To reset the left margin, move to where you want the left margin and type **[**.
6. Press **Ctrl-End** to save the settings. The cursor moves back to the detail band.



TIP

Margin settings will apply only to the line that the cursor is on. When starting to enter text into the detail band, it is best to delete all but one line from the detail band before setting margins.

Entering Text and Fields

Type the text for a mailmerge form into the detail band as if you were using a word processor. The mailmerge layout uses *word-wrap* mode. Any text you enter is automatically wrapped between the margins, and the text adjusts itself to accommodate any size field you insert.

To end a paragraph or insert a blank line, press ↵ with **Insert** mode on. (If the **Ins** indicator does not appear in the right side of the status bar, press the **Ins** key before attempting to insert a blank line or end a paragraph.) If **Insert** mode is off, pressing ↵ moves the cursor to the next line without inserting a blank line.

You can also read a text file created with a word processor into the detail band. First, save the file as an ASCII text file. In the mailmerge layout, position the cursor where you want the text to start and select the **Write/read text file** option from the **Words** menu. Then select **Read text from file**. Enter the name of the text file in response to the prompt. dBASE IV reads the file into the band.



NOTE

A text file that you read into the detail band cannot be larger than 30 kilobytes.

Inserting Fields

You can insert a field at any time while typing the text of a document.

1. Position the cursor where you want to insert a field. Then press **F5 Field**, or select **Add field** from the **Fields** menu, to display a list of field names, as shown in Figure 11-4.

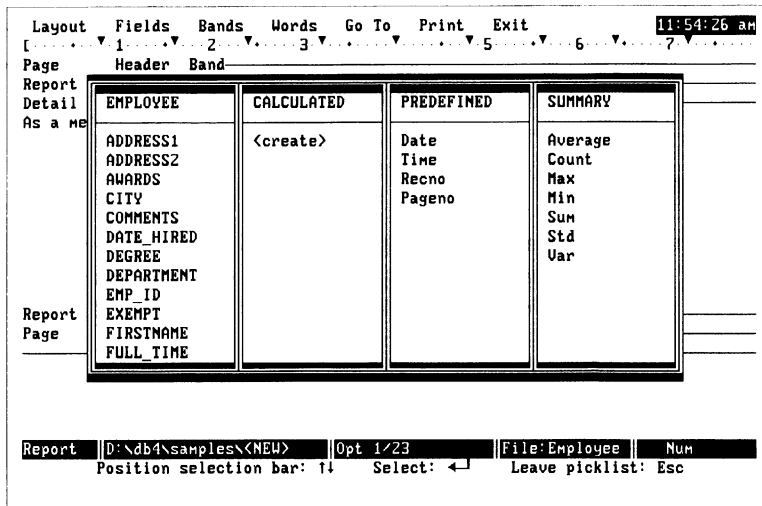


Figure 11-4 Field names

2. Highlight the field you want and press ↵.
3. Press **Ctrl-End**.

The template for the field appears. A field template shows the width of the field and the type of data it contains. For example, a character field appears as a series of Xs (XXXXXXXXXXXX), a date field as MM/DD/YY, a logical field as Y, and a numerical field as a series of 9s (99999).

Inserting a Page Break

dBASE IV automatically begins a new page when the number of lines specified in the **Page length** option in the **Print** menu has been exceeded.

To insert a page break manually:

1. Move the cursor to where you want the page break.
2. Press **Alt-W** to access the **Words** menu.
3. Select **Insert page break**.

A line of dashes appears at the specified point to indicate the page break.

Using Other Bands

To create a mailmerge document, you must enter text into the detail band. You can also enter text or fields into the other bands on the reports design screen. If your mailmerge document contains many pages, for example, you might want it to have a header or a footer with a page number.

To enter information into another band, move the cursor to the band border, press **↵** to open the band, and press **↓** to move inside the band.

See Chapter 10 for a detailed description of how to use bands.

Using Other Text-Editing Functions

When you enter text using the mailmerge layout (or in any word-wrap band), you can use any of the editing functions available in the dBASE IV text editor. For example, you can move or copy text, set paragraph indentation, set tab positions, or use any editing key. See Chapter 15 to learn about these editing functions.



NOTE

When using the mailmerge layout, you cannot draw boxes or vertical lines.

Saving a Mailmerge Layout

You can save a mailmerge layout to print documents at another time:

1. Press **Alt-E** to access the **Exit** menu.
2. Press **↵** to select **Save Changes and Exit**. dBASE IV prompts for a filename.
3. Type a valid filename and press **↵**.

The Control Center appears and the filename entered in step 2 appears in the **Reports** panel.

Viewing Mailmerge Documents

To view mailmerge documents on the screen before printing:

1. Press **Alt-P** to access the **Printer** menu.
2. Select **View report on screen**.

Press **Spacebar** to display the next screenful of data. Press **Esc** to cancel.

Suppressing Blank Lines

A line that contains only blank fields and no text will not be printed. It is automatically collapsed and the line below it moves up.

Printing Mailmerge Documents

You can print a mailmerge document from the reports design screen or the Control Center. Before printing, verify that the form (.frg) file has been created.

To print from the reports design screen:

1. Press **Alt-P** to access the **Print** menu.
2. Press **↓** to begin printing.

To print from the Control Center:

1. Highlight the name of the report in the **Reports** panel. Press **↓**.
2. Select **Print Report**.
3. Select **Begin Printing**.

The **Print** menu contains options such as setting the print size and the page dimensions. They are discussed in Chapter 13.

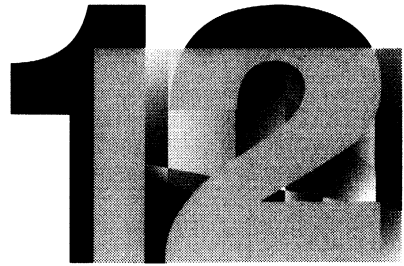
Printing Single Sheets

If your printer uses continuous form paper and you want to print on letterhead or standard office paper, follow these steps:

1. Press **Alt-P** to access the **Print** menu.
2. Select **Control of printer**.
3. Select **Wait between pages**.
4. If necessary, press **Spacebar** to set the **Wait between pages** option to **YES**.
5. Press **Esc** to return to the **Print** menu.

dBASE IV will pause after each page and wait for you to insert the next page.

Creating Labels



One of the most useful capabilities of dBASE IV is its ability to print labels from data stored in a database file or view. You can create mailing labels or other types of labels, such as name badges, hospital medication stickers, and shipping tags. You can also print envelopes.

This chapter includes information about the following topics:

- Accessing the labels design screen
- Entering text and fields
- Saving a label format
- Viewing labels
- Sorting labels before printing
- Printing labels
- Using labels from dBASE III PLUS

Accessing the Labels Design Screen

Create and modify labels on the *labels design screen*. You can access the labels design screen from the Control Center or the dot prompt. To create a new label from the Control Center:

1. Highlight the database file or view you want to use. Press ↵.
2. Select **Use file** or **Use view**. If **Instruct** is ON, the database file or view appears above the line in the Control Center.
3. Highlight the **<create>** marker in the **Labels** panel and press ↵. The labels design screen appears, as shown in Figure 12-1.

To create a new label from the dot prompt, use the CREATE LABEL command.

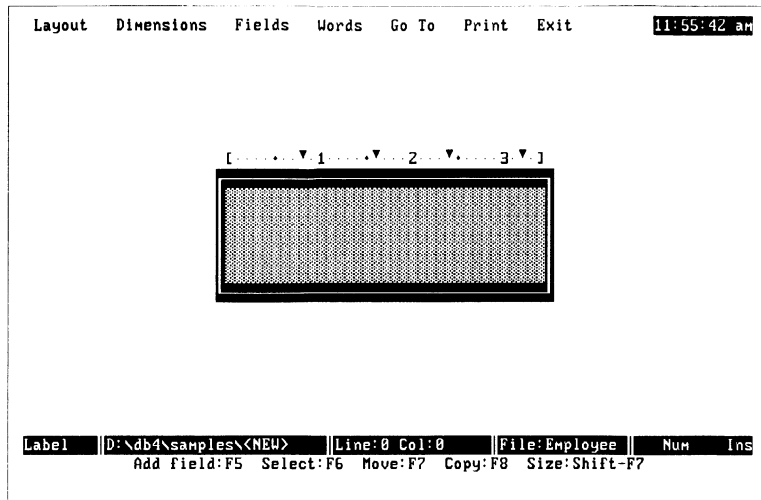


Figure 12-1 Labels design screen

To modify an existing label from the Control Center:

1. Highlight the name of the label in the **Labels** panel. If **Instruct** is ON, press **↵** and the panel prompt box displays.
2. Select **Modify layout**. The labels design screen appears.

To modify an existing label from the dot prompt, use the **MODIFY LABEL** command.

Use **Shift-F2 Design** as a shortcut to the design screen. Highlight the **<create>** marker or the name of an existing label and press **Shift-F2 Design** to display the labels design screen. This works whether **Instruct** is ON or OFF.



NOTE

If you choose to modify a label that does not normally use the current database file or view, a prompt box appears for you to choose between the current database file or view and the one normally associated with the label.

If you choose the current database file or view, you receive a warning if fields needed by the label cannot be found in this file or view.

Entering Text and Fields

You can enter text and place fields on the labels design screen. Text is printed on each label exactly as you type it. Data from a record of a database file or view is printed where you placed the fields in the layout. One label prints for each record.

Press **F10 Menus** to access the menu bar at the top of the screen, or hold down the **Alt** key while you type the first letter of a menu name.

Use the ruler line, just above the work surface, to set margins, tab stops, and paragraph indentations.

While working on the labels design screen, you can use any of the standard cursor movement and editing keys found in the dBASE IV text editor. See Chapter 15 for a complete description of these keys.

Setting Label Dimensions

Default margins are set for a common label size that measures 15/16-inch tall by 3 1/2 inches wide. The default page layout prints one label across. To change these default settings, press **Alt-D** to open the **Dimensions** menu shown in Figure 12-2.

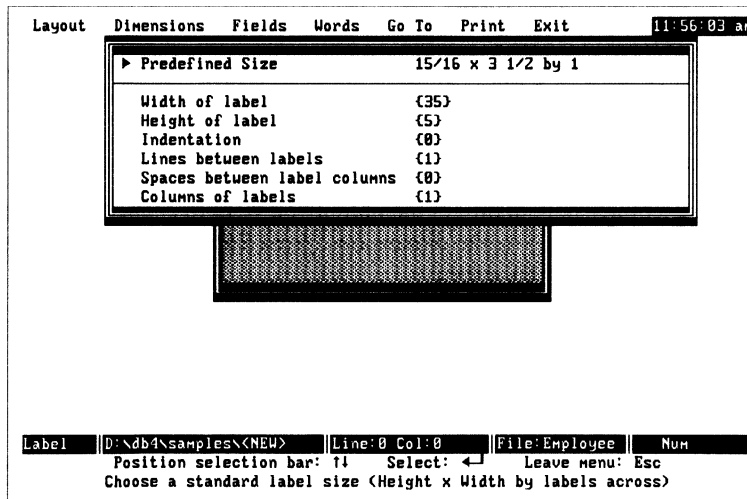


Figure 12-2 **Dimensions** menu

Select the **Predefined Size** option to open a menu of standard sizes, as illustrated in Figure 12-3.

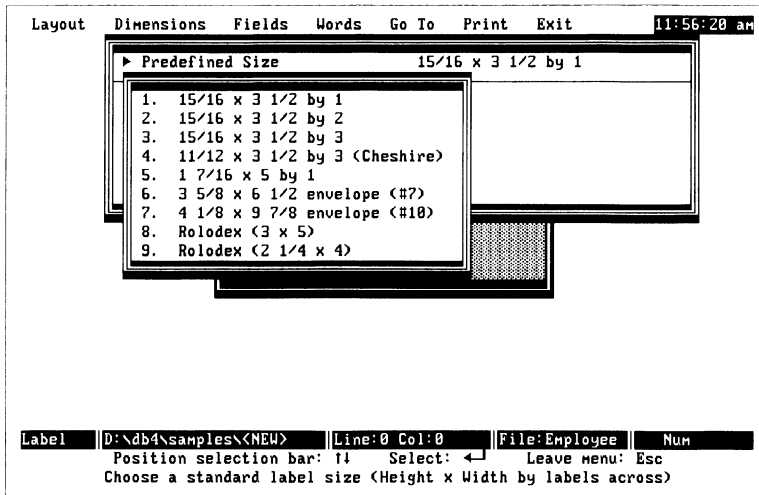


Figure 12-3 **Predefined label size** menu

Each label size option shows the height and width of the label and the number of labels across the page. Type the number to the left of the option you want. The labels design screen appears and the dimensions are saved. Table 12-1 explains the dimensions on this menu.

To change a dimension, highlight the option you want to change, press **↓**, and enter the correct one. After changing the dimensions, press **Esc** or **Ctrl-End** to save them and to return to the labels design screen.

Table 12-1 **Dimensions** menu options

Option	Description
Width of label	Specifies the width of the label in total characters. This option assumes you are using a Pica font (10 characters per inch). If you are printing with Elite or Condensed, increase the Width of label setting as needed. Maximum width is 255 characters.
Height of label	Specifies the height of the label in printed lines and assumes your printer is set to six lines per inch. If your printer is set differently, adjust this number accordingly. Maximum height is 255 lines.

(continued)

Table 12-1 **Dimensions** menu options (continued)

Option	Description
Indentation	Modifies how far the printer indents from the left. It is added to the beginning print position as set by the Offset from left option on the Print menu's Page dimensions menu. Indentation can be from 0 to 254.
Lines between labels	Specifies the number of blank lines between the bottom of one label and the top of the next. This setting can be from 0 to 16 lines.
Spaces between label columns	Specifies the number of spaces between the right side of one label and the left side of the next. The maximum varies depending on the columns of labels and the indentation. The total of the following cannot exceed 254: width of label times the columns of labels, plus the spaces between each label minus one, plus the indentation.
Columns of labels	Specifies how many labels to print in each row. This setting can be from 1 to 15.

Figure 12-4 illustrates the areas on a page of printed labels that are affected by these options.

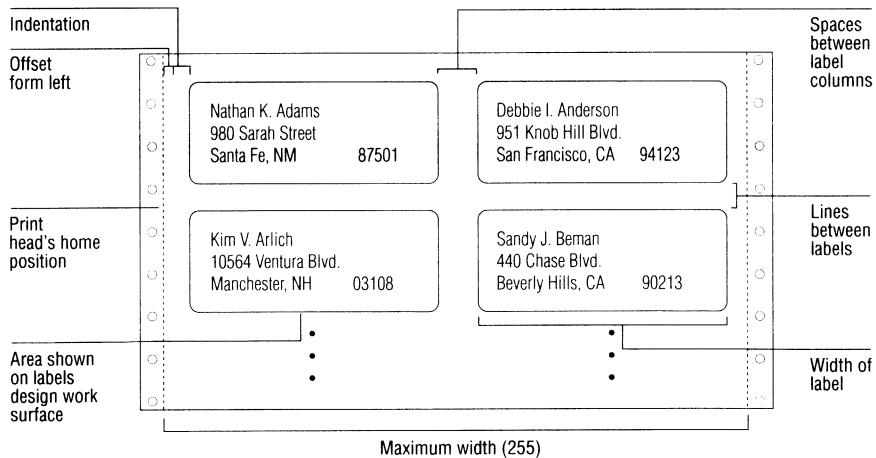


Figure 12-4 Printed labels

Adding Text

To add text to a label, move the cursor to where you want the text, and type it in.

You can create labels that contain nothing but text. To do this, you must open a database file or view even though you will not place any field from it on the labels. You might do this to create return address labels. You can create as many text-only labels as there are records in the file. Adjust the total number by changing the **End after page** or **Number of copies** option of the **Output options** submenu of the **Print** menu.

Adding Fields

To place on the screen the individual fields that will print on the label:

1. Move the cursor to where you want a field to start.
2. Press **F5 Field**. A list appears like that in Figure 12-5.

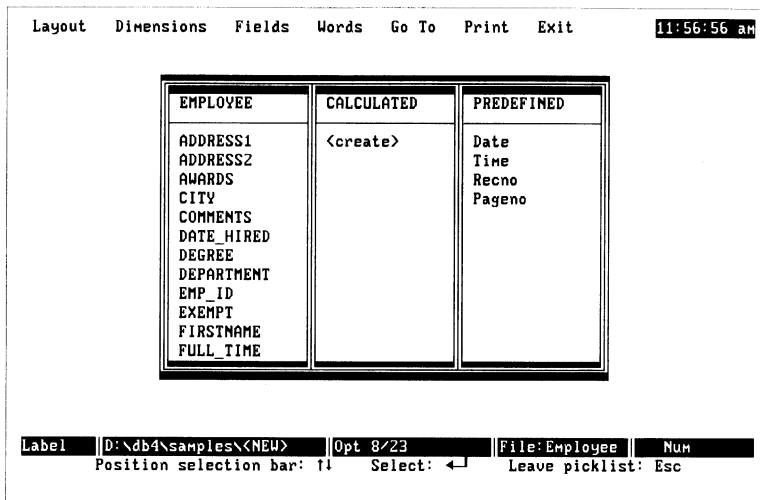


Figure 12-5 Fields list

3. Highlight the field you want and press **↵**.

If you selected the **<create>** marker from the **CALCULATED** column, you are prompted to enter an expression. If you selected a field from the **PREDEFINED** column, choose from the current data, time, page, or record number.

If you selected a field from the left column, which lists fields from the selected database file or view, a field definition menu appears as shown in Figure 12-6. Enter the required information.



Figure 12-6 Field definition menu



NOTE

For information about using the **Load field program** option of the **Add field** submenu of the **Fields** menu to launch a new program, refer to Chapter 17 of Programming in dBASE IV.

4. Press **Ctrl-End**. The templates for the selected fields appear on the screen, as shown in Figure 12-7.

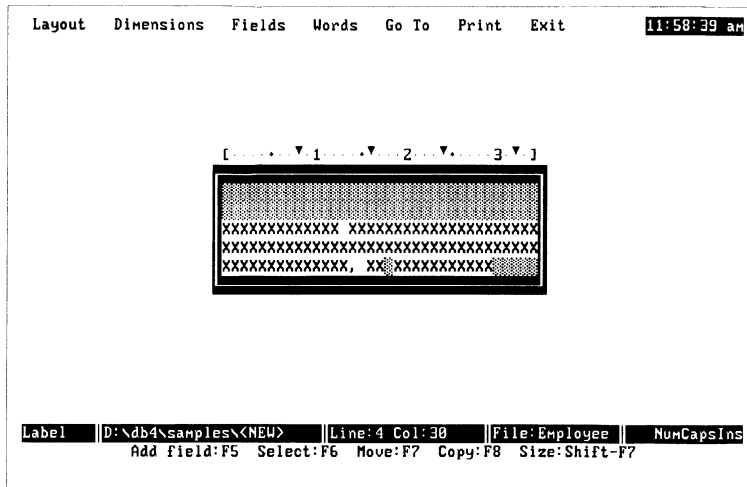


Figure 12-7 Templates placed on a mailing label

A field template shows the width of a field, where it will be printed, and the type of data it contains. For example, a character field appears as a series of Xs (XXXXXXXXXX), a date field as MM/DD/YY, a logical field as Y, and a numerical field as a series of 9s (99999).

Using Spaces in Labels

When you place a field on the labels design screen, dBASE IV automatically assigns the **Trim** picture function (denoted by the letter T in Figure 12-6). The **Trim** function removes blank spaces before and after a field's data when it prints.

For example, Figure 12-7 shows the design for a label that prints data from a database's City, State, and Zip fields. Because the City field has the **Trim** function, the comma always prints just after the name of each city, no matter how long or short that name is. Similarly, you can reserve exactly one space between the comma and the state abbreviation by pressing **Spacebar** to place a blank space on the screen and then adding the State field.

The label design shown in Figure 12-7 uses no spaces between the State and Zip fields. Instead, the two fields are separated by empty work surface. When you use empty work surface to separate the fields, then the position of the second field is fixed. A field with empty work surface immediately preceding it is not affected if the field before it is extra long or short. Figure 12-4 shows the labels printed by the design in Figure 12-7.

The city and state are printed as a unit with the state's position adjusting to the length of the City field. The Zip field, on the other hand, appears in the same place on each label. This is because it is separated from the State field by empty work surface.

Using Other Capabilities

When creating a label design, you can use alternate print styles (such as boldface and italic) and add lines and boxes. See Chapter 10 for information on these topics.

Adding a Description

You can optionally add a description for the label format. The description appears on the Description line of the Control Center when you highlight the label name.

To add a description to the label format:

1. From the labels design screen, press **Alt-L** to select the **Layout** menu.
2. Select **Edit description of label**.
3. Type a description for the label, such as "Small mailing label, 2 across." Press **↵**.
4. Save the label format as described below.

Saving a Label Format

Any saved label format can be used to print labels at another time or can be modified to create a label with different content or format. To save a label format:

1. From the labels design screen, press **Alt-E** to select the **Exit** menu.
2. Select **Save changes and exit** or press **Ctrl-↵**. If this is the first time you have saved this file, continue with step 3. If you have saved this label format before and given it a name, the Control Center appears.
3. When dBASE IV displays the **Save as:** prompt, type a valid filename and press **↵**. The Control Center appears and the filename you entered appears in the **Labels** panel.

Viewing Labels

To view labels on screen:

1. From the labels design screen, press **Alt-P** to access the **Print** menu.
2. Select **View labels on screen**.

Press **Esc** to cancel or **Spacebar** to display the next full screen of data.

Sorting Labels Before Printing

You can sort labels on any field in the label. To sort labels:

1. From the Control Center, highlight the database file in the **Data** panel and press **Shift-F2 Data**. The database design screen appears with the **Organize** menu open.
2. Select **Order records by index**.
3. Highlight the field you want to sort by and press ↵.
4. Press **Alt-E** to access the **Exit** menu.
5. Select **Save changes and exit**.

Printing Labels

Before printing labels, check the alignment between your labels, printer, and label design. dBASE IV includes an option that sends a sample label, consisting of rows of Xs, to the printer. Make sure the label is printing properly before printing the whole job.

To generate sample labels:

1. If you are using a dot matrix or daisy wheel printer, insert the labels into your printer and move the top line of the label near the printer head.
2. From the labels design screen, press **Alt-P** to access the **Print** menu.
3. Select **Generate sample labels**. dBASE IV prints a label.

If you are printing more than one label in a row, this option prints a row of labels. dBASE IV then asks if you want to see another row of sample labels. You may continue printing sample labels until your alignment is correct. When you indicate that the sample labels are printing satisfactorily, dBASE IV starts printing the labels from the beginning of your database file or view.

See Chapter 13 for information on other **Print** menu options.

Using Labels from dBASE III PLUS

You can print labels developed with dBASE III PLUS directly in dBASE IV. If you need to change the layout of these labels, you can import them by choosing **Add file to catalog** from the Control Center's **Catalog** menu. Then place the labels on the labels design screen.

dBASE III PLUS labels are converted to dBASE IV labels by using the proper field templates whenever possible. When this is not possible, the dBASE III PLUS expressions are converted into calculated fields.

Control Center Tools

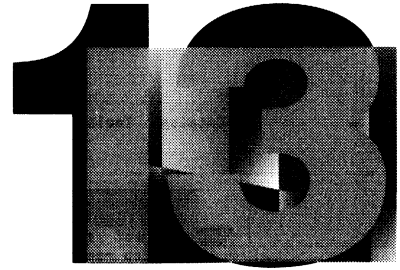
Printing

Using the Tools Menu

Using the Program Editor

dBASE II Convert

Printing



Previous chapters have discussed how to create reports, mailmerge documents, and labels. When you print any of these, the **Print** menu appears. You see the same menu when printing a Quick Report, the structure of a database file, or a program. Use the options on the **Print** menu to control the appearance of a report and the operation of your printer. This chapter discusses:

- Accessing the **Print** menu
- Printing reports, file structures, and programs
- Ejecting a page
- Cancelling and pausing printing
- Viewing reports and labels before printing
- Printing sample labels
- Saving and reusing print settings
- Specifying the output destination
- Changing print settings
- Special printing requests

Accessing the Print Menu

You can reach the **Print** menu in any of these ways:

- Press **⌘** on a filename in the **Reports** or **Labels** panels of the Control Center. If the panel prompt box appears, select **Print report** or **Print label**.
- Press **Shift-F9 Quick Report** when the cursor is on the name of a file in any Control Center panel except **Applications**.
- Press **Alt-P** when designing a report, label, or program.
- Press **Shift-F9 Quick Report** from the Browse/Edit screen or the queries design screen. (This works only if you came to these screens directly from the Control Center or dot prompt.)

Figure 13-1 illustrates the **Print** menu.

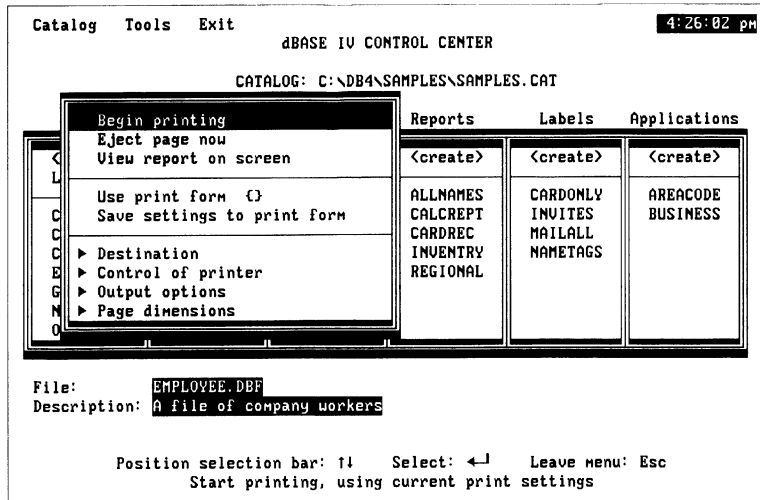


Figure 13-1 Print menu

Printing a Quick Report

dBASE IV provides a fast and easy way to print basic reports. These *Quick Reports* organize and print data from the current database file or view or from the database file or view associated with a form, report, or label.

To print a Quick Report:

1. Press **Shift-F9 Quick Report** from the Control Center, the Browse/Edit screen, or the queries design screen. A **Print** menu appears.
2. Use the **Destination**, **Control of printer**, **Output options**, and **Page dimensions** options to modify the print defaults, if desired.
3. Choose the the **Begin printing** option to begin printing. To cancel printing, press **Esc**.



NOTE

If you press **Shift-F9 Quick Report** from the reports design screen, dBASE IV beeps (if **SET BELL** is **ON**). To print the report shown on the reports design screen, use the screen's **Print** menu.

**TIP**

*If you use a switch box for your printer, you may get a “Printer not ready” error after choosing **Begin printing**. To bypass this problem, enter **SET PRINTER TO FILE PRN** at the dot prompt. DOS redirects the output to the printer attached to device **LPT1**.*

*(If you get a “File already exists” error after entering the **SET PRINTER** command, enter **SET SAFETY OFF** before entering **SET PRINTER**. Then, enter **SET SAFETY ON**.)*

Printing the Structure of a Database File

To print the structure of a database file from the database design screen:

1. Press **Alt-L** to select the **Layout** menu.
2. Type **P** to select the **Print database structure** option.

The **Print** menu appears, and you can change printing attributes before printing the database structure.

To print from the Control Center:

1. Highlight the name of the file in the **Data** panel whose structure you want to print.
2. Press **Shift-F2**. The database design screen appears with the **Organize** menu open.
3. Press **←** to access the **Layout** menu and press **↓** twice.

Figure 13-2 shows a printed database structure.

```

Structure for database: C:\DBASE \SAMPLES\EMPLOYEE.DBF
Number of data records: 47
Date of Last update : 11/22/88

```

Field	Field Name	Type	Width	Dec	Index
1	LASTNAME	Character	15		N
2	FIRSTNAME	Character	10		Y
3	INITIAL	Character	1		N
4	DEPARTMENT	Character	15		N
5	EMP_ID	Character	11		N
6	PHONE	Character	13		N
7	SPECIALTY	Character	11		N
8	COMMENTS	Character	40		N
9	AWARDS	Character	15		N
10	DATE_HIRED	Date	8		N
11	DEGREE	Character	3		N
12	EXEMPT	Logical	1		N
13	FULL_TIME	Logical	1		N
14	LABORGRADE	Numeric	1		N
15	RATE	Numeric	4	1	N
16	SALARY	Numeric	9		N
17	TITLE	Character	15		N
18	YRS_EXPER	Numeric	4	1	N
19	ADDRESS1	Character	20		N
20	ADDRESS2	Character	20		N
21	CITY	Character	14		Y
22	STATE	Character	2		N
23	ZIP	Character	10		N
**	Total	**	244		

Figure 13-2 Printed database structure

Printing a Program

Use the **Print** menu in the program editor to print programs. Set the **Line numbers** option **ON** to print line numbers to the left of each line.

See Chapter 15 for more information about the program editor.

Ejecting a Page

Before printing on a dot matrix or daisy wheel printer, the paper must be aligned to begin and end printing at the perforations. Check the alignment whenever you change paper, have a paper jam, or manually turn the platen to remove paper.

Once the paper is aligned correctly, use the **Eject page now** option on the **Print** menu to move the paper to the top of the next page.

You can also eject pages at specified locations by selecting the **New page** option from the **Control of printer** menu. For more information, see the Ejecting Pages Automatically section later in this chapter.

Canceling and Pausing Printing

Press **Esc** to cancel printing. Press **Ctrl-S** to halt printing temporarily. Press any key to resume printing after pressing **Ctrl-S**.

If your printer has an internal buffer, the printer may not respond immediately to your request. To clear the buffer after dBASE IV stops sending data, press the printer's **RESET** button or turn the printer off.

If you send a document to a printer attached to a network, your chance to cancel or pause the transmission of data may be brief. The cancel/pause message may appear only for a few seconds. Once dBASE IV transmits a document to a network, you must enter a network-level command to cancel printing.

Viewing Reports and Labels Before Printing

To view reports or labels before printing, select the **View report on screen** or **View labels on screen** option from the **Print** menu. Reports and labels are displayed one screenful at a time. If they are wider than your screen, the text wraps to the next line.

Printing Sample Labels

The **Generate sample labels** option is available only on the **Print** menu of the labels design screen. Use this option to adjust the alignment of your labels with the printer. For more information, see the Printing Labels section in Chapter 12.

Saving and Reusing Print Settings

A print form contains print menu settings. Once you save print menu settings to a print form, you can use the print form at any time. You do not need to manually recreate the same print menu settings each time you use a report. You can even use a print form for creating a report in a different report or a label. You can, for example, save the settings for a report that requires special printer control codes and is always printed in triplicate, and use these settings at a later time in the same report, a different report, or a label.

By default, print forms are given the name of the report or label and a .prf extension. The default print form for reports is Report.prf. The default print form for labels is Label.prf. To customize either form for your printer or to change the default settings, use the **Use print form** option of the **Print** menu to select the form and then use the other **Print** options to change settings. Use the **Save settings to print form** to save the new settings.

The *first* time you alter the standard print settings while on the reports or labels design screen and then save the report or label, dBASE IV asks if you want to save these new settings to a print form.



NOTE

*The four options you can change without being asked to save the changes are: **Echo to screen, Begin on page, End after page, and Number of copies.***

dBASE IV does not ask you if you want to save print settings after the first save. You must select **Save settings to print form** to save new settings.

Saving and Naming Print Forms

Once you have created a print form, you can change the settings for that print form. To save a new setting to the current print form:

1. Change the **Print** menu settings as desired.
2. Select **Save settings to print form**. A prompt box appears.
3. Press ↵ if you want to save the changes to the current form.

If you want to change the name and store the settings to a new print form, backspace over the current print form name and type in a new one. Press ↵. You do not have to add the .prf extension because dBASE IV does that automatically.

4. If you have changed the settings of an existing print form, a prompt box appears (if SET SAFETY is ON). Highlight **Overwrite** and press ↵ to change the old settings.

Reusing a Print Form

To use a previously saved print form as the current print form:

1. Select the **Use print form** option on the **Print** menu to use a previously saved print form. A menu of print forms appears.
2. Select the print form you want and press ↵. The name of the print form appears in the **Print** menu.

Setting the Default Print Form

The default print form is the print form automatically loaded when you open a **Print** menu at the Control Center or the design screen. To make a print form the default, save the print settings to a print form and then save the layout of the design screen.



NOTE

You can only make a print form the default from the design screens. You cannot make a print form the default from the Control Center. Default print forms are not recognized at the dot prompt or in programs. You must use the `_pform` system memory variable to designate a print form. Refer to Chapter 5 of Language Reference.

Specifying the Output Destination

You can send output to a printer or to a file on disk. You can also display the file on screen as it prints.

Sending Output to a Printer

To send output to a printer:

1. Select the **Destination** option from the **Print** menu. A menu appears.
2. Highlight the **Write to** option, and press `↓` to select **PRINTER**, if it is not already displayed.
3. Highlight **Printer model** and press `↓` to scroll through the choices and select a printer.

The printers shown here include those you installed using DBSETUP. They are recorded in Config.db, and their names can be edited for more readable display. See Chapter 2 of *Getting Started with dBASE IV* for information about installing printer drivers.

The printer drivers for **ASCII Text** and **Generic** are also available. Select **ASCII Text** to send a file by a form of electronic mail that cannot handle printer control codes or to create a file that uses only the most common printer codes.

If you install another printer driver by setting the `_pdriver` memory variable at the dot prompt, the name of this driver also appears in the printer model list.

4. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

Sending Output to a DOS File

To send output to a DOS file:

1. Select the **Destination** option from the **Print** menu. A menu appears.
2. Highlight the **Write to** option, and press `↓` to select **DOS FILE**, if it is not already displayed.

3. Highlight **Name of DOS file** and press ↵. dBASE IV suggests a name based on the name of the report or label. The extension of the suggested name is *.prt*. If you choose **ASCII text** with the **Printer model** option, the suggested extension is *.txt*.
Accept the suggested name, or type a new one and press ↵.
4. Highlight **Printer model** and press ↵ to scroll through the choices and select a printer. The **Printer model** option embeds control codes in the file for printing later on the selected printer.
5. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

You can print the report or label later with the DOS PRINT or COPY commands (for example, you can enter *COPY Myfile.prt /B PRN* at the DOS prompt to print *Myfile.prt*). Or you can edit and print the file later with a text editor or word processor.

To create a print file without any control codes, select the *Ascii.pr2* printer driver under **Printer model**.

Displaying Output While Printing

To display output on screen while it is printing:

1. Select the **Destination** option from the **Print** menu.
2. Highlight the **Echo to screen** option, and press ↵ to select **YES**.
3. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

The report or label is formatted for the printer and may appear different on screen from the way it prints out.

Changing Print Settings

This section describes the print settings, including:

- setting print size
- setting print quality
- changing fonts
- ejecting pages automatically
- printing single sheets
- specifying the type of page advancing
- specifying printer control codes

Setting Print Size

You can control the pitch (horizontal spacing) of the characters in your printed reports. You have four choices: **PICA**, **ELITE**, **CONDENSED**, and **DEFAULT**.

PICA prints 10 characters per inch, the largest print size. **ELITE** prints 12 characters per inch. **CONDENSED** prints even smaller, with the number of characters per inch between 16 and 20 depending on your printer. **DEFAULT** uses the pitch set by switches on your printer.

If your printed data wraps to a new line when using a dot matrix printer or is truncated when using a laser printer, the selection of a smaller pitch might help you fit all the columns on a page.

To change the pitch of printed characters:

1. From the **Print** menu, type C to select the **Control of printer** option. A menu appears.
2. Press **Spacebar**, **↓**, or **T** to cycle through the **Text pitch** options.
3. When the pitch you want appears, press **Esc** or **Ctrl-End** to return to the **Print** menu.

Changing the pitch of printed characters does not change the way characters appear on screen. All characters occupy the same space.



NOTE

*Printer settings that affect print size, quality, and style are dependent upon the capabilities of your printer and printer driver. Setting the **Text pitch** option to **CONDENSED** while **ASCII Text** is selected does not produce condensed print.*

Setting Print Quality

Some dot-matrix printers have a *near letter quality* mode that prints text slower and produces a high-quality print. If your printer supports this mode, you can select it by following these steps:

1. From the **Print** menu, type C to select the **Control of printer** option. A menu appears.
2. Type Q to highlight the **Quality print** option.
3. Press **Spacebar**, **↓**, or **Q** to cycle through the options. Select **YES** to produce quality print or **NO** to produce a faster draft-quality print. The **DEFAULT** choice uses the quality set by switches on your printer.
4. Press **Esc** to return to the **Print** menu.

Many laser printers may not support **Quality print** mode. For these printers, the option should be set to **NO**.

Changing Fonts

Some printers, such as laser printers, support *fonts*, such as Times Roman or Helvetica. You can establish special fonts by including commands in your Config.db file. See Chapter 2 of *Getting Started with dBASE IV* for more information.

The font settings you establish appear as numbered entries below the horizontal line on the **Style** menu. To change fonts from the reports design screen:

1. Press **Alt-W** to select the **Words** menu.
2. Select the **Style** option.
3. Enter the number of the font you want.
4. Press **Esc** or **Ctrl-End** to return to the **Words** menu.



NOTE

- *You cannot access the **Words** menu by using **Shift-F9 Quick Report**. You can only apply fonts in the design screen. To change fonts, go to the reports design screen and create a report with the **Quick layout** option. Adjust the fonts as desired.*
- *Additional fonts are displayed only if you've already specified the printer using the **Printer model** option of the **Print** menu's **Destination** menu.*

Ejecting Pages Automatically

dBASE IV can automatically eject a blank page before printing a report, after printing, both before and after printing, or not at all.

To control automatic page ejection:

1. From the **Print** menu, type C to select the **Control of printer** option. A menu appears.
2. Type N to select the **New page** option.
3. Press **Spacebar** or **↵** to select **BEFORE**, **AFTER**, **BOTH**, or **NONE**.
4. Press **Esc** or **Ctrl-End** to return to the **Print** menu.



NOTE

- *If you are using an Apple LaserWriter (or compatible PostScript printer), you must set **New page** to **AFTER** to properly eject pages.*

Printing Single Sheets

If you need to print on single, hand-fed sheets you must tell the printer to pause after each page:

1. From the **Print** menu, select **Control of printer**. A menu appears.
2. Select **Wait between pages**.
3. Press \downarrow to cycle through the options. Select **Yes**.
4. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

dBASE IV will prompt you to insert the next page and confirm that you are ready to print.

Specifying the Type of Page Advancing

dBASE IV can start new pages with form feeds or line feeds. The **FORM FEED** option tells the printer to start a new page by sending a form feed character to the printer. The **LINE FEEDS** option tells the printer to advance to the top of the next page by sending the precise number of line feeds needed to fill out the page length.

If you have an older printer that doesn't support form feeds, use the **LINE FEEDS** option to perform a form feed.

Specifying Printer Control Codes

dBASE IV does not provide a menu option for all the print features built in to every printer. However, you can access features supported by your printer that are not on the **Print** menu by using your printer's control codes. These codes are not the same for all printers. The manual that came with your printer should list these codes. Typically, they look like {CTRL-M} and {ESC}H. If your printer control code is ESC&K25, enter {ESC}&K25.

You can specify printer control codes to take effect just before printing and immediately after. A starting control code might, for example, tell the printer to print in landscape mode (horizontally), and the ending control code might revert to portrait mode (vertically). Starting control codes apply to the entire report. You cannot change from landscape to portrait mode in the middle of a report.

To specify the starting and ending control codes:

1. From the **Print** menu, select **Control of printer**. A menu appears.
2. Select **Starting control codes**.
3. In response to the **Enter a string** prompt, type the starting control codes. Press \downarrow .
4. Select **Ending control codes**.

5. In response to the **Enter a string** prompt, type the ending control codes. Press ↵.
6. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

See the ASCII chart in Appendix E of *Language Reference* for a list of the special characters used with escape codes.



NOTE

dBASE III PLUS conventions for sending control codes to printers do not apply here as they do at the dot prompt or within a program. Non-printable characters such as Escape are expressed as {ESC} or {27}, not as CHR(27). Quotes are not necessary to delimit printer control code sequences.

Special Printing Requests

This section describes special printing requests, including:

- printing multiple copies
- printing specific pages
- specifying the first page number
- setting page dimensions

Printing Multiple Copies

To print more than one copy of a report:

1. From the **Print** menu, type O to select **Output options**. A menu appears.
2. Type N to select the **Number of copies** option.
3. Enter the number of copies you want to print.
4. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

Printing Specific Pages

To print a specific page of a report or a range of pages:

1. From the **Print** menu, select **Output options**. A menu appears.
2. Select **Begin on page**.
3. Enter the number of the first page you want to print and press ↵.
4. Select **End after page**.

5. Enter the number of the last page you want to print and press ↵. If you want to print only one page, enter the same number in this field that you entered in the **Begin on page** field.
6. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

Specifying the First Page Number

You can control the page number printed on the first page of your report. This is important if a document is the continuation of a previously printed document and you want to combine them. For example, if your first document ends on page 39, you can begin the second document on page 40.

To specify the starting page number for a report:

1. From the **Print** menu, select **Output options**.
2. Select the **First page number** field.
3. Enter the number you want printed on the first page of your report and press ↵.

Setting Page Dimensions

Define how text is placed on a report by setting the page length, margins, and line spacing. Figure 13-3 shows the attributes you can change.

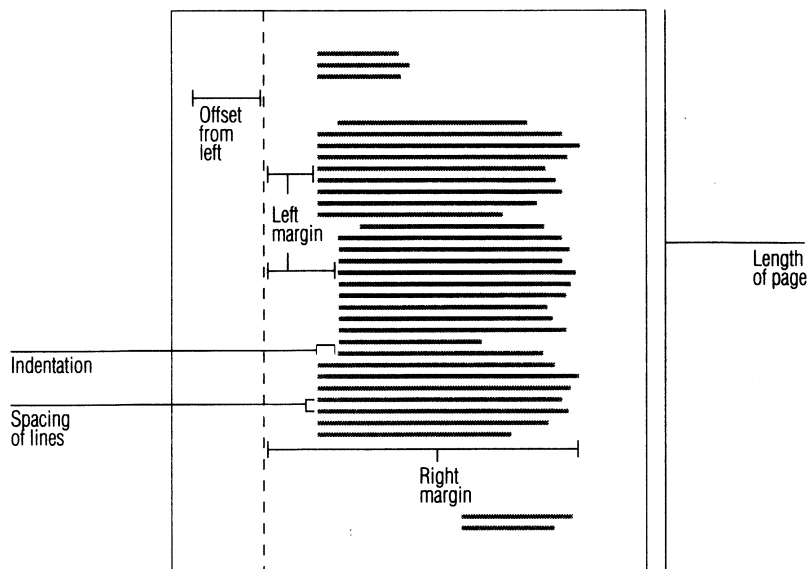


Figure 13-3 Schematic of a printed page

dBASE IV provides three options in the **Page dimensions** menu to define these attributes.

The **Length of page** option defines the height of a page by the number of single-spaced lines that can fit on it. A typical sheet of paper usually has room for 66 lines providing the vertical line spacing on your printer is set to six lines per inch. Change the number of lines if you print using a different line spacing. For example, set the **Length of page** option to 88 if your vertical line spacing is eight lines per inch and you are printing on standard 11-inch paper. You can, however, make this setting as large as 32,767 lines.

If you set **Length of page** to something other than 66 (or 60, on some laser printers) to print on irregular-size paper, set **Advance page using** to **LINE FEEDS** or dBASE IV may not honor the new page length. For example, when printing on 8-inch-high paper, set **Length of page** to 48 and **Advance page using** to **LINE FEEDS**.

The **Offset from left** option tells dBASE IV where to start printing horizontally on the page. It establishes where the first column for report layout bands and labels appears. In word wrap mode, the position of the first printed column is the sum of this left offset and the left margin set on the ruler. For example, if you want the first characters to appear 10 spaces from the edge of the paper, you could have a left offset of 10 and a left margin on the word wrap ruler of zero. You could also have a left offset of five and a left margin of five. The maximum setting available is 254.

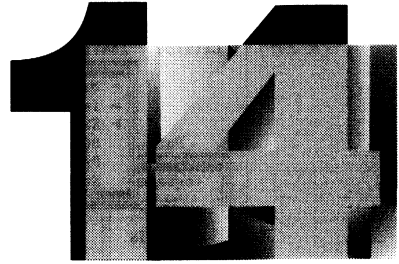
The **Spacing of lines** option controls the spacing between printed lines. You can choose among **single**, **double**, or **triple**.

To set a page dimension option:

1. From the **Print** menu, select **Page dimensions**.
2. Highlight the option you want to change. Press **↵**.
3. Change the value and press **↵**.
4. Press **Esc** or **Ctrl-End** to return to the **Print** menu.

Set the left margin, right margin, and indentation with the ruler at the top of the page. For more information, see *Using the Ruler* in Chapter 10.

Using the Tools Menu



dBASE IV provides utilities in the **Tools** menu that can increase your productivity. This chapter describes how to:

- Use keyboard macros
- Import data from and export data to non-dBASE IV files
- Manage files
- Reach the operating system from within dBASE IV
- Change dBASE IV settings and display options
- Restrict access to confidential files using the PROTECT security command
- Customize the way dBASE IV displays and handles data

Accessing the Tools Menu

From the Control Center, select the **Tools** menu by pressing **F10 Menus** and then selecting **Tools** from the menu bar. You can also press **Alt-T** to select the **Tools** menu directly. Figure 14-1 shows the **Tools** menu.

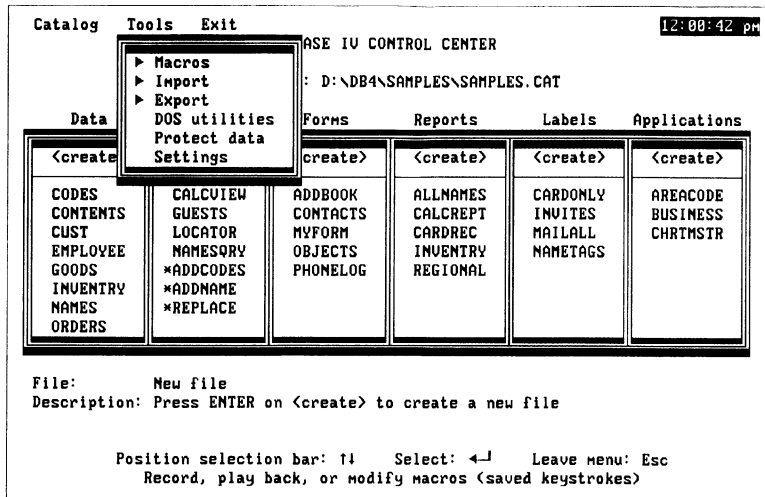


Figure 14-1 Tools menu

Some of the options on the **Tools** menu bring up submenus. Others — **DOS utilities**, **Protect data**, and **Settings** — display new menu bars. When you leave these menu bars, you return directly to the Control Center, rather than to the **Tools** menu.

Using Keyboard Macros

Use keyboard macros to capture repetitive keystrokes and save time. The macro records keystrokes exactly as you enter them.

For example, you can create a macro that would take you to the **DOS utilities** screen, open up the **DOS** menu, select the **Set default drive:directory** option and put the cursor at the end of the text in the box. Or, you can create a macro that selects the **<create>** marker in the **Forms** panel of the Control Center and sets up a Quick Layout. There are many possibilities.

You can also edit keyboard macros and save them in macro *libraries*. Libraries are separate files that contain up to 35 macros, and are used to organize sets of macros. You can change to a different set of macros quickly by loading and unloading macro libraries.



NOTE

A keyboard macro is different from a macro introduced by the & macro substitution function, which you use at the dot prompt or in a dBASE program. See Language Reference for information about the & function.

Creating a Macro

To create a keyboard macro:

1. From the Control Center, press **Alt-T** to open the **Tools** menu.
2. Select the **Macros** option.
3. Select **Begin recording**. The macro display table shown in Figure 14-2 appears. It shows the letters and names of your current macros. The top part of the list shows the macros assigned to function keys. The bottom part shows the macros assigned to the letter keys.

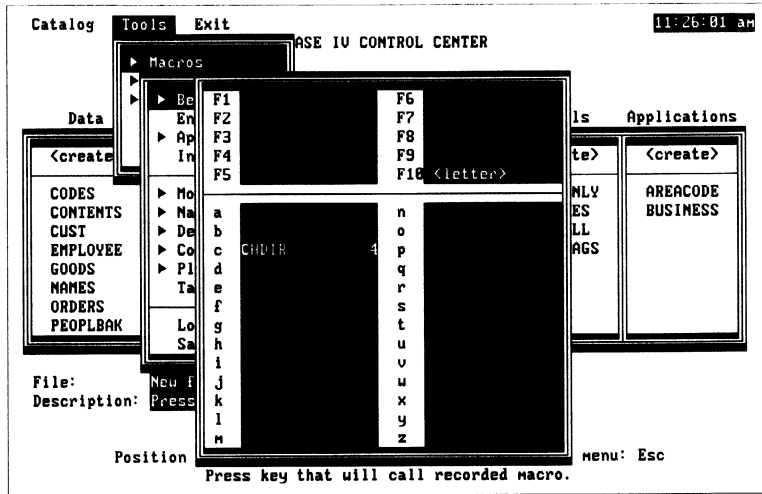


Figure 14-2 Macro display table

4. Press the function key or letter you want to use for the macro. The function key or letter becomes the *macro name*. If you choose a key already used by a macro, you are asked to confirm that you want to overwrite the current macro. The macro display table and the macros menu disappear from the screen.
5. Type the keystrokes for the new macro.
6. When you finish, press **Shift-F10 Macros** followed by the letter **e**. The macro is stored in the current macro library and is ready to be played back in this session of dBASE IV.
7. If you want to use this new macro in future sessions of dBASE IV, save the current macros on disk by selecting **Save library**. After you select this option, enter a valid filename with no extension (dBASE IV uses the extension **.key** to name library files), change the filename that appears, or accept the current macro library's name. Then press **↵** and the library is saved to the default drive and directory. Be aware of where you save your macros.

If you forget what key you assigned to which macro, check the macro display table. In Figure 14-2, the macro table shows the name of a macro, CHDIR, next to the c key (renaming a macro is discussed in the Renaming a Macro section later in this chapter). To the right of the name in the macro display table is the number of keystrokes used to create the macro, which dBASE IV counts automatically.

The CHDIR macro, which selects the **Set drive:directory** option of the **DOS** menu of the **DOS utilities** submenu of the Control Center **Tools** menu, is displayed in Figure 14-3. (To display an existing macro, refer to the Editing a Macro section later in this chapter.)

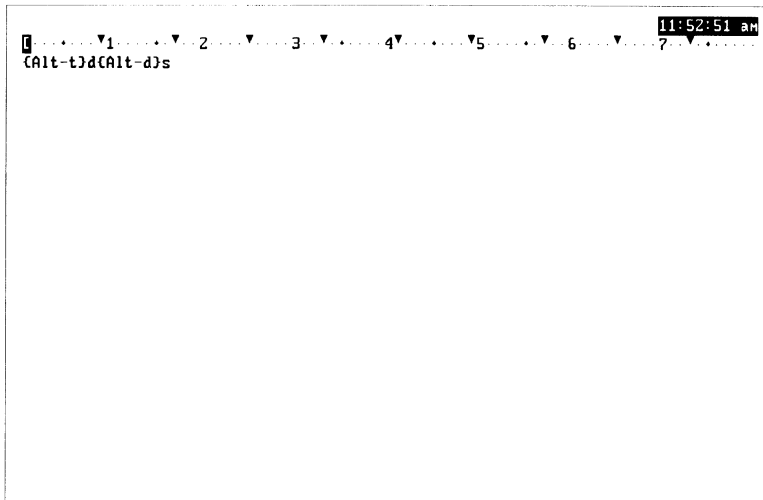


Figure 14-3 Macro example



NOTE

Alt-F10 cannot be assigned a macro, since it is the gateway to the letter macros listed in the bottom part of the macro display table.

Macros play back exactly as they were recorded. Take this into account when creating a keyboard macro. For example, a macro that uses ↓ to reach a particular file in a list will not work if the number of files at the top of the list changes.

There are two ways to make macros as accurate as possible:

- Choose menus and menu options by their first letter. For example, on any screen that has the **Words** menu, the keystrokes **Alt-wwr** select the **Read text from file** option from the **Write/read text file** option on the **Words** menu.

- Spell out all file or field names to be chosen from lists on the screen.

For example, if you are at the Control Center and execute a macro that enters **Alt-CU**samples.cat ↵, you always switch to the Samples catalog if it's on the list of catalogs.

Neither the macro key (**Shift-F10 Macros**) nor any keys pressed while the **Macros** prompt box is on the screen are recorded in macros. You can enter the **Shift-F10 Macros** key into a macro by using the macro editor, available with the **Modify** option.

Running a Macro

You can run a macro from any work surface or menu other than the **Macros** menu. You can run the macros in the top part of the macro display table by holding down **Alt** and pressing the desired function key. Run the macros in the bottom part of the table by pressing **Alt-F10** followed by the desired letter.

For example, if you created a macro and assigned it to the letter d, you type **Alt-F10** to run the macro.

From the dot prompt or a .prg file, use the **PLAY MACRO** command to run a macro. See *Language Reference* for more information.

Function keys are an even faster way to carry out macros. If you assign a macro to **F3**, you can play back that macro by pressing **Alt-F3**.

Nesting Macros

You can embed one macro in another. For example, if you have a macro that types your name, you can include it in a new macro that types your name and address. Simply start recording the new macro, run the name-writing macro, and finish by entering your address.

The name-writing macro is now *nested* inside the name-and-address-writing macro. A nested macro reference must exist in the current macro library.

The size of your macros is limited by the amount of space available in your computer's memory (RAM).

Adding to a Macro

Use the **Append to macro** option to add material to the end of an existing macro. Press the key of the macro you want to modify and begin appending to what is already in the macro.



TIP

*If you want to be on a screen other than the Control Center when you make your additions to the macro, move to that screen and continue appending to the macro. You can then edit the macro to remove the extra keystrokes needed to reach the screen. For example, if your macro works from the Browse screen, place the cursor in the **Data** panel, choose the **Append to macro** option, and then edit out the {F2} keystroke later.*

Making a Macro Prompt for User Input

You can design your macros to pause for user input. When a *user-input break* occurs, the macro stops running. You can then enter data or perform other actions. To resume running the macro, press **Shift-F10 Macros**.

You could use a user-input break, for example, to construct a macro that sets up a complicated calculated field, waits for you to enter today's interest rate, then continues.

To insert a user-input break, first begin recording a macro. When you want to insert a user-input break, press **Shift-F10 Macros** and select **Insert user-input break**. Then continue recording the macro. You can insert as many user-input breaks as you need in any macro.

Editing a Macro

Select the **Modify** option to change an existing macro. If you want, you can use an external editor, because the macro file is converted into a file that can be edited with any ASCII editor.

Letters typed in from the keyboard appear as regular characters. Special keystrokes appear inside curly braces. For example, if you press \uparrow while recording a macro, it appears as {uparrow}.

If you need to enter a literal left curly brace ({}), you can do so by enclosing it inside a pair of curly braces, like this: {{}}. The right curly brace needs no special treatment.

Keywords in Macro Editor

Table 14-1 shows the proper spelling for the keywords that you can use in editing a macro. The macro editor is not case sensitive, so you can use either uppercase or lowercase letters.

Table 14-1 Keywords used in the macro editor

Key as used in text	Keyword in macro editor
↵	Enter
Esc	Esc
Del	Del
PrtSc	PrtSc
Backspace	Backspace
Tab	Tab
Shift-Tab	Shift-Tab
→	rightarrow
←	leftarrow
↑	uparrow
↓	downarrow
PgUp	PgUp
PgDn	PgDn
Home	Home
End	End
Shift	Shift
Ins	Ins
Ctrl-	Ctrl-
Alt-	Alt-
Ctrl—	Ctrl-hyphen
Alt—	Alt-hyphen

In addition to the keywords shown in Table 14-1, you can enter the keystrokes for function keys as *F1* through *F10*.

You can also represent keystrokes by entering ASCII decimal numbers inside curly braces (for example, {100}, {103}, {120}). (For the ASCII representation of characters, refer to Appendix E of *Language Reference*.) The user-input break is represented with an *InpBreak* keyword.

You can combine *Alt-* with any number (0-9), character (a-z), function key (F1-F10), and the *hyphen* keyword.

You can combine *Ctrl-* with any character (a-z), function key (F1-F10), and the *hyphen* keyword. It can also be combined with these keywords: *Backspace*, *leftarrow*, *rightarrow*, *Home*, *End*, *PgDn*, *PgUp*, *Enter*, and *PrtSc*.

You can combine *Shift* with any function key (F1-F10) and with *Tab*.

Changing a Macro

When a macro definition is brought into the macro editor, it is formatted to make it easier to work with. Whenever the macro includes ↵, the macro definition string wraps back to the left margin.

You can use the **Tab** and ↵ keys to arrange text to make it easier to edit. These keystrokes do not become part of the macro. Only explicit carriage returns or tabs, entered as {*Enter*} or {*Tab*}, become part of the macro. Blank characters (spaces) are used as spaces in the macro when it runs.

To nest a macro inside the current macro, type it in. This could be {*Alt-F10*}q to run the macro assigned to the q key.

If you enter an incorrect macro definition, a message appears when you try to save it. You can then return to the macro editor and fix the problem. If you choose **Abandon edit**, all changes made to the macro are cancelled.

Renaming a Macro

When you create a macro, the single letter or function key you enter becomes the macro name. You can give a macro a more descriptive name.

To change the name of a macro:

1. Select the **Name** option.
2. Press the key that runs the macro.
3. Type the new name. The name cannot begin with a digit or contain blank spaces. Do not exceed 10 characters, and do not choose a name used by some other macro in the current library. Press ↵ when you have made the change.

Deleting a Macro

Select the **Delete** option to remove a macro from the current library. First choose the option, then press the key that runs the macro. You are asked to confirm your intention. Enter y or Y and then press ↵ to delete the macro.

Copying a Macro

Copying a macro is convenient when you want to create another macro that is similar to an existing macro.

To copy a macro:

1. Select the **Copy** option from the **Macros** menu.
2. The macro display table for the current library appears on the screen. Press the key or letter for the macro you want to copy.
3. Press the key or letter to hold the copy of the macro.
4. Enter a name for the macro and press ↵.

Viewing the Macro Display Table

If you forget which key is assigned to what macro, use the **Play** option to show the macro display table. The table shows which key runs the macro. Press the key to run the macro, or press **Esc** or **Ctrl-End** to exit the table.

Displaying a Macro During Execution

Select the **Talk** option to display the macro text as the macro is being executed. If you are in the Control Center or the status bar is visible on the screen, the macro text displays in the navigation line. Otherwise, it appears at the top of the screen.

You can increase or decrease the speed at which a macro is running by pressing the < or > key. You do not have to press the **Shift** key. Pressing < slows down the macro, and > speeds it up.

Loading a New Library

Loading a different macro library makes available all the macros in that library:

1. Select **Load library**.
2. If you changed any macro in the current library, a prompt reminds you that the changes have not been saved. Enter Y to replace the current library or N to return to the macro menu where you can save the library.
3. A list of available libraries appears. Select the library you want.

When a new library is loaded, its macros are available in addition to those in the previous library. If you use a letter for a macro in the previous library to define a new macro, the macro in the previous library is no longer available.

This lets you combine macro libraries. You can load a standard macro library, then fine-tune it with macros from specialized macro libraries.

Shift-F10 Macros Prompt Box

The prompt box that displays when you press **Shift-F10 Macros** is an abbreviated version of the complete **Macros** menu at the Control Center. The advantage of this prompt box is that it's available from anywhere in dBASE IV.

Importing Files

To import data from a non-dBASE IV file, select the **Import** option from the **Tools** menu. A menu of file types appears as shown in Figure 14-4.

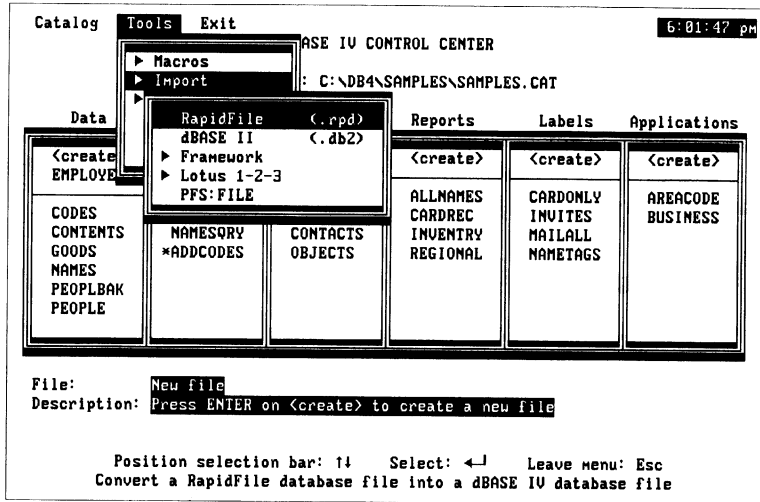


Figure 14-4 **Import** menu

Table 14-2 describes these file types.

Table 14-2 Import file types

File type	Description
RapidFile	Imports RapidFile data. When you choose this option, a list of RapidFile files is displayed.
dBASE II	Imports dBASE II data. In order to import a dBASE II file, you must change its .dbf extension to .db2 before using the Import menu. After renaming the files and choosing this option, a list of dBASE II files is displayed.
Framework®	Imports data from Framework spreadsheet or database files (.fw2, .fw3, or .fw4).
Lotus 1-2-3	Imports data from Lotus 1-2-3 files (.wks or .wk1).
PFS:FILE	Imports PFS:FILE data. When you choose this option, a list of all files that have no extensions is displayed. Make sure you choose an actual PFS:FILE file. When a PFS:FILE file is imported, .dbf, .vue, and .fmt files are created.

If importing a file would create a file with the same name as one already in the current directory, a prompt offers you the choice of writing over the existing file or canceling this operation (if SET SAFETY is ON).

If you choose to proceed, the file is imported and given a .dbf extension. Whenever possible, the data types of the new .dbf file match those from the original file.



NOTE

*You can also use the **Copy records from non-dBASE file** option of the database design screen's **Append** menu to import data from RapidFile, dBASE II, Framework II, and Lotus 1-2-3 .wks files. You can also use the **Append** menu to combine imported data with an existing database.*

Exporting Files

To send data to a non-dBASE IV file, select the **Export** menu option from the **Tools** menu. A menu of file types appears as shown in Figure 14-5.

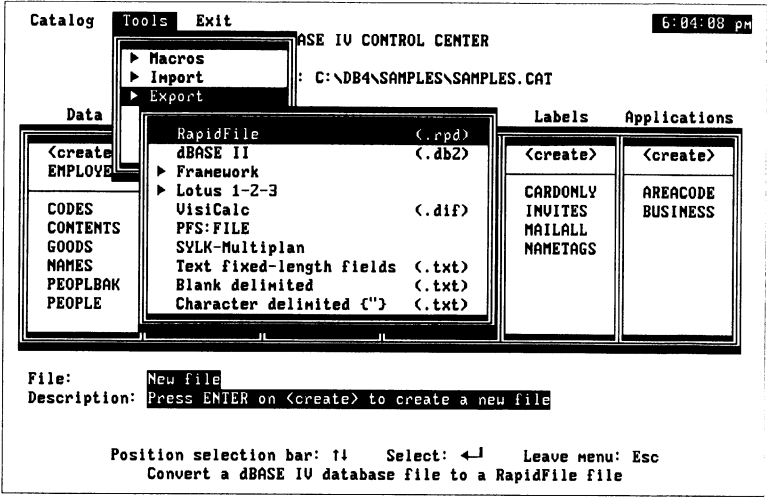


Figure 14-5 **Export** menu

Table 14-3 describes these file types.

Table 14-3 Export file types

File type	Description
RapidFile	Exports a dBASE IV .dbf file to a RapidFile.rpd file.
dBASE II	Exports a dBASE IV .dbf file to a dBASE II .db2 file. When you have moved the new .db2 file to the dBASE II system, rename it to have a .dbf extension. Do not rename the .db2 file if there is a chance you might overwrite the original .dbf file.
Framework	Exports a dBASE IV .dbf file to a Framework database file (.fw2, .fw3, or .fw4).
Lotus 1-2-3	Exports a dBASE IV .dbf file to a Lotus 1-2-3 file (.wks or .wk1).
VisiCalc	Exports a dBASE IV .dbf file to a VisiCalc .dif file.
PFS:FILE	Exports a dBASE IV .dbf file to a PFS:FILE file. The new file does not have an extension.
SYLK-MultiPlan	Exports a dBASE IV .dbf file to a MultiPlan file. The new file does not have an extension.
Text fixed-length fields	Exports a dBASE IV .dbf file to a <i>system data format</i> .txt file. These SDF files store data in records and fields of uniform length.
Blank delimited	Exports a dBASE IV .dbf file to a .txt blank-delimited file.
Character delimited	Exports a dBASE IV .dbf file to a .txt character-delimited file. You may specify a different character for the delimiter than the one shown in the menu.

When you choose the type of file, a list of dBASE IV .dbf files is displayed. The correct extensions are added automatically to the exported files.

For more information about these file types, see the sections about the EXPORT and COPY commands in *Language Reference*.



NOTE

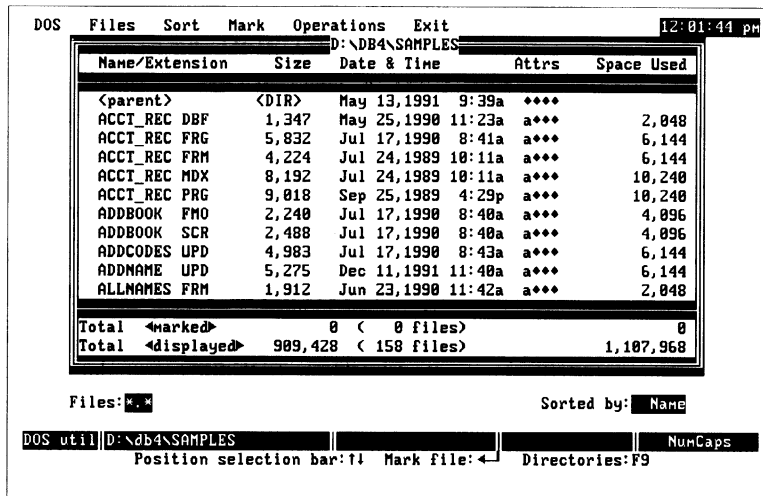
To export a dBASE IV file to dBASE III PLUS, use the COPY TO command with the DBMEMO3 file type. Refer to *Language Reference*.

Managing Files and Accessing DOS

To manage files or issue DOS commands, select **DOS utilities** from the Control Center **Tools** menu. The DOS utilities screen appears. This screen either displays files in a *file list* or displays directories and subdirectories in a *directory tree*. Use these to find files and to see information about them. Use the DOS utilities menus to manage files and to access DOS.

Using the File List

Figure 14-6 shows the DOS utilities screen with a list of files in a given directory.



The screenshot shows the DOS utilities interface with a menu bar (Files, Sort, Mark, Operations, Exit) and a title bar (D:\DB4\SAMPLES). The main window displays a table of files with the following data:

Name/Extension	Size	Date & Time	Attrs	Space Used
<parent>	<DIR>	May 13,1991 9:39a	****	
ACCT_REC DBF	1,347	May 25,1990 11:23a	a***	2,048
ACCT_REC FRG	5,832	Jul 17,1990 8:41a	a***	6,144
ACCT_REC FRM	4,224	Jul 24,1989 10:11a	a***	6,144
ACCT_REC MDX	8,192	Jul 24,1989 10:11a	a***	10,240
ACCT_REC PRG	9,018	Sep 25,1989 4:29p	a***	10,240
ADDBOOK FMO	2,240	Jul 17,1990 8:40a	a***	4,096
ADDBOOK SCR	2,488	Jul 17,1990 8:40a	a***	4,096
ADDCODES UPD	4,983	Jul 17,1990 8:43a	a***	6,144
ADDNAME UPD	5,275	Dec 11,1991 11:40a	a***	6,144
ALLNAMES FRM	1,912	Jun 23,1990 11:42a	a***	2,048
Total <marked>	0	< 0 files>		0
Total <displayed>	989,428	< 158 files>		1,107,968

Below the table, the interface shows 'Files: *.*' and 'Sorted by: Name'. At the bottom, there are status bars for 'DOS util | D:\db4\SAMPLES', 'Position selection bar: f1', 'Mark file: ←', and 'Directories: F9'. The system clock in the top right corner shows 12:01:44 pm.

Figure 14-6 File list

The **Name/Extension** column shows the filename and file extension.

The **Size** column shows the amount of space taken up by the data in a file. The names of directories are indicated by a **<DIR>** marker. The **Date & Time** column shows the last date and time that the file was updated.

The **Attrs** column shows whether an attribute has been set for the files. Possible file attributes are Archive, Hidden, Read-Only, and System. If an attribute for a file is not set, that column contains a small diamond. See your DOS manual for more information about file attributes.

The **Space Used** column shows the space needed on the disk to store each file. This disk space depends on the cluster size for the current disk. Values in this column are always equal to or greater than the numbers in the **Size** column. For example, if your disk has a cluster size of 2,048 bytes, then any file, no matter how small, takes up at least 2,048 bytes.

The two rows at the bottom of the list show the number and total size of all files in the list, as well as the size and number of marked files. Marked files are those you choose to operate on as a group. For example, you could choose six files and then copy or delete them all at once. To mark or unmark a file, move the highlight to it and press **↵**.

Move up and down the list of files by pressing **↑**, **↓**, **PgUp**, **PgDn**, **Home**, or **End**. To display the files in another directory, place the cursor on the name of the directory and press **↵**. The file list displays the files in that directory.

To see the files in the directory containing the current directory, place the cursor on the **<parent>** marker and press **↵**.

Using the Directory Tree

There is a faster way to move from one directory to another. Press **F9 Zoom** from any place in the file list to display a directory tree. To return to the file list, press **F9 Zoom** again.

The directory tree contains a diagram of your disk's directories and subdirectories. The current disk drive appears at the top of the tree. A single backslash below it indicates the root directory.

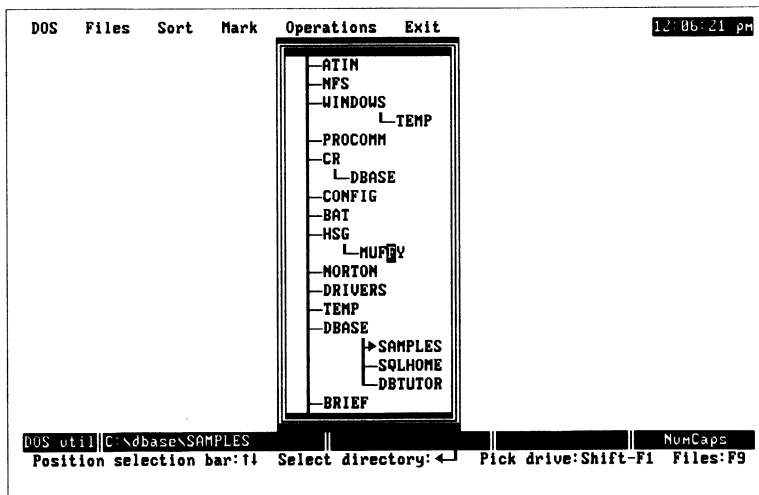


Figure 14-7 Directory tree

In Figure 14-7, the small triangle next to **\DBASE\SAMPLES** shows it was the directory displayed in the files list.

Move up and down the directory tree by pressing \uparrow , \downarrow , **PgUp**, **PgDn**, **Home**, or **End**. To display the files in a directory, place the cursor on the name of that directory and press \downarrow . The directory tree is replaced by the file list for the chosen directory.

To change to a different disk drive, place the cursor on the drive marker at the top of the tree and press \downarrow . A list of other possible drives appears. Select the one you want. The directory tree displays the directories in the newly chosen drive.

Accessing DOS

Use the **DOS** menu to enter DOS commands and to manage your files without leaving dBASE IV.

Issuing a DOS Command

Choose the **Perform DOS command** option from the **DOS** menu to issue a DOS command directly from dBASE IV.

Enter a DOS command such as CHKDSK or DIR into the prompt box, and press \downarrow . The command is carried out, and any output appears on the screen.

When you finish, press any key and the list of files appears again.



NOTE

The amount of memory available to programs through DOS access is limited. Do not issue DOS commands that create TSRs in RAM, such as MODE, PRINT, and ASSIGN.

Transferring to DOS

Choose the **Go to DOS** option to clear the screen and go to a full-screen DOS window, for performing DOS operations or running other programs without leaving dBASE IV.

If you have marked any files, a prompt box warns you that they will no longer be marked when you return from DOS. If this is acceptable, select the **Proceed** button. If not, select **Cancel**.

To return to dBASE IV from the DOS window, type `exit` and press \downarrow .

Setting the Default Drive and Directory

When you change the default drive and directory new files are automatically stored there.

To change the default drive and directory, select the **Set default drive:directory** option from the **DOS** menu. A prompt box asks for the name. You can type in the name and press \downarrow . You can also press **Shift-F1 Pick** to display the directory tree. Place the cursor on the name of the directory you want for the default and press \downarrow .

Displaying Files

Use the **Files** menu to select groups of files to display on the DOS utilities screen.

Display Drives and Directories

To show the files in a different drive or directory, choose the **Change drive:directory** option on the **Files** menu. Press ↵ and type the desired drive and directory. Then press ↵ to complete the entry.

You can also show a different drive or directory by selecting this option and pressing **Shift-F1 Pick** to display the directory tree. Place the cursor on the name of a directory with files you want to see and press ↵.



NOTE

*Changing this option only determines which files appear in the file list. It does not affect the default drive or directory described under **Set default drive:directory**.*

Filtering Displayed Files

To filter the files appearing in the file list, choose the **Display only** option. For example, display only .dbo files by entering *.dbo in this option. To display every file in a directory, enter *.* or press ↵ if the option is empty.

The current choice for the **Display only** filter is shown on the left side of the screen, below the file list.



TIP

*To quickly mark groups of files, you may find it useful to combine the **Display only** option with the **Mark all** option on the **Mark** menu. For example, to mark all the .prg files, display only *.prg files, then choose the **Mark all** option. If you then display all files, every .prg file is marked.*

Sorting Files

Use the **Sort** menu (shown in Figure 14-8) to change the order in which files are listed. You can sort by name, extension (such as .exe or .dbf), date followed by time, or size. Only a single sort option can be chosen at a time.

The current sorting choice is shown on the right of the screen below the file list.

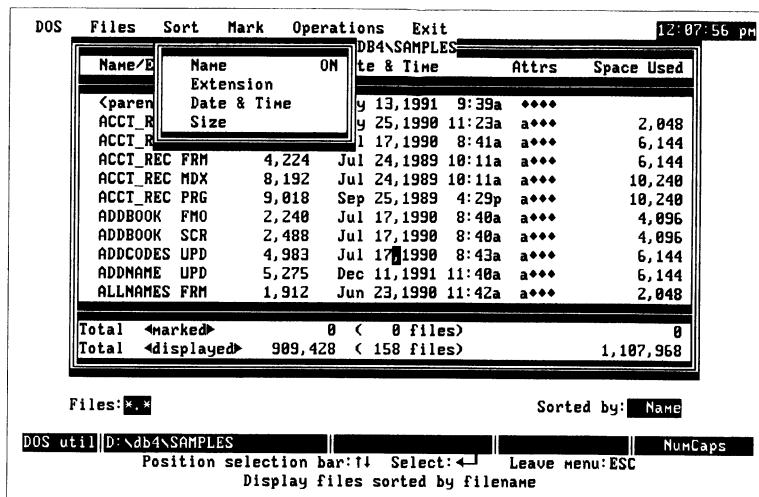


Figure 14-8 Sort menu

Marking and Unmarking Files

You can mark files on the DOS utilities screen and then delete, move, copy, or rename those files. Move the cursor to a file you want to mark using the ↑ or ↓ key and press ↵. A marker (▶) appears before the filename.

You can only mark files when they appear in the list. Once you have marked a file, however, it remains marked until you move the cursor to it and press ↵, return to the Control Center, or choose **Go to DOS**.

Use the **Mark** menu options to mark or unmark all files at once.

- **Mark all** marks all files displayed in the list, even if they are scrolled out of view.
- **Unmark all** clears the list of all marks. This option clears the file marks, even if the files have scrolled out of view. You should consider using this option whenever you finish an operation and want to make sure no files are still marked.
- **Reverse marks** swaps which files are marked and which are not. You can, for example, mark all the .dbf files and copy them to another directory. Then you can reverse the marks and copy all the other files in the current file list to a different directory.

Manipulating Files

Use **Operations** menu options (shown in Figure 14-9) to manipulate files without going to DOS.

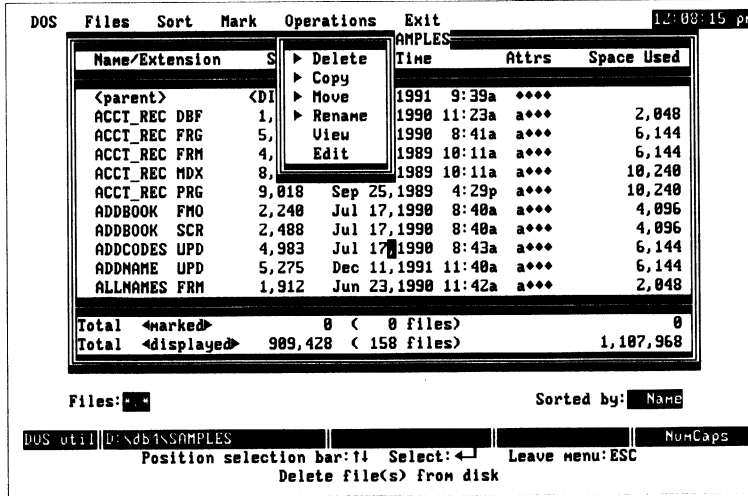


Figure 14-9 **Operations** menu

The **Delete**, **Copy**, **Move**, and **Rename** options prompt you to choose whether to apply these operations to the current file, the marked files shown on the file list, or all the displayed files.

The **Marked files** option only applies to marked files in the current file selection. For example, if any marked files are excluded from the file list because of a **Display only** filter, those files are not affected by these operations. This safety feature prevents you from inadvertently applying an operation to files that are marked but not displayed.



WARNING

Some marked files may not appear on the screen because all the files do not fit in the file list at one time. Be sure you know which files are scrolled out of view before carrying out any operation on marked files.

If the cursor is on the name of a directory when you choose an operation (except for **Rename**, **View**, and **Edit**), that operation is applied to the whole directory if you select the **Single file** option from the prompt box.

Deleting Files

To delete files, choose the **Delete** option on the **Operations** menu and specify whether you want to delete the current file, the marked files, or all the files in the file list. A prompt box lists which files you are about to delete.

When files are deleted with this option, they are no longer available and you cannot restore them.

You can also delete the current file by pressing **Del**.

Copying Files

Choose the **Copy** option on the **Operations** menu to copy files to a different directory or to a different filename.

You are prompted to choose between copying the current file, all the marked files, or all the files in the file list.

After you make this choice, you are prompted to enter the destination drive and directory. The destination of the most recent copy, move, or rename operation is presented as the default. Accept this destination by pressing **↵**, or type a new destination or use **Shift-F1 Pick** to select one from the directory tree.

If you are copying a **Single file**, press **↵** to move the cursor to the filename in the prompt box. The filename highlighted in the file list is the default, which you can modify.

If you are copying **Marked files**, press **↵** to move the cursor to the empty filename space in the prompt box. Enter a filename that contains the asterisk (*) wildcard in the basic filename, its extension, or both. Otherwise, the marked files are all copied into the one file named in the prompt box.

Suppose you want to copy *Sales1.dbf* and *Sales2.fmt* to a directory named *Test*. If you enter the target filename as **.**, then the files are copied with the same names to the *Test* directory. If you enter the target filename as **.tst*, then the copies of the two files in the *Test* directory are named *Sales1.tst* and *Sales2.tst*. If you enter the target filename as *Salesold.**, then the copies are named *Salesold.dbf* and *Salesold.fmt*.

When you have entered the path and name, press **Ctrl-End** to carry out the operation.

You are not allowed to copy a file onto itself. You are warned if you try to copy a file onto a different file with the same name.

You can copy the current file by pressing **F8 Copy**. A prompt box displays so you can enter the path and name for the copy of the current file.

Moving Files

Use the **Move** option on the **Operations** menu to quickly transfer one or more files to another directory. After you choose this option, you are prompted to choose between moving the current file, all the marked files, or all the files in the file list.

After you make this choice, you are prompted to enter the destination drive and directory. The destination of the most recent copy, move, or rename operation is presented as the default. Accept this destination by pressing ↵, or type a new destination or use **Shift-F1 Pick** to select one from the directory tree.

If you are moving a **Single file**, press ↵ to move the cursor to the filename in the prompt box. The filename highlighted in the file list is the default, which you can modify.

You may also move the current file by pressing **F7 Move**. A prompt box appears and you can enter the path and name for the new location for the current file.

After you press **Ctrl-End** to complete the move, the specified files are removed from the current directory and placed in the destination directory.

Renaming Files

Rename one or more files with the **Rename** option on the **Operations** menu. After you choose between the **Single file**, **Marked files**, and **Displayed files** options, you are prompted to enter the destination filename.

Suppose you want to rename two files *Salesnew.dbf* and *Salesnew.dbt*. You could enter the destination filename as *Salesold.**. This would rename these files to *Salesold.dbf* and *Salesold.dbt*.

You cannot rename a file to its current name. You are warned if a file with that name already exists.

Viewing Files

Use the **View** option on the **Operations** menu to display the contents of the highlighted file. The file's data appears in the display area.

For files that are not all text, non-textual characters are filtered out, eliminating the beeps and characters other display utilities often produce when they try to show a binary file.

The display pauses after each screenful of data. Press **Spacebar** to view the next screen of text, or press ↵ to choose a scrolling display that does not pause after each screen. During the scrolling display, press ↵ or **Spacebar** to suspend the scrolling. Press **Esc** at any time to cancel the display.

Editing Files

Use the **Edit** option on the **Operations** menu to use the program editor on the currently selected file. The program editor is described in Chapter 15.



WARNING

Do not try to edit files that are not ASCII text files. The **Edit** option is designed to work with files containing dBASE IV code, such as files with .fmt, .frg, .lbg, .prg, or .prs extensions. You can also edit batch files (.bat) or text files (.txt). Do not attempt to edit other dBASE IV files or files with .exe or .com extensions. To edit files produced with non-dBASE IV word processors, make sure the file is in ASCII format. If you want to edit dBASE IV memo field files (those with .dbt extensions), use the Edit screen, not this option. Otherwise, the .dbf file may not be able to find the proper memo field text.

Exit Menu

Use the **Exit** menu to exit from the DOS utilities screen to the Control Center.

Changing Settings

To change dBASE IV settings and display options, choose the **Settings** option from the **Tools** menu in the Control Center. The **Settings** menu bar appears with three menus, **Options**, **Display**, and **Exit**. The **Options** menu lets you customize the way dBASE IV displays and handles data. The **Display** menu lets you change the colors assigned to different parts of dBASE IV.

Changing Options

The choices on the **Options** menu are a selection of the most commonly used dBASE IV settings. Table 14-4 describes these options.

Table 14-4 Option settings

Option	Settings	Usage
Bell	ON/off	Turn the warning bell on and off.
Carry	on/OFF	Copy data from the previous record into the new record.
Century	on/OFF	Display dates with a four-digit year.
Confirm	on/OFF	Require that ↵ be pressed before advancing to the next field.
Date order	MDY/dmy/ymd	Determine the format for date display.
Date separator	/ - .	Define character used as date separator.
Decimal places	0 – 18	Define the number of decimal places displayed. Default is 2.
Deleted	on/OFF	Determine if records marked for deletion are skipped by other dBASE IV commands.
Exact	on/OFF	Require that equal strings match on length and content.
Exclusive	on/OFF	Prevent other users from accessing an open file on a multi-user system.
Instruct	ON/off	Display information boxes in the Control Center.
Margin	<expN>	Define printer offset from left. Default is zero.
Memo width	8 – 32000	Define width of memo field output. Default is 65.
Safety	ON/off	Display confirmation message before overwriting files.
Talk	ON/off	Display command responses.
Trap	on/OFF	Activate the debugger when an error occurs in a program.

Each option on the **Options** menu is also described in the message line, on the related Help screen, and under the individual SET commands in *Language Reference*. These settings are also available in the larger selection of settings offered by the dot prompt's full-screen SET command. Type SET and press ↵ at the dot prompt.



NOTE

Any changes you make on the **Options** menu alter the way dBASE IV works in the current session only. To make changes that last from session to session, modify your *Config.db* file. Do this by running *DBSETUP* from the operating system and choosing the **Config.db** menu.

Changing Display Settings

You can use the **Display** menu to change screen color settings and EGA display mode.

Use the **Display** menu to assign colors to different parts of dBASE IV screens. The **Display** menu uses the same color palette as the **Display** option in the **Words** menu. For information on how colors are assigned, see the *SET COLOR* command in *Language Reference*.

To toggle EGA display mode between 25-line mode and 43-line mode, select the **Display mode** option and press ↵.

Restricting Access to Confidential Files

This section should be read by database administrators responsible for data security. It describes how to use the **Protect data** option on the **Tools** menu. Topics discussed include:

- **Protect data** security concepts, including levels of security
- Using the **Protect data** menus to set up a security system
- System password files
- Operational considerations that affect network security



NOTE

SQL users should refer to Chapter 30 of Programming in dBASE IV for information about securing data in the SQL environment.

About dBASE Security

The **Protect data** option on the **Tools** menu is used to create and maintain security on a dBASE IV system. **Protect data** can be used on a single computer or in a local area network environment.

Protect data is optional: you don't have to use it. Once you have used it, however, the security system will always control access to database files.

There are three distinct types of database protection:

- *Log-in security*, which prevents access to dBASE IV by unauthorized personnel.
- *File and field access security*, which allows you to define what files, and fields within files, each user can access.
- *Data encryption*, which enciphers dBASE files so that unauthorized users cannot read them.

Log-in security is the first security level. Once a security system is in place, users cannot access dBASE IV until they pass log-in security. Access control is the next security level. Access control determines what a user can do with both a database file and data in the file, and can be used to control processing of application code. Data encryption scrambles the database so that unauthorized users cannot read the information in the file.

You must implement the security types in the order listed above. You cannot establish file and field access control without first creating log-in security. Similarly, you must create both log-in security and file and field access control in order to have data encryption. However, it is not necessary to implement all three levels of security. Many database administrators elect to implement just log-in security.

If you decide to implement security, you must create a *user profile* for each operator. When you create each user's security profile, you assign each user to a group, which they must specify at login. You also must establish a file privilege scheme for each file. As part of each file's privilege scheme, you assign the file to a group. A file can be assigned to only one group. If the user group and file group do not match, the user cannot access the file.



NOTE

A user can belong to more than one group. However, each group that a user belongs to must be logged-in separately. If a user needs to access files from two different groups, the user must log in twice, specifying a different group name at each login.

Typically, each group is associated with a set of files. By associating each application with its own group, you use the group to control data access. Further, by using access levels within the group, you can give different users different kinds of access to the application program files.

Log-in Security

Protect data allows you to create a password-protected system. If password protection is in force:

- No user can gain access to dBASE IV on that system unless the user enters a valid login. The login consists of three items: a group name, a log-in name, and a password.
- The user log-in screen appears whenever you access dBASE IV. All paths into the database system initiate the log-in process.

Access Level Security

Control access to database files and fields within those files by assigning *user access levels* that determine the user's file access and field access *privileges*. The file access privileges and the field access privileges for a file are called its *privilege scheme*.

User access levels are numbered 1 through 8. Assigning a low number gives the user greater access privileges. Assigning a higher number limits the user's access.

User access levels default to 1 (the most powerful level). If you have no need to separate users based on access level, you need not change the default level. If you choose to change the default level, the value you enter is a relative value and has no intrinsic meaning.

Establish an access level for each user in the user's profile. Establish additional access levels for file and field privileges in the file privilege scheme.

After you log in, dBASE IV determines what access level you have with a file by matching the user access level with the file's privilege scheme.

You can assign any number of users to each access level, but only one access level to the same user in the same group. A user's ability to access a particular file is a function of both group membership and access level. However, only access level determines what the user can do with the file once it is accessed.

File Access Privileges

Establish privileges for a database file by assigning access levels to the operations that a user can do on it. You can assign access levels, in any combination, to read, update, extend, and delete privileges. These privileges grant users the ability to:

- View records in a database file (read privilege)
- Change database file record contents (update privilege)
- Append new records to a database file (extend privilege)
- Delete records from a database file (delete privilege)

If you do not create a privilege scheme for a database file, all users of the group can read and write to all fields in the file. When you create a file privilege scheme, all four file privileges are granted initially until you change them. That is, all file access levels are 8 by default.

Field Access Privileges

At the field level, you can control what operations each user is allowed. You can grant full (FULL), read-only (R/O), or no access (NONE) privilege to each field in a database file *for each access level*. The field privileges allow users to:

- Read and write the field in the database file (FULL privilege). This is the initial default.
- Read but not write the field (R/O privilege).
- Neither read nor write the field (NONE privilege).

When NONE is selected, a user is blocked from writing to fields and even from seeing fields you do not want displayed.

Data Encryption

Data encryption scrambles data so that it can't be read until it is unscrambled. An encrypted file contains data that has been translated from source data to another form that makes its contents unreadable. If your database system is protected, dBASE IV automatically encrypts and decrypts database files and their associated index and memo files.

System Password Files

dBASE IV creates and maintains the Dbsystem.db and Dbsystem.sql system password files, which contain records for each user defined through **Protect data**.

Dbsystem.db stores dBASE IV user profiles, which include the user's log-in name, account name, password, group name, and access level. Dbsystem.sql stores user log-in names and passwords for use by SQL.

When a user enters the dBASE command at a network workstation, dBASE IV looks for the applicable system file in the dBASE IV directory. If it is found, the log-in process is initiated. If it is not found, there is no log-in process.

Dbsystem.db and Dbsystem.sql are maintained as encrypted files that can be decrypted by dBASE IV. Only a database administrator can view, modify, and print this information. (See the Printing Security Information section later in this chapter.)

Creating a Security System

To create a protected database system:

1. Select **Protect data** from the **Tools** menu.
2. Define the database administrator's password.
3. Define user profiles.
4. Define file privilege levels and field privileges.
5. Save the security information.

The following sections describe these steps in detail.

Initiating Protect Data

Initiate **Protect data** after all database files have been closed. Select **Protect data** from the Control Center through the **Tools** menu.



NOTE

To start PROTECT at the dot prompt, enter PROTECT and press ↵.

Database Administrator Password

When you select **Protect data**, the dBASE IV Password Security System log-in screen appears, as shown in Figure 14-10.

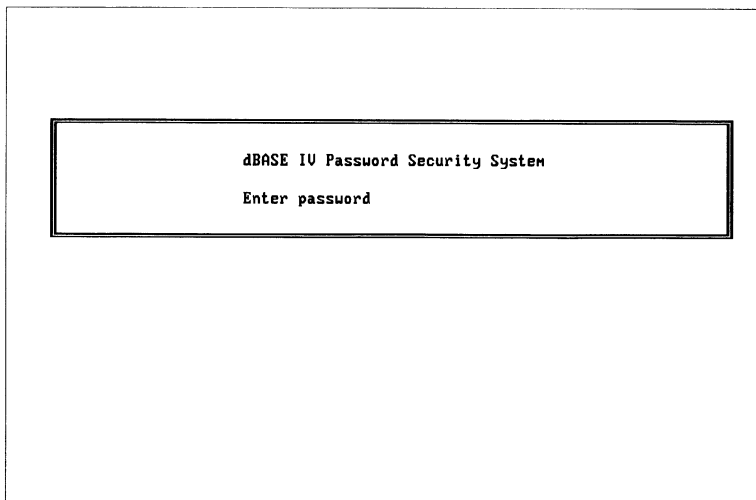


Figure 14-10 dBASE IV Password Security System log-in screen

Enter a password of up to 16 alphanumeric characters on the log-in screen. You can enter alphabetic characters in uppercase or lowercase. The password is not displayed on the screen. For maximum log-in security (and maximum encryption protection), you should specify the full 16 characters allowed.

The first time you use **Protect data**, the system prompts **Please reenter password to confirm**. Enter your password again. Thereafter, you enter the password only once. The system gives you three chances to enter the password correctly before the **Protect data** option terminates.



WARNING

Remembering the administrator password is essential. You can access the security system only if you can supply the password. Once established, the security system can be changed only if the administrator password is supplied. Keep a hard copy of the database administrator password in a secured area. There is no way to retrieve this password from the system.

If you pass security, the system displays the **Users** menu, through which you create user profiles.

Creating User Profiles

The **Users** menu, shown in Figure 14-11, creates or modifies a user profile in the `Dbssystem.db` file.

```
Users  Files  Reports  Exit  12:10:06 pm
+-----+
| Login name |
| Password   |
| Group name |
+-----+
| Full Name  |
| Access level: 1 |
+-----+
| Store user profile |
+-----+
| Delete user from group |
+-----+
Protect  Position selection bar: F1  Select: ←  Cancel: Esc  NumCaps
Enter the login name for this user
```

Figure 14-11 **Users** menu

Use the **Users** menu to:

- Add, change, and delete user profiles
- Establish and change the access level for each user

Adding a New User Profile

Follow the steps below to add a user profile to the Dbsystem.db file:

1. Access the **Users** menu. The cursor is at the first field, **Login name**. Press ↵.
2. Enter a user log-in name (1-8 alphanumeric characters). Press ↵. This entry is converted to uppercase.
3. The **Password** option is highlighted. Press ↵. Enter a user password (1-16 alphanumeric characters). Press ↵.
4. The **Group name** option is highlighted. Press ↵. Enter a group name (1-8 alphanumeric characters). Press ↵. This entry is converted to uppercase.
5. The **Full name** option is highlighted. Press ↵. Enter the full name (1-24 alphanumeric characters), if desired. Press ↵.
6. The **Access level** option is highlighted. Press ↵. Select a user access level (a number from 1 through 8).
7. The **Store user profile** option is highlighted. Press ↵ to store the user profile.

You must specify a value for log-in name, password, and group name, or a user profile will not be created.

Note that:

- If you intend to use SQL, you must add the super user log-in name SQLDBA, which is granted privileges to all operations in SQL mode. The SQL GRANT and REVOKE commands control file and field access privileges using log-in names assigned by PROTECT.
- The full name is the only optional item in a user profile. Since this item is not used in validating a login, you can use it any way you want. Frequently, the full name is used to add a more complete user identification. Alphabetic characters you enter in the **Full name** option will not be converted to uppercase characters.
- The user group name will be matched with the file group name to enable file access. You may find it useful to organize users and files into groups that reflect application use.
- Within each group, the user is assigned an access level. This level will be matched with file access levels established with the **Files** menu to determine what access level the user has for each database file. It will also determine the type of access the user has to each file and, within each file, to each field. See the Establishing File Privilege Levels section later in this chapter for a discussion of access levels and how they should be assigned.

When you have entered all the items, you must select **Store user profile** to save the new profile. You can then do one of the following:

- Return to the first option on the menu (**Login name**), and begin entering another user profile.
- Move to another menu by pressing ← or →.

At any time during the definition or modification of a user profile, you can terminate the process. The user profile information is not saved until you store it.

Changing a User Profile

When you enter the first three items on the **Users** menu (**Login name**, **Password**, and **Group name**), dBASE IV checks to see if the user profile has already been defined. If it has, the rest of the menu items are completed with their current values and **Editing User** displays above the status bar. You can then change any of the values, but it is recommended that you do not change the group name.

To change a user profile:

1. Open the **Users** menu.
2. Enter the log-in name, password, and group name of the user profile you want to change.
3. Enter Y in response to the **User already exists, do you want to edit?** prompt.
4. Press ↑ to highlight the **Login name** field or the **Password** field. Press ↓.

If you edit the group name, there will be no way to access files associated with the original name. You also should not delete the group. If you delete all users from a group before all files associated with the group are copied out in a decrypted form, no one can access the files.

Remember that you will need to enter the user profile changes and, later, save them. (See the previous section, Adding a New User Profile.)

Deleting a User Profile

The last option on the **Users** menu is used to delete a user profile. Follow the steps below:

1. Open the **Users** menu.
2. Enter the log-in name, the password, and the group name of the user you want to delete from the system.
3. Move the highlight to **Delete user from group**.
4. Press ↓.

File Privilege Schemes

The **Files** menu creates or modifies file privilege schemes in which file and field privileges are assigned to match user access levels. The file privilege schemes are saved in the database file structure. Press ← or → to move to the **Files** menu, illustrated in Figure 14-12.

The screenshot shows a menu window titled "Files" with a menu bar containing "Users", "Files", "Reports", and "Exit". The time "12:11:26 pm" is displayed in the top right corner. The main menu area contains the following options:

- New file
- Group name
- File access privileges
- Field access privileges
 - Access level 1
 - Establish field privileges
- Store file privileges
- Cancel current entry

At the bottom of the window, there is a status bar with the following text: "Protect: [bar] Position selection bar: 1 Select: ← Cancel: Esc NumCaps [bar] Select file name to protect".

Figure 14-12 **Files** menu

Use the **Files** menu to:

- Assign a file to a specific group.
- Create and change access levels for file privileges. You can define up to eight levels of privilege for each file.
- Assign field access privileges for each file access level.

Creating a File Privilege Scheme

Follow the steps below to define file and field privileges for a database file:

1. Access the **Files** menu.
2. Select a file.
3. Assign the file to a specific group.
4. Establish the most restrictive access level for each file privilege.
5. Select an access level for field privilege assignment.
6. Select field privileges for each field at each access level, as required.
7. Store the file and field privilege scheme.

The sections that follow describe these steps in detail.

A file is not encrypted unless you select it (**New file**), store it (**Store file privileges**), and save it (**Exit**). With these choices, you can change the file privilege scheme or accept the preset menu values for the privileges. These values, also called *default values*, are set as follows:

- The access levels for all file privileges are set to 8 (the most restrictive level).
- Field privileges are set to FULL.

If these access level and privilege associations are not set, the only access controls are those established by the network operating system. See your DOS manual or Chapter 3 of *Getting Started with dBASE IV* to define access controls outside of dBASE IV.

Table 14-5 summarizes the values you enter in this menu and lists the default values for items on this menu.

Table 14-5 **Files** menu items summary

Menu Item	Value Type	Value	Initial Default
New file	Menu list item	File selected from file list	The current drive designation
Group name	User-defined character string	1-8 alphanumeric characters	None
Read privilege	Integer	1 through 8	8
Update privilege	Integer	1 through 8	8
Extend privilege	Integer	1 through 8	8
Delete privilege	Integer	1 through 8	8
Access level	Integer	1 through 8	1
Field access privilege (set for each field at each access level)	Enumerated data type	Fields selected from field list FULL, R/O, NONE	First field in list FULL *

*Once field privileges are set for an access level, the field privileges for more restricted levels that are not set default to FULL. (See the Establishing Field Access Privileges section later in this chapter.)

Selecting Database Files

Pressing \downarrow to choose the **New file** option displays a file list. The file list illustrated in Figure 14-13 contains the names of all the database files in the system.

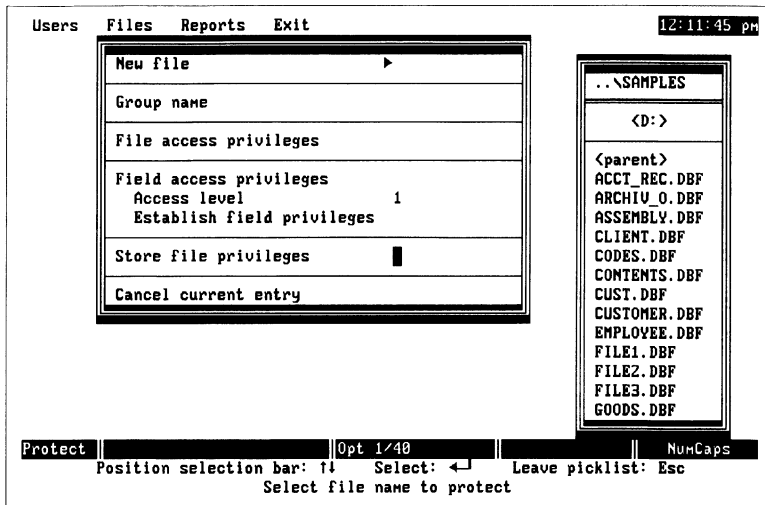


Figure 14-13 File list

Move the highlight to the name desired and press \downarrow . The highlighted file name will be displayed in the **New file** option.



WARNING

You can create database file privilege schemes for up to nine database files at a time. If you try to set up a tenth file, you will get the error message **Too many files are open**. When you have finished creating the eighth scheme, move to the **Exit** menu and select **Save** or **Exit** to save the database file privilege schemes. If appropriate, you can then move back to the **Files** menu and continue defining database file privilege schemes.

Assigning the File to a Group

A file can be assigned to only one group. The group name will be matched with a user group name to enable data access. Try to organize users and files into groups that reflect application use (for instance, by department or sales area). Through group association you can establish file and user sets to limit application access by user and, within applications, to limit what users can do with applications.

Establishing File Privilege Levels

Next, establish the privilege levels for the selected file. File privileges specify the access rights to a file. When you select **File access privileges**, the system displays the submenu shown in Figure 14-14.

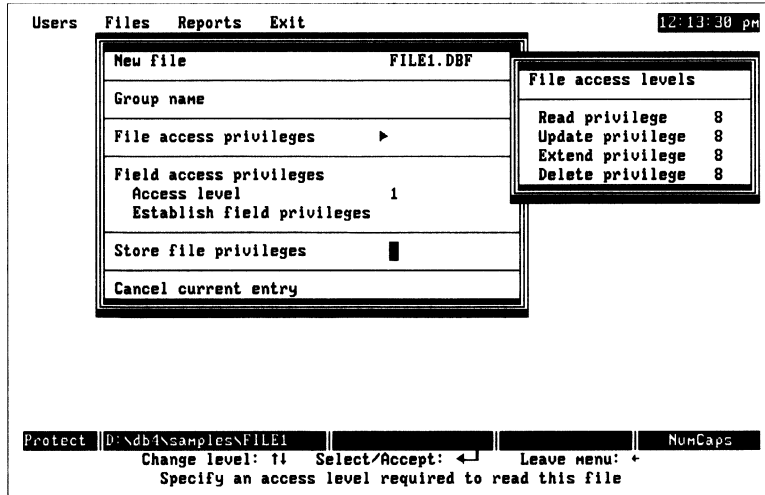


Figure 14-14 **File access privileges** submenu

These access rights cannot override a read-only attribute established for the file at the operating system level.

In building a file privilege scheme, note that:

- Access level 1 has the most privilege, and access level 8 has the least. Level 1 is called the least restrictive access level, while level 8 is called the most restrictive.
- The more privileged levels (1, 2, 3) are typically assigned to the fewest people. To limit access to your data, the more privileges a level has, the fewer users you should assign to that level. The access level values are relative and have no intrinsic meaning. If you establish a read privilege of 5, users with a level of 1 to 5 can read that file. Users with a level of 6 to 8 cannot read the file.

File privileges determine permissions for the file operations listed in Table 14-6.

Table 14-6 File privilege operations

Privilege	Access Granted
DELETE	Delete records from the database
EXTEND	Add records to the file
READ	View the file contents
UPDATE	Edit existing records in the file

For each type of file privilege, you can specify the most restricted access level to have the privilege. All levels less restricted than the specified one will be granted the file privilege; all levels more restricted than the specified one will not be granted the file privilege. For example, if you specify 6 as the READ privilege level for the file Customer.dbf, all users with access levels of 1 through 6 will be able to read the file. However, users with access levels of 7 and 8 will not be able to read the file.

Assign and change file privileges by entering an integer value. To change the value, highlight the item, press ↵, and set the value, or use the ↑ and ↓ keys to change the value.



NOTE

Some access levels cannot be specified. For example, you cannot restrict read access but allow update.

Establishing a Field Access Level

Move the highlight to **Access level** and enter the access level for which you wish to define field access. The eight file access levels match the user-assigned access levels (1 through 8). Remember that level 1 has the most rights and level 8 has the least. You do not need to establish field access privileges for any access level that does not have the READ privilege.

Establishing Field Access Privileges

Finally, you establish Field Access privileges by moving the highlight to **Establish field privileges** and pressing ↵, or by pressing the first letter of the menu choice. A fields list appears next to the **Files** menu. You can specify one of the field access privileges listed in Table 14-7 for each field in the selected file at the selected access level.

Table 14-7 Field privilege operations

Privilege	Access Granted
FULL	View and modify the field. This is the default.
R/O	View the field only (no update capability).
NONE	No access. The user can neither read nor update the field, and the field appears as if it is removed from the database file.



NOTE

File privileges take precedence over field privileges. For example, if a file privilege is set for READ, but not UPDATE, the only meaningful field privileges are R/O and NONE. You must restrict file privileges to protect your data against file-oriented commands like DELETE or ZAP. Restricting field privileges to R/O or NONE without restricting file privileges does not protect your data against these commands.

The fields list contains all fields defined in the database file and the current field access privilege assigned to them. Initially, all field access privileges are set to FULL. To change the field privilege:

1. Move the highlight to the field for which privilege is to be changed.
2. Use \downarrow to switch the preset values between FULL, R/O, and NONE.
3. When the appropriate field privilege is displayed, move to the next field to be changed by pressing \uparrow or \downarrow .

Continue this process until all fields for the access level are set to the appropriate value, and then return to the **Files** menu by pressing **Esc**.

Continue this process as long as necessary to establish field privileges for all user access levels. The procedure is as follows:

- Establish all the field access privileges for one level. Typically, you would remove access to one or two fields for users at the lower access level.
- Then, move back to the **Files** menu (using \leftarrow). Set the next access level, and move the highlight back to **Establish field privileges** (by pressing \downarrow) to assign field privileges at that level.
- This process continues until you have assigned all necessary field privileges.

If you specify a level and change field privileges, the changes you make affect that field only at that access level. All other fields and access levels remain the same.

Storing a File Privilege Scheme

When you are satisfied with all the file and field access privilege settings, select **Store file privileges** to store them. Remember that after you have defined or modified nine file privilege schemes, you must save them before you can continue using the **Files** menu. You can then do one of the following:

- Begin entering another file privilege scheme
- Move to another menu by pressing ← or →



NOTE

Do not store file privileges until you are completely finished with the file you are working on.

Cancelling a File Privilege Scheme

At any time during the definition or modification of a file privilege scheme, you can move to the last option on the menu, **Cancel current entry**, press ↵, and delete the definition in progress.

Changing a File Privilege Scheme

When you select a file, dBASE IV checks to see if the file privilege scheme has already been defined. If it has been stored but not saved, the rest of the menu items are filled in with their current values. You can then change any of the values. Follow these steps:

1. Make your changes.
2. If the file privilege scheme has already been saved, the message **<filename>.crp already exists, overwrite it? (Y/N)** is displayed. Press Y to change any values.
3. Save your changes. (See the Creating a File Privilege Scheme section earlier in this chapter.)

If you have saved the file privilege scheme, the message **File already exists** appears. Select **Overwrite** to change the file privilege scheme.

Printing Security Information

Dbssystem.db is maintained as an encrypted file. Outside the PROTECT utility, there is no way for you or any other user to examine the contents of that file once information is stored in it. Therefore, you will probably want to keep a hard copy record of some or all of the information contained in Dbssystem.db. For example, if a user forgets a log-in value (such as group, log-in name, or password), you will want to have that information available.

The **Reports** menu illustrated in Figure 14-15 allows you to display or print security information about users and files.

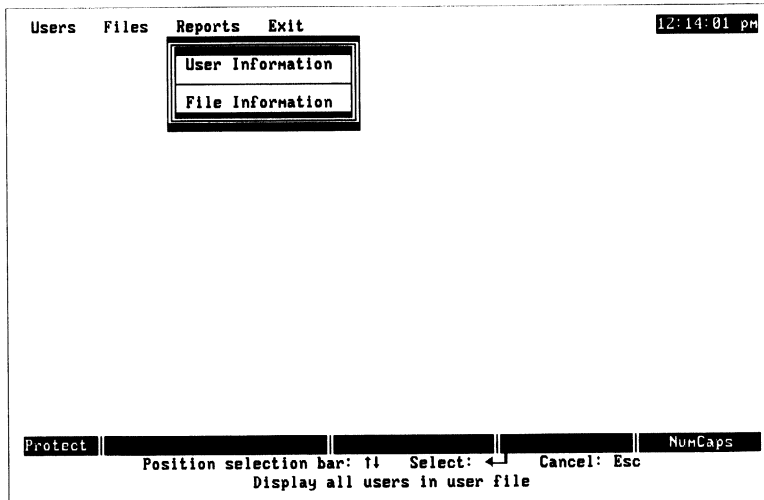


Figure 14-15 **Reports** menu

The User Information Report lists the names of all system users, their passwords, group names, account names, and levels.

The File Information Report lists:

- the name of the selected dBASE file
- the group to which the file is assigned
- the file privileges
- the name of each field in the file
- the field privileges

The File Information Report cannot be run on a file that has not been saved.

Selecting the **User Information** option displays a prompt box with the message **Send report to the printer? (Y/N)**.

Entering Y sends the output to the printer, and entering N displays the output on the screen.

Selecting the **File Information** option first displays a list of the available encrypted (.crp) files. Select a file from the list. The system displays the prompt **Enter Group Name:.**

Enter the correct group name for the selected database file. The system displays a box with the prompt **Send report to the printer? (Y/N)**.

Entering Y sends the output to the printer, and entering N displays the output on the screen.

Exiting from Protect Data

The **Exit** menu contains three options:

- Save
- Abandon
- Exit

Select **Save** to post all new and updated user profiles and file privilege schemes that have been stored during the current session. User profiles are saved in the current `Dbssystem.db` file. File privilege schemes are saved in the database file structure. You can save user profiles at any point during a **Protect data** session. You must save file privilege schemes after you define or change eight of them. Database files are encrypted when the file privilege scheme is saved.

Select **Abandon** to cancel all new and updated user profiles and file privilege schemes not already saved during the current session.

Select **Exit** to encrypt and save new and updated user profiles and updated file privilege schemes, and terminate the procedure. You return to where you started the procedure, either the Control Center or the dot prompt.

Other Considerations

Keep the general considerations discussed in this section in mind as you build and use a protected database system.

Data Encryption

Be aware of the following:

- When a database file's privilege scheme is saved, dBASE IV creates an encrypted version of the database file with a `.crp` extension. To enable security, you should:
 1. Copy the encrypted file (`.crp`) over the unencrypted file (`.dbf`) at the DOS prompt, changing the extension to `.dbf`, as follows:

```
COPY <filename.crp> <filename.dbf>
```

You may want to copy the unencrypted file to a floppy disk and store the floppy disk in a secure place.
 2. Delete the `.crp` file, as follows:

```
ERASE <filename.crp>
```
 3. If the file has a memo field, you must also rename the `.cpt` file so that it has a `.dbt` extension.
- Index files are only encrypted when you reindex or create them with an encrypted database file.

- You can control when copied files are encrypted through the SET ENCRYPTION command. (See the Using SET ENCRYPTION section.)
- The time required to encrypt files depends on the size of your files. Files are encrypted when you select **Save** or **Exit** on the **Exit** menu of the **Protect data** procedure. If you are saving file privilege schemes of large files, it may take some time to exit.

You can use the BUILD utility to encode application program files.

Using SET ENCRYPTION

Even after a database system has been protected, the database administrator and application programmer maintain control over encryption of copied files.

If a database system has been protected, SET ENCRYPTION is ON by default. If you SET ENCRYPTION OFF, files created with the COPY command will not be encrypted. SET ENCRYPTION is entered at the dot prompt. Refer to *Language Reference* for more information on the SET ENCRYPTION command.



NOTE

The COPY TO command with the DELIMITED, SDF, or WKS options does not respect encryption. Files created with these options while SET ENCRYPTION is ON are unencrypted.

General Security Considerations

Security is only as good as its degree of control and confidentiality. Maintaining the integrity of the security system is your first responsibility. Be sure you consider the points below when establishing your security system.

1. Decide how your users are to be assigned logins. Are they to select their user log-in name, password, and group membership, or will you assign the login? If they are to select values for the login, be sure that they know how to make such a request, how long user names and passwords can be, and what characters can be used in them.
2. Once passwords are determined, make sure that you keep your password secret and that your users understand the importance of keeping their user log-in names and passwords secret.
3. If a user wants to create a file and protect its contents, make sure the user knows how to communicate that requirement to the database administrator prior to creating the file. You may wish to use a form to facilitate communication between yourself and your users, and also to have a hard copy of security information. You can use copies of the security request form included later in this chapter (see Figure 14-17), or develop your own. A completed security request form (Figure 14-16) is also provided for your reference.

4. Develop a strategy for retaining the database administrator password in a secure place so that it can be available should it be forgotten or otherwise needed. Make sure it is well protected from unauthorized access.

Security Request Form

Enter drive ▼ ▼ Enter path

Server/Directory file in | D : \ DBASE

Group name	A	G	E	N	T	S				◀ Enter 1 to 8 alphanumeric characters
User name	L	O	U	I	S					◀ Enter 1 to 8 alphanumeric characters
File name	A	V	A	L	-	F	L	T		◀ Enter 1 to 8 alphanumeric characters

File Privileges								
	◀ Least Restrictive					Most Restrictive ▶		
	1	2	3	4	5	6	7	8
Access Level			X					
Extend		X						
Delete								
Read								X
Update						X		

▲ Enter X at Most Restrictive Level ▲

Field Privileges									
Fld. No.	Field Name	Type of Access and Access Level							
		1	2	3	4	5	6	7	8
1	AFLT_NO						F		
2	ADEP_CITY						F		
3	ADES_CITY						F		
4	ADATE						F		
5	ADEP_TIME						F		
6	AARR_TIME						F		
7	AClass						F		
8	ASEAT_AVL						F		
9	AFARE						F		
10									

▲ Enter Field Name ▲ Enter F for Full, N for None, or R for Read-only ▲

Figure 14-16 Completed security request form

Security Request Form

Server/Directory file in Enter drive ▼ ▼ Enter path
 | : \

Group name

 ◀ Enter 1 to 8 alphanumeric characters

User name

 ◀ Enter 1 to 8 alphanumeric characters

File name

 ◀ Enter 1 to 8 alphanumeric characters

File Privileges									
	◀ Least Restrictive				Most Restrictive ▶				
	1	2	3	4	5	6	7	8	
Access Level									
Extend									
Delete									
Read									
Update									

▲ Enter X at Most Restrictive Level ▲

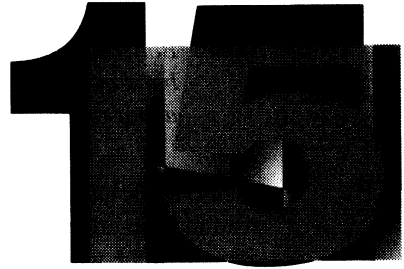
Field Privileges										
Fld. No.	Field Name	Type of Access and Access Level								
		1	2	3	4	5	6	7	8	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

▲ Enter Field Name

▲ Enter F for Full, N for None, or R for Read-only ▲

Figure 14-17 Blank security request form

Using the Program Editor



Use the program editor to edit memo fields, program files, and report word wrap bands.



NOTE

Each of these three has a slightly different version of the program editor. For instance, some text styling options can be used in report word wrap bands, but are not available in program files. As you read this chapter, you will see which option works in a particular environment.

The program editor is different from the layout editor used to design labels and forms. One way to distinguish between the two editors is to think of the program editor as a tool for writing and the layout editor as a tool for drawing (see Chapter 9 for more information on using layout mode).

This chapter tells how to:

- Set margins in word wrap report bands
- Set automatic indent in programs
- Move, copy, and delete selected text
- Use your own external editor

There is also a short discussion of creating applications (this topic is covered in depth in Chapters 18 through 21 of this manual).

Word Wrap Mode

Memo fields, report word wrap bands, macros, and the command line editing window (but not program files) all use word wrap mode. Word wrap mode works like a traditional word processor. It treats text as long character strings that wrap inside the margins. When you remove or add a section of text, the editor automatically wraps and rearranges the rest of the text.

**NOTE**

Both the word wrap and layout modes are used in designing reports. Each band in a report is in either word wrap or layout mode. For more information about report bands, see Chapter 10.

Memo fields and programs can use only text (characters typed in from the keyboard or read in from other files). However, a word wrap band in a report uses an enhanced version of the word wrap mode, giving you additional control over margins, tabs, and print styles.

You can also place fields from a database file inside a word wrap band of a report. When you print the report, these fields are filled with data. This lets you print reports that combine fixed text with changing data (see Chapter 11).

**NOTE**

Word wrap mode, whether in a memo field or in a word wrap band of a report, does not support line or box drawing.

Accessing the Editor for Program Files

There are three ways to access the program editor from the Control Center to work on *program files*:

- Press **Alt-E** to open the **Exit** menu. Press \downarrow to go to the dot prompt and type **MODIFY COMMAND <filename>**. If you don't specify a drive, directory, or file extension, dBASE IV assumes the default drive and directory, and a .prg extension.
- Select the **Tools** menu and type D for **DOS Utilities**. Highlight the .prg file you want to edit and press **Alt-O** to open the **Operations** menu. Select the **Edit** option.
- Highlight **<create>** in the **Applications** panel and press \downarrow . Select the **dBASE program** option.

**NOTE**

The editor used to edit program files is similar to the ones used to edit memo fields and report word wrap bands. For information on how to access a memo field (which gives you access to the program editor in the memo field), see Chapter 4. For information on setting up and accessing a word wrap band on your reports design screen (which provides you with access to the program editor there), see Chapter 10.

Using the Ruler in a Report Word Wrap Band

The following sections (Navigating the Ruler, Setting Margins, Creating an Outdent or an Indent, and Setting Tab Stops) describe how to use the ruler in the report word wrap band only. These options are not available in the version of the editor for program files and memo fields. However, the section on Hiding the Ruler is applicable to all three environments.

Navigating the Ruler

Report word wrap bands start with a default right margin of 255. You can adjust the right margin with the **Modify ruler** option on the **Words** menu. Once you have entered the ruler, move with the cursor keys or **Spacebar**. In addition, **Ctrl**-→ and **Ctrl**-← move the cursor right and left eight spaces. **Tab** and **Shift-Tab** move the cursor right and left one tab stop, respectively.

End and **Home** move the cursor to the right or left edge of the portion of the ruler displayed on your screen. If the cursor is already at the right edge of the screen, press **End** to display the next section of the ruler. If the cursor is at the left edge of the screen, press **Home** to display the previous section of the ruler.

Here is more information about rulers in report word wrap bands:

- When you delete the margin or indentation markers, these items reset to their default values. The left margin and indentation return to zero, while the right margin resets to the maximum width available.
- When you assign more than one marker to the same place on the ruler, only one of the markers can be shown. The order of precedence is margin, indentation, tab, then column number.

In other words, if you place a margin marker on top of a tab marker, the margin marker will hide the previous tab marker. The tab marker will still be active, and if you move the margin marker away from this place, the tab marker will again be visible.

- To abandon the changes you just made, press **Esc**. To keep your changes, press **Ctrl-End** or ⌘.

Setting Margins

You can individually set both left and right margins paragraph by paragraph in a report word wrap band (but not in memo fields or programs). These margins are indicated by a left bracket (l) for the left margin and a right bracket (r) for the right margin.

When you first enter a new report word wrap band, the right margin is set at 255. The right bracket is not visible. You should reset the right margin before continuing. When you change the margin of a paragraph, all the text in that paragraph is reformatted to fit within the new margins, but the other paragraphs remain unchanged.

As shown in Figure 15-1, two paragraphs can have different margins on both the left and the right.

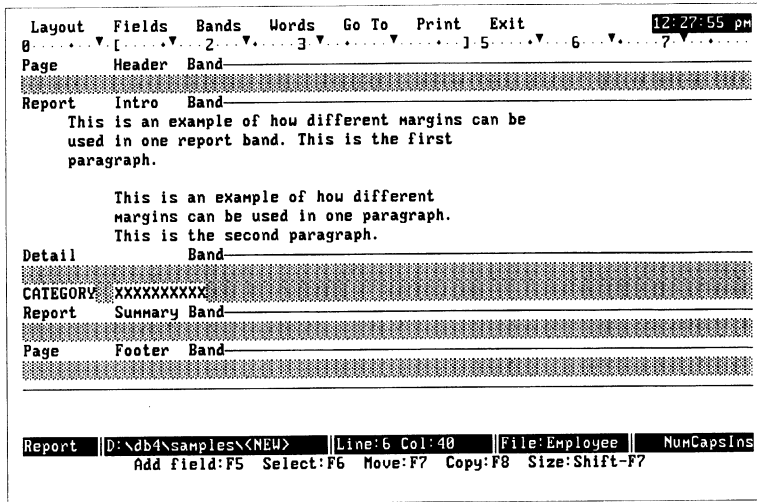


Figure 15-1 Margins in report word wrap band

To set a margin in a report word wrap band:

1. Move your cursor inside the word wrap band whose margin you want to set and press **Alt-W** to open the **Words** menu.
2. Type **M** to select the **Modify ruler** option. The cursor moves into the ruler.
3. Move the cursor with the **←** and **→** keys to where you want the margin to be.
4. Type left bracket (**[**) for a left margin and right bracket (**]**) for a right margin and press **↵**. The cursor returns to the word wrap band and the margin is set.

Reports can be up to 255 characters wide.

If you want to reset both the left margin and the indentation point to zero, enter 0 (zero) when modifying the ruler.



NOTE

While you can change the right margins in report word wrap bands, the right margins in memo fields and program files cannot be changed. Memo fields always wrap at 65 characters and program files are always 1,024 characters wide.

Creating an Outdent or an Indent

To create an *outdent* (where you have a margin that wraps inside of where you can begin typing) or an *indent* (where the margin wraps to the left of where you begin typing):

1. Select the **Modify ruler** option in the **Words** menu.
2. Type [where you want the left margin and type # where you want the outdent or indent.
3. Press ↵.

With an outdent (see Figure 15-2), you can set up a margin to wrap inside of where you begin typing.

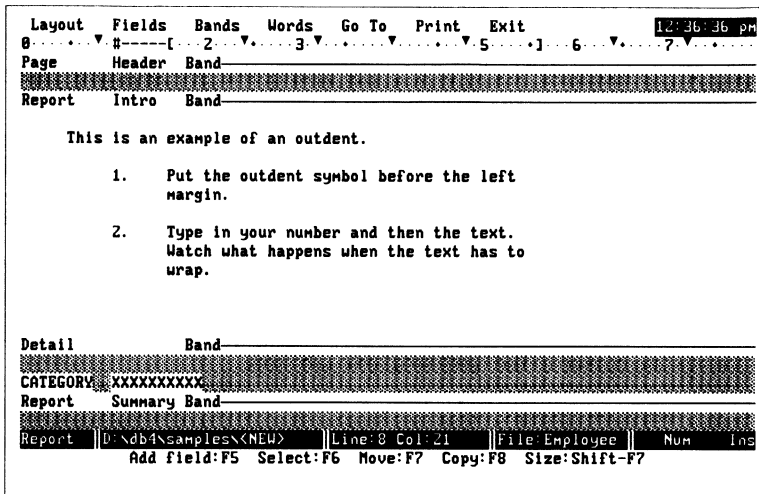


Figure 15-2 Outdent in word wrap mode

Setting Tab Stops

To set a tab stop in the ruler, select the **Modify ruler** option in the **Words** menu and type an exclamation point (!) in the ruler where you want the tab to be. Preset tab markers appear on the ruler as triangles.

To set tabs at a specified interval, type = while still on the ruler. At the prompt, enter the number of spaces you want between tabs. Enter zero for no tabs.

Clear tabs with **Del** or **Backspace**.



NOTE

The **Modify ruler** option is not available for editing memo fields, programs, or text files. The tab stops in these situations use the standard tab stop settings established for your configuration of dBASE IV. You can change these settings with the **TABS** setting in your *Config.db* file.

Hiding the Ruler

To hide the ruler at the top of the screen, open the **Words** menu, highlight **Hide ruler**, and press ↵ to set the option to **YES**.

Automatic Indenting

Change the left margin in a program file, memo field, or a report word wrap band with the **Enable automatic indent** option on the **Words** menu. With this option, you can quickly set up indented blocks of text and distinguish programming constructs such as **IF** and **DO WHILE** sections from surrounding lines of code.

When **Enable automatic indent** is set to **YES** and the cursor is at the beginning of a paragraph, **Tab** and **Shift-Tab** reset the left margin to the next or previous tab stop. To return to the left margin, use **Shift-Tab** until the text is brought back to the margin.

When **Enable automatic indent** is set to **NO**, **Shift-Tab** moves the cursor to the previous tab stop. If **Insert** is **OFF**, pressing **Tab** moves the cursor to the next available tab stop. If **Insert** is **ON**, pressing **Tab** inserts a tab character (moving the text to the right), and moves the cursor to the next available tab stop.

Also, if **Enable automatic indent** is set to **NO**, **Home** returns you to the far left margin.

Editing Text

The following sections explain how to enter, alter, and move text, as well as describing other word processing features.

Entering Text

You can enter text in two different ways: with **Insert ON** or **OFF**. With **Insert ON**, new characters push existing characters to the right. With **Insert OFF**, new characters replace existing characters.

You can tell whether you have Insert ON or OFF by looking at the cursor. When Insert is ON, the cursor is taller. The status bar also displays the letters **Ins**. With Insert ON, **↵** starts a new paragraph and positions the cursor at the beginning of this new paragraph. The new paragraph inherits the formatting of the old paragraph. With Insert OFF, **↵** merely moves the cursor to the next line down (unless the cursor is at the bottom of a report word wrap band). Insert mode defaults to ON when you enter a file.

When you write programs in dBASE IV, the text is saved as an ASCII file. This means you cannot store styling information or preserve special tab settings in programs.

Deleting Text

To delete one character, press the **Del** key once. To delete the character before the cursor, press **Backspace**. To delete characters from the cursor position to the beginning of the next word, press **Ctrl-T**. To delete the current line, press **Ctrl-Y**. To delete the previous word, press **Ctrl-Backspace**.

When you press **Backspace** with Insert OFF, the character to the left of the cursor is replaced by a blank space, the cursor moves to this blank space, and all the other text and fields remain as they were.

To delete an extended selection of text:

1. Move the cursor to the beginning of the text that you want to delete.
2. Press **F6 Extend Select**.
3. Move the cursor to the end of the text that you want to delete. The text is highlighted.
4. Complete the selection by pressing **↵**.
5. Press the **Del** key and then type Y. The block of selected text is deleted.



NOTE

When a field is in an extended selection in a report word wrap band, deleting the extended selection will only delete that field if its entire field template is included in the selection.



TIP

*Pressing **F6 Extend Select** twice selects the entire word. Pressing it three times selects the current paragraph. See Table 15-1 for more information on using **F6 Extend Select**.*

Moving and Copying Text

To move and copy text selections:

1. Move the cursor to the beginning of the text that you want to copy or move.
2. Press **F6 Extend Select** .
3. Move the cursor to the end of the text that you want to move or copy. Notice that the text is highlighted.
4. Complete the selection by pressing ↵.
5. Place the cursor where you want to move or copy the selection.
6. When the cursor is positioned where you want it, press **F7 Move** or **F8 Copy**. The selected material is moved or copied.

When designing a report, you can move and copy material between different bands. If you are copying from a layout band to a wrapping band, simply make a selection, move the cursor to the desired new location, and press **F7 Move** or **F8 Copy**. When you copy from a wrapping band to a layout band, you are able to position the selection's outline before pressing ↵ to finish the move or copy.



TIP

If you want dBASE IV to help wrap text that will eventually be placed in a layout band, you can write the text in a word wrap band and then move it to a layout band. Once the text is moved, though, it will no longer wrap if you make changes.

Quick Selections

You can select large amounts of material by pressing **F6 Extend Select** several times. This special use of **F6 Extend Select** is shown in Table 15-1.

Table 15-1 Extended selections

Location	Second F6	Third F6
Word wrap	Word or field	Paragraph
Forms	Current line	Entire form
In forms box	Box, border characters, and box interior	Entire form
On forms box border	Box and border characters	Box, border characters, and box interior
Reports layout band	Current line	Entire band
Labels	Current line	Entire label

Undo an extended selection by pressing **Esc**.

Adding a Line

To add a line after the current line, you can use the **Add line** option in the **Words** menu. **Ctrl-N** adds a line, moving any text from the cursor to the end of the line onto the next line. ↵ adds a line in the same way as **Ctrl-N** when **Insert** is ON. When **Insert** is OFF, ↵ merely moves the cursor to the next line (except in the last line of a report word wrap band).

Removing a Line

Either the **Remove line** option on the **Words** menu or **Ctrl-Y** removes the current line. They are equivalent to selecting all the characters on the current line and pressing **Del**.

Inserting a Page Break

Use the **Insert page break** option on the **Words** menu to insert a page break just above the current line. This option is not available on the forms or labels screens.

Searching For and Replacing Text

To search forward for a particular string of text, use the **Forward search** option in the **Go To** menu. This option finds the next text string that matches the search string. To search backward, use the **Backward search** option.

To find a particular text string with the **Forward search** option:

1. Press **Alt-G** and then type F to choose the **Forward search** option.
2. When prompted for the search string, type it in. (No quotes are needed, since search criteria are *strings*, not *expressions*.)
3. Press ↵.

To find text without regard to capitalization, set the **Match capitalization** option to **NO** before doing a backward or forward search. For instance, if **Match capitalization** is set to **NO**, then a search string of *demille* finds *DeMille*, *DEMILLE*, or *Demille*.

If **Match capitalization** is set to **YES**, then a search string of *DeQuincy* does not find *dequincy* or *DEQUINCY*. In this case, the search string must match the text exactly.

Using the Program Editor for Non-Program Files

There are three ways you can use the dBASE IV editor to write or modify text files even if they are not dBASE programs:

- From the Control Center, choose the **DOS utilities** option from the **Tools** menu. Place the highlight on the name of the file you want to edit, then choose the **Edit** option from the **Operations** menu.
- If you are on the program editor screen, choose the **Modify a different program** option from the **Layout** menu. Then enter the exact name of a file you want to edit, including its extension. Press ↵.
- From the dot prompt, type `MODIFY FILE <filename>`. You can then use word wrap mode to work with your non-program file.

Using an External Editor

You may use any editor to write programs, text files, or memo fields. When you use an external editor, make sure you save your work in the editor to an ASCII file.

Use the TEDIT and WP settings in your Config.db file to tell dBASE IV that you want to use your own editor. Word wrap bands in reports are not affected by either WP or TEDIT. They always use the built-in word wrap mode of dBASE IV.

Programs and Files

With the TEDIT setting, you can use an external editor to edit programs and files. You can also bring up your external editor when you choose the **Edit** option from the **Options** menu on the **DOS utilities** menu bar. This menu bar is reached through the **Tools** menu.

The TEDIT setting also determines which editor is used in the command line editing window. You can open this window by pressing **Ctrl-Home** at the dot prompt or SQL prompt.

Memo Fields

You can use an external editor for memo fields by using the WP setting in your Config.db file. If you use an external editor for memo fields, however, use the ASCII mode of the editor. This will ensure that special control characters the text editor might otherwise insert will not make it difficult to work with these memo fields in dBASE IV.

Find out more about the WP and TEDIT settings in Chapter 2 of *Getting Started with dBASE IV*. The word processor you use may be limited by the amount of available memory.

Writing and Reading Text Files

Two options are available for exchanging text between a design surface and other files: **Write text file** and **Read text file**.

Writing Text to a File

The **Write text file** option on the **Words** menu prompts for a filename and then writes the current selection to that file. If there is no current extended selection, the entire text or layout is written to the file. You can also use **Ctrl-KW** to write text to a file.

Reading Text from a File

The **Read text file** option prompts for a filename. You can type in the filename or press **Shift-F1 Pick** to choose a file from a list of available .txt files. dBASE IV inserts the contents of the specified file at the current position. You can also use **Ctrl-KR** to read text from a file.

Editing a Different Program

To edit a different program from the current one, use the **Modify a different program** option in the **Layout** menu. If you made any changes to the current program, first save those changes (you are prompted to do so before switching files). Then enter the name of the program file to modify, or press **Shift-F1 Pick** to see a list of the available .prg or .prs files.

You can also enter the full name of ASCII files other than program files if you want to edit them from this screen.

Editing the Program Description

To modify the catalog description of the current program file, use the **Edit description of program** option in the **Layout** menu. If no catalog is open, this option is dimmed.

Printing Programs

The **Print** menu for programs is almost identical to the basic **Print** menu described in Chapter 13. There is, however, one special option for the program editor.

The **Line numbers** option prints the line number at the left of every line. These line numbers help you keep track of where you are, especially in large programs.



NOTE

The line number on or off setting is not saved when you save settings to a print form.

Saving the Program

You can choose to save changes and continue working, save changes and exit the program editor, or abandon your changes and exit the program editor.

Saving Changes and Continuing

To save program coding changes as you go along, use the **Save this program** option in the **Layout** menu. You can also use this option to copy the current program by saving it under a different name.

You can also press **Ctrl-↵** to save the current program at any time.

Saving Changes and Exiting

To save changes and exit, use the **Save changes and exit** option on the **Exit** menu or press **Ctrl-End**. If you came to the program editor from the Control Center, you return to the Control Center. If you came from the dot prompt or a program, you return to the dot prompt or program.

Automatic Backups

When you save a program, dBASE IV automatically creates a backup copy of the file you are working on. This file has a .bak extension.



WARNING

If you need to use a .bak file, rename it with a .prg extension before editing it. dBASE IV won't let you edit and save a .bak file.

Abandoning Changes and Exiting

To abandon changes and exit, use the **Abandon changes and exit** option on the **Exit** menu. After you select this option, you are asked to verify that you really do want to abandon your changes.

If you came to the program editor from the Control Center, you return to the Control Center. If you came from the dot prompt or a program, you return to the dot prompt or program.

Running the Program

Use the **Run program** option on the **Exit** menu to run the program with which you are working. This shortcut saves any changes to the program, then immediately runs it. This option is not available in report word wrap bands or memo fields.

When the program finishes, you return to either the Control Center or the dot prompt, depending on where you came from.

Running the Debugger

The *debugger* is a special work surface that appears when a program error is encountered. To use the debugger after modifying a program, choose the **Debug program** option from the program editor's **Exit** menu. This saves the current program, turns on the debugger, and displays the debugger screen.

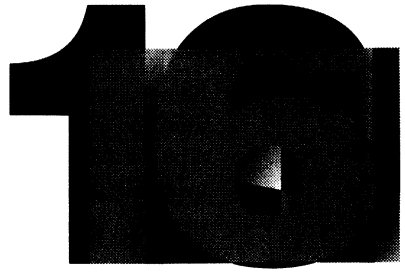
When you select this menu option, you may enter a list of optional parameters to be passed to the program. When the program finishes, you return to the Control Center.

You can also prepare to use the debugger by setting TRAP ON. With TRAP ON, when your program encounters an error, you are sent into the debugger (instead of receiving an error box). From the Control Center, set TRAP ON through the **Settings** menu in the **Tools** menu.

You can also enter the debugger by entering the DEBUG command at the dot prompt.

For more information about the debugger, see *Language Reference* and Chapter 15 of *Programming in dBASE IV*.

dBASE II Convert



Use the dCONVERT utility to convert non-database dBASE II files.



NOTE

*Even though it is possible to convert dBASE II database files with dCONVERT, it is recommended that you use the **Import** option on the **Tools** menu. See Chapter 14 for information on converting database files.*

dCONVERT converts dBASE II files to dBASE III PLUS files, which can be used by dBASE IV. The dBASE II files that you may want to convert are the index files (.ndx), format files (.fmt), and report form files (.frm). Programmers may want to convert command files (.prg) and memory files (.mem).

This chapter describes:

- How to run dCONVERT
- What happens during the conversion process

Starting dCONVERT

You can run dCONVERT either through a menu or from the operating system. After deciding which method you prefer, follow the appropriate instructions.

Running dCONVERT by Menu

Start dCONVERT by entering the following command at the operating system prompt, substituting the appropriate drive labels:

```
dconvert <source path:> <destination path:>
```

The source drive is the location of the dBASE II files. The destination drive is where dCONVERT should put the converted files. If you want the new files to end up on the same drive as the originals, just type `dconvert ↵`, and the program assumes that all the files belong on the same drive as dCONVERT. Hard disk users can work entirely on drive C.

A menu appears with possible file types, as well as **Instructions** and **Exit** options. Continue as follows:

1. Select a menu item by highlighting it and pressing ↵, or by typing the appropriate number. After you select the file type, dCONVERT displays a list of files of that type on the current disk (or source drive if it was specified) and the amount of available disk space.
2. Enter the filename you want to convert and press ↵. As you enter each filename, dCONVERT makes the conversion. If you have more than one disk to convert, you can replace the disks in the source and destination drives between conversions. You may not specify a different disk drive through the menu.

Running dCONVERT from the Operating System

At the operating system prompt, type `dconvert <filename> <destination drive:>` to convert the named file. The filename must include the file type extension, such as `.frm` or `.mem`, and the drive designator, such as `A:`, if it is different from the currently logged drive.

This method allows wildcards in the filename. Wildcards are the asterisk (*) and the question mark (?), and they behave exactly as they do in the DIR command (see *Language Reference*). When the conversion is complete, the program returns to the operating system.

Conversion Process

Because converting a large file may take some time, dCONVERT sends a message that it is still working by printing a period every few seconds. When the conversion is complete, the original dBASE II file is renamed so that the last letter of the file extension is **b**, for backup file. For example, dBASE II memory files change from `.mem` to `.meb`. During the conversion, the new file is temporarily named with the extension `.dcv`. At the end of a successful conversion, the new file has the same extension as the original file. To prevent dCONVERT from pausing between conversions, press **Spacebar** after each conversion.

Converting Non-Program Files

dBASE II `.ndx` index files cannot be fully converted to dBASE III PLUS `.ndx` files. Instead, dCONVERT produces a special command file with the same name as the index file and a new extension of `.rx`. To recreate the index file from the dot prompt, first USE the associated database and then type `DO <index filename>.rx`.

Unlike dBASE II, dBASE IV report (`.frm`) files are not in ASCII text format. dCONVERT will make the necessary changes for you. Some of the report options in dBASE II are not available in dBASE III PLUS. You can modify the `.frm` file once you are in dBASE IV to gain back these options (such as, right justifying and centering headers).

Memory (.mem) files are also converted to dBASE III PLUS format. The new memory file is much larger than it was in dBASE II. dCONVERT changes embedded colons in memory variable names to underscores.

Before attempting to use dCONVERT to convert .dbf files, refer to the NOTE at the beginning of this chapter.

Converting Program Files

dCONVERT handles most of the conversions described in this chapter automatically. However, because dBASE II syntax has been changed in many ways, it can't do a complete conversion of command files. When it reaches a problematic statement, dCONVERT adds a comment, preceded with *!! to help you find it quickly.

When dCONVERT has finished processing your command files, it's a good idea to print out both the dBASE II and dBASE III PLUS versions. By reading them side by side, you'll be able to find the automatic conversions and study the comments on changes that you have to make yourself.

The first statement in a converted file is a comment that notes the version of dCONVERT used to create it. This is followed by the statement SET HEADING OFF in the new command file. Normally, dBASE IV shows field names above field columns on a LIST or DISPLAY. SET HEADING OFF suppresses these field name headings. If you want to take advantage of the field labels, just delete this new line. The next line, SET SAFETY OFF, turns off warning messages before overwriting files.

The major changes not handled by dCONVERT deal with PUBLIC and PRIVATE memory variables and ALIASes. Command files that use macros may also include syntax changes you'll have to make yourself.



NOTE

If your dBASE II program uses memory variable names which could be confused with logical constants T, F, Y, or N, dCONVERT will change them to the new logical constants .T. or .F. You'll then have to change them back to variable names or, better yet, rename them.

Certain dBASE II commands, such as TEST, RESET, SET DATE TO, and SET RAW, have no direct counterparts in dBASE IV. If your program requires any of these commands, check *Language Reference* for the closest dBASE IV equivalent.

The Applications Generator

Applications and the dBASE IV Applications Generator

Introduction to the Applications Generator

A Sample Application

Building Your Own Application

Applications and the dBASE IV Applications Generator



The Applications Generator is an easy-to-use tool that frees you from programming while providing you with the flexibility to create customized applications. It shortens development time by automatically generating dBASE program code you'd ordinarily have to write. The ability to add dBASE code to your applications means you also have access to all the power of the dBASE language itself.

This chapter, and Chapters 18 and 19, explain the concept of applications and how to use the Applications Generator to develop a sample application.

Chapter 20 contains the information you'll need as you build your own applications with the Applications Generator. It describes the Applications Generator menu bar and menu options in detail.

This chapter focuses on the background information you need to effectively use the Applications Generator. It defines the term *application* and explains how the Applications Generator relates to other product components. It then describes the design issues involved in developing an application.

What's an Application?

The terms *application* and *program* are often used interchangeably. A *program* is a set of commands, written in a programming language such as the dBASE language, that does some computing task.

The following program shows some of the commands you may have already used. It references a fictitious database file, *Money.dbf*, which contains information about customers who owe money, and prints a list of customers who need to be reminded to pay their accounts.

```
USE Money INDEX Last
SET FILTER TO Owing
LIST TO PRINTER
CLEAR
LIST FOR Pastdue TO PRINTER
CLEAR
SUM Amount_due FOR Owing
SUM Amount_due FOR Pastdue
REPORT FORM Reminder FOR Owing PLAIN TO PRINTER
REPORT FORM Warning FOR Pastdue PLAIN TO PRINTER
```

Rather than typing these commands every time you wanted to print these reports, you could put the commands in a program file named, for example, `Overdue.prg`. To run the program, you'd enter `DO Overdue` at the dot prompt or choose it from the Control Center **Applications** panel.

An *application* is a set of programs, such as `Overdue.prg`, that does various related tasks. Broadly speaking, dBASE IV is an application. It's a large application that allows you to do a multitude of tasks with databases, including building other database applications.

What's the Applications Generator?

The dBASE IV Applications Generator is a component of dBASE IV that helps you build applications of your own. The Applications Generator creates the program code needed to run an application, which means that you can build applications without writing programs. For example, using the Applications Generator, you could create a personal application that would store names and addresses of friends, remind you of important dates, balance your checkbook, and keep an inventory of your belongings for insurance purposes.

You could also create a medical office application to handle medical and billing records, inventory, and tax records. This application might require on-screen forms for adding information and printing invoices and financial reports. Whether simple or complex, your application can be built easily and quickly with the Applications Generator.

In this manual, the term *application* has an additional meaning. An application built with the Applications Generator refers to a set of *objects* (database, index, and query files, reports, forms, menus, lists, and so forth) that work together. You create some of the objects through the Control Center or dot prompt, such as database files and reports. Others, such as menus and lists, you create with the Applications Generator. The Applications Generator then generates the dBASE code needed to tie the objects together as an application. Figure 17-1 illustrates the relationship of objects in an application built with the Applications Generator.

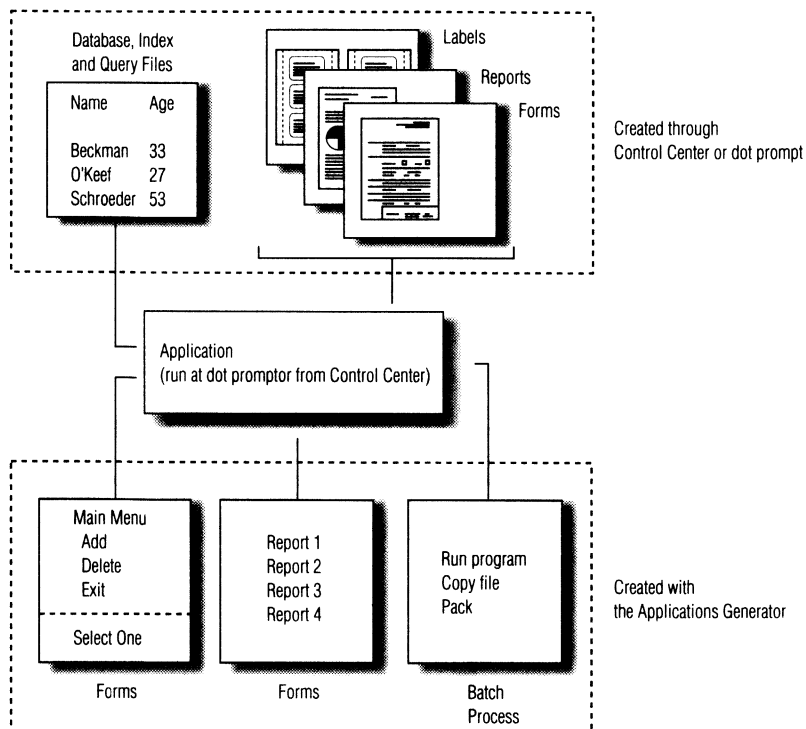


Figure 17-1 Objects in an application

Designing an Application

If you're new to application development, you may want to learn some basic application design principles before using the Applications Generator. If you do, read through the rest of this chapter. If you're ready to get started, however, skip to Chapter 18, "Introduction to the Applications Generator."

Creating an application that serves the needs of the user takes some planning. The following discussion introduces principles that will help you plan effectively, but it's not intended to be a comprehensive treatment of the subject.

Analyzing a Work System

You design an application in response to the requirements of a work system that may or may not already be computerized. For example, a video rental store may have its customers listed on computer but not its inventory, or the employees may keep manual records of customers and inventory. So, the first step in designing an application is assessing the work system: what is needed and by whom? If the application is for someone other than yourself, you should involve them in the analysis. You can do that by asking the following questions:

- What reports and mailings are needed?
- What forms are used in record keeping?
- What do they wish their current system could do?
- What is the expertise level of the users of the proposed application?
- What plans for expansion should be built into the application?

Once you have this information, you can follow the steps shown in Figure 17-2 to prepare an application design plan.

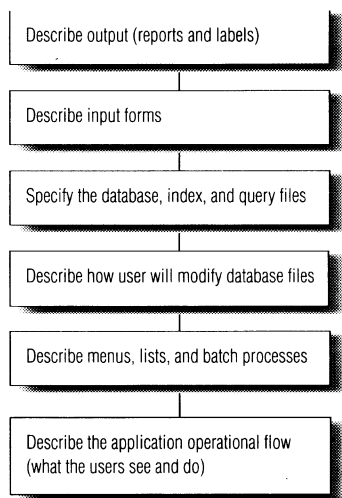


Figure 17-2 Planning an application

You'll see a sample application design in Chapter 19, "A Sample Application."

If you plan your application before using the Applications Generator, you can greatly reduce the time spent building the application. Planning will also help you maintain and update your application later. Fortunately, you can easily modify the objects in your application, so you're not bound by one design approach.

The techniques for creating compact, efficient databases are thoroughly discussed earlier in this manual. This section discusses how these objects connect in an application.

Refining the User Interface

A user interface is what the user sees on the screen — the menus and forms through which the user views, adds, or changes data. A simple, well-designed user interface makes the user's job easier, even enjoyable.

Once you know the menus, reports, and forms you'll need, you can spend some time refining them. You can create the forms and reports through the Control Center or dot prompt and customize them to your tastes. Then, with the Applications Generator, you can easily generate the menus for your application.

Because you have many options for customizing, you should consider some of the issues involved in creating the user interface. These include:

- Where information should be placed on the screen for maximum effectiveness
- Where to present error messages
- How much information should be on a typical screen
- How to format a menu
- When to use highlighting, color, and sound
- What to consider when assigning function keys

The following guidelines address these issues. Of course, there are exceptions to every rule, so let your good judgment be your guide.

1. Put important information in the center of the screen. For a standard 80-column by 24-line screen, try to place the main message, whether text or a menu, between columns 10 and 70 and rows 6 and 19.
2. Display the same type of information in the same place. Error messages are an example of information that should be placed off center and in the same location every time.
3. Avoid screen clutter. Use blank spaces to separate columns and to indent information.
4. Format stand-alone, vertical menus carefully. Guidelines include:
 - a. Start each menu with a heading.
 - b. Format the menu with an uneven right margin, rather than presenting the menu in block style. (Aligned right margins are harder to read.)
 - c. Limit the number of menu items to nine or fewer.
5. Emphasize areas of the screen with decorative borders, highlighting, and underlining.

6. For applications being designed for color systems, use color sparingly, especially in the standard interface (menus, window frames, and dialog boxes).
7. If the application is for a system with a monochrome adapter, generate the code on a system with a monochrome adapter; for a color system, generate the code on a color system. You can also generate two versions, one for color and one for monochrome. You can recompile the color version on a monochrome system, and it will run; but screens set up for color and displayed in monochrome may be confusing and difficult to read.



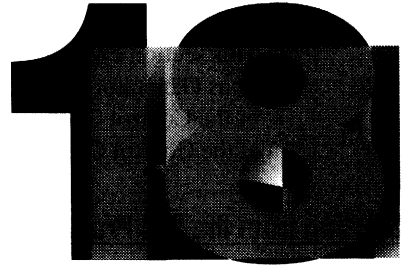
NOTE

Some computers (such as laptops and portables) have a color card, but a monochrome screen. dBASE IV perceives these as color systems. For such systems, generate the color version of the application and then check each screen to ensure that it is readable. If it is not, you can modify the application and regenerate it.

8. Consider matching function key assignments as closely as possible to other applications similar to yours. For example, **F10** is a key that many applications use to call menus.

The time invested in design is time well spent. You'll find the other tasks of application building much less difficult if you think your design through. Later in this section, you'll have the opportunity to use these design principles in a sample application. In the next chapter, you'll learn more about the Applications Generator — how to use it and what it can do for you.

Introduction to the Applications Generator



The previous chapter introduced you to the issues involved in application design and how the Applications Generator can simplify the process of building an application. This chapter tells you how to quickly enter the Applications Generator and describes the Applications Generator desktop. You'll then see how to leave the Applications Generator.

Understanding the Applications Generator

The Applications Generator is an easy-to-use tool for building both simple and complex applications. The job of building applications is made easier by the Applications Generator's "what you see is what you get" (WYSIWYG) environment. Once you've decided what menus and other objects your application will feature, you can create and position them where you want them to appear when the application is run.

While you can build many fully functional applications without writing programs, the Applications Generator also gives you the ability to add dBASE code to your applications. This access to the powerful dBASE programming language gives you flexibility to design an application as complex as you, or your users, want it.

The ability to create objects (database and query files, reports, forms, menus, lists, and batch processes) in any order you want is another benefit of the Applications Generator. If you change your design while you're building the application, you can easily return to other design screens to create these objects.

You can also save time by creating generic objects that can be easily customized for particular users. For example, you might create a set of objects for an office application. Then, when you need to develop an application for a specific client, all you have to do is modify the application you've already created.

It is most efficient to design ahead, and create the necessary databases, queries, forms, and reports before you build the application. But you can build the menus, lists, and batch processes first, if you prefer.

Starting the Applications Generator

This section explains how to enter the Applications Generator. Because the Applications Generator is a component of dBASE IV, you can start from either the dot prompt or the Control Center. If you're relatively new to dBASE IV, you should probably start at the Control Center.

Starting from the Dot Prompt

To create a new application from the dot prompt, type:

```
create application <application name>
```

and press ↵.

For information about choosing an existing application, see *Modifying Your Application* in Chapter 19.

Starting from the Control Center

To create an application from the Control Center, follow these steps:

1. From the Control Center, move the cursor to the **Applications** panel, move the highlight to **<create>**, and press ↵. A dialog box appears.
2. Choose **Applications Generator** from the dialog box by pressing → and then pressing ↵. You will see the Application Definition screen shown in Figure 18-1.

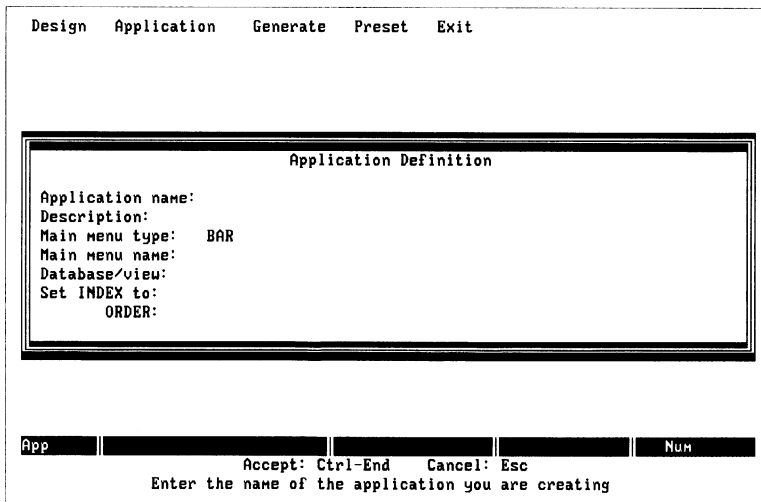


Figure 18-1 New application definition

3. At the **Application name** field, type `testapp` and press ↵.

An entry in this field is required. Try to give it a name that you or your users can easily identify from a list of application files. The Applications Generator assigns the `.app` extension to the name entered here. You'll see the name and extension in your disk directory.

4. At the **Description** field, type This is a test application and press ↵. An entry in this field is not required.
5. At the **Main menu type** field, press the **Spacebar** to see the types of objects that can start your application. Select **POP-UP**, and press ↵ to move to the next field.

The default object type is **BAR**, a horizontal bar menu (such as the menu at the top of the screen). A pop-up, or vertical, menu (**POP-UP**) and batch process (**BATCH**) can also serve as a main menu. (A batch process can do several tasks behind the scenes, one of which might be opening a menu.)

6. Skip the **Main menu name** field by pressing ↵.

Later, when building your own applications, you can enter the name of the menu or batch process that you want to start your application. If you haven't yet created it, type in a name that dBASE IV can recognize. If it has been created, press **Shift-F1 Pick**, and choose it from the list that appears.

The Applications Generator assigns the three-character extension `.bar` if the starting menu is a horizontal bar menu, `.pop` if it's a pop-up menu, or `.bch` if it's a batch process. You'll see this name and extension in your disk directory later.

An entry in this field is not required at this time. You can specify the main menu at any time while building the application, or when you generate code.

7. At the **Database/view** field, type `testdbf` and press ↵.

This is the name of the database file or view associated with this application. When building your own applications, you can type in the name or press **Shift-F1 Pick** to choose one from the current catalog or directory.

This is the database file or view that you want to serve as the default for the application. Later, you can override the default by assigning a different database file or view for specific objects or items. For example, each menu in your application can use a different database file. An entry in this field is required, although you can name a database file or view that hasn't yet been created.

8. Skip the **Set INDEX to** field by pressing ↵.

This field accepts the name of the index or indexes associated with this application, if any. Later, if you want to use index files (`.mdx` or `.ndx`) in your own application, you can enter the names here, separated by commas. You can also choose one or more index files from a list that appears when you press **Shift-F1 Pick**.

9. Leave the **ORDER** field blank.

This field accepts the index order number or name of a new controlling index, if any. You can type in the order number or name.

10. To finish defining the application object, press **Ctrl-End**.

Now you can see the entire Applications Generator desktop with the application object on it.

The application object always stays on the desktop. You can resize and move it (using keys described later) to unclutter the *work surface*, the area of the desktop on which it appears. If you wish, the application object can serve as the first screen your users see, and you can change the information that appears in it. For example, you can include a greeting to your users, such as **Welcome to this Application**, or a title, such as **The Address Manager**, in the application object.

When used as the initial screen of an application, this object is called a *sign-on banner*. You'll learn how to specify that the application object be used as a sign-on banner in the next chapter.

The number of other objects (for example, menu objects) that the work surface can hold depends on the amount of memory used by dBASE IV and the Applications Generator at the time. If you try to create more objects than the Applications Generator can handle, a message appears that tells you to put away some objects first. You can always bring these objects back to the work surface if you need to modify them.

You can only work on one application at a time.

Getting to Know the Desktop

Now that you've created an application object, you're ready to look at the Applications Generator desktop more closely.

The Applications Generator desktop has several elements. The Applications Generator menu bar and information lines at the top and bottom of the screen, respectively, provide you with the tools for creating your application. The work surface is where you position your objects just as you want them to appear when your application is run.

The Applications Generator Menu Bar

The Applications Generator menu bar is a horizontal bar menu with associated pull-down menus. To try out the menu bar, press **F10 Menus**. Move across the menu bar by using the cursor keys, just as you would in the rest of the menu system.

The Applications Generator menu bar is dynamic, meaning that its options change depending on the object that is current, or selected by you. For example, when an application object is current, the menu bar automatically displays **Application**. The options in the **Application** menu are used to specify attributes for your application (for example, you can change its name or description).

The menus on the Applications Generator menu bar are briefly described in the following pages. Take a look at the options in each menu as you read the descriptions.

Design

You choose the type of object you want to create or modify from the **Design** menu. The options in this menu don't change. Brief descriptions of each option follow.

Horizontal bar menu. Use this option to create a menu in the same style as the Applications Generator menu bar.

Pop-up menu. A pop-up menu is a general term that describes both pull-down menus (menus attached to a horizontal bar menu) and any other vertical menus in your application.

Files list. A Files list is similar to a menu, except it displays a single type of item: the names of files available to the users of your application.

Structure list. A Structure list gives the field names of a database or view that you want to make available to the users of the application.

Values list. A Values list gives the field values, or contents, of a particular field in one of the database files or views used in your application.

Batch process. A batch process works behind the scenes, performing actions without the intervention of the user. In other words, the user doesn't see the object at work. For example, you could create a batch process that automatically copies a file and packs a database file.

Application, Menu, List, and Batch

When you select an object on the work surface, the second menu on the Applications Generator menu bar changes to reflect your choice. For example, if the current object is a horizontal bar menu, the menu changes to **Menu**. The menu can change to **Application**, **Menu**, **List**, or **Batch**, depending on what type of object is current. You'll see this happen in the next section.

The options in the **Application**, **Menu**, **List**, and **Batch** menus are used to assign particular attributes to that object. For example, from **Menu**, you could choose the **Write help text** option. This option is used to create help text related to a menu.

**NOTE**

From the **Application** menu, you can also choose **Generate quick application** to automatically build a single-menu (pop-up) application. This application allows users to append, edit, browse, and pack a database file that you specify. It will also run a report and label and, if assigned an index, it will have an option to reindex.

Item

You must make an object other than an application object current before **Item** appears on the Applications Generator menu bar:

1. Choose **Pop-up menu** from the **Design** menu.
2. Choose **<create>** from the displayed list. A dialog box appears in which you're asked to enter the name, description, and message line prompt.
3. For now, just enter **testpop** in the **Name** field, and press **Ctrl-End**.

The cursor appears in the empty object frame on the work surface, and **Menu** and **Item** appear in the Applications Generator menu bar. Type the following items in this pop-up menu object:

Add a record
Edit a record
Quit

4. Now press **F10 Menus** and review the options in the **Item** menu.

The options in the menu are used to define what action a menu item, batch item, or list does. For example, choose **Change action** to see some of the actions an item in the pop-up menu might perform.

Notice that the last item in your menu, **Quit**, appears in the middle of the status bar. That is the currently selected item to which you'd assign an action (probably the **Quit** action). To make another item current, press **PgUp** until the item you want appears in the status bar. (You can also use **PgDn** to move down an item.)

Press **Esc** to exit the submenu.

**NOTE**

To avoid confusion, menu options refer to menus in the Applications Generator itself, and menu items refer to actions you assign in your application objects.

Generate

This menu always appears on the Applications Generator menu bar. It provides options for generating a description of each of your objects, and for generating the dBASE code that allows you to run your application.

Preset

This menu always appears on the Applications Generator menu bar. It allows you to specify defaults for how your future applications will look (for example, the type of border around pop-up menus). Each application you create in the Applications Generator will automatically have the defaults you specified from the **Preset** menu before the application was created. You can change them for a particular application if you wish by choosing options from the **Application** menu.

Exit

This menu always appears on the Applications Generator menu bar. It provides options for saving or abandoning changes you made to the application and exiting the Applications Generator.

Selecting Options

As you saw when reviewing the **Item** menu, some options in menus lead to submenus. The > symbol to the left of some options indicates that the option leads to another menu from which you can make selections.

Many options lead to dialog boxes, which prompt you for information. To see a dialog box, choose the **Item** menu, **Change action** option, and the **Edit form** action. Some fields in these types of boxes can be filled in by typing the information or by pressing **Shift-F1 Pick** to choose from a displayed list. (Using the second method helps prevent entry errors.)

Other fields in dialog boxes display a default value. You can see the other possible values for a field of this type by pressing **Spacebar** or the first letter of a choice if you know it.

Later, you'll see smaller boxes in which you're asked to make a simple selection or prompted to enter information in one field. To make a selection, use the keystroke choices described for dialog boxes. To save your selection and exit these types of boxes, press ↵.



NOTE

For more detailed information about the Applications Generator menu system, see Chapter 20, "Building Your Own Application."

Help in the Applications Generator

Press **F1 Help** for context-sensitive help while in the Applications Generator.

The Work Surface

The application object and pop-up menu you've created are displayed on the work surface of the Applications Generator desktop. The work surface is a "what you see is what you get" (WYSIWYG) environment. That means you can position and size each object on the work surface the way you want it to appear when the application is run.

If you're still using the Applications Generator menu bar, press **Esc** until the cursor returns to the work surface. To make the application object current (bring it to the foreground), press **F3 Previous**.

The work surface features tools to make laying out your application easier. The grid on the work surface helps you align objects. The numbers at the bottom of the screen represent column position. The numbers in the left margin of the work surface represent the screen lines of your application.

Note that the work surface starts with the first line labeled **0** and ends with **20**. Line **0** is the top of the screen when the application is run. If you want access to all lines on a standard 24-line screen, press **F9 Zoom**, which causes the Applications Generator menu bar and information lines to disappear. Pressing **F9 Zoom** again brings them back to the screen.



NOTE

dBASE IV uses line 0 for indicators such as CAPS. In general, it is not a good idea to use this line in an application.

The following table explains how each function key is used. Press the appropriate key and proceed according to the instructions in the message line at the bottom of the screen.

Table 18-1 Function key assignments

Function key	Explanation
F1 Help	Provides Help wherever you are in the Applications Generator.
F3 Previous	Moves cursor to the previous object on the work surface, making that object current.
F4 Next	Moves cursor to the next object on the work surface, making that object current.
F5 Field	Marks beginning and end of an item when entering it in a horizontal bar menu (↵ may also be used instead of the second F5 to finish).
F7 Move	Moves an object to a new location on the work surface, or an item and all its attributes to a new location in the object or to a different object of the same type.
F8 Copy	Copies an item to another location in the same object or to a different object of the same type.
F9 Zoom	Displays or removes the Applications Generator menu bar and information lines, giving a full screen on which to lay out objects.
F10 Menus	Moves cursor from an object on the work surface to the Applications Generator menu bar. If in a menu, selects the current option.
Shift-F1 Pick	Displays a list when the cursor is on a field that provides a selection.
Shift-F2 Design	From the Control Center, displays selected application for modification.
Shift-F7 Size	Changes the length and width of the frames that enclose an object.



TIP

Use the function key strip that you received in your dBASE IV package as a reminder of these function key assignments.

Other navigation keys are listed in Table 18-2.

Table 18-2 Navigation keys

Key	Action
←	In an object, editing frame, or dialog box, moves cursor one position to the left In a bar menu, moves cursor one option to the left and opens an attached pull-down menu; wraps through options
→	In an object, editing frame, or dialog box, moves cursor one position to the right In a bar menu, moves cursor one option to the right and opens an attached pull-down menu; wraps through options
↑	In an object, editing frame, or dialog box, moves the cursor one position up In a pop-up menu, moves one option up (wraps around in menus)
↓	In an object, editing frame, or dialog box, moves one position down In a pop-up menu, moves one option down (wraps around in menus)
PgUp	In the Item menu, moves cursor to the previous item in the menu or batch process and makes the item current In a list, moves one page up
PgDn	In the Item menu, moves cursor to the next item in the menu or batch process and makes the item current In a list, moves one page down
Backspace	In an object, full-screen editing frame, or dialog box, deletes the previous character
Del	Deletes the current character
Home	In a dialog box or list, moves to the first field or option, respectively; in an enumerated field, moves to the first field; in a fill-in field, moves to the beginning of the field In a menu or full-screen editing frame, moves to the beginning of the line
Ins	Toggles Insert on and off
End	In a dialog box or list, moves to the last field or option, respectively; in an enumerated field, moves to the last field; in a fill-in field, moves to the end of the field In a menu or full-screen editing frame, moves to the end of the line

(continued)

Table 18-2 Navigation keys (continued)

Key	Action
Tab	In an editing frame, moves to the next tab In a dialog box, moves to the first character of the next field (with wrap); when on the last field, moves to the first field; has no action if the next field is an enumerated field to the first field
Shift-Tab	In an editing frame, moves to previous tab In a dialog box, moves to the first character of the previous field (no wrap); when on the first field, does not move to the last field
↵	In an Applications Generator menu, executes the currently highlighted option In a dialog box, confirms choice and moves to the next field In an object or full-screen editing frame, moves to the beginning of the next line
Spacebar	In a field with choices, cycles through the choices In an object, editing frame, or dialog box, enters a space at the cursor position
Esc	In an editing frame or dialog box, cancels the changes made and exit In the Applications Generator menu, exits to the current object on the work surface In an Applications Generator submenu, exits to the calling menu In an object, cancels all unsaved changes made to any object during the current session and asks whether to exit the Applications Generator Cancels a move or copy
Alt-<key>	In combination with the first letter of the desired menu, moves the cursor quickly to an Applications Generator menu
Ctrl-End	In a dialog box, editing frame, or multiple-choice list, saves the entries and returns the cursor to the originating menu option In submenus, exits to previous level In pull-down menus, returns to the work surface In an object, saves all changes and exits the Applications Generator
Ctrl-H	In a full-screen editing frame, deletes the previous character

(continued)

Table 18-2 Navigation keys (continued)

Key	Action
Ctrl-I	In a dialog box, moves to the first character of the next field; when on the last field, moves to the first field; has no action if the next field is an enumerated field to the first field
Ctrl-N	In an object or an editing frame, inserts a line above the line indicated by the cursor
Ctrl-T	Deletes to the end of the current word
Ctrl-W	In a dialog box or full-screen editing frame, saves the entry and returns the cursor to the originating menu option
Ctrl-Y	In an object or an editing frame, deletes the line indicated by the cursor
Ctrl←	In an editing frame, moves to start of a word
Ctrl→	In an editing frame, moves to beginning of the next word

Moving, Resizing, and Copying

You move, resize, and copy objects and items on the work surface. An object must be current or selected to perform these operations. If there are multiple objects on the work surface, press **F3 Previous** or **F4 Next** until the object you want to make current appears highlighted in the foreground. Pressing **Esc** abandons any of these operations. Use the row and column information in the status bar to help you move or copy an object.

To get some practice with these operations, follow the instructions in the next few paragraphs.

To move or resize the pop-up menu object, make sure it is the current object (press **F3 Previous** if necessary) and follow these steps:

1. Press **F7 Move** and choose **Entire frame** from the box that appears by pressing ↵, or press **Shift-F7 Size**. The object frame begins to flash, indicating that you can begin the operation.
2. Reposition the pop-up menu object or change its size, using the cursor keys. A new frame appears as you move the object.
3. When you are finished, press ↵. The original object moves to the new frame or expands or contracts to fit it. Note that if you overlay one object with another, the bottom object remains intact.

An object frame must be larger than the items within it. List objects can be made larger but not smaller than their default size.

To move or copy an item to a new location in the object or to a different object, select the item and follow these steps:

1. Press **F7 Move** and choose **Item only**, or press **F8 Copy**.
2. Use the cursor keys to position the item in the new location, and press ↵ to complete the move.

(To move the item to another object, use **F3 Previous** or **F4 Next** to select the object, and then do step 3 of the previous instructions.)



NOTE

An item cannot be moved or copied on top of other text.

*You can also insert an item between two others by pressing **Ctrl-N** to create a blank line and moving the item there.*

When you copy an item, all the attributes associated with the original item (including assigned action) also apply to the copy unless you specifically change them.

Working in Frames

As you've seen, when you first create an object, an empty frame in which you can enter menu or batch process items appears on the work surface. (If you created a list object, the items will be represented by Xs.)

Don't worry about making mistakes as you type. You can make changes with editing techniques you've already used in other dBASE IV components. (Refer to Table 18-2 if you need a refresher.) Because text is not automatically wrapped to the next line, you must provide your own carriage returns in these frames. To increase the line width, resize the frame, as explained in the previous section, **Moving, Resizing, and Copying**.

Sometimes you'll use a full-screen editing frame. You use these frames to enter help text or embed dBASE code, for example. You can enter up to 19 lines in a full-screen editing frame. Like the other frames, you must provide your own carriage returns, and press **Ctrl-End** to save and leave the frame. To see a full-screen editing frame, follow these steps:

1. Press **F10 Menus** to return to the Applications Generator menu bar.
2. From **Menu**, choose **Write help text**.

You'll see a full-screen editing frame in which you can enter text that will appear when the user of your application presses **Help**. Note that this frame does not use the editing keys associated with the command editor.

3. For now, press **Esc** to exit the frame without saving it.

Leaving the Applications Generator

After you've defined objects to meet your design requirements, you can generate object documentation or generate code to run the application. Object documentation describes the objects you created and is useful as a record of your application. Code is needed to test and distribute your application. Or, you can simply leave the Applications Generator until another work session. The steps for creating a complete application and for generating documentation and code can be found in the next chapter. For the test application, you'll leave the Applications Generator without generating code and documentation.

1. Go to the **Exit** menu.
2. Choose **Abandon all changes and exit**.

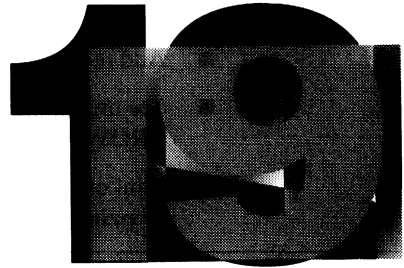
The Applications Generator asks you to confirm that you want to abandon all changes.

3. Press ← to choose **Yes** and press ↵.

You then return to the Control Center or dot prompt, depending on the component you used to enter the Applications Generator.

Now that you're familiar with the Applications Generator, you can begin to create a fully functional application. In the next chapter, you'll see a design for a sample application and the steps for creating it.

A Sample Application



This chapter describes how to build a sample application with the Applications Generator. First, you'll see the sample application design, which you'll use to create the menus and other objects in the Applications Generator. The reports, forms, and labels specified in this design are provided with dBASE IV. This description is followed by a diagram that outlines the general tasks you do to build this application in the Applications Generator. Finally, you'll see the specific steps for doing so.

A Sample Application Design

The following design describes a simple application that holds address information for personal use — for example, the information you'd ordinarily keep in an address book. It also records whether a person was sent a holiday card, and produces indexed reports for all names and for holiday card recipients. When you build this application, you'll assign the name *<INI>Names*, where *<INI>* represents your initials.



NOTE

You can use this design approach as a guide for the design of your own applications.

Operational Flow

This application will include the following capabilities:

1. Users will initially see an easy-to-use, horizontal bar menu of the features, which include updating records, generating reports and labels, backing up and packing the database file, and exiting the application. The items on the horizontal menu bar will be Updates, Reports, Maintenance, and Exit.

2. Users will be provided with items for the following actions:
 - Add records, using the **Add/Edit/Delete in EDIT** action
 - See or edit multiple records on a single screen, using the **Add/Edit/Delete in BROWSE** action
 - Print or display a report of the entire file indexed by name, using the **Display or print** action
 - Print or display a report of the people who received holiday cards, indexed by name, using the **Display or print** action
 - Print labels for all records, using the **Display or print** action
 - Print labels for a holiday card mailing, using the **Display or print** action
 - Run a batch process that makes a backup copy and packs the database file, using the **Run program** action

Building the Sample Application

The steps below describe how to build the sample application in the Applications Generator. These instructions take an hour-and-a-half to two hours to complete. If you need to leave your work before finishing, simply press **F10 Menus** to return to the Applications Generator menu bar (if needed). Then choose **Save all changes and exit** from the **Exit** menu. You'll return to the Control Center, where you can end your session. To start up again, select your application from the **Applications** panel and continue where you left off.

While you must define an application object first, you can build the other objects (menus and batch process) and assign actions to each item in any order you want. These instructions, however, emphasize creating all the objects first and assigning actions to the items later. To get the broad picture of the tasks involved in building a sample application, refer to Figure 19-1.

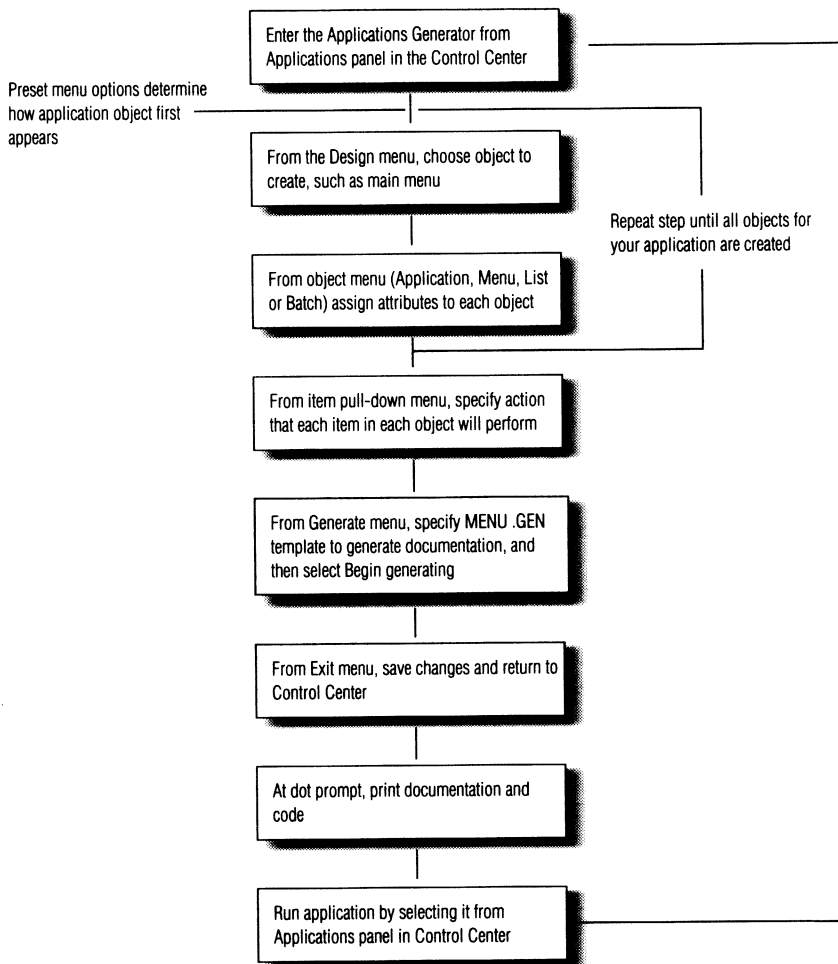


Figure 19-1 Building the sample application

Defining an Application Object

Defining the application object is the first step you take when building any application in the Applications Generator.

1. From the Control Center, choose **<create>** from the **Applications** panel, and press ↵.
2. From the dialog box that appears, use → to choose **Applications Generator** and press ↵.
3. At **Application name**, enter the name of the sample application, **<INI>NAMES**, where **<INI>** represents your initials.

4. At the **Description** field, enter a description of the sample application — for example, Names, Addresses, and Holiday Card Recipients.
5. At the **Main menu type** field, accept the default **BAR**, which indicates a horizontal bar menu.
6. At the **Main menu name** field, enter **MAIN**, the name of the main menu for the sample application.
7. At the **Database/view** field, press **Shift-F1 Pick** to select **PEOPLE** from the displayed list.

The database file you specified is the default database file for this application. It is used by every menu and batch process in the sample application.



NOTE

People.dbf and other files used in the sample application are sample files from the SAMPLES subdirectory. If you did not install the sample files, you can do so using the menu-driven installation. See Chapter 1 of Getting Started with dBASE IV.

8. Skip the **Set INDEX to** field. dBASE IV always opens the production .mdx file.
9. At the **ORDER** field, enter Names, which is a tag in People.mdx.
10. When finished, press **Ctrl-End**.

You see the entire Applications Generator desktop with the defined application object on the work surface, and **Application** displayed in the Applications Generator menu bar.

The application object always remains on the work surface. The information in it comes from the default information specified with **Preset** menu options.

In the next section, you'll specify that this object be the first screen displayed when the application starts. When used in this way, the application object becomes a *sign-on banner*. To prepare the object to be a sign-on banner, follow the next step.

11. Erase the default information by typing over it (or by pressing **Ctrl-Y** to remove lines), and add a greeting to your users — for example, <Your Name>'s Name and Address Manager.



NOTE

*The remaining instructions in this chapter assume that you know how to get to the Applications Generator menu bar (by pressing **F10 Menus** or **Alt** plus the first letter of a menu on the Applications Generator menu bar) and that you know to press ↵ when choosing options from the Applications Generator menu bar or from a displayed list.*

Specifying Attributes for an Application

You can modify and define certain attributes of an application by using the options on the **Application** menu. For example, you can change its name and description or specify new colors for the objects in your application. For the sample application, you're going to specify that the application object serve as a sign-on banner.

1. From the **Application** menu, choose **Display sign-on banner**.
2. Choose **Yes** from the dialog box that appears, and press ↵.
3. To save this application object, choose **Save current application definition** from the **Application** menu.

Defining a Menu

While you can build the remaining objects in any order, a logical place to start is with the main menu. For the sample application, the main menu is a horizontal bar menu. In the future, you can use a horizontal bar menu for a main menu, including associated pull-down menus, or your main menu can be a pop-up or batch process type.

Defining a Horizontal Bar Menu

A horizontal bar menu is often used as a main menu in an application. The process of creating horizontal bar menus differs from that of other objects because you use **F5 Field** to mark the beginning and end of an item.

1. From the **Design** menu, choose the **Horizontal bar menu** option.
2. From the displayed list, choose **<create>**.

A dialog box appears in which you enter the name, description, and message line prompt for this menu.

3. In the **Name** field, enter **MAIN**.

Notice that this is the name of the main menu you specified when you created the application object.

4. In the **Description** field, enter Names and Addresses Main Menu.
5. Skip the **Message line prompt** field.
The messages for each attached pull-down menu, which you'll specify later, will tell the user how to navigate in your application.
6. Press **Ctrl-End** to finish the definition. The cursor displays at the top left-hand corner of the work surface within a frame.
Now you're going to type the items for this horizontal bar menu.
7. Press **F5 Field** to mark the position of the first item of the horizontal bar menu.
8. Press → a few times to leave a margin, then enter UPDATES, and press **F5 Field** again to mark the end of the item.
9. Use the **Spacebar** or → to position the next item, and repeat steps 7 and 8 for the following items: REPORTS, MAINTENANCE, and EXIT.
10. If the items on this menu bar are not spaced to your preference, remove spaces between the items with the **Del** key, or insert spaces by pressing **Ins** and the **Spacebar**. Do not insert spaces directly before the first character of the pad, or they will become part of the pad. You can also move the pad with **F7 Move**.

Assigning Attributes to a Menu

Next, you're going to specify that the horizontal bar menu will automatically display its pull-down menus.

1. Choose **Attach pull-down menus** from **Menu**.
2. Answer the prompt **Pull-down associated menus...** by choosing **Yes**.
3. To save the menu and remove it from the work surface, choose **Put away current menu** from **Menu**. From the dialog box that appears, accept the default, **Save changes**.



WARNING

When designing your own applications, refer to About Inheritance in Chapter 20 before choosing the **Attach pull-down menus** option.

Defining a Pop-Up Menu

A pop-up menu can be a vertical menu that appears alone or a pull-down menu attached to a horizontal bar menu item.

Defining a pop-up menu is essentially the same process as defining a horizontal bar menu. The major difference is that you just type the items in the object frame, rather than pressing **F5 Field** before and after the item.

For the sample application, you'll create pop-up menus that serve as the pull-down menus to each item on the horizontal bar menu you just created.

1. Choose the **Pop-up menu** option from **Design**.
2. From the list that appears, choose **<create>**.
3. In the **Name** field, enter **UPDATES**.
4. In the **Description** field, enter **This is the pull-down menu for the UPDATES item.**
5. In the **Message line prompt** field, enter **Use the up and down cursor keys to choose options from this menu.**
6. Press **Ctrl-End** to finish the definition and display the object on the work surface.
7. Press **Shift-F7 Size** and use the → to widen the borders of the frame about five characters (use the grid to guide you). To finish, press ↵.

Resizing the frame was necessary to accommodate the width of one of the items, which you'll type in next.

8. In the object frame, type the following items for the Updates pull-down menu:

```
Add a record
Change/Delete a record
-----
Remember to back up the
file after updates.
See Maintenance.
```

The dotted line and the text below it are informational items only.

9. To save the menu and remove it from the work surface, choose **Put away current menu** from **Menu**. From the dialog box that appears, accept the default, **Save changes**.

Follow steps 1 through 6 and 8 through 9 to create each of the remaining three pull-down menus of the sample application. (You need not resize these menus.) The other pull-down menu names are **REPORTS**, **MAINTNCE**, and **EXIT**. You can add descriptions and message line prompts; however, they're not required to run the application. The items for each of these pull-down menus follow. You'll need this information to complete step 8 of the process just described.

REPORTS

- All Names Report
- Card Report
- All Records Labels
- Holiday Labels

MAINTNCE

- Back up file

EXIT

- Exit application

Next you're going to define the batch process.



NOTE

*For more information about the options in the **Menu** menu, see Chapter 20.*

Defining a Batch Process

Use a batch process when you want to assign more than one action to an item. The batch process does these tasks behind the scenes — that is, without the intervention of the user. The batch process in the sample application copies **People.dbf** to a backup file, **Peoplbak.dbf**. It then packs the database file, which includes erasing records marked for deletion, reindexing, and reclaiming the disk space used by the erased records.

1. Choose **Batch process** from the **Design** menu.
2. From the list that appears, choose **<create>**.
3. In the **Name** field, enter **BACKUP**.
4. In the **Description** field, enter **COPY** and **PACK** batch process for the Backup file item.
5. Press **Ctrl-End** to finish the definition and display the batch object on the work surface.

6. Type the actions you want the batch process to do, one action to a line as follows:

```
Copy People.dbf to Peoplbak.dbf
Pack People.dbf
```

Note that these are not commands. They are descriptive text lines; you will assign actions to each of these lines later.

7. To save the batch process object and remove it from the work surface, choose **Put away current batch process** from **Batch**. Then accept the default, **Save changes**.

Now you're going to assign actions to each object, item by item.

Assigning Actions to an Object

The next step involves assigning actions to the objects you just defined. The actions you assign now will be performed when you run your application later.

Assigning Actions to a Menu

First, you're going to assign actions to the horizontal bar menu.

1. Choose **Horizontal bar menu** from the **Design** menu.
2. From the displayed list, choose **MAIN**.
3. Choose the first item in the main menu: **UPDATES**.
4. Choose **Change action** from the **Item** menu.

A menu appears from which you can choose an action.

5. Choose **Open a menu**.

You'll see a dialog box in which you're asked to provide the menu type and name this item will open.

6. Choose the menu type by pressing **Spacebar** until **POP-UP** appears in the **Menu type** field.
7. In the **Menu name** field, enter **UPDATES**.
8. Press **Ctrl-End** to finish, and then **PgDn** to move to the next item, **REPORTS**.

Notice that **REPORTS** appears in the center of the status bar at the bottom of the screen. You can use **PgDn** and **PgUp** as a shortcut method of selecting items in an object.

You're going to assign the **Open a menu** action to the other three items in this main menu. So, repeat the previous steps, changing the name in the **Name** field accordingly (see step 8). For the **REPORTS** item, assign the pop-up menu **REPORTS**. For the **MAINTENANCE** item, assign the pop-up menu **MAINTNCE**. For the **EXIT** item, assign the pop-up menu **EXIT**. When you're finished, choose **Put away current menu** from **Menu** and select **Save changes** from the dialog box.

The process just described is used to assign actions to other menu items. To use this process for the other menu items, see the steps and table that follow.

1. Make another menu current by choosing it from the **Design** menu. For example, choose **UPDATES** from the **Pop-up menu** option in **Design**.
2. Select an item in the menu — for example, **Add a record**.
3. Look at Table 19-1 to determine which action you should assign to the item.
4. From the **Item** menu, choose the action, and follow the instructions given in the table.
5. Choose the next item, if any, in the menu, and assign an action to it as specified in the table.



NOTE

*Remember to save the item actions for a menu when you've finished specifying them. You do that by choosing **Put away current menu** from **Menu**, and selecting **Save changes** from the dialog box that appears.*

Table 19-1 Sample pull-down items and actions

Menu Name	Item	Action (from Item menu)
Choose UPDATES	Choose Add a record	Choose Change action Choose Edit form In FORMAT file field, enter ADDBOOK Accept other defaults by pressing Ctrl-End
	Choose Change/Delete a record	Choose Change action Choose Browse Accept defaults by pressing Ctrl-End
	————— Remember to back up your file after updates. See Maintenance.	[Since these lines are Text (no action) , the default, you don't need to assign an action to them.]

(continued)

Table 19-1 Sample pull-down items and actions (continued)

Menu Name	Item	Action (from Item menu)
Choose REPORTS	Choose All Names Report	Choose Change action Choose Display or print Choose Report In the Form name field, enter ALLNAMES At Send output to , choose ASK AT RUN TIME (press Spacebar to display) Accept other defaults by pressing Ctrl-End
	Choose Card Report	Choose Change action Choose Display or print Choose Report In the Form name field, enter CARDREC At Send output to , choose ASK AT RUN TIME (press Spacebar to display) In the FOR field, enter CARDSENT Accept other defaults by pressing Ctrl-End
	Choose All Records Labels	Choose Change action Choose Display or print Choose Labels In the Form name field, enter MAILALL Accept defaults by pressing Ctrl-End
	Choose Holiday Labels	Choose Change action Choose Display or print Choose Labels In the Form name field, enter CARDONLY In the FOR field, enter CARDSENT Accept defaults by pressing Ctrl-End

(continued)

Table 19-1 Sample pull-down items and actions (continued)

Menu Name	Item	Action (from Item menu)
Choose MAINTNCE	Choose Back up file	Choose Change action Choose Run program Choose Execute BATCH process In the Batch name field, enter BACKUP Ctrl-End
Choose EXIT	Choose Exit application	Choose Change action Choose Quit Choose Quit to DOS Press ↵ at the OK prompt

Assigning Actions to a Batch Process

The steps to assign actions to batch process items are the same as those used to assign actions to menu items. Batch processes are special, however, in that you first assign the action to *run* the batch process to a menu item or list. Then you specify the actions the batch process *performs* when the user selects the menu item.

For the sample application, you've already assigned the action to run the **Backup** batch process to the **Back up file** item in the Maintenance pull-down menu. Next, you're going to specify the actions that the batch process performs when the menu item is selected by the user.

1. From the **Design** menu, choose **Batch process**.
2. From the displayed list, choose **BACKUP**.
The batch process object appears on the work surface with the items you specified earlier.
3. Choose the first item, **Copy People.dbf to Peoplbak.dbf**.
4. From the **Item** menu, choose **Change action** and, from the submenu that appears, the **Perform file operation** option.
You'll see a list of actions.
5. Choose **Copy records to file**.
A dialog box appears in which you're asked to enter the database file to which you wish to copy People.dbf.

6. Press **Shift-F1 Pick** and choose **PEOPLBAK**, or type **PEOPLBAK** if the file does not yet exist.
7. Accept the **of type** default, and press **Ctrl-End** to finish.
8. Press **PgDn** to display the next item, **Pack People.dbf**, in the status bar near the bottom of the screen.
9. From **Item**, select **Change action** and **Perform file operation**.
10. From the submenu, choose the **Discard marked records** option, and press **↵** to confirm your choice.
11. To save the batch process and remove it from the work surface, choose **Put away current batch process** from **Batch**. From the dialog box that appears, accept the default, **Save changes**.



NOTE

For more information on the actions you're assigning to items, note the command equivalent, which appears to the right of each action. Then refer to the Language Reference manual for an explanation of the command.

Laying Out the Application

Now that you've defined the objects of your application and assigned actions to the items in the menus and batch process, you're ready to lay out the application. This determines what your users see when your application is run.

First, retrieve the main menu for your application.

1. From **Design**, choose **Horizontal bar menu**.
2. From the displayed list, choose **MAIN**.

The main menu of your application appears at the top of the work surface. Next, retrieve the pull-down menus. By moving and resizing the pull-down menus, you can make your application aesthetically pleasing.

3. To retrieve the Updates menu, choose **Pop-up menu** from **Design**.
4. From the displayed list, choose **UPDATES**.

The Updates menu appears on the work surface.

5. To position the menu under the **UPDATES** item, press **F7 Move** and accept the default, **Entire frame**, from the dialog box.
6. Use **←** and **↑** to position the flashing frame under **UPDATES**. To accept the new position, press **↵**.

7. To resize the menu, press **Shift-F7 Size** and use the cursor keys to remove or add extra space to your menu. When you're satisfied with the results, press ↵.

Use steps 1 through 5 as a guide for positioning the other pull-down menus in the sample application. Note that you can overlay the pull-down menus if the items in them are wider than the space between the items in the horizontal bar menu.

When the application is run, only one pull-down menu displays at a time. So, don't worry if the items in one pull-down menu overlap the items of the pull-down menu beside it at this stage. You can also move back to the horizontal bar menu by pressing **F3 Previous**, and add spaces between the items.

8. To get a better idea of how your application will appear at run time, press **F9 Zoom**.

Pressing this key removes the Applications Generator menu bar and information lines at the bottom of the screen. When you're ready to proceed, press **F9 Zoom** again.

9. To save the new layout, choose **Clear work surface** from **Application** or **Menu**. When prompted, choose **Save changes** for each object.

Next, you'll generate the object documentation and code for running your application.

Generating Object Documentation and Code

Object documentation is a record of the objects you created. When printed, it's useful for noting changes you want to make as the application is run. The dBASE programs generated to run your application constitute the *code*.

Generating Object Documentation

To generate the object documentation for your application:

1. Choose the **Display during generation** option from the **Generate** menu. Choose **Yes** to see the object documentation as it's generated.
2. Choose **Select template** from the **Generate** menu.
3. Type the documentation template name, DOCUMENT.GEN, and press ↵.
4. Select **Begin generating**.

A small box appears in which you're asked whether you have a graphics compatible printer. This type of printer will give you better quality object documentation when you print it later.

5. Accept the default, N (for No), or type Y (for Yes), and press ↵.

You'll see the object documentation as it's generated. The Applications Generator creates an object documentation file called <INI>Names.doc, where <INI> represents your initials, for this application.

Generating Code

To generate the dBASE IV programs to run your application:

1. Choose the **Display during generation** option from the **Generate** menu. Choose **Yes** to display the code as it's generated.
2. Choose **Select template** from the **Generate** menu.
3. Type the code template name, MENU.GEN, and press ↵.
4. Select **Begin generating**.

You'll see the code as it's generated. When you look in your disk directory, you'll see the two program files that run the application. The Applications Generator produces an <appname>.prg file and a <mainmenu>.prg file for each application.

Now that you've generated the object documentation and the code, you're ready to leave the Applications Generator, print the object documentation and code, and test your application.

Saving Changes and Exiting

To save your changes and exit the Applications Generator, choose the first menu option from **Exit**.

The Applications Generator saves all the changes made since the last time you saved. Then the Applications Generator returns to the Control Center.

Printing Object Documentation and Code

Printing the object documentation that the Applications Generator creates can help you evaluate your application and serve as a hard-copy record of your work. You print object documentation from the dot prompt. To leave the Control Center, press **F10 Menus** and choose **Exit to dot prompt** from the **Exit** menu.

To print the object documentation, make sure your printer is ready and that you have SET HEADING to OFF. Then, enter TYPE <INI>Names.doc TO PRINTER, where <INI> represents your initials.

Printing Code

Now you're going to print the code that you've generated. A printed version of the code is useful when you begin to run and test your application. You can more easily trace errors if you have the printed code. You enter the commands to print the code at the dot prompt.

1. To print the general procedures and environmental settings, enter TYPE <INI>Names.prg TO PRINTER, where <INI> represents your initials.
2. To print the code for object actions, and object and item level help, enter TYPE Main.prg TO PRINTER. (Main.prg is the name of the main menu, plus the .prg extension.)

Testing Your Application

The Applications Generator is simply a menu-driven method of generating program code. It creates a program that can be run like any other dBASE IV program, either by selecting it from the **Applications** panel and selecting **Run application**, or by typing `DO <application>` at the dot prompt.



NOTE

*You can learn about testing or debugging your application by referring to *About Testing Your Application* in Chapter 20, “Building Your Own Application,” the *DEBUG* and *SET TRAP ON* commands in the Language Reference manual, or the *Programming in dBASE IV manual*.*

Enhancing the Application

You could enhance this sample application in other ways. For example, you could give users the option to request a particular record when updating `People.dbf`. To do this, you’d create a Values list that contained the contents of the Lastname field. When users wanted to change a record, they’d choose a particular last name from the Values list, and the specified record would appear. For more information, see *Giving Users More Control* in the Chapter 20, “Building Your Own Application.”

This application can stand alone as a simple application, or it can be included in a more complex design as one module of a bigger application. For example, a personal application might include modules that keep an inventory of your personal possessions, balance your checkbook, and remind you of important dates, as well as keep records of names and addresses. Now that you’ve learned how to use the Applications Generator, you can design and build these modules on your own, or you can begin building other applications.

Modifying Your Application

To change this application or another existing application from the dot prompt, you would type `MODIFY APPLICATION <appname>` and press `↵` where `<appname>` is the name of an application you want to modify. You’ll see the Applications Generator desktop with your application object on it.

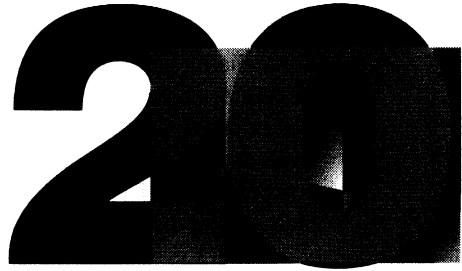
To change this application or another existing application from the Control Center, choose the application from the **Applications** panel and **Modify application** from the prompt box that appears (the box does not appear if `SET INSTRUCT` is OFF). Alternatively, move the highlight to the application name in the **Applications** panel, and press **Shift-F2 Design**.

You can then change the application attributes by choosing options in the **Application** menu, and by making changes to the objects associated with this application. For example, you can change actions that menu items perform, or fine tune the application by adding help text and changing color attributes. After making the changes, you must regenerate the code in order to see the changes reflected in the application when it is run. For more information about modifying an application, refer to About Generic Applications in Chapter 20.

Distributing Your Application

When you've become skilled in application development, you may wish to distribute your applications to others. The first time you run a newly created or modified application, *.dbo object code files* are created that run quickly and discourage others from tampering with your code. You can distribute these object code files to other dBASE IV version 2.0 users, or to users of other versions of dBASE IV if you did not use commands specific to version 2.0.

Building Your Own Application



Refer to this chapter when you're ready to build your own applications. It primarily describes the Applications Generator menu system, including each menu on the Applications Generator menu bar. You should already be familiar with the material in the previous three chapters before using this material.

About Dialog Boxes

Dialog boxes appear when you choose some options from the Applications Generator menu bar. Dialog boxes contain prompts and fields in which you enter data.

Making Choices

You can enter data for some fields in the dialog boxes by typing it, or by pressing **Shift-F1 Pick** to choose from a displayed list. For example, to specify an index file, you can either type the index filename, or you can press **Shift-F1 Pick** to choose from a list of index files in the current catalog or directory. The second method helps you avoid making entry errors that will prevent the application from running.

Other fields in dialog boxes display a default value. You can see the other possible values for a field of this type by pressing the **Spacebar** or the first letter of a choice if you know it. For example, to choose a pop-up menu and advance to the next field, you could press P. The instructions for each dialog box suggest the **Spacebar** technique, but you can use either of the two methods.



NOTE

A few small boxes require you to make a simple selection or prompt you to enter information in one field. To make a selection, use the keystroke choices described for dialog boxes. To save your selection and exit these types of boxes, press ↵.

Creating Non-Applications Generator Objects

Some dialog boxes include fields in which you can choose to create non-Applications Generator objects, such as database files, reports, forms, and labels. For example, if you're prompted to enter a database file that is not yet created, you can either name it without creating it then, or you can choose **<create>** from the list that appears when you press **Shift-F1 Pick**. Choosing **<create>** saves all the Applications Generator objects, and displays the appropriate design screen on which to create the object.

Saving and Exiting

For dialog boxes and full-screen editing frames, press **Ctrl-End** to save the information you entered and exit the box or frame. You can also press **Esc** to abandon the changes and exit the box or frame. For small boxes, you can save your selection or single entry and exit by pressing ↵.

About Catalogs

Applications Generator objects, such as menus, lists, and batch processes, are added to the current directory, not to the catalog. As a result, they do not appear in the Control Center. When an application object is saved, however, the new application name (the .app file) is added to the catalog and so appears in the **Applications** panel of the Control Center. If you've generated code for the application, you can run it from the Control Center. If you haven't yet generated code, you can select the application from the Control Center and choose **Modify application** from the dialog box that appears.

About Generic Applications

In the Applications Generator, you can work on just one application at a time. To work on an application other than the current one, you have two choices. You can save all objects, return to the Control Center or dot prompt, and enter the Applications Generator again, where you can choose to create or modify another application. Or, you can rename the current application, and modify and save it.

To use the application on the work surface as a model for a new application, change the name of the application object and any objects you want to modify just for the new application. Use the **Name and describe** option in the second menu on the Applications Generator menu bar. Then save the objects, using the **Save current <object>** option in the same menu. Next, modify the objects associated with the new application. When you save again, the Applications Generator will store the newly named application while retaining the original.

About Inheritance

For design purposes, the application object (.app) is the key object in the application, and its filename appears in the Control Center representing all objects used in the application. All Applications Generator objects inherit attributes assigned to the application object (except for menu border) during a session. For example, when you assign a database file to the application object, it is automatically assigned to every new object used by that application unless you specifically override the assignment. Likewise, an item inherits the attributes of the object in which it appears.

Inheritance applies to all attributes except menu border. Attached pull-down menus do not inherit the menu border of the object in which they appear.

If you want a menu to use a database file other than the one assigned to the application object, for example, you must change the assignment using the **Override assigned database or view** option in **Menu**. This option is also used to specify whatever database file or view is in effect at run time. If you save an object with the new attribute (by choosing **Save current menu**), the new database file will be used regardless of any change you make later to the application object.

If you use the **Attach pull-down menus** option to specify that pull-down menus are automatically displayed when the user highlights the associated bar menu choice, the pull-down menu will inherit the attributes of the horizontal bar menu. For example, if you've assigned a database file to a pull-down menu that is different from the one assigned to the horizontal bar menu, the database file assigned to the pull-down menu will be overridden and the database file assigned to the horizontal bar menu will be used instead.

If pull-down menus are *not* automatically displayed (the default), the user has to actually select a bar menu choice and press ↵ to display the associated pull-down menu, and the pull-down menu will *not* inherit the bar menu attributes. If the pull-down menu has a different database file assigned, it will be used instead of the bar menu's database file. With either choice, the database and view and the **Embed code** attributes made to *items* (as opposed to those associated with the menus themselves) are retained.

Reports and forms used in the application also inherit attributes from the Applications Generator objects that use them. For example, a report referenced by a menu item will inherit the color attributes assigned to the menu object, if any, or those assigned to the application object. Any attributes assigned to the report or form in dBASE IV will be overridden by the Applications Generator assignments.

Except for the application object, both the Applications Generator and non-Applications Generator objects can be shared among applications. If a pop-up menu is identical in two applications, for example, you need only ensure that it's in the same directory as the current application object when you run the application. All attributes and actions assigned to that pop-up menu when it was last saved will be automatically used in the second application, unless you modify them and save the modifications.

To make universal changes to an object, save the modifications under the original name. Both applications will then feature the new attributes if you regenerate the code. You thus only have to make the change once to have it reflected in all applications using that menu. If the changes are for the current application only, simply rename the object and save the modifications.

Giving Users More Control

The Applications Generator allows you to control what the user can do with your application. For example, you can specify which database files the user can edit, browse, or copy. If you want to give users more control, however, you can do that in several ways.

Creating a Pick List

Use the `&LISTVAL.` macro substitution symbol if you want to create a pick list to substitute for a specific file, field name, or value in your application (`LISTVAL` is a memory variable). For example, rather than specifying a report that will be printed when users choose a **Print report** item from a menu, you can present them with a list of reports from which to choose.

The following steps show you how to give users more report choices. Adjust these steps for other actions in which you want to give the user choices.

1. Create a Files list, specifying *.frm files in the **Identify files in list** option. All reports in the directory will appear in the list.
2. Select the **Print report** item in your menu, and choose **Change action** from the **Item** menu.
3. Specify the Files list name in the **Open a menu** action.
4. Select the Files list, and assign the **Display or print** action to it, choosing **Report** from the submenu.
5. Enter `&LISTVAL.` in the **FORM name** field.

When your application is run, the report selected by the user from the Files list will be used as the form for the **Display or print** action.

You can enter `&LISTVAL.` in **Item** dialog boxes anywhere a file, field, or value is expected. You must also create a pick list, assign it as the item action, and use `&LISTVAL.` in the action assigned to the list.

Embedding Code

Embedding dBASE code is another way to give more control to your users. If you have a useful program already written in dBASE code, you can use the program in an application built with the Applications Generator. You do that by embedding the program, either by typing it line by line (up to 19 lines of code, not to exceed 255 bytes) in the frame that appears when you choose **Embed code**, or by simply entering DO <program name> there.

If you want to learn more about writing programs to expand your application, see *Language Reference* and *Programming in dBASE IV*.

About Testing Your Application

Testing your application, also called *debugging*, is an important step in the process of building applications. You test your application by running it. You will not be able to run it, however, if you have syntax errors that prevent dBASE IV from compiling the code you've generated in the Applications Generator. Fortunately, dBASE IV tells you what those errors are when you attempt to run an application from the dot prompt or from the Control Center.



NOTE

You can also run an application from the operating system prompt by entering dbase <application name>. Whether you run it from the operating system prompt, dot prompt, or Control Center, the application is under the control of dBASE IV. For information on running applications from the dot prompt or Control Center, see Chapter 19, "A Sample Application."

Syntax and Run-time Errors

When running an application for the first time, the dBASE code generated by the Applications Generator is compiled. Compiling translates the dBASE code into a language that the computer can understand. If you've made no errors entering information as you built the application, the compile process will proceed without interruption and your application will appear on the screen.

If, however, you've made a syntax error (a mistake in entering information while you were designing your application), you'll see a message at the bottom of the screen. Errors are briefly described and the lines of code that contain the errors are listed.

Errors can have various causes. For example, if you incorrectly type a filename, the compiler will not be able to find the file, and so will return a run-time error message to you. Preventing errors is a good reason for using **Shift-F1 Pick** to choose file and field names from displayed lists.

Other errors may result from entering invalid code with the **Embed code** option or invalid data in fields when you're assigning actions to items. For example, an incorrectly entered expression in the **FILTER** field of the Browse dialog box may result in a syntax or run-time error when you try to run your application. That's why you should be sure to carefully enter data and follow the syntax requirements for fields associated with dBASE commands. You can learn how to enter information in these fields by referring to the descriptions of them in this section and by using *Language Reference*. Data entered correctly as you create your application will greatly reduce debugging time.

You can easily prevent two common errors. The first is the inclusion of double quotation marks (") in any object or frame displayed to the user. *Do not* include double quotation marks in application objects or menus, or in help text or message line prompts. You can use them, however, in object description fields, code embeds, or fields that request delimiter information — in other words, in any field or frame that will not appear to the user. Another error to avoid is renaming objects through the operating system. Use the Applications Generator **Name and describe** option to rename objects and prevent run-time errors.

Even if you're careful when entering data, you'll probably still have a few syntax errors. Most programmers do. Note the lines of code in which the errors occur and then refer to the error message explanations and command syntax requirements in *Language Reference*. These resources will help you understand the nature of the errors and the steps to take in fixing them.

From here, you can make corrections in two ways. You can return to the Applications Generator, find the objects and the dialog box fields in which the errors were made, correct the data, and then regenerate the code. Or you can use the debugger program to find the error and a program editor (for example, the dBASE IV editor) to correct the code directly. Refer to *Language Reference* for information on the SET TRAP and DEBUG commands.

Design Errors

Once the application is running, you may notice problems in design. For example, you may have assigned the wrong database file to a menu item, or forgotten to include a feature. Or maybe you just want to change the appearance of some of the objects in your application. These types of modifications can be addressed easily by returning to the Applications Generator, adding or modifying the objects, and then regenerating the code.



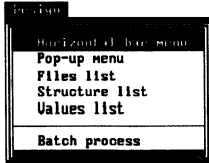
WARNING

Any direct changes you make to the program code will be lost if you regenerate it through the Applications Generator. You should keep a careful record of such changes.

About Multi-User Environments

Because the Applications Generator incorporates record and file locking, it can be used in a multi-user environment. The applications you generate can also be used in a single- or multi-user environment.

Design



The **Design** menu is always available on the Applications Generator menu bar, and it always contains the same options. These options are used to create or modify the Applications Generator objects for your application. The only Applications Generator object that you don't create from this menu is the application object, which you create or modify when you enter the Applications Generator.



NOTE

For information about defining an application object, see Chapter 19, "A Sample Application."

The requirements for naming and describing the objects for your application are given in this section. The Applications Generator adds a three-character extension to each name. The extensions vary with the type of object, and are useful to know because you'll see them in your disk directory. Table 20-1 lists these extensions.

Table 20-1 Object extensions

Object	Extension
Application	.app
Horizontal bar menu	.bar
Pop-up menu	.pop
Files lists	.fil
Structure list	.str
Values list	.val
Batch process	.bch



NOTE

To modify an object but keep a copy in its original form, rename it before making changes. Rename it by choosing the **Name and describe** option from the second menu on the Applications Generator menu bar. When saving, the Applications Generator stores the original object and retains the newly named object on the work surface.

Horizontal Bar Menu

This option specifies a menu in which the items appear across the screen, rather than in a vertical presentation. You can associate a pop-up menu or list with each item on the horizontal bar menu. When associated with a horizontal bar menu item, these objects are called pull-down menus. The Applications Generator menu bar is an example of a horizontal bar menu with associated pull-down menus.

Choosing the **Horizontal bar menu** option displays a list from which you can choose an already existing bar menu in the current directory. You can also choose to create a new horizontal bar menu. If you choose one of the bar menus in this list, the menu will appear on the work surface. If you choose <create>, you'll see the dialog box shown in Figure 20-1.

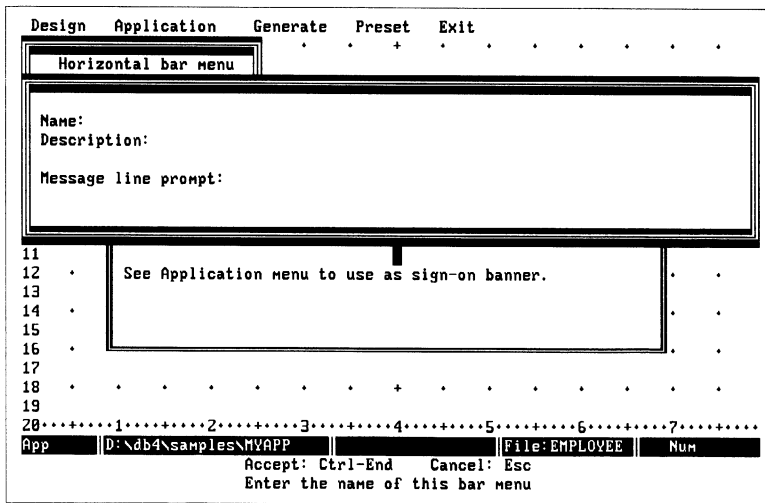


Figure 20-1 Horizontal bar menu dialog box

You can use a horizontal bar menu as a main menu with associated pull-down menus. However, the Applications Generator doesn't restrict the use of horizontal bar menus to main menus, nor does it require that a main menu be horizontal.

Name

This field accepts the name of the horizontal bar menu that you're creating. If the horizontal bar menu is the main menu, you must give it the name you specified, if any, when you entered the Applications Generator. Otherwise, your application won't run.

An entry in this field is required. Make sure it's a valid dBASE IV filename and is unique within the current directory. This horizontal bar menu object will be stored under this name with the .bar extension.

Description

This field accepts the description you want to appear in the code and documentation created with the Applications Generator. An entry in this field is not required. If you review the code or documentation later, the description will help indicate the purpose of this menu.

Message line prompt

This field accepts the message that appears when users choose this menu. Enter as many as 76 characters in this field. (Double quotation marks are not permitted.) An entry in this field is not required.

Once you've entered the message and press **Ctrl-End**, the cursor appears in the upper left corner of the work surface within a frame, where you can enter the items for this menu. (Remember to use **F5 Field** to mark the beginning and end of each item.) The second option on the Applications Generator menu bar changes to **Menu**, from which you can specify further attributes for this menu.



NOTE

*For more information about creating a horizontal bar menu, see **Menu option descriptions**, which appear later in this chapter, and Chapter 19, "A Sample Application."*

Pop-up Menu

A pop-up menu contains a vertical list of items that appear in a menu frame. A pop-up menu can serve as a main menu or as a submenu. It can also be associated with a bar menu item as a pull-down menu.

Choosing the **Pop-up menu** option displays a list of all pop-up menus in the current directory. You can also choose to create a new pop-up menu. If you select one of the pop-up menus in this list, the menu will appear on the work surface. If you choose **<create>**, you'll see a dialog box similar to the **Horizontal bar menu** dialog box.

Name

This field accepts the name of the pop-up menu that you're creating. If the pop-up menu is the main menu, you need to give it the same name as the one you specified, if any, when you entered the Applications Generator.

An entry in this field is required. Make sure it's a valid dBASE IV filename and that it's unique within the current directory. This pop-up menu object will be stored under this name with the .pop extension.

Description

This field accepts the description you want to appear in the code and documentation created with the Applications Generator. An entry in this field is not required. If you review the code or documentation later, the description will help indicate the purpose of this menu.

Message line prompt

This field accepts the message that will appear when users choose this menu. Enter as many as 76 characters. (Double quotation marks are not permitted.) An entry in this field is not required. The message line prompt appears in the code and object documentation that the Applications Generator creates.

Once you've entered the message and press **Ctrl-End**, a pop-up menu object appears on the work surface. The second option on the Applications Generator menu bar changes to **Menu**, from which you can specify attributes of this menu. You can also type the menu items in the pop-up menu object.



NOTE

*For more information about creating a pop-up menu, see **Menu** option descriptions, which appear later in this chapter, and Chapter 19, "A Sample Application."*

Files List

A Files list contains a list of files from which your users can choose. For example, you may want to offer users a choice of reports to print.

A Files list differs from a menu in that you assign one action to be performed when the user chooses any item on the list. (For a menu, you assign an action to each item in the menu.)

Choosing the **Files list** option displays a list of all Files list objects in the current directory. You also see an option to create a Files list object. If you select one of the pop-up menus in this list, it will appear on the work surface. If you choose **<create>**, you'll see a dialog box similar to the **Horizontal bar menu** dialog box in Figure 20-1.

Name

This field accepts the name of the Files list object that you're creating.

An entry in this field is required. Make sure it's a valid dBASE IV filename and is unique within the current directory. The Files list object will be stored under this name with the .fil extension.

Description

This field accepts the description you want to appear in the code and documentation created with the Applications Generator. An entry in this field is not required. If you review the code or documentation later, the description will help indicate the purpose of this list.

Message line prompt

This field accepts the message that will appear when users choose this list. Enter as many as 76 characters. (Double quotation marks are not permitted.) An entry in this field is not required. The message line prompt appears in the code and object documentation that the Applications Generator creates.

Once you've entered the message and press **Ctrl-End**, a Files list object appears on the work surface. The second option on the Applications Generator menu bar changes to **List**, from which you can identify the files to be included in this list.



NOTE

*For more information about defining a Files list, see the **List** option descriptions later in this chapter.*

Structure List

A Structure list contains a list of the fields in the currently assigned database file or view. Users choose field names from this list to perform some action, such as determining which fields to print in a report.

A Structure list object differs from a menu in that you assign one action to be performed when users choose an item or items from the list. (For a menu, you assign an action to each item in the menu.)



NOTE

*When the application is run, users can choose more than one item in a Structure list by selecting an item and pressing ↵, selecting another item and pressing ↵, and so forth, until they've finished. Then, they press **Ctrl-End** to save their choices and exit the list.*

*The exception to choosing multiple items from a Structure list occurs when the list is automatically displayed as a pull-down menu. When attached to a horizontal bar menu item in this way (with the **Attach pull-down menus** option), only one item can be chosen from the Structure list.*

Choosing the **Structure list** option displays a list of all Structure list objects in the current directory. You can also create a Structure list object. If you select one of the objects in this list, it will appear on the work surface. If you choose **<create>**, you'll see a dialog box similar to the **Horizontal bar menu** dialog box in Figure 20-1.

Name

This field accepts the name of the Structure list that you're creating.

An entry in this field is required. Make sure it's a valid dBASE IV filename and is unique within the current directory. The Structure list object will be stored under this name with the .str extension.

Description

This field accepts the description you want to appear in the code and documentation created with the Applications Generator. An entry in this field is not required. If you review the code or documentation later, the description will help indicate the purpose of this list.

Message line prompt

This field accepts the message that will appear when users choose this list. Enter as many as 76 characters. (Double quotation marks are not permitted.) An entry in this field is not required.

Once you've entered the message and press **Ctrl-End**, a Structure list object appears on the work surface. The second option on the Applications Generator menu bar changes to **List**, from which you can identify the fields in this list.



NOTE

*For more information about defining a Structure list, see the **List** option descriptions later in this chapter.*

Values List

A Values list contains values for a specific field of the currently assigned database file or view. Users choose field values from this type of list to perform some action, such as viewing or updating specific records. For example, a Values list might contain all the values in the City field of the Clients database file. Users could choose a city for which they want to view records — for example, all clients who live in Ithaca.

A Values list differs from a menu in that you assign one action to be performed when the user chooses any item from the list. (For a menu, you assign an action to each item on the menu.)

Choosing the **Values list** option displays a list of all Values list objects in the current directory. You also have the choice to create a Values list object. If you select one of the objects in this list, it will appear on the work surface. If you choose **<create>**, you'll see a dialog box similar to the **Horizontal bar menu** dialog box shown in Figure 20-1.

Name

This field accepts the name of the Values list that you're creating. An entry in this field is required.

Make sure it's a valid dBASE IV filename and is unique within the current directory. The Values list object will be stored under this name with the .val extension.

Description

This field accepts the description you want to appear in the code and documentation created with the Applications Generator. An entry in this field is not required. If you review the code or documentation later, the description will help indicate the purpose of this list.

Message line prompt

This field accepts the message that will appear when users choose this list. Enter as many as 76 characters. (Double quotation marks are not permitted.) The message line prompt appears in the code and object documentation that the Applications Generator creates.

Once you've entered the message and press **Ctrl-End**, a Values list object will appear on the work surface, and the second option on the Applications Generator menu bar changes to **List**, from which you can identify the field you want to appear in the list.



NOTE

*For more information about defining a Values list, see the **List** option descriptions later in this chapter.*

Batch Process

A batch process is a series of actions performed when your application is run. You assign the action to run a batch process to a menu item or list. Then you assign actions to be performed by the batch process. The batch process object itself is never visible to the user. For example, a batch process might prompt the user for information (**Insert dBASE code** action), copy a file (**Copy records to file** action), and pack the database file (**Discard marked records** action).

Choosing the **Batch process** option displays a list of all batch process objects in the current directory to appear. You also have the option to create a batch process object. If you select a batch process object in this list, it will appear on the work surface. If you choose **<create>**, you'll see a dialog box similar to the **Horizontal bar menu** dialog box shown in Figure 20-1.

Unlike the dialog boxes for other objects, this one does not include a **Message line prompt** field. Because users don't see the batch process in action, no message is needed.

Name

This field contains the name of the batch process that you're creating.

An entry in this field is required. Make sure it's a valid dBASE IV filename and is unique within the current directory. This object will be stored with the .bch extension.

Description

This field contains the description you want to appear in the code and documentation created with the Applications Generator. An entry in this field is not required. If you review the code or documentation later, the description will help indicate the purpose of this batch process.

Once you've entered the description and press **Ctrl-End**, the batch process object appears on the work surface, and the second option on the Applications Generator menu bar changes to **Batch**.



NOTE

*For more information about defining a batch process, see the **Batch** option descriptions later in this chapter.*

Object Menus (Application, Menu, List, and Batch)

When you select an object on the work surface, the second option on the Applications Generator menu bar changes to reflect your choice. For example, if the current object is a horizontal bar menu, the option changes to **Menu**. The option can change to **Application**, **Menu**, **List**, or **Batch**, depending on what type of object is current.

The options in the menus associated with **Application**, **Menu**, **List**, and **Batch** are used to assign particular attributes to an object. For example, from **Menu**, you could choose the **Write help text** option, which is used to create help text relating to a menu.

Common Options

Even though this second menu changes to reflect the current object, many of the options in the object menus are the same. These common options are described next. For information about options that are unique to one of the menus, refer to the sections entitled **Application**, **Menu**, **List**, or **Batch**, as appropriate.

Name and describe

This option is common to all object menus. Choose this option to modify the name, description, or message line prompt of an object.

You must enter a valid dBASE IV filename in the **Name** field, and it must be unique within the current directory. If you change the name of the object, the newly named object becomes current and carries all the attributes of the original object (for example, its color assignments) until you change them. The original object is retained in its last saved state and can be brought back to the work surface at any time.



NOTE

Use this field to rename objects, rather than renaming them through the operating system. Otherwise, your application will not run.

In the **Description** field, enter text that will appear in the object documentation or as a comment in the code. This description should indicate the purpose of the object.

In the **Message line prompt** field, enter text that will appear when this object is used at run time. You can enter up to 76 characters. (Double quotation marks are not permitted.) Note that this field does not appear when an application or batch object is current.

Override assigned database or view

This option is common to all object menus except the application object. Choose this option to assign a database file or view for the current object that is different from the one you assigned to the application when you entered the Applications Generator.

After choosing this option, you see the database or view and index files currently assigned to this object. Change the assignments by completing the following fields.

For this <object> you may use values

Make a choice from this field by pressing the **Spacebar**. If you choose **IN EFFECT AT RUN TIME** or **ABOVE**, you will not be able to enter values in the fields that follow.

IN EFFECT AT RUN TIME is used to specify the database file or view that was in use just prior to the object being displayed. For example, your application displays a Files list from which users can choose a database file, and then a menu appears. For the menu to use the database file selected from the list, you'd choose **IN EFFECT AT RUN TIME**. You can also use the database file or view specified by a calling object. For example, Menu A opens Menu C, and Menu B also opens Menu C. When Menu C is used by the application, you may want to use the database file or view assigned to whatever menu opened Menu C.

You can enter values in the following fields if you've chosen **ENTERED BELOW**.

Database/view

Enter the database file or view that you want this object to use if it is different from the one specified for the application object. Type in the name, or press **Shift-F1 Pick** to choose a database file or view in the current catalog or directory. Choosing the **<create>** marker takes you to a design screen, where you can create the database file.

Set INDEX to

Enter the index files to be used with the database file or view for the current object if they differ from the ones assigned to the application and from the production .mdx file (which is automatically opened when the database file is opened). Either type the name of the index file or files, separated by a comma, or use **Shift-F1 Pick** to select from a displayed list of index files.



NOTE

*You can choose multiple index files by highlighting a filename and pressing ↵, highlighting another filename and pressing ↵, and so forth, until you've highlighted all the index filenames you want. Then, press **Ctrl-End** to save the choices and exit the list. If a catalog is active, the names of .mdx files will not be in the list. You can type in .mdx filenames, however.*

ORDER

Enter the index order or the name of a new controlling index if it differs from the one assigned to the application object.

Write help text

This option is common to all object menus except **Application** and **Batch**. (A batch process does not appear to the user, so help text is unnecessary.) Use this option to write the help text for the object you're defining. This help text will appear at run time if the object is displayed and the user presses **F1 Help**. If you don't write help text for the object, the message **No help defined** will appear when the user presses **F1 Help**.

Choosing this option displays a full-screen editing frame on the work surface. Use this frame to enter or modify the help text. Press **Ctrl-End** to save your help text and return to the object menu. You can enter as many as 19 lines of text in this frame. Do not, however, enter double quotation marks.

**NOTE**

*You can define help text for objects or for items in an object. At run time, help text defined at the item level appears when the user positions the highlight on an item and presses **F1 Help**. If help text is defined at the item level, there's no need to define it at the object level because only the item-level text will display.*

Modify display options

This option is common to all object menus except **Application** (which offers the same choices under the **Modify application environment** option) and **Batch** (because batch processes aren't displayed to the user). The option is used to select the display attributes, the settings that determine how the objects will appear.

New attributes will change how the current object and any non-Applications Generator objects used by the current object, such as reports and forms, appear at run time. For example, if a menu item prints a report, you'll assign attributes to the report as you assign attributes to the menu.

These selections override the display attributes you selected from the **Preset** menu and the attributes, if any, you set for the application with **Display options** in the **Application** menu.

The type of frame appears to the right of **Object border style**. You can change the type to none, double, single, or panel by pressing ↵ (or O for Object). Choose **DOUBLE** for a double-line frame, **SINGLE** for a single-line frame, **PANEL** for a wide frame, or **NONE** for no frame.

**NOTE**

*If you choose **NONE**, the object frame becomes invisible; however, the frame still occupies its position on the work surface. To have a frameless object (for example, a horizontal bar menu) appear on line 0 at run time, you must modify the code created by the Applications Generator. Use the dBASE program editor to change the line number of the object from 1 to 0.*

The options below the horizontal line are used to specify colors for your application. Select options under **Standard - All** for text and headings. (To choose text, messages, and titles, select **Standard - All** itself.) Select options under **Enhanced - All** for object frames, fields, and highlighted items. (To choose all of these options, select **Enhanced - All** itself.) Brief descriptions of the options on this menu follow.

Normal text sets the color for text, such as unselected fields in Browse.

Messages sets the color for messages, such as message line prompts, navigation line messages, and unselected menu and list items.

Titles sets the color for titles, such as Browse field name headings and Browse table grids.

Highlight sets the color for highlighted items, such as highlighted menu and list choices.

Boxes sets the color for object frames, including menus, lists, batch processes, and the application (sign-on) object.

Information sets the color for the status line, the clock, and error box borders.

Fields sets the color for selected fields in Browse and fields that can be edited.

See *Language Reference*, Chapter 3, SET COLOR for more information.

When you choose one of these options, you'll see a menu of colors. To choose color combinations, use the ↑ and ↓ keys. To move between foreground and background, use the ← and → keys.

For example, you could select **Fields** and press ↵ to display the color panel. Then, you could select a blue foreground color, move over to the **Background** panel, and select different background colors to see how input fields would look with different color combinations.

The type of monitor on which the application runs determines whether these color settings will be used. If the application is run on a system with a monochrome monitor, the default dBASE IV monochrome settings will be used.

Embed code

This option is common to all object menus except **Application**. It is used to add dBASE code that will execute when the application is run. For example, you could embed dBASE SET commands that aren't included in the default settings for the application. The embedded code will execute before or after (or before *and* after) the menu or list is displayed. For a batch process, the code will execute before or after (or before *and* after) the batch process is run.

When you select either **Before** or **After**, you see a full-screen editing frame. You can enter up to 19 lines of dBASE code in this frame. The Applications Generator doesn't check code syntax, so enter or modify the code carefully. (Use the keys described in Chapter 18 to modify the code.) Press **Ctrl-End** to save and return to the object menu. To simplify this process, put the code into a .prg file using dBASE IV, and embed the dBASE instruction DO <program name>.prg.



NOTE

This option is for application developers who know how to program in dBASE IV. If you're new to dBASE IV, see the Language Reference manual for programming basics and a description of each command. See also Programming in dBASE IV.

Save current <object>

This option is common to all object menus. When you choose this option, the current object is saved to disk but remains on the work surface so you can continue working with it.

Put away current <object>

This option is common to all object menus except **Application** (because the application object cannot be put away). When you choose this option, you can save or abandon changes to the current object before it's removed from the work surface.

Choosing **Save changes** saves all the work you did to the current object since you last saved it and then removes the object from the work surface.

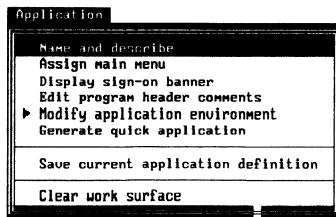
Choosing **Abandon changes** removes the current object from the work surface without saving the changes to disk.

Clear work surface

This option is common to all object menus. Use it when you no longer need objects on the work surface. When you choose this option, all objects except the application object are removed from the work surface one by one.

For each object that has been modified since you last saved it, you will be given a choice to **Save changes** or **Abandon changes**. If you select **Save changes**, the current object is saved before it's removed from the work surface. If you select **Abandon changes**, the object is removed from the work surface and remains in its last saved version. Objects that were *not* changed are simply removed from the work surface.

Application



When you create or select an application to modify, an application object appears on the work surface and the **Application** menu displays in the Applications Generator menu bar. This menu appears whenever the application object is current. The application object always remains on the work surface and can be made current by pressing **F3 Previous** or **F4 Next** until it displays in the foreground of the work surface.

The attributes assigned from the **Preset** menu appear in the application object when it's created. For example, if you've previously specified an author, copyright notice, and dBASE version in **Preset**, this default information will automatically appear in the application object when it's created. You can change this information or add other information, such as a greeting to your users, in the application object itself. The application object can also serve as your application sign-on banner, the screen users see when they first start your application.

To further define the application object, choose options from the **Application** menu. Descriptions of the options specific to this menu follow.



NOTE

See the previous section for options that are common to all object menus.

Assign main menu

This option is used to change the main menu for the current application. This will be the first menu your users see when they start your application. Only menus and batch processes can serve as a main menu. A Files, Structure, or Values list cannot be a main menu.

To change the menu type shown in the **Main menu type** field, press the **Spacebar**.

To change the menu name, enter the new name in the **Main menu name** field, or press **Shift-F1 Pick** to choose one from the displayed list. The menus displayed in the list are the same type as those in the **Main menu type** field. This name replaces the name assigned when you created the application. Press **Ctrl-End** to finish the assignment and return to the **Application** menu.

Display sign-on banner

This option displays the sign-on banner when your application is run. The sign-on banner is your application object. It contains the options you specified using the **Sign-on defaults** option in the **Preset** menu (before the application was created), and any other additions, deletions, or edits you made directly to the default information in the application object itself.

Answering **Yes** to the question **Display frame as "sign-on banner" at run time?** displays the application object as the first screen users see. Answering **No** starts your application at the main menu. Press **↵** to save the answer and return to the **Application** menu.

Edit program header comments

This option is used to specify the author, copyright notice, and dBASE version. These comments will appear in the code and object documentation created with the Applications Generator. If you don't specify this information here, the information you entered with the **Preset** menu option **Sign-on defaults** will be used in the documentation and code instead. Once you've made the changes, press **Ctrl-End** to return to the **Application** menu.

Using this option doesn't affect the information in the current sign-on banner if you specified one. If you want to change the sign-on banner for the current application, type your changes in the application object itself.

Modify application environment

This option is used to override the attributes specified with **Preset** options. A submenu appears in which you can choose to change display options, environment settings, the search path, or the view or database file and index for the application.

Display options

This option is the same as the **Modify display options** option, which is described earlier in this chapter.

Environment settings

This option is used to turn the environment settings for this application on or off. For example, specifying **Set BELL** to **ON** will sound a warning signal when users have entered invalid data or have reached the end of an input area.

In the **to** field on the **Set DELIMITERS** line, enter the specific delimiter if **Set DELIMITERS** is **ON**.

Press **↓** to move among the settings, and the **Spacebar** to change a setting. When you're satisfied with the settings, press **Ctrl-End**.

Search path

Use this option to enter the run-time default drive and search path for the application you're defining.

In the **Drive** field, enter the name of the drive on which all operations should take place and where all non-Applications Generator objects (such as reports, forms, and database files) can be found when the application is run. Pressing **Shift-F1 Pick** displays a list from which you can choose the drive name.

In the **Search path** field, enter the directory path list your application should take to find objects and open files, such as database files. Press **Ctrl-End** to save these settings and return to the **Application** menu.

View/database and index

Use this option to change the database file or view, index files, or index order assigned to this application when it was created. Other objects associated with this application will be automatically assigned the new files or order, unless they have been saved with other assignments.

The names of the currently assigned database file or view, index files, and index order for this application appear in a dialog box when you choose this option. If you don't want to make changes to these assignments, press **Esc** to return to the **Application** menu. If you do want to make changes, enter the information in the three fields on this dialog box.

In the **Database/view** field, type in a different database file or view for the application or press **Shift-F1 Pick** to choose from a displayed list of filenames in the current catalog or directory. Choosing **<create>** will take you to the design screen where you can specify a new database file.

In the **Set INDEX to** field, enter the new index or indexes by typing the filenames (.mdx or .ndx) or by pressing **Shift-F1 Pick** to choose from a displayed list of indexes in the current catalog or directory. Note that the production index is automatically opened when you open the database file.



NOTE

*You can choose multiple index files from a list by highlighting a filename and pressing ↵, highlighting another filename and pressing ↵, and so forth, until you've chosen all the desired index filenames. To change your mind about a particular index file, highlight it and press ↵ again. To save the choices and exit the list, press **Ctrl-End**.*

In the **ORDER** field, enter the index order or the name of a new controlling index if it differs from the one assigned to the application object. An entry in this field is not required.

Press **Ctrl-End** to save your changes and return to the **Application** menu.

These assignments serve as the defaults for your application. They affect each object (the menus, lists, and batch processes) associated with this application, unless the objects were saved with their own assignments. You can easily override the assignments for a particular object or item by choosing the **Override assigned database or view** option from any of the other object menus and the **Item** menu.

Generate quick application

Choose this option to create a simple, single-menu (pop-up) application so users can append, edit, browse, and pack a database file. If you specify an index file, the menu will also include an option to reindex. If you specify a report or label format, the menu will include options to print one or both of these. The quick application uses the display options specified in the **Preset** menu.

The **Database file** field displays the database file you specified when you entered the Applications Generator. To change it, type the name of the database file, or press **Shift-F1 Pick** to choose one from the displayed list. Choosing **<create>** takes you to the design screen where you can specify a new database file. An entry in this field is required.

In the **Screen format file** field, enter the name of the screen format for this quick application by typing it or by pressing **Shift-F1 Pick**. Choosing **<create>** takes you to the design screen where you can specify a new screen format file. No entry in this field means your application will use the default screen for record editing.

In the **Report format file** field, enter the name of the report form you want for this quick application by typing it or by pressing **Shift-F1 Pick**. Choosing **<create>** takes you to the design screen where you can specify a new report format file. No entry in this field means the **Print Report** item will not be included on the menu.

In the **Label format file** field, enter the name of the label format you want for this quick application by typing it or by pressing **Shift-F1 Pick**. Choosing **<create>** takes you to the design screen where you can specify a new label format file. No entry in this field means the **Mailing Labels** item will not be included on the menu.

In the **Set INDEX to** field, enter the name of the index file or files if it differs from the one you specified for the application object and from the production index. Enter the index name by either typing it or pressing **Shift-F1 Pick**. An entry in this field is not required. No entry in this field means the **Reindex Database** item will not be included on the menu.

In the **ORDER** field, enter the index order or the name of the new controlling index if it differs from what you specified for the application object. An entry in this field is not required.

The **Application author** field displays the name specified with the **Sign-on defaults** option in the **Preset** menu. Change it by typing in a new name. This information appears as a comment in the code and documentation that the Applications Generator creates.

In the **Application menu heading** field, enter the heading to appear on the menu created by the Applications Generator. If you don't specify a menu heading, the name of the application will be used. Don't include double quotation marks in this field.

Press **Ctrl-End** to save this information. You're asked if you want to generate the quick application. Select **No** or accept the default, **Yes**, and press ↵. If you choose **Yes**, the code is immediately generated. If you choose **No**, you return to the **Application** menu.



NOTE

*The Applications Generator uses the `Quickapp.gen` template to create the code for this type of application. If you choose **No** from the confirmation box, you can generate the code later by entering `QUICKAPP.GEN` in the box that appears when you choose **Select template** from the **Generate** menu.*

Menu

The options on the menu associated with **Menu** vary slightly depending on the type of menu you choose. If the current object is a horizontal bar menu, there's an additional option in **Menu**. This option is described next. Refer to the Common Options section for a description of the other options, which are common to all object menus.

Attach pull-down menus

This option appears only when a horizontal bar menu object is the current object. It is used to specify whether menus (or lists) associated with horizontal bar menu items pull down automatically as the user positions the cursor on each item.

After choosing this option, accept the default, **No**, or choose **Yes** in response to the question **Pull down associated menus...** If you answer **Yes**, associated pull-down menus will appear when a user positions the cursor on a horizontal bar menu item. If you answer **No**, the user must press \downarrow on a horizontal bar menu item to display the associated menu.



NOTE

When considering this option, keep in mind the rules of inheritance. If the pull-down menus you want to appear automatically have attributes different from the attributes of the horizontal bar menu, all pull-down attributes will be overridden by those of the horizontal bar menu. (See the About Inheritance section near the beginning of this chapter.) Inheritance applies to all attributes except menu border. Attached pull-down menus do not inherit the menu border of the object in which they appear.

Make your decision by positioning the highlight on **Yes** or **No** and pressing \downarrow . Either selection returns you to **Menu**.



NOTE

*You associate menus (either pull-down or stand-alone) or lists with a particular menu item when you assign an action to the item. Specifically, you use the **Open a menu** action in the **Item** menu to associate menus or lists with menu items. Refer to the Item section for more information on the **Open a menu** action.*

List

The options on the **List** menu vary slightly, depending on the type of the current list. The options specific to the **List** menu are described next. Refer to the Object Menu section for a description of the other options, which are common to all object menus.

Identify files in list

This option appears on the **List** menu when a Files list object is the current object.

After choosing this option, enter the files that you want to appear in the current Files list object by using the asterisk (*) or question mark (?) wildcards to enter a group of filenames. For example, enter *.dbf to include all database files in the current directory, or *.?dx to include both .mdx and .ndx files.

If you don't enter filenames, the Applications Generator will use all files in the directory to create the Files list.

When you finish, press **Ctrl-End** to save the filename assignment and return to **List**.

Identify fields in list

This option appears on the **List** menu if a Structure list object is the current object.

After choosing this option, you can either type the names of the fields that you want to appear in the current Structure list, or press **Shift-F1 Pick**. When typing, enter the field names from the database file or view assigned to this Structure list object, separating each name with a comma. If you enter no field names, the Applications Generator will use all fields in the currently assigned database file or view. The maximum length of this expression is 255 characters.

The list that appears if you press **Shift-F1 Pick** contains all the fields in the assigned database file. To add a field, select it and press ↵. To change your mind about including a field, select it and press ↵ again. To find a field in a very long list, type the first letter or few letters of the field name if you know it. The first field that matches these letters will be highlighted.



NOTE

If the Structure list is automatically attached as a pull-down menu to a horizontal bar menu item, all fields in the file will be displayed in the list. You can only choose one field.

Press **Ctrl-End** to save the field name assignments and return to **List**.

Identify field values in list

This option displays on the **List** menu if a Values list object is the current object.

After choosing this option, you're prompted to enter the field name from which you want values to be listed in the current Values list object. You must enter a field name defined in the structure for the current database file or view.

You can either type in the field name or press **Shift-F1 Pick** to choose one from a list of the fields in the database file or view assigned to this Values list.

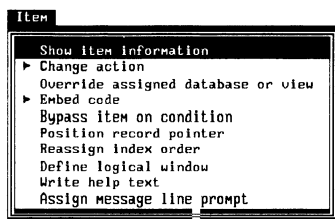
To find a field in a long list, type the first letter or a few letters of the field name. This technique highlights the first field in the list that matches these letters. It's useful if the displayed list is very long and you're not sure of the exact field name. To change your mind about the field, select it and press **↵** again.

Press **Ctrl-End** to save the field name assignment and return to **List**.

Batch

All the options on this menu are the same as the common options described in the Object Menus section. Refer to that section for further information on these options.

Item



This menu is available whenever a menu, list, or batch process object is the current object. After you've created a list or entered at least one item for a menu or batch process, you can specify an action that will be performed when the user selects the item. You can also assign attributes to that item. For example, you can write help text or position the record pointer before the action starts.

For menu objects, you'll assign an action to each item on the menu.

For list objects, you'll assign *one* action to be performed whenever an item is chosen from the list.

For batch process objects, you'll assign an action to each line in the batch process object.

Before beginning, select the item (or the list) to which you wish to assign an action.

To specify actions to more than one item in an object, use **PgUp** and **PgDn** to cycle through the items while in the **Item** menu. The status bar indicates which item you're specifying. This method is much faster than backing out of dialog boxes and submenus, choosing another item, and returning to **Item**.

For example, if you want to assign the **Open a menu** action to every item in a menu, choose that action, assign the menu type and name to the first item, and then press **PgDn** to select the next item in the menu. Then, assign a menu name and type for that item, and so forth, until all the items are assigned that action.

Descriptions of the options on this menu follow.

Show Item Information

After choosing this item, a dialog box appears that displays the action assigned to the current item.

When you've reviewed the information, press **↓** or **Esc** to leave the dialog box. To change this information, go to an option on the **Item** menu. The descriptions of the fields in this dialog box follow.

Object

This field displays the name of the object that contains the item you selected.

Item

This field displays the item you selected on the work surface.

Current database/view <filename> using index <filename>

The field displays the currently assigned database file or view and the index file for the item if there is one. If you haven't specifically assigned a database file, view, or index for the item, this field displays the assignments for the application object.

This field helps you remember the database file or view, and index, used when the user chooses this item.

This item will

This field displays the action you specified for this item with the **Change action** option in the **Item** menu. The default action is **Display text (no action)**.

To leave this dialog box, accept **OK** by pressing **↓**.



NOTE

*You can use **PgUp** and **PgDn** to review quickly the item information for each item in a menu or batch process object.*

Change Action

Use this option to specify an action to be associated with the current item. If you don't specify an action, **Text (no action)** will be automatically assigned to the item or list.

Many options on this menu relate to dBASE commands, as shown in the right margin next to the option. To fill in the dialog box that appears when you choose an option, you'll need some knowledge of dBASE IV syntax — that is, the requirements for writing commands in the dBASE language. The fields in the dialog box provide the command, but you must enter the scope, expression, and condition.

**NOTE**

For the following menu items, refer to the Giving Users More Control section earlier in this chapter.

Text (no action)

This action is the default action for all items until they are assigned another action. It provides menu text that is for informational or aesthetic purposes only. The text itself doesn't invoke an action and cannot be selected when the application is run. For example, the text in Figure 20-2 tells the user how to choose a menu item.

Position the highlight on the desired option and press ↵. ----- Add/Edit a record Print a Report Print Labels Exit	This is text that causes no action
---	---------------------------------------

Figure 20-2 Text (no action)

In this example, the first four lines, including the dividing line, are defined as text. Because **Text (no action)** is the default, you don't need to assign this action to informational lines. Rather, the **Text (no action)** option is useful when you want to change an action item to a non-action item.

After choosing this option, press ↵ at the **OK** prompt.

Open a menu

This action opens a menu or a list. Use it to create an application with submenus, such as pull-down menus. For example, specify a bar menu item that you want to associate with a pop-up (pull-down) menu.

After choosing this action, a dialog box appears in which you specify the menu type and name of the menu or list.

In the **Menu type** field, press the **Spacebar** to make your choice. Then press ↵.

In the **Menu name** field, type the name of the menu or list, or press **Shift-F1 Pick** to see the menus or lists from the current directory. Only saved menus or lists appear, including any saved menus or lists on the work surface. The menus or lists that appear are of the same type you specified in the first field.

If you haven't yet created the menu or list you're specifying in this option, you can name it now and create it later. Or, you can go to the **Design** menu, create the menu or list, and return to the **Item** menu to assign the action.

Browse (add, delete, edit)

Choose this action when you want to specify an item that allows your users to add, delete, or edit a database file (as done with the dBASE command **BROWSE**). The **BROWSE** command presents the records of a database file in a table so users can view more than one record at a time.

After choosing this action, you're prompted to enter information about the action. Descriptions of the fields follow.

FIELDS

Enter the names of the fields to include in the Browse action. You can type them in, separating each field with a comma, or you can use **Shift-F1 Pick** to choose them from a displayed list. You can enter up to 68 characters in this field. If you don't enter the field names, the user will see all the fields in the assigned database file or view.

The list that appears when you press **Shift-F1 Pick** contains all the fields in the assigned database file. To add a field, select it and press **↵**. To change your mind about including a field, select it and press **↵** again. To find a field in a very long list, type the first letter or a few letters of the field name if you know it. The first field that matches these letters will be highlighted.

FILTER

Specify the filter condition to use with Browse.

Fields to LOCK on screen

Specify the number of contiguous fields that remain on the left side of the screen when the user moves from column to column. The default is **0**, meaning that no fields are locked. An entry in this field is optional.

FREEZE edit for field

Specify a field to which the cursor is confined when the application is run. Type in the field name, or press **Shift-F1 Pick** to choose from a displayed list. If you don't specify a field, all previously frozen fields will be unfrozen and the cursor will no longer be confined to one field. An entry in this field is optional.

Maximum column WIDTH

Specify the maximum column width (number of characters) in the Browse table. No column will be wider than the width specified, regardless of the individual field widths assigned when the database file was created. An entry in this field is optional.

FORMAT file

Specify the name of the format (.fmt) file to be used when users choose this item to display and validate data. Type a name or press **Shift-F1 Pick** to choose a .fmt file from the current catalog or directory. Choosing **<create>** takes you to the design screen where you can specify a format file. If you don't specify an .fmt file, the standard Browse format will be used.

Allow record ADD

Specify whether to allow users to append records to the end of the database file. To change the default **YES**, press the **Spacebar**.

Allow record EDIT

Specify whether to allow users to edit records as they browse a table of records. To change the default **YES**, press the **Spacebar**.

Allow record DELETE

Specify whether to allow users to delete records from the database file. To change the default **YES**, press the **Spacebar**.

KEEP image on exit

Specify whether to keep the image of the table on the screen after the user ends the Browse session. To change the default **NO**, press the **Spacebar**.

Display Browse MENU

Specify whether to display the default Browse menus. To change the default **YES**, press the **Spacebar**.

Use PREVIOUS Browse table

Specify whether to use the previously defined Browse table rather than creating a new table. To change the default **NO**, press the **Spacebar**.

FOLLOW record after update

Specify whether to reposition the record pointer according to the record's new location in the index. To change the default **YES**, press the **Spacebar**.

COMPRESS display

Specify whether to compress the format of the Browse table to allow more lines of data on the screen. To change the default **NO**, press the **Spacebar**.

Press **Ctrl-End** to save this information.

Edit form (add, delete, edit)

This action allows users to add, delete, or edit a database file, as done with the dBASE command EDIT. The EDIT command displays the records of a database file one record at a time.

After choosing this action, you're prompted to enter information about the action. Descriptions of the fields follow.

FORMAT file

Specify the name of the format users will see when they choose this item. Type a name or press **Shift-F1 Pick** to choose a .fmt file from the current catalog or directory. Choosing **<create>** takes you to the design screen where you can specify a format file. If you don't specify an .fmt file, the standard Edit format will be used.

Mode

Change the default editing mode from **APPEND** to **EDIT** by pressing the **Spacebar**. If **APPEND** is chosen, **FIELDS** is the only option available.

FIELDS

Enter the names of the fields to include in the Edit action. You can type them in, separating each field with a comma, or you can use **Shift-F1 Pick** to choose them from a displayed list. If you don't enter the field names, the user will see all of the fields in the assigned database file or view.

The list that appears if you press **Shift-F1 Pick** contains all the fields in the assigned database file. To add a field, select it and press **↵**. To change your mind about including a field, select it and press **↵** again. To find a field in a very long list, type the first letter or few letters of the field name if you know it. The first field that matches these letters will be highlighted.

FILTER

Specify the filter condition to use.

SCOPE, FOR, WHILE

In the SCOPE field, enter a qualifier (for example, ALL) that specifies the extent or number of records available for editing.

In the FOR field, enter a condition that must be met for a record to be edited.

In the WHILE field, enter a condition that specifies when editing records should stop.

Allow record ADD

Specify whether to allow users to append records to the database file. To change the default **YES**, press the **Spacebar**.

Allow record EDIT

Specify whether to allow users to update records. To change the default **YES**, press the **Spacebar**.

Allow record DELETE

Specify whether to allow users to delete records from the database file. To change the default **YES**, press the **Spacebar**.

KEEP image on exit

Specify whether to keep the table image on screen after the user ends a Browse editing session initiated from Edit. To change the default **YES**, press the **Spacebar**.

Display EDIT menu

Specify whether to display the default Edit menu (the menu that appears when the user presses **F10 Menus**). To change the default **NO**, press the **Spacebar**.

Use PREVIOUS Edit form

Specify whether to use the previously defined Edit table rather than creating a new table.

FOLLOW record after update

Specify whether to reposition the record pointer according to the record's new location in the index. To change the default **YES**, press the **Spacebar**.

Press **Ctrl-End** to save this information.

Display or print

This action prints or displays information, such as reports and labels.

After choosing this action, a menu appears from which you can select whether to print reports or labels or to display information. This menu is described in the following sections.

Report

This action prints a report. After selecting it, you see a dialog box. Descriptions of the fields in this box follow.

In the **FORM name** field, enter the name of the report form to print when users select this item. You can type in the name or press **Shift-F1 Pick** to select a report form from the current catalog or directory. Choosing **<create>** takes you to the design screen where you can specify a report form. An entry in this field is required.

In the **HEADING** field, you can enter an extra heading to print on the first line of each page of the report. Do not use double quotation marks.

In the **Report format** field, specify whether to print detail or summary lines. Choose between **FULL DETAIL** (summary and detail) or **SUMMARY ONLY** by pressing the **Spacebar**. Choosing **SUMMARY ONLY** means the report will print with subtotals and totals but no detail lines.

In the **Heading format** field, choose between **PLAIN** and **INCLUDE DATE AND PAGE** by pressing the **Spacebar**. If you choose the **PLAIN** option, the heading is not printed.

In the **Before printing** field, specify whether to eject a page before printing. Choose between **SKIP TO NEW PAGE** and **DO NOT EJECT** by pressing the **Spacebar**.

In the **Send output to** field, specify where the report output should be sent. The choices are **PRINTER, DISK FILE, SCREEN, and ASK AT RUN TIME**. The last choice gives users the previous three choices in a pop-up menu (you don't need to define this menu). Press the **Spacebar** to cycle through the choices.

In the **FILTER** field, specify the filter condition to use in the report.

In the **SCOPE** field, enter a qualifier (for example, **ALL**) that specifies the extent or number of records in a file to be included in the report.

In the **FOR** field, enter a condition that must be met for the record to be included in the report.

In the **WHILE** field, enter a condition that specifies when the inclusion of records in the report should stop.

Press **Ctrl-End** to save this information.

Labels

This action prints labels. After choosing it, a dialog box appears. Descriptions of the fields in this box follow.

In the **FORM name** field, enter the name of the label form to print when users select this item. You can type in the name or press **Shift-F1 Pick** to select a label form from the current catalog or directory. Choosing **<create>** takes you to the design screen where you can specify a labels form. An entry in this field is required.

In the **Send output to** field, specify where the label output should be sent. The choices are **PRINTER, DISK FILE, SCREEN, and ASK AT RUN TIME**. The last choice gives users the previous three choices in a pop-up menu (you don't need to define this menu). Press the **Spacebar** to cycle through the choices.

In the **Print SAMPLE** field, specify whether the item selected by the user displays test labels. Choose between **YES** and **NO** by pressing the **Spacebar**.

In the **FILTER** field, specify the query file and the filter condition to use for the labels. Filenames must be preceded by the FILE keyword. The Applications Generator assumes these are query files unless you specify otherwise.

In the **SCOPE** field, enter a qualifier (for example, ALL) that specifies the extent or number of records in a file to be printed as a label.

In the **FOR** field, enter a condition that must be met for the record to be printed as a label.

In the **WHILE** field, enter a condition that specifies when printing should stop.

Press **Ctrl-End** to save this information.

Display/list

Choose this action when you want an item to display the records in a database or view. After choosing this action, a dialog box appears. Descriptions of the fields follow.

In the **PAUSE at full page/screen** field, specify whether to pause the display after 20 lines. Press the **Spacebar** to choose between **YES** and **NO**. Choosing **YES** pauses the display after 20 lines, which is how the dBASE command DISPLAY operates. Choosing **NO** means all records will appear without pausing, which is how the dBASE command LIST operates. (If the display appears in a window, the number of lines will vary with the size of the window.)

In the **Send output to** field, specify where the display or list output should be sent. The choices are **PRINTER**, **DISK FILE**, **SCREEN**, and **ASK AT RUN TIME**. The latter choice gives your users the previous three choices in a pop-up menu (you don't need to define this menu). Press the **Spacebar** to cycle through the choices.

In the **Include RECORD NUMBERS** field, specify whether the display or list should include the record numbers. Choose between **YES** and **NO** by pressing the **Spacebar**.

In the **FIELDS** field, you specify the fields to include in the display or list. You can type them in, separating each field with a comma, or you can use **Shift-F1 Pick** to choose them from a displayed list. If you don't enter the field names, the user will see all the fields in the assigned database file or view.

The list that appears if you press **Shift-F1 Pick** contains all the fields in the assigned database file. To add a field, select it and press ↵. To change your mind about including a field, select it and press ↵ again. To find a field in a very long list, type the first letter or few letters of the field name if you know it. The first field that matches these letters will be highlighted.

In the **FILTER** field, specify the query file or the filter condition to use for the display or list. Filenames must be preceded by the FILE keyword. The Applications Generator assumes these are query files unless you specify otherwise.

In the **SCOPE** field, enter a qualifier (for example, ALL) that specifies the extent or number of records in a file to be included in the display or list.

In the **FOR** field, enter a condition that must be met for the record to be included in the display or list.

In the **WHILE** field, enter a condition that specifies when inclusion of records in the display or list should stop.

Press **Ctrl-End** to save this information.

Perform file operation

Choose this action when you want to assign a file operation to an item. For example, you can have a batch process item update, sort, or reindex a database, create a new index, or import or export a foreign file.

After choosing this action, the File operations submenu appears (see Figure 20-3). The actions on this menu are explained in the following sections.

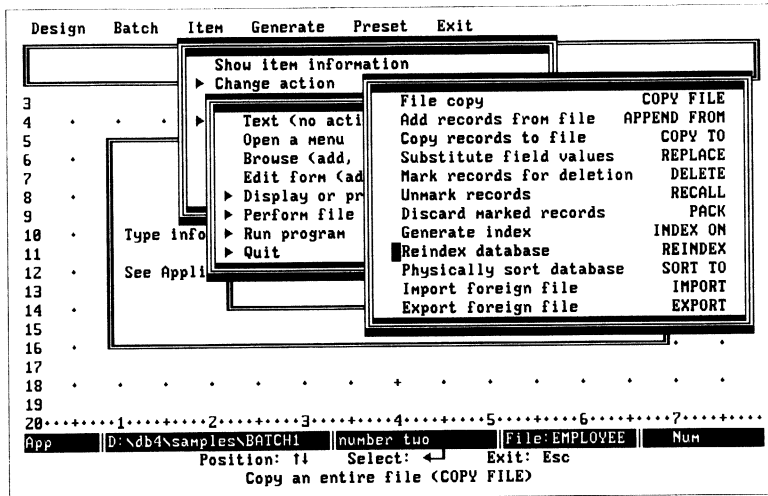


Figure 20-3 File operations menu

File copy (COPY FILE)

This action copies one closed file to another file. After choosing this action, you're asked to enter the name of the file to copy and the name of the target file that receives the copy. You can copy any file type, even .exe files.

In either of the fields, you must type a filename or press **Shift-F1 Pick** to select one.

Press **Ctrl-End** to save this information.

Add records from file (APPEND FROM)

This action adds records from one file to the active database file.

**NOTE**

To allow users to add records to a file of their choosing, see Giving Users More Control earlier in this chapter.

After choosing this action, enter information in the following fields.

In the **Add records FROM file/array** field, enter the name of the file or array from which the records should be appended. Enter the filename by typing it or by pressing **Shift-F1 Pick** to select the name from the current catalog or directory.

In the **of type** field, choose the type of file from which the records will be appended. You choose among **DBF, dBASE II, FW2, RPD, DELIMITED, ARRAY, SDF, DIF, SYLK**, and **WKS** by pressing the **Spacebar**.

In the **DELIMITER** field, if the **of type** field above is **DELIMITED**, enter the delimiter used in the file from which the records will be copied. If the delimiter is double quotation marks, you can leave this field blank.

In the **FOR** field, enter the condition that must be met for a record to be added to the target file.

Press **Ctrl-End** to save this information.

Copy records to file (COPY TO)

This action copies specific fields from the active database file to another file. It differs from the **File copy** action in that it can copy specific fields or records, not just the whole file. This action overwrites any data in the target file. It does not append records.

After choosing this action, enter information in the following fields.

In the **Copy records TO file/array** field, enter the name of the file or array to which the records should be copied. Enter the filename by typing it or by pressing **Shift-F1 Pick** to select a name from the current catalog or directory.

In the **of type** field, choose the type of file to which the records will be copied. Choose among **DBF, dBASE II, FW2, RPD, DELIMITED, ARRAY, SDF, DIF, SYLK**, and **WKS** by pressing the **Spacebar**.

In the **DELIMITER** field, if the **of type** field above is **DELIMITED**, enter the delimiter used in the file to which the records will be copied. If the delimiter is double quotation marks, you can leave this field blank.

In the **FIELDS** field, specify a list of the fields to include in the target file. You can type them in, separating each field with a comma, or you can use **Shift-F1 Pick** to choose them from a displayed list. If you don't enter the field names, the user will see all the fields in the assigned database file or view.

The list that appears when you press **Shift-F1 Pick** contains all the fields in the assigned database file. To add a field, select it and press ↵. To change your mind about including a field, select it and press ↵ again. To find a field in a very long list, type the first letter or few letters of the field name if you know it. The first field that matches these letters will be highlighted.

In the **SCOPE** field, enter a qualifier (for example, ALL) that specifies the extent or number of records in a file that are to be included in the target file.

In the **FOR** field, enter a condition that must be met for the records to be copied to the target file.

In the **WHILE** field, enter a condition that specifies when records should no longer be eligible for copying.

Press **Ctrl-End** to save this information.

Substitute field values (REPLACE)

This action performs a REPLACE command operation. This command specifies new values for fields in a database file.

After choosing this action, enter information in the following fields:

In the **SCOPE** field, enter the extent or number of records in a file that are to be searched.

In the **FOR** field, enter a condition that must be met.

In the **WHILE** field, enter a condition that specifies when records should no longer be subject to the REPLACE.

Under **The field named**, enter each field that you want to replace with a new value. You can type each field name, or you can use **Shift-F1 Pick** to choose from a displayed list. Entries in the first line are required. You can only replace up to five fields at a time.

In each **with this value** field, enter the new value (including an expression) for the corresponding field. This value can be no more than 68 characters long.

In the **ADDITIVE option** field, specify whether the substitute value should be added to the current value in the field (for memo fields only), rather than replacing the current value. To change the default, **NO**, press the **Spacebar**.

Press **Ctrl-End** to save this information.

Mark records for deletion (DELETE)

This action performs a DELETE command operation. This command marks certain records for deletion.

After choosing this action, enter information in the following fields.

In the **SCOPE** field, enter a qualifier (for example, ALL) that specifies the extent or number of records in a file that are to be marked for deletion.

In the **FOR** field, enter a condition that must be met.

In the **WHILE** field, enter a condition that specifies when records should cease being marked for deletion.

Press **Ctrl-End** to save this information.

Unmark records (RECALL)

This action removes the mark indicating that a record should be deleted.

After choosing this action, enter information in the following fields.

In the **SCOPE** field, enter a qualifier (for example, ALL) that specifies the extent or number of records in a file that are to be searched for recall.

In the **FOR** field, enter a condition that must be met.

In the **WHILE** field, enter a condition that specifies when records should no longer be subject to recall.

Press **Ctrl-End** to save this information.

Discard marked records (PACK)

This action discards all records marked for deletion, renumbers the records, and reindexes any associated indexes that are open at the time.

After choosing this action, you're prompted to confirm your choice by pressing ↵.

Generate index (INDEX ON)

This action generates an index. To add a FOR clause, generate the code and edit the INDEX ON line.

After choosing this action, enter information in the following fields.

In the **Index KEY expression** field, enter the key expression. The key expression can be any number of fields or any valid dBASE expression except logical expressions and memo fields. For example, you could enter *Lastname + Firstname*. An entry in this field is required.

In the **Index first key occurrence only (UNIQUE)** field, choose **YES** to include only the first record in which duplicate values occur, and **NO** to index all records, regardless of whether the database file includes duplicates. To change the default from **NO**, press the **Spacebar**.

In the **Index in DESCENDING order** field, to index the database file in descending order, press the **Spacebar** so that **YES** displays.

To generate an .ndx file, enter the index filename in the **Index file** field. You can enter the .ndx filename, or press **Shift-F1 Pick** to choose an .ndx file in the current catalog or directory. You can't make an entry in this field if you make an entry in the **TAG** and **MDX** fields. However, you must make an entry either in this field or in *both* of the following fields.

In the **TAG** field, enter the index tag you want to create in the .mdx file specified in the following field. You can't make an entry in this field if you've made an entry in the **INDEX file** field above.

In the **of MDX file** field, enter the .mdx file for the tag specified in the **TAG** field (the .mdx file need not already exist, but it may). You can't make an entry in this field if you've made an entry in the **INDEX file** field above.

Press **Ctrl-End** to save this information.

Reindex database (REINDEX)

This action will cause the database file to be reindexed after the file length has been changed or the key field changed while the index is closed.

Physically sort database (SORT TO)

This action sorts a database file. A SORT reorganizes records and writes them to a new database file.

After choosing this action, enter information in the following fields.

In the **TO file** field, enter the name of the file in which the sorted records should be stored. You must enter a name in this field, either by typing it or by pressing **Shift-F1 Pick** to choose a filename from the current catalog or directory. If you choose a filename from the displayed list, the sorted records will overwrite the data in the existing file.

In the **SCOPE** field, enter a qualifier (for example, ALL) that specifies the extent or number of records in a file that are to be sorted.

In the **FOR** field, enter a condition that must be met.

In the **WHILE** field, enter a condition that specifies when records should no longer be sorted to a new database file.

In the **Sort FIELDS** fields, enter up to five sort keys (field names) in their order of importance. (For example, you enter the primary key in field **1**, the secondary key in field **2**, and so forth.) Type in the field names or press **Shift-F1 Pick** to choose them from the current catalog or directory. An entry in the first field is required.

In the **Sort order** field, which is not labeled, press the **Spacebar** to display **ASCENDING** or **DESCENDING** order. You specify whether the case (capital-ization) should be considered in the sort by pressing the **Spacebar** to display **IGNORE CASE** or **USE CASE**.

Press **Ctrl-End** to save this information.

Import foreign file (IMPORT)

This action imports a non-dBASE file to your application. Use it to import from PFS:FILE, Framework II, dBASE II, RapidFile, and Lotus 1-2-3.

After choosing this action, type the name of the file you want to import in the **FROM file** field or press **Shift-F1 Pick** to choose a file from the current catalog or directory. An entry in this field is required.

In the **of type** field, the default file type is **PFS**. To change it to **dBASE II, FW2** (Framework II), **RPD** (RapidFile), or **WK1** (Lotus 1-2-3), press the **Spacebar** until the file type you want appears. Press **Ctrl-End** to save this information.



NOTE

You can use dBASE III and dBASE III PLUS files without importing them.

Export foreign file (EXPORT)

This action exports a dBASE IV database file to another product. Use it to export a dBASE IV database file to PFS:FILE, Framework II, RapidFile, and dBASE II.

After choosing this action, enter information in the following fields.

In the **TO file** field, enter the name of the file to which you want to export. Type a filename in this field or press **Shift-F1 Pick** to choose a file from the current catalog or directory. An entry in this field is required.

In the **of type** field, choose the file type for the exported file. The default file type is **PFS**. To change it to **dBASE II, FW2** (Framework II), or **RPD** (RapidFile), press the **Spacebar** until the file type you want appears.

In the **FIELDS** field, enter the database fields you want exported to the file. You can type them in, separating each field with a comma, or you can use **Shift-F1 Pick** to choose them from a displayed list. If you don't enter the field names, all fields in the assigned database file or view will be exported to the new file.

The list that appears when you use press **Shift-F1 Pick** contains all the fields in the assigned database file. To add a field, select it and press **↓**. To change your mind about including a field, select it and press **↑** again. To find a field in a very long list, type the first letter or few letters of the field name if you know it. The first field that matches these letters will be highlighted.

In the **SCOPE** field, enter a qualifier (for example, **ALL**) that specifies the extent or number of records in a file that should be considered for export.

In the **FOR** field, enter a condition that must be met.

In the **WHILE** field, enter a condition that specifies when records should cease being exported.

Press **Ctrl-End** to save this information.

Run program

This action runs programs, including dBASE or operating system level programs, batch processes, and Control Center macros. After choosing this action, you see a submenu from which to select the type of program you want to run. These types are described in the following sections.

Do dBASE program

This action runs a dBASE III PLUS or dBASE IV program.

In the **Program** field, enter a valid dBASE program name (a .dbo, .prg, or .prs file), or press **Shift-F1 Pick** to select a .prg file from the displayed list. Choosing **<create>** takes you to the program editor, where you can enter the lines of dBASE code. An entry in this field is required.

In the **Parameters** field, enter the parameters for the program specified in the **Program** field, according to the parameter statement for the program to be run.

Press **Ctrl-End** to save your choice.

Execute BATCH process

This action executes a batch process that you created in the Applications Generator. After choosing this action, you can either type the batch process name, or select a batch process from the list that appears when you press **Shift-F1 Pick**. An entry in this field is required.

Press **Ctrl-End** to save your choice.

Insert dBASE code

This action is used to specify dBASE code that you want to run when a user selects a list or an item from a menu. For example, you could enter the following:

```
USE Old_data  
ZAP
```



NOTE

For further information on dBASE IV commands and basic information you'll need to write dBASE code, see Language Reference and Programming in dBASE IV.

After you choose this action, a full-screen editing frame appears on the Applications Generator desktop in which you can enter up to 19 lines of dBASE code. When you're through entering the code, press **Ctrl-End** to save it.

You can also embed code, including a .prg file, that runs before or after (or before *and* after) an object is displayed to the user. For more information, refer to Object Menus earlier in this chapter.

Run DOS program

This action runs a DOS program. After choosing this action, you are prompted to enter the program name and the parameters for the program to be run.

In the **Program** field, type a valid program name or press **Shift-F1 Pick** to select a program name from the current directory. An entry in this field is required.

In the **Parameters** field, enter the parameters for the program specified in the **Program** field, according to the syntax for the program to be run. This field does not relate to the dBASE PARAMETERS command.

Load/call binary file

This action loads and calls a binary file (assembler program, .bin). This type of file is written in assembly language. After choosing this action, enter the filename and the parameters for the program to be run.

In the **Program** field, enter the name of the assembler program to load and call by typing the filename and extension. When your users select the associated menu item for the first time, the program will be loaded and called. An entry in this field is required.

In the **Parameters** field, enter the parameters for the program entered in the **Program** field according to the syntax for the program to be called. For example, to pass an integer value of 10 to a shareable image file program, you could enter *CHR(10)* in this field. This field does not relate to the dBASE PARAMETERS command.

Play back macro

This action calls a macro created through the Control Center. After choosing this action, you're asked to enter the macro name. Either type the macro name, or press **Shift-F1 Pick** to select a name from the current catalog or directory. An entry in this field is required.



NOTE

For information about macros, see Chapter 14 of this manual and the Language Reference manual.

Quit

This action allows users to quit your application and return to the operating system or the calling program. After choosing this action, select **Return to calling program** or **Quit to DOS** and press ↵. Confirm your choice by pressing ↵ at the **OK** prompt.

Override Assigned Database or View

This option specifies the database file or view that you want the current item to use if it's different from the one you specified for the object or the application.

After choosing this option, you see the database and index files currently assigned to this item. Change the assignments by entering information in the following fields.

For this item you may use values

Make a choice from this field by pressing the **Spacebar**. If you choose **IN EFFECT AT RUN TIME** or **ABOVE**, you will not be able to enter values in the fields that follow.

IN EFFECT AT RUN TIME is used to specify the database file or view that was in use just prior to the item being selected. For example, if the first item on a menu opens a Files list containing the names of database files, and the following items on the menu are to use the database file chosen by the user, these items should be assigned **IN EFFECT AT RUN TIME**.

You may enter values in the following fields if you've chosen **ENTERED BELOW**.

Database/view

Enter the database file or view that you want this item to use. Type in the name, or press **Shift-F1 Pick** to see the database files and views in the current catalog or directory. Choosing the **<create>** marker takes you to the design screen where you can specify a database file. If this item uses the same database file or view as used by the current object, you don't need to enter the filename here.

Set INDEX to

Enter the .ndx index files to be used with the database file or view for the selected item. Either enter the name of the index file or files, separated by a comma, or use **Shift-F1 Pick** to select the files. If this item uses the same index files as the current object, you don't need to enter an index file here.



NOTE

*You can choose multiple .ndx files by selecting a filename and pressing ↵, selecting another filename and pressing ↵, and so forth, until you've selected all the index filenames you want. Then, press **Ctrl-End** to save the choices and exit the list. You cannot choose a non-production .mdx file here; a production .mdx is opened automatically and does not need to be entered here.*

ORDER

Enter the index order number or the name of a new controlling index, if any. If this item uses the same order as used by the current object, you don't need to enter the order here.

Embed Code

Use this option to add dBASE code that will execute either before or after (or before *and* after) an item action is performed at run time. For example, you could embed dBASE SET commands not included in the default settings for the application or object.

When you select either **Before** or **After**, you see a full-screen editing frame. Enter up to 19 lines of dBASE code inside the frame. The Applications Generator doesn't check code syntax, so enter or modify the code carefully. (Use the keys described in Chapter 18 to modify the code.) Press **Ctrl-End** to save the code and return to **Item**. To simplify this process, put the code into a .prg file, and embed the command DO <program name>.prg.



NOTE

This option is for application developers who know how to program in dBASE IV. If you're new to dBASE IV, see Language Reference for basic information you'll need to write programs and a description of each command. Also see Programming in dBASE IV.

Bypass Item on Condition

Use this option to specify a condition on which the current item should be skipped at run time. Complete the field in this dialog box only if you're defining a pop-up menu.

Skip this item if

This field is used to create a condition on which to skip the current item at run time. Use this condition only for actions other than **Text (no action)**. For example, to specify that an item be unavailable to your users if its associated database file or view is missing from the directory, enter .NOT. FILE(<filename>).

Press **Ctrl-End** to save this information.

Position Record Pointer

This option sets the record pointer position before the action begins. Use it to specify the record you want to use first in this action. After choosing this option, you see the dialog box shown in Figure 20-4.

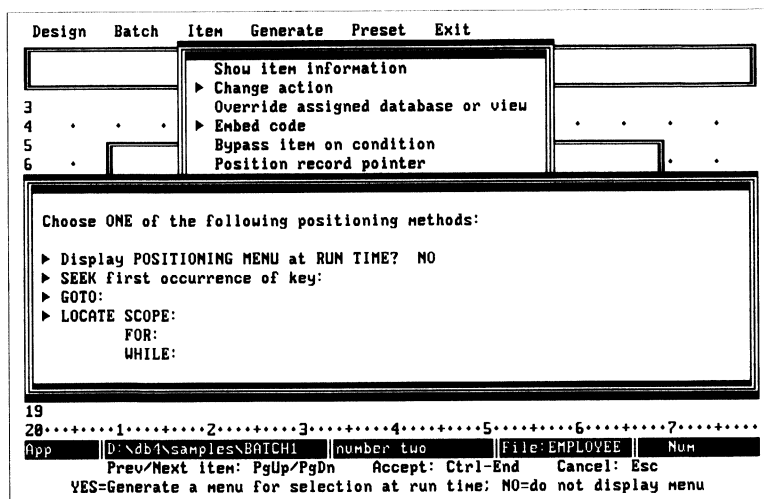


Figure 20-4 Set position of record pointer in file

Descriptions of the fields follow.

Display POSITIONING MENU at RUN TIME?

Use this field to present a record positioning menu to your users. (The Applications Generator automatically creates this menu.)

The action will not begin until the user enters a positioning choice. The default for this field, **NO**, tells the Applications Generator not to include the positioning menu here. If you want to control where the action starts, accept the default and make an entry in one of the other fields.

If you want to give users a choice of record position, simply press the **Spacebar** to display **YES**. You can't change the default from **NO** if you've entered values in any other field in this dialog box.

SEEK first occurrence of key

Specify a valid dBASE expression that has the same data type as the index key expression. This expression should indicate the particular record where the action should start. For example, entering "Santa Fe" would cause your application to go to the first record in which the string "Santa Fe" is found in the key field. If you've made an entry in another field, you can't make an entry here.



NOTE

*The file must be indexed to use this command, and the index file must be the controlling index. So, specify an index in the **Override assigned database or view** option on the **Item** menu if you haven't yet specified one for this item, object, or application.*

GOTO

Specify an exact location where a particular action starts in a file. This field and your entry are based on the syntax required by the dBASE GOTO command.

TOP and BOTTOM take you to different records depending on whether an index is active. Entering a particular record number, either as a constant or as a numeric expression (such as RECNO()+1), takes you to the specified record no matter where it is in the file as displayed.

You can't make an entry in this field if you've made an entry in another field in this dialog box.

LOCATE

In the following fields, specify a particular record where you want an action to start. This command works with any file, indexed or not; however, it's slower than SEEK.

SCOPE, FOR, WHILE

In the SCOPE field, enter a condition that specifies the extent or number of records to be searched.

In the FOR field, enter a search condition for the LOCATE command just explained. It's different from the SCOPE condition because it requires that a specific condition be met. You can't make an entry in this field if you've made an entry in any of the top three fields.

In the WHILE field, enter a search condition for the LOCATE command just explained. You can't make an entry in this field if you've made an entry in any of the top three fields.

Press **Ctrl-End** to save this information.

Reassign Index Order

Use this option to specify the index or tag for the action being defined. When you choose this option, you see the **Set ORDER to** field. You enter a sort order number (0 to 7) and an .ndx filename, or an .mdx tag. You can also specify a non-production .mdx filename using the OF clause. An entry in this field is required.

Press **Ctrl-End** to save this information.

Define Logical Window

Use this option to define a window that will appear when an action takes place. For example, you could define a window in which the user browses a database file. When you choose this option, you see the dialog box shown in Figure 20-5.

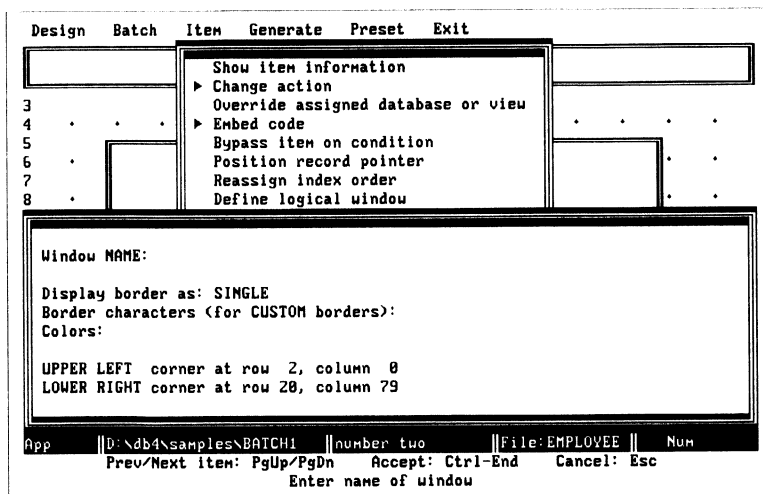


Figure 20-5 Define logical window

Descriptions of the fields follow.



NOTE

*Specifying a logical window for certain actions doesn't make sense. These include **Edit form (add, delete, edit)**, **Open a menu**, and the **Return to calling program** and **Quit to DOS** actions under **Quit**.*

Window NAME

Enter the name of the window for the action you're defining. An entry in this field is required, and it must be a legal dBASE window name.

Display border as

Specify the type of border for the action window. The default is **SINGLE**, meaning that the border will consist of a single line. To change it to **DOUBLE**, **PANEL**, **CUSTOM**, or **NONE**, press the **Spacebar**.

Choosing **DOUBLE** creates a double-line border. Choosing **PANEL** creates a single-line border that displays in inverse video on monochrome monitors. Choosing **CUSTOM** creates a border with the features you specify in the next field. Choosing **NONE** creates a window with no border.

Border characters (for CUSTOM borders)

Enter the characters or numbers for the border of this window. To enter characters directly, you must enclose them within a delimiter other than double quotation marks. You can use single quotation marks or left and right brackets []. For example, to create a border of asterisks, you'd enter '*'.

You can also enter ASCII codes, separated by commas, to represent other characters. These numbers need not appear between delimiters. See *Language Reference* for more information about ASCII character equivalents.

An entry in this field is required if you specified **CUSTOM** in the previous field.

Colors

In applications that are designed for systems that support color, you can specify the standard, enhanced, border, and background colors for this window. For example, entering *G+/N,W/R,G+* would set standard video to high green letters on a black background, enhanced (highlighted) video to white letters on a red background, and the border to high green.

UPPER LEFT corner at row and column

Enter the screen coordinates for the upper left corner of the window in these fields. The default for row is 2, and the default for column is 0. Entries in these fields are required.

LOWER RIGHT corner at row and column

Enter the screen coordinates for the lower right corner of the window in these fields. The default for row is 20, and the default for column is 79. Entries in these fields are required.

Press **Ctrl-End** to save this information.

Write Help Text

Use this option to write the help text for the item you're defining. This help text will appear at run time if this item is chosen and the user presses **F1 Help**. If you don't write help text for this item, the user will see the help text written for the menu or list. If you didn't write help text for the menu or list, the user will see the message **No help defined**.

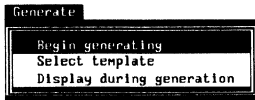
After choosing this option, a full-screen editing frame appears on the work surface in which you can enter up to 19 lines of text. Use this window to enter or modify the help text. When you finish, press **Ctrl-End** to save the text and return to **Item**.

Assign Message Line Prompt

Use this option to specify a prompt for the item being defined. At run time, the prompt will appear in the message line when the item is highlighted. If you don't enter a prompt for the item, any prompt you specified for the menu or list will display.

After choosing this option, you see the prompt, if any, assigned to the menu or list, and the type of object. To change the prompt from the one you specified for the menu or list, enter up to 76 characters in the field indicated by the cursor. Double quotation marks are not permitted.

Generate



Use the options on the **Generate** menu to produce the code and the documentation for your application. The code comprises the dBASE programs that will run your application, and the documentation is a record of the objects you created in the Applications Generator.

The Applications Generator generates the code or documentation by taking the information added as you built objects and merging it with a template. The templates contain instructions to dBASE IV for generating code or documentation.

In the process of generating code, the Applications Generator creates two program files, <appname>.prg and <mainmenu>.prg. You'll need these files in the same directory to run your application later. For documentation, the Applications Generator creates a file with the name you assigned to the application object, plus the .doc extension.



NOTE

You can learn more about these template files in the Using the Template Language section of the Programming in dBASE IV manual.

The Applications Generator creates the documentation and code quickly; however, the actual generation time depends on both your equipment and the size of your application. You must wait for the Applications Generator to finish before trying to exit and run your application.

Before running the application, you may wish to print the documentation and code. As you test your application, you can note design changes on the documentation, and note any syntax changes on the code.



NOTE

If you change one object, you must regenerate the entire application. Otherwise, the change will not appear in the application when you run it.

The first option on the **Generate** menu is **Begin generating**. It appears first on the menu because it's used most often. Before using it, however, be sure that the other two menu options are set to your preferences, as explained in the following sections.

Begin Generating

Choosing this option causes the Applications Generator to generate object documentation or dBASE code, depending on the choice you made in the **Select template** option. You can request that the documentation or the code appear on the screen as it's generated with the **Display during generation** option.

If you didn't specify a main menu for this application when you entered the Applications Generator, you must do so now. Press the **Spacebar** to choose a main menu type, either **BAR**, **POP-UP**, or **BATCH**. Then type the menu name or press **Shift-F1 Pick** to choose one from the current directory.

Once the documentation or code is generated, you may wish to print the documentation and code, and test the application. For information on these tasks, refer to Chapter 19, "A Sample Application."

Select Template

Use this option to specify the template used by the Applications Generator to create code or documentation, after you've made the application object current. When you choose this option, you can accept the default template, **MENU.GEN**, or type in another template name (you cannot use **Shift-F1** here). You save your entry by pressing **↵** or **Ctrl-End**. A description of the templates follows.

The Document.gen template is merged with the information you entered as you created your application to produce an <appname>.doc file. This file contains the descriptions, or documentation, of the objects in your application. A printed version of the documentation is useful to have as you're testing the application. As you test, you can note changes you want to make on the hard copy.

The Menu.gen template is merged with the information you entered as you created your application to produce two program (.prg) files — one for the application and one for the objects used in the application. The names of these files are <appname>.prg and <mainmenu>.prg, and they contain the dBASE code needed to run your application.

The Quickapp.gen template is merged with the information you entered after choosing the **Generate quick application** option from the **Application** menu to produce an <appname>.prg file. This file contains the code needed to run a simple, one-menu application. (If you did not specify a quick application, entering this template name and choosing **Begin generating** will produce code for a simple, one-menu application that uses the default screen format file and the database file assigned to the application object.)

**NOTE**

These three templates come with the Applications Generator. To learn about modifying them or creating other templates, see Programming in dBASE IV.

Display During Generation

After choosing this option, you're asked whether you want to see the code or documentation displayed as it's generated. Accept the default, **Yes**, or choose **No** by pressing the **Spacebar**. (Choosing **No** causes the generation to occur at a slightly faster speed than if the code is displayed on the screen.) Then, press **↵**. When you choose **Begin generating**, you'll see a line count in the status bar at the bottom of the screen.

Preset



The **Preset** menu options are used to specify information that remains constant for each application you design, unless you change it for a specific application. For example, you can specify that your name, copyright notice, and the dBASE version you're using appear in each application sign-on banner.

**NOTE**

*You can change information that is specific to an application by choosing options in the **Application** menu. That menu is described earlier in this chapter.*

Sign-on Defaults

When you design an application, you might want the first screen that appears to be a sign-on banner. The sign-on banner usually specifies who wrote the application, gives the copyright notice, and specifies the dBASE versions that can be used to run the application.

When you choose this option, you see three fields: **Author**, **Copyright notice**, and **dBASE version**. Enter the appropriate information into each field, using **↵** to move among the fields. If you make a mistake when adding information, just backspace to make corrections. Press **Ctrl-End** to save the changes.

You can enter any type of information in these fields. For example, you can type a standard greeting to your users in these fields, rather than your name, copyright notice, or dBASE version. If you still want your name, copyright notice, or dBASE version to appear in the object documentation or code, use the **Edit program header comments** option in the **Application** menu.

The next time you create an application object, this information will automatically appear in the object itself. (The current application object will not reflect these changes.) You can then size the object and add other information. You can also move the information within the application object using the navigation keys explained in Chapter 18. To use an application object as a sign-on banner, choose the **Display sign-on banner** option in the **Application** menu.

Display Options

This option is the same as the **Modify display options**, which is described earlier in this chapter.

Environment Settings

This option sets the default environment for all your applications. It is used to turn environmental settings on or off. For example, with **Set BELL**, you can cause a warning signal to sound when users have entered invalid data or have reached the end of an input area on a form.

In the **to** field on the **Set DELIMITERS** line, enter the delimiters if **Set DELIMITERS** is **ON**.

Press **↓** to move among the settings, and the **Spacebar** to change a setting. When you're satisfied with the settings, press **Ctrl-End**. You can change these settings for a specific application by choosing **Modify application environment** from the **Application** menu.

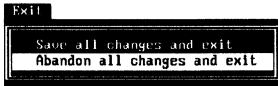
Application Search Path

Use this option to enter the default drive and search path for all applications created with the Applications Generator. You can change the path for an individual application by choosing the **Modify application environment** option in the **Application** menu.

In the **drive** field, enter the name of the drive on which all operations should take place and where all non-Applications Generator objects can be found at run time. Pressing **Shift-F1 Pick** displays a list from which you can choose the drive name.

In the **search path** field, enter the directory path your application will search to find objects, such as reports.

Exit



You use options on the **Exit** menu to save or abandon changes and exit the Applications Generator to the Control Center or dot prompt. If you choose the second option from **Exit** and change your mind about leaving the Applications Generator, you can always press **Esc** to exit the dialog box.

Save All Changes and Exit

Choosing this option saves all objects on the work surface and ends the session in the Applications Generator. If you've made changes to objects but haven't previously saved them with **Save current <object>** in the object menus, the changes will be saved with this option.

The modified object replaces the previous version of the object when you save and exit.

As mentioned in the Preset section, modifying an application object and saving it under a new name can be used to create generic applications that you can easily customize for specific users.

Abandon All Changes and Exit

Choosing this option discards the changes made to all objects on the work surface and ends the session in the Applications Generator. When you abandon changes, the objects remain as they were last saved.

If you choose **Yes** from the confirmation box that displays, the Applications Generator abandons the changes, clears the work surface, and returns to the Control Center or dot prompt, depending on the component from which you entered the Applications Generator.

If you choose **No**, you return to the Applications Generator menu bar, and the modified objects remain intact on the work surface.

Appendixes

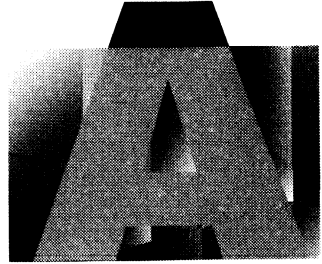
Menu Trees

Function Key Table

Cursor Navigation Keys

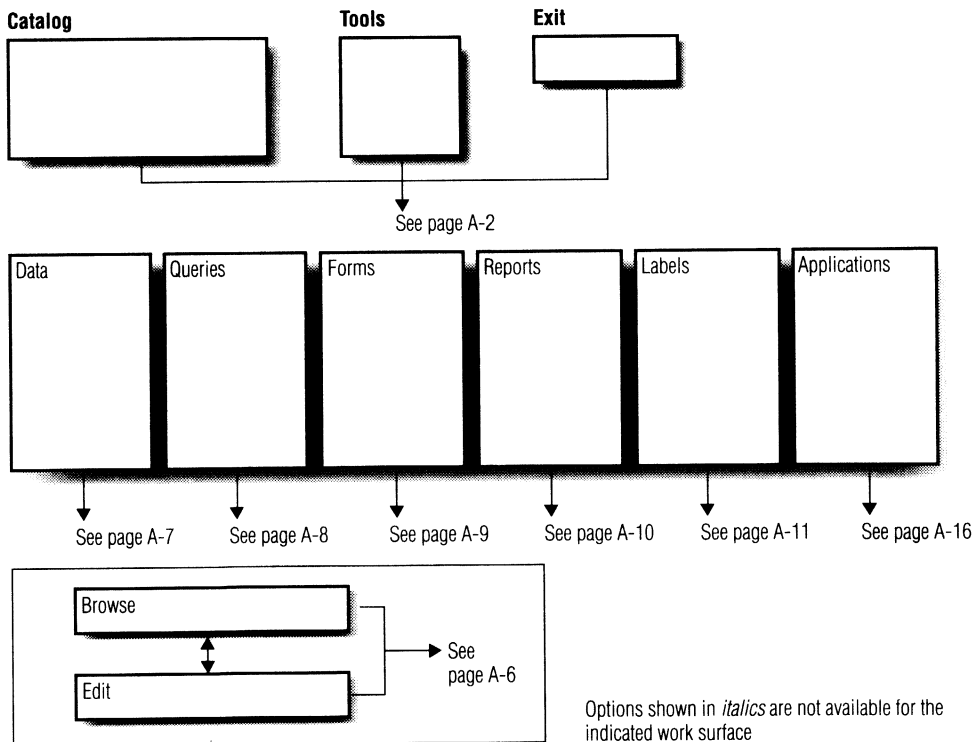
Work Surfaces

Menu Trees

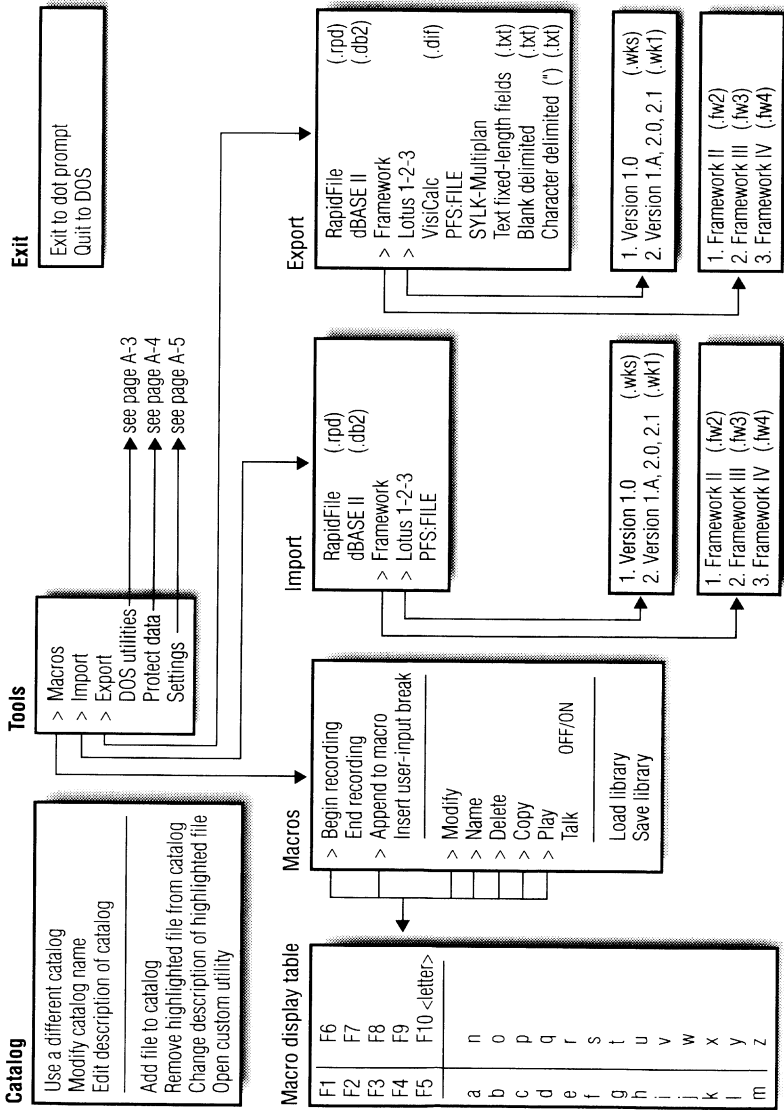


This appendix shows the menu trees for the dBASE IV menu system. It includes the Control Center, the design screens, and the Browse and Edit screens.

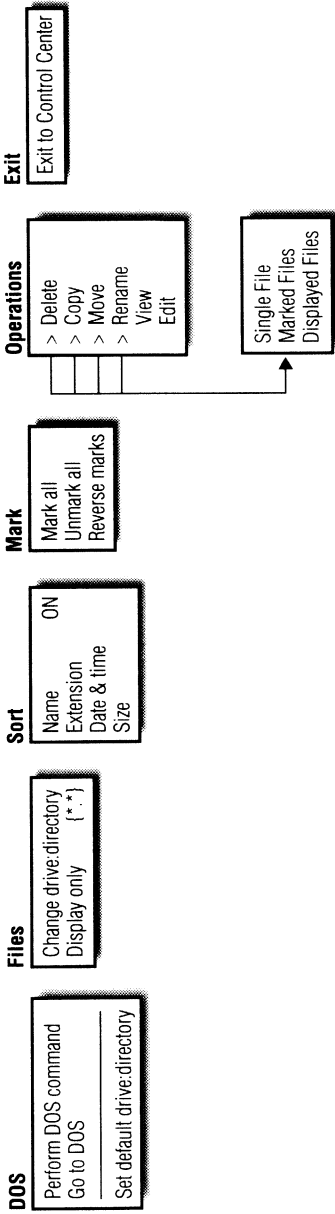
Control Center



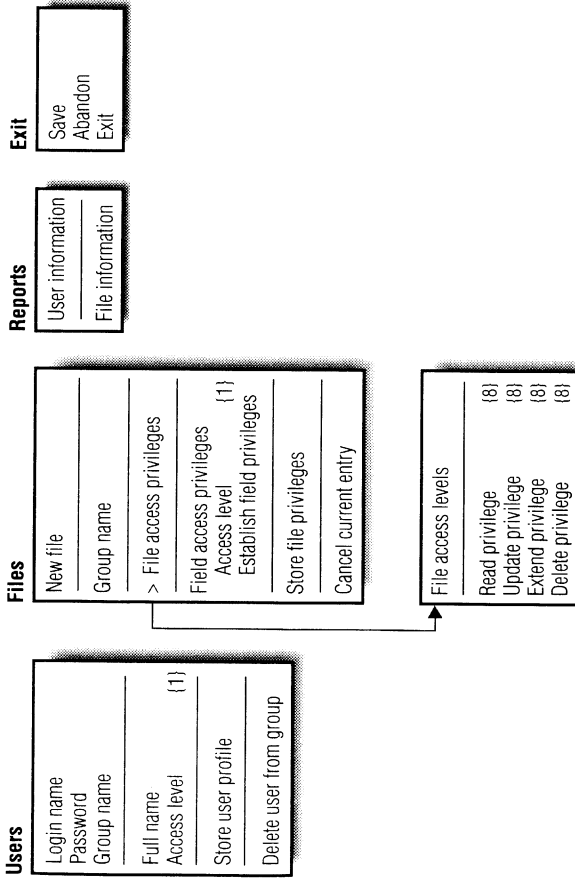
Control Center Menu Bar



Tools/DOS Utilities



Tools/Protect Data



Tools/Settings

Options	
Bell	ON/OFF
Carry	OFF/ON
Century	OFF/ON
Confirm	OFF/ON
Date order	MDY/DMY/YMD
Date separator	{/}
Decimal places	{2}
Deleted	OFF/ON
Exact	OFF/ON
Exclusive	OFF/ON
Instruct	ON/OFF
Margin	{0}
Memo width	{50}
Safety	ON/OFF
Talk	ON/OFF
Trap	OFF/ON

Display	EGA25/EGA43
Display mode	
> Standard - All	
> Normal text	
> Messages	
> Titles	
> Enhanced - All	
> Highlight	
> Boxes	
> Information	
> Fields	
> Perimeter of screen	

Exit
Exit to Control Center

Monochrome Attributes	
Intensity (Bold)	OFF/ON
Underline	OFF/ON
Reverse	OFF/ON
Blink	OFF/ON

Color Attributes	
Foreground Background	
Black	Black
Blue	Blue
Green	Green
Cyan	Cyan
Red	Red
Magenta	Magenta
Brown	Brown
White	White
Gray	Gray
Lt Blue	Lt Blue
Lt Green	Lt Green
Lt Cyan	Lt Cyan
Lt Red	Lt Red
Lt Magenta	Lt Magenta
Yellow	Yellow
Br White	Br White
BLINK	OFF/ON

Browse

Records

Undo change to record
 Add new records
 Mark record for deletion/Clear deletion mark
 Blank record
 Record lock
 Follow record to new position YES/NO

Organize

> Create new index
 > Modify existing index
 Order records by index
 Activate .NDX index file
 Include .NDX index file
 Remove unwanted index tag
 Sort database on field list
 Unmark all records
 Erase marked records

Fields

Lock fields on left {0}
 Blank field { }
 Freeze Field { }
 Size field { }

Go To

Top record
 Last record
 Record number {1}
 Skip {10}
 Index key search { }
 Forward search { }
 Backward search { }
 Match capitalization YES/NO

Exit

Exit
 Transfer to Query Design
 Return to <object> Design

Create new index

Name of index { }
 Index expression { }
 FOR clause { }
 Order of index ASCENDING/DESCENDING
 Display first duplicate key only NO/YES

Edit

Records

Undo change to record
 Add new records
 Mark record for deletion/Clear deletion mark
 Blank record
 Record lock
 Follow record to new position YES/NO

Organize

> Create new index
 > Modify existing index
 Order records by index
 Activate .NDX index file
 Include .NDX index file
 Remove unwanted index tag
 Sort database on field list
 Unmark all records
 Erase marked records

Go To

Top record
 Last record
 Record number {1}
 Skip {10}
 Index key search { }
 Forward search { }
 Backward search { }
 Match capitalization YES/NO

Exit

Exit
 Transfer to Query Design
 Return to <object> Design

Create new index

Name of index { }
 Index expression { }
 FOR clause { }
 Order of index ASCENDING/DESCENDING
 Display first duplicate key only NO/YES

Database Files

Layout

Print database structure
 Edit database description
 Save this database file structure

Organize

> Create new index
 > Modify existing index
 Order records by index
 Activate .NDX index file
 Include .NDX index file
 Remove unwanted index tag

 Sort database on field list
 Unmark all records
 Erase marked records

Create new index

Name of index {}
 Index expression {}
 FOR clause {}
 Order of index ASCENDING/DESCENDING
 Display first duplicate key only NO/YES

Append

Enter records from keyboard
 Append records from dBASE file
 > Copy records from non-dBASE file

Copy records from non-dBASE file

RapidFile (.rpd)
 dBASE II (.db2)
 Framework II (.fw2)
 Lotus 1-2-3 (.wks)
 VisiCalc (.dif)
 SYLK-Multiplan
 Text fixed-length fields (.txt)
 Blank delimited (.txt)
 Character delimited (*) (.txt)

Go To

Top field
 Last field
 Field number

Exit

Save changes and exit
 Abandon changes and exit

Queries

Layout

Add file to query
 Remove file from query
 Create link by pointing
 Write view as database file
 Edit description of query
 Save this query
 Invoke layout program

Fields

Add field to view
 Remove field from view
 Edit field name
 Create calculated field
 Delete calculated field
 Sort on this field
 Include indexes
 Keep speedup indexes
 Filter method
 Load field program

NO/YES
 Optimized/SET KEY/INDEX...FOR/SET FILTER

Condition

Add condition box
 Delete condition box
 Show condition box YES/NO

Update

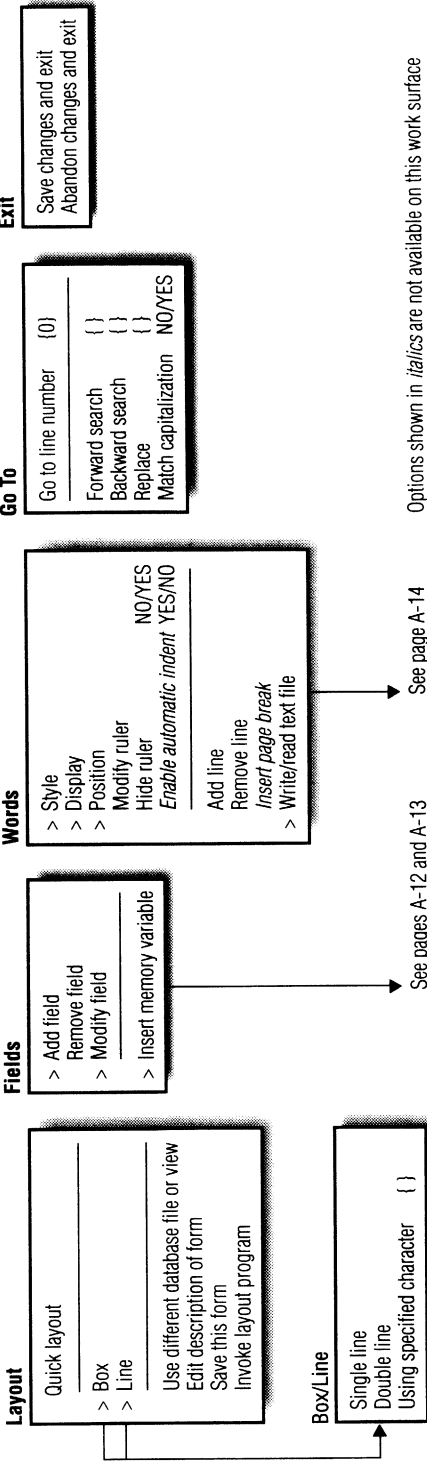
Perform the update
 > Specify update operation

Specify update operation
 Replace values in <filename>
 Append records to <filename>
 Mark records for deletion
 Unmark records in <filename>

Exit

Save changes and exit
 Abandon changes and exit
 Return to <module>

Forms



Reports

Layout

- > Quick layouts
- > Box
- > Line

Use different database file or view
 Edit description of report
 Save this report
 Invoke layout program

Box/Line

- Single line
- Double line
- Using specified character ()

Quick layouts submenu

- Column layout
- Form layout
- Mallmerge layout

Fields

- > Add field
- Remove field
- > Modify field
- > Change hidden field

See pages A-12 and A-13

Bands

- > Add a group band
- Remove group
- > Modify group
- Group intro on each page

Open all bands

Begin band on new page	NO/YES
Word wrap band	NO/YES
Text pitch for band	DEFAULT/PICA/ELITE/CONDENSED
Quality print for band	DEFAULT/YES/NO
Spacing of lines for band	DEFAULT/SINGLE/DOUBLE/TRIPLE

Page headings in report intro YES/NO

Add a group band/Modify group

- > Field value { }
- Expression value { }
- Record count { }

Words

- > Style
- > Display
- > Position
- Modify ruler
- Hide ruler
- Enable automatic indent YES/NO
- Add line
- Remove line
- Insert page break
- Write/read text file

See page A-14

Go To

- Go to line number ()
- Forward search ()
- Backward search ()
- Replace ()
- Match capitalization NO/YES

Print

- Begin printing
- Eject page now
- View report on screen
- Use print form (<filename>)
- Save settings to print form

- > Destination
- > Control of printer
- > Output options
- > Page dimensions

See page A-15

Exit

- Save changes and exit
- Abandon changes and exit

Options shown in *italics* are not available on this work surface

Labels

Layout

Use different database file or view
 Edit description of label design
 Save this label design
 Invoke layout program

Dimensions

> Predefined Size 15/16 x 3 1/2 by 1
 Width of label (35)
 Height of label (5)
 Indentation (0)
 Lines between labels (1)
 Spaces between label columns (0)
 Columns of labels (1)

Predefined size

1. 15/16 x 3 1/2 by 1
2. 15/16 x 3 1/2 by 2
3. 15/16 x 3 1/2 by 3
4. 11/12 x 3 1/2 by 3 (Cheshire)
5. 17/16 x 5 by 1
6. 3 5/8 x 6 1/2 envelope (#7)
7. 4 1/8 x 9 7/8 envelope (#10)
8. Rolodex (3 x 5)
9. Rolodex (2 1/4 x 4)

Fields

> Add field
 Remove field
 Modify field

Words

> Style
 > Display
 > Position
 Modify ruler
 Hide ruler
 Enable automatic indent NO/YES
 YES/NO
 Add line
 Remove line
 Insert page break
 Write/read text file

See page A-14

See page A-12

Go To

Go to line number (0)
 Forward search {}
 Backward search {}
 Replace {}
 Match capitalization NO/YES

Print

Begin printing
 Eject page now
 Generate sample labels
 View labels on screen
 Use print form {<filename>}
 Save settings to print form
 > Destination
 > Control of printer
 > Output options
 > Page dimensions

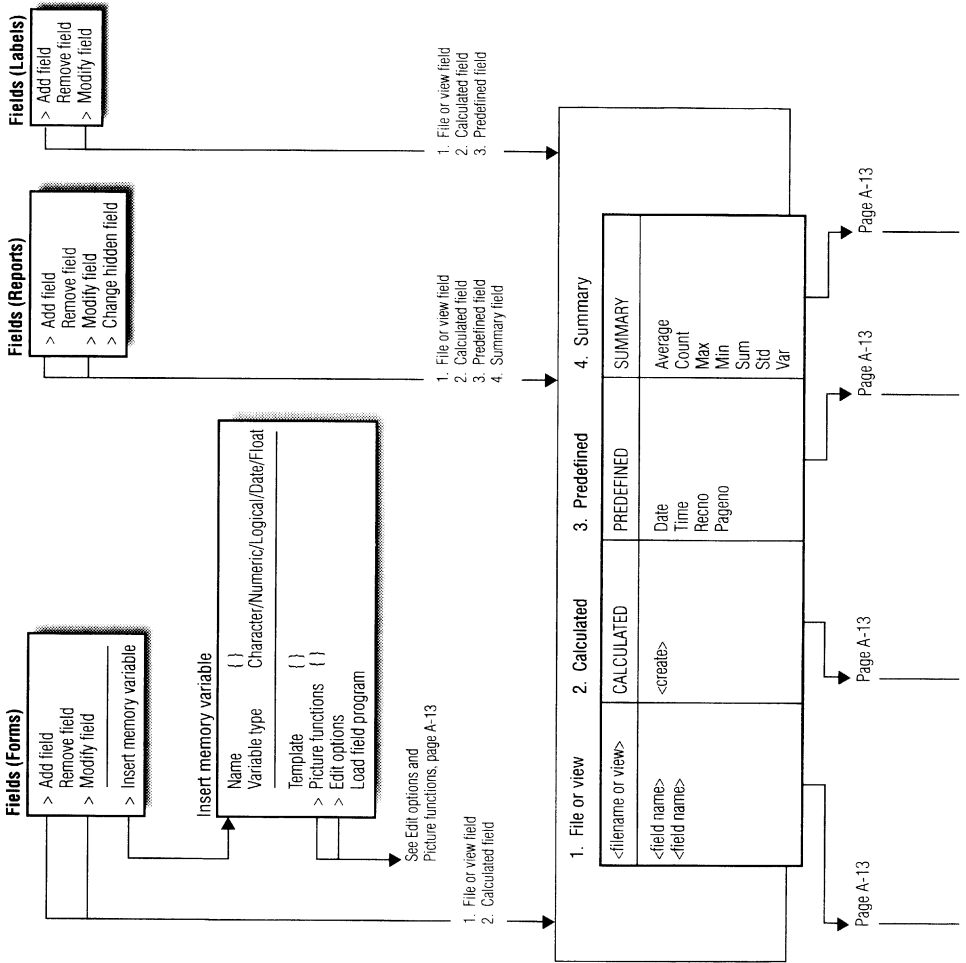
See page A-15

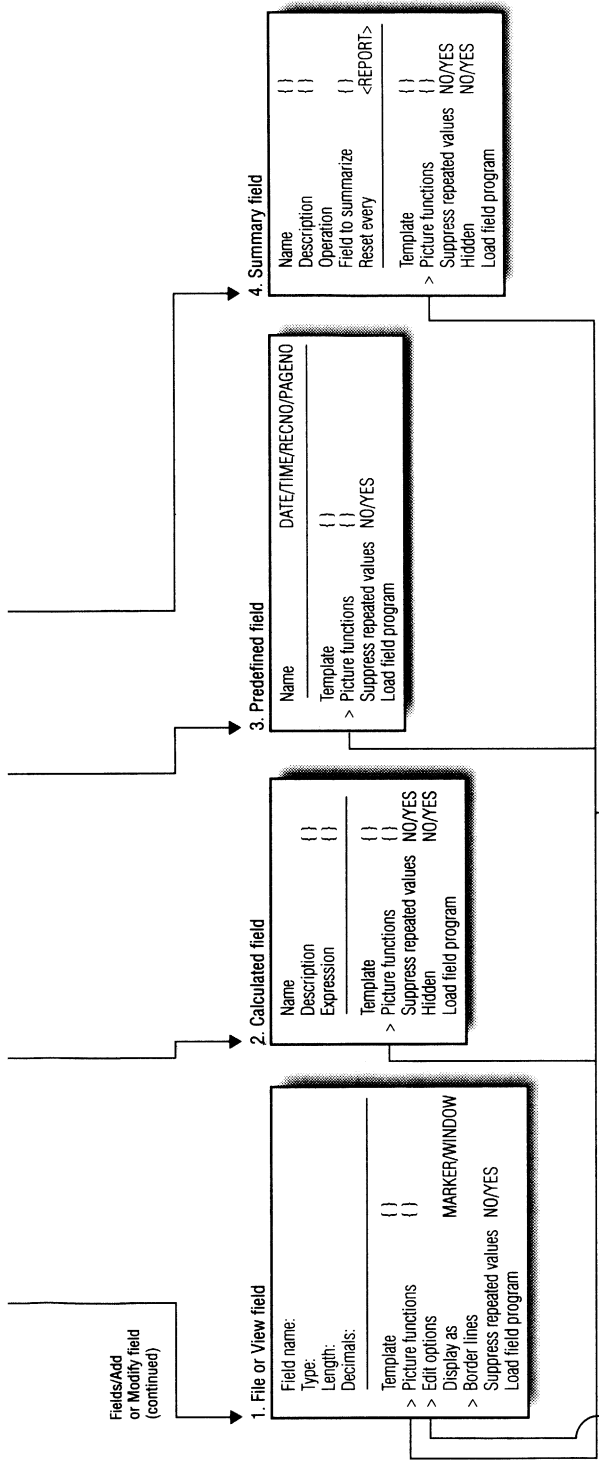
Exit

Save changes and exit
 Abandon changes and exit

Options shown in *italics* are not available on this work surface

Fields/Add or Modify Field





Only numeric and character data types have picture functions. The type of functions are different.

Edit options

Editing allowed	YES/NO
Permit edit if	{}
Message	{}
Carry forward	NO/YES
Default value	{}
Smallest allowed value	{}
Largest allowed value	{}
Accept value when	{}
Unaccepted message	{}

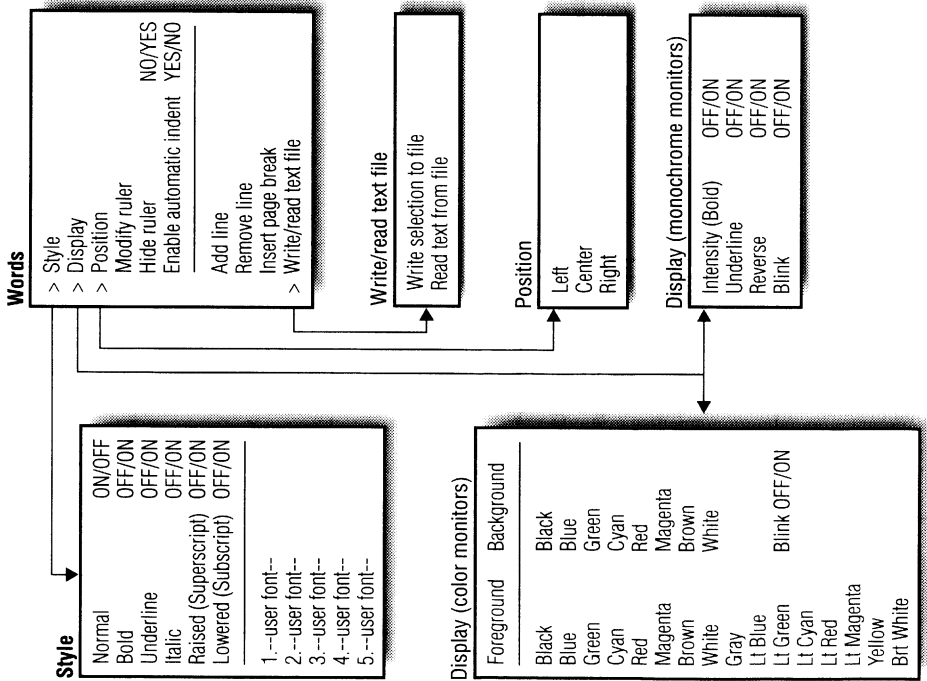
Picture functions (numeric field)

Positive credits followed by CR	C	OFF/ON
Negative debits followed by DB	X	OFF/ON
Use () around negative numbers	(OFF/ON
Show leading zeros	L	OFF/ON
Blanks for zero values	Z	OFF/ON
Financial format	\$	OFF/ON
Exponential format	^	OFF/ON
Trim	T	OFF/ON
Left align	B	OFF/ON
Center align	I	OFF/ON
Horizontal stretch	H	OFF/ON
Vertical stretch	V	OFF/ON

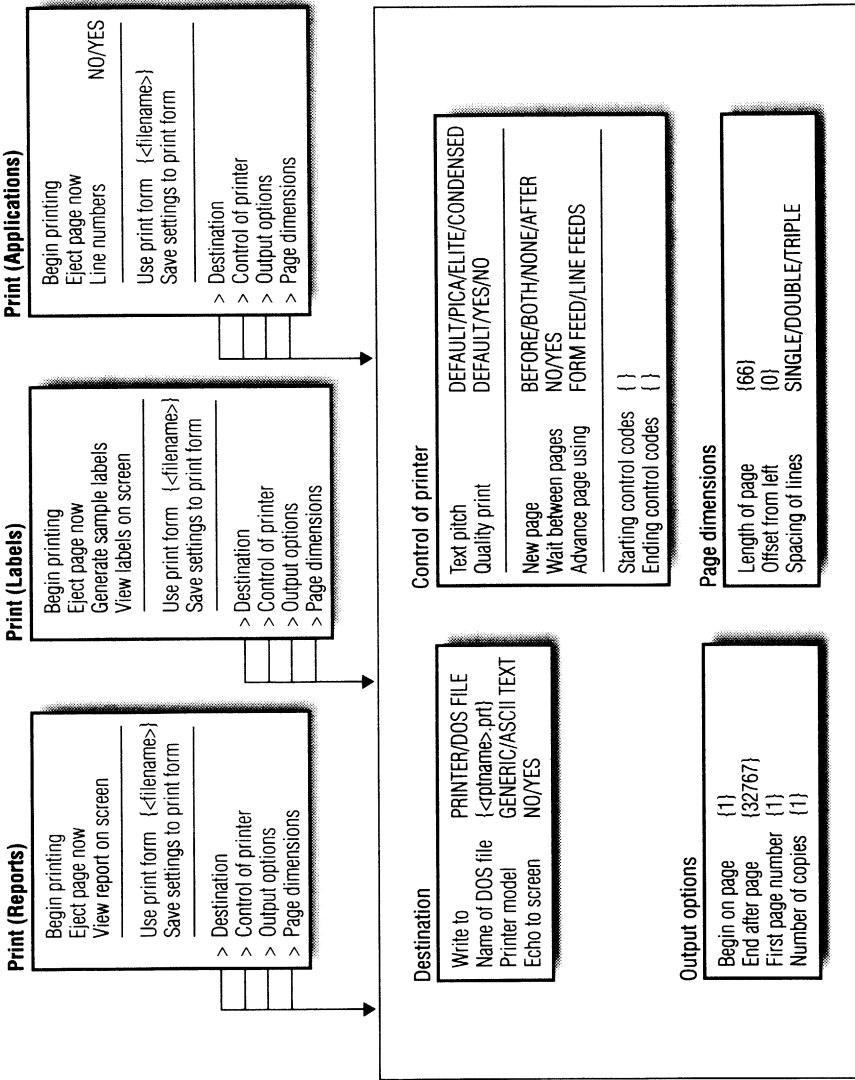
Picture functions (character field)

Alphabetic characters only	A	OFF/ON
Upper-case conversion	!	OFF/ON
Literals not part of data	R	OFF/ON
Scroll within display width	S	OFF/ON
Multiple choice	M	OFF/ON
Trim	T	OFF/ON
Right align	J	OFF/ON
Center align	I	OFF/ON
Horizontal stretch	H	OFF/ON
Vertical stretch	V	OFF/ON
Wrap semicolons	:	OFF/ON

Words



Print



Applications

Layout

Modify a different program
 Edit description of program
 Save this program

Words

> *Style*
 > *Display*
 > *Position*
 > *Modify ruler*
 Hide ruler
 Enable automatic indent NO/YES YES/NO
 Add line
 Remove line
 Insert page break
 Write/read text file

Write/read text file

Write selection to file
 Read text from file

Go To

Go to line number {1}
 Forward search {}
 Backward search {}
 Replace {}
 Match capitalization NO/YES

Print

Begin printing
 Eject page now
 Line numbers NO/YES
 Use print form {<filename>}
 Save settings to print form
 > Destination
 > Control of printer
 > Output options
 > Page dimensions

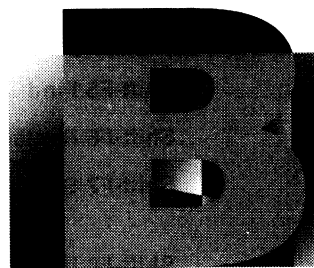
See page A-15

Exit

Save changes and exit
 Abandon changes and exit
 Run program
 Debug program

Options shown in *italics* are not available on this work surface

Function Key Table

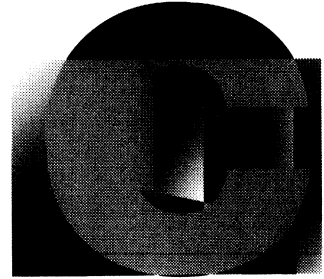


Key	Result
F1 Help	Display on-screen Help
F2 Data	Switch to Browse or Edit screen
F3 Previous	Move to previous field (Browse/Edit), object (queries design screen), or page (Help)
F4 Next	Move to next field (Browse/Edit), object (queries design screen), or page (Help)
F5 Field	Add field to layout surface or view skeleton (or remove field from view skeleton)
F6 Extend Select	Select contiguous text and fields
F7 Move	Move selected text and fields
F8 Copy	Copy selected text and fields; toggle R/O on and off in view skeleton field in queries design
F9 Zoom	Enlarge or shrink memo fields, condition boxes, some data fill-ins, and file skeletons; show or hide files in DOS utilities directory tree
F10 Menus	Access menus for current screen
Shift-F1 Pick	Display list of items available for current fill-in
Shift-F2 Design	Display the design screens; transfer to queries design from another design surface
Shift-F3 Find Previous	Locate previous occurrence of search string
Shift-F4 Find Next	Locate next occurrence of search string

(continued)

Key	Result
Shift-F5 Find	Find specified search string
Shift-F6 Replace	Replace search string with another string
Shift-F7 Size	Change size of design elements and column widths (Browse)
Shift-F8 Ditto	Copy data from corresponding field of previous record into current field
Shift-F9 Quick Report	Print a Quick Report of data
Shift-F10 Macros	Access macros prompt box

Cursor Navigation Keys



Key	Movement or action	Work surface
→	Right one position	
←	Left one position	
↓	Down one row	
	Next field	Edit
↑	Up one row	
	Previous field	Edit
PgDn	Display next screen	Browse, Edit, word wrap, layout
PgUp	Display previous screen	Browse, Edit, word wrap, layout
End	End of field	Edit
	Last field in record	Browse
	Last text/field on line	Word wrap, layout
	Last column of skeleton	Queries
Home	Beginning of field	Edit
	Beginning of record	Browse
	Left margin	Layout
	Indent (or left margin)	Word wrap
	First column of skeleton	Queries
Backspace	Delete previous character	
Ctrl-Backspace	Delete previous word	Word wrap, layout

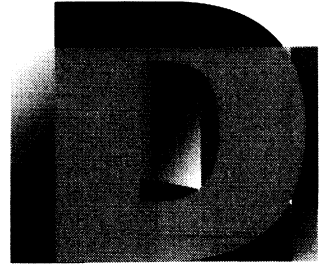
(continued)

Key	Movement or action	Work surface
Tab	Next field	Edit, Browse
	Next tab stop	Layout, word wrap (if Insert is OFF)
	Next column	Queries, lists, tables
	Insert tab character	Word wrap (if Insert is ON)
	Move margin to next tab stop	Word wrap (with Enable automatic indent)
Shift-Tab	Previous field	Edit, Browse
	Previous tab stop	Layout, word wrap
	Move margin to previous tab stop	Word wrap (with Enable automatic indent)
	Previous column	Queries, lists, tables
⌞	Next field	Browse, Edit
	Move to next line	Layout, word wrap
	Break line, move to new one	Layout (if Insert is ON), word wrap (if Insert is ON)
Esc	Leave, abandoning changes; cancel extended selection	
Del	Delete currently selected item	
Ins	Toggle Insert ON or OFF	
Ctrl-→	Beginning of next word or field	
Ctrl-←	Beginning of previous word or field	
Ctrl-PgDn	End of text	Word wrap
	Bottom of layout surface	Layout
	Current field in last record	Browse, Edit

(continued)

Key	Movement or action	Work surface
Ctrl-PgUp	Beginning of text	Word wrap
	Top of layout surface	Layout
	Current field in first record	Browse, Edit
Ctrl-Home	Move into a memo field	Memo field
Ctrl-End	Save work and leave	
	Move out of memo field	Memo field
Ctrl-↵	Save work and remain	Design screens

Work Surfaces



Layout Organize Append Go To Exit 2:09:22 pm

Bytes remaining: 3905

Num	Field Name	Field Type	Width	Dec	Index
1	CATEGORY	Character	10		N
2	NAME	Character	20		N
3	MODEL	Character	5		N
4	SERIAL_NO	Character	15		N
5	STORE	Character	15		N
6	DATE	Date	8		N
7	QUANTITY	Numeric	2	0	N
8	COST	Numeric	10	2	N
9	DESCRIPT	Memo	10		N

Database: D:\db4\samples\CONTENTS | Field 7/9 | Num

Enter the field name. Insert/Delete field: Ctrl-N/Ctrl-U
Field names begin with a letter and may contain letters, digits and underscores

Annotations:
 - Name of field: points to the 'Field Name' column.
 - Field's data type: points to the 'Field Type' column.
 - Number of decimal places in numeric fields: points to the 'Dec' column.
 - Enter "Y" to make an index tag on this field: points to the 'Index' column.
 - Width of field: points to the 'Width' column.

Database design screen

Layout Fields Condition Update Exit 2:13:00 pm

File skeleton	Employee.dbf	LASTNAME	↑FIRSTNAME	INITIAL	DEPARTMENT	EMP_ID	PHONE	SP
		"Egan"						

File skeleton (optional)	Orders.dbf	CUST_ID	↑DATE_TRANS	↑PART_ID	PART_QTY	PO_NUMBER	NOTES	E

Calculated field skeleton (optional)	Calc'd Flds	orderdays=	↑DATE()-Date_trans

View skeleton	View	Employee->	Orders->	Orders->	orderdays=
	<NEW>	FIRSTNAME	DATE_TRANS	PART_ID	Calc'd Flds->

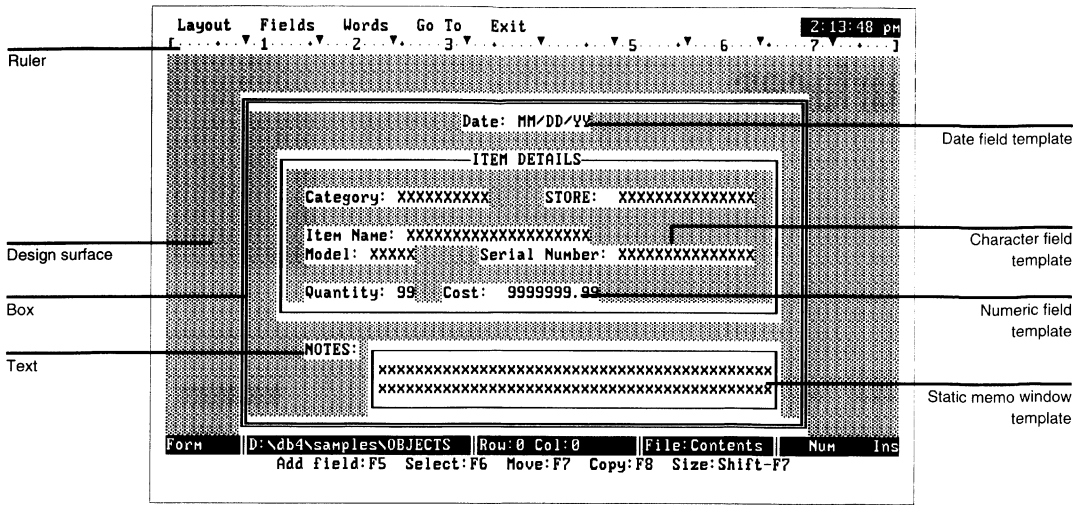
CONDITION BOX (optional)	Date_trans-Date_hired > 1000

Query: D:\db4\samples\<NEW> | Field 3/8 | Num

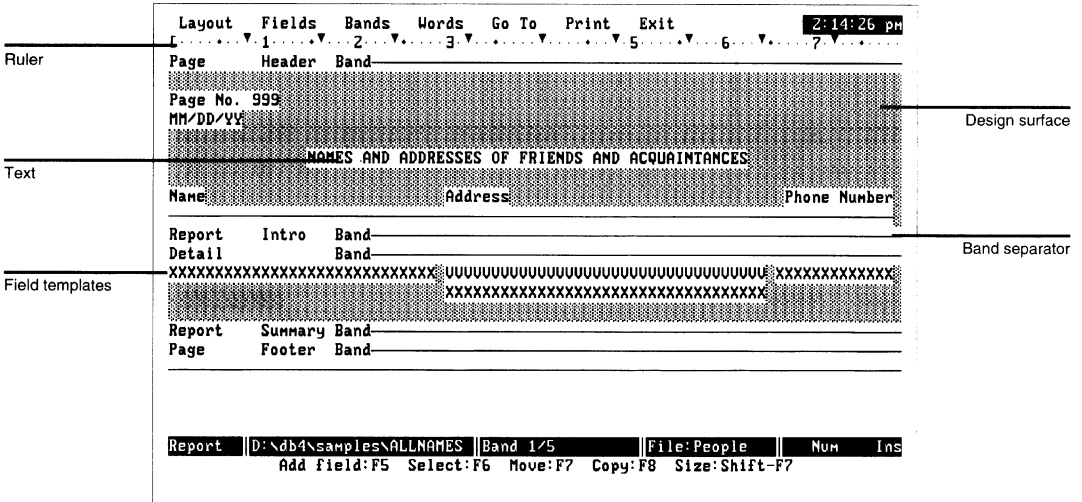
Prev/Next field: Shift-Tab/Tab Data: F2 Size: Shift-F7 Prev/Next skel: F3/F4

Annotations:
 - File skeleton: points to the 'Employee.dbf' row.
 - File skeleton (optional): points to the 'Orders.dbf' row.
 - Calculated field skeleton (optional): points to the 'Calc'd Flds' row.
 - View skeleton: points to the 'View' row.
 - Condition box (optional): points to the 'CONDITION BOX' row.

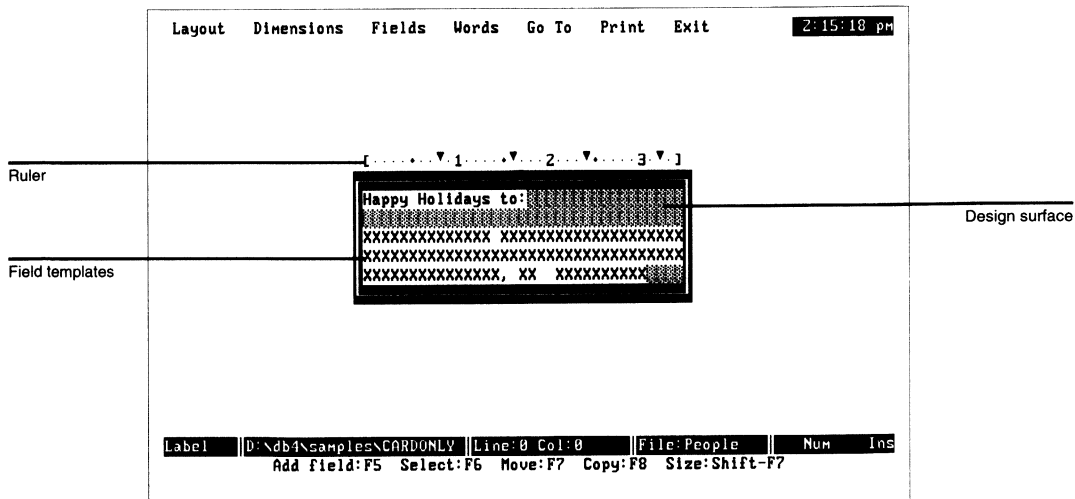
Queries design screen



Forms design screen



Reports design screen



Labels design screen

Num					
CATEGORY	NAME	MODEL	SERIAL_NO	STORE	DATE
CD	Stomper's Hits #2			Disc City	02/13/86
CD	Beethoven Symphony 5			Disc City	03/20/86
CD	Bach Piano Concertos			Christmas gift	12/25/87
BOOK	Van Gogh Landscapes			Book Mart	09/11/86
BOOK	Remington Bronzes			Book Mart	11/03/87
BOOK	Disney Animation			Book City	04/12/87
BOOK	Complete Shakespeare			Bill's Books	10/10/83
PAINTING	Jumped			Auction Art	01/23/87
PAINTING	Hummer's Father			Auction Art	02/02/88
FURNITURE	sofa-blue			Furniture Mart	11/12/85
FURNITURE	armchair-green	1200		Grandma	01/05/82
FURNITURE	table-kitchen			Old Oak Pieces	11/01/85
FURNITURE	chairs-kitchen			Old Oak Pieces	11/01/84
FURNITURE	table-coffee	13-55		Furniture Mart	03/03/85
FURNITURE	bed	1303		Country Styles	02/12/83
FURNITURE	night table	4403		Old Oak Pieces	12/01/86
APPLIANCE	television	14022	122-223-4873	Sid's Stereo	03/04/86
APPLIANCE	refrigerator	33051	44-3397-1A	Furniture Mart	02/02/86

Field names

Data

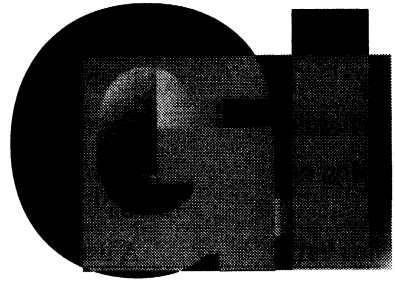
Browse screen

	Num
Record No	14
CATEGORY	FURNITURE
NAME	table-coffee
MODEL	13-55
SERIAL_NO	
STORE	Furniture Mart
DATE	03/03/85
QUANTITY	1
COST	135.00
DESCRIPT	MEMO

Edit screen

Glossary

Glossary



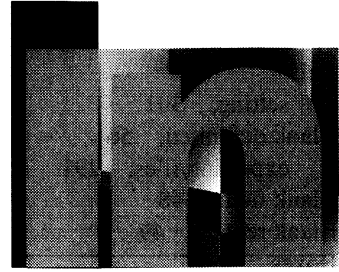
Action	The task assigned to an item on a menu or batch process, or to a list.
Application	(1) A set of programs that is used to perform a number of related tasks + for example, an accounting application. (2) A set of objects that function together used to perform tasks. The application becomes functional once code is generated for these objects. See also application object.
Application object	The unifying object of an application created with the Applications Generator. All other objects are tied to the application object, which always appears on the work surface of the Applications Generator desktop and can serve as a sign-on banner.
Applications Generator	See the chapters in this manual grouped under Using the Applications Generator.
Attributes	Characteristics assigned to objects in an application + for example, double-line frames or a specific color. Also, characteristics assigned to items in an object + for example, code embeds or help text.
Bar menu	See horizontal bar menu.
Batch process	An object that performs a number of tasks out of view of the user (for example, copying a database file and then discarding marked records).
Code	The commands that tell the computer what to do. You can write dBASE IV code, or automatically generate it using the Applications Generator.
Code embeds	dBASE IV code inserted before or after an object or item in an application created with the Applications Generator. Code embeds give application developers the ability to add additional functionality to their applications. A code embed may DO a .prg (program) file.

dBASE IV Applications Generator	A component of dBASE IV that simplifies the process of building applications by providing a design area and generating the code needed to run them.
Debugging	See testing.
Dialog box	A box in which you are requested to provide information as you build an application.
Files list	A list that displays files of a specified type + for example, a list of .frm (report) files.
Full-screen editing frame	A box in which to enter help text or code embeds.
Horizontal bar menu	A horizontal display of menu items, usually at the top of the screen. Pull-down menus are often attached to the menu items on a horizontal bar menu.
Inheritance	The process by which objects or items automatically obtain the attributes assigned to another object or the host object, respectively. These automatic assignments can be changed later.
Item	A choice on a menu, list, or batch process created with the Applications Generator. You assign actions to each item on a menu or batch process, or to a list, using the Item menu. See also menu option.
List	An object that displays items of one type. The same action is assigned to all the items on the list.
Menu	An object, such as a horizontal bar, pull-down, or stand-alone (pop-up) menu, that presents action choices to the user.
Menu option	A choice displayed in the dBASE IV Applications Generator menu system.
Message line prompt	A message that you specify to appear when a user selects a menu, list, or application object.
Object	A database or query file, report, form, menu, list, or batch process used in an application created with the Applications Generator. See also application object.
Object documentation	A record of the objects you create with the Applications Generator. At your request, the Applications Generator will create object documentation for you.
Pop-up menu	A menu with a vertical presentation of items. It may stand alone or be attached to a horizontal bar menu as a pull-down menu.
Program	Lines of code (computer commands) that perform some function. A program often serves as a module, or part, of an application.
Pull-down menu	A pop-up menu or list that is attached to a menu item on a horizontal bar menu.

Run time	The time when an application is run from the dot prompt, Control Center, or from the operating system.
Sign-on banner	The application object when used as the first screen seen at run time.
Structure list	A list that presents the field names of a database file or view to users.
Testing	Noting and fixing design problems or errors in the code of an application.
Ticks	A clock tick is a unit of time approximately equal to 0.0549 seconds, or about 1/18 of a second.
User interface	The menus, lists, and other objects that display to the user at run time.
Values list	A list that presents the values, or contents, of one field in a database file or view to users.
Work surface	The area of the Applications Generator desktop in which you design and lay out the objects of your applications.

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