RAINBOW

dBASE II™

J. VARNUM

dBASE II

Assembly Language Relational Database Management System

WRITTEN BY
WAYNE RATLIFF

Ratliff Software Production (RSP), Inc.

USER MANUAL

ASHTON·TATE
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A Note from the President:

We hope you'll like our revision of the dBASE II™ manual. The response was so favorable to our first two-part manual that we've kept the same structure.

This dBASE II version represents months of software testing and revisions that result in a more user-oriented program. Your dBASE II manual includes all of these new software changes. In addition to improving our software we have typeset our manual, substantially improving the readability of our documentation.

Our two-part manual format assists you in several ways as you are learning dBASE II. While you are becoming acquainted with dBASE II you will find the first part of the manual, written by a user as he learned to operate his system, especially helpful. We suggest that you read this section and refer to it throughout your dBASE II learning experience.

Once you are familiar with the system, the second section of the manual, written by Wayne Ratliff, dBASE II's author, will assist you as you begin programming in dBASE. This second section, used as reference while generating your own programs, will be a valuable asset to your efforts.

Thank you for purchasing dBASE II. I hope you find this program as useful and exciting as tens of thousands of other users have already.

Sincerely,

George Tate

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ASHTON·TATE
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Dear Customer,

Thank you for considering dBASE II for your data management project. We believe you will find it has all the computing power you need to build databases and give you fast access to just the information you want.

Ashton-Tate is happy to inform you that dBASE II now includes ZIP, a screen format generating program written by Hal Pawluk. ZIP will enable you to easily customize your screen input and output format, allowing dBASE II to operate for you that much faster.

To install ZIP on your terminal please run ZIPIN, then run ZIP to set up your screen. If you have any comments or suggestions regarding ZIP, Ashton-Tate would appreciate hearing from you.

As part of Ashton-Tate's ongoing customer service, we will periodically send out corrections, programming suggestions, and new product announcements. But in order to receive these services, as well as technical support, you must sign the dBASE II Software License Agreement. A comprehensive index to both parts of the Manual is also included for your convenience.

For post-sale service, your software dealer has the professional resources to assist you with any suggestions that may arise. We in turn support our dealers when they call us with their customers' questions.

Please make sure to make a back up copy of your system disk and ZIP before proceeding any further. The usual CP/M command for moving disk files from A: to B: is:

PIP B:=A:<Filename.ext>

For more important data use the HELP facility on either the Demo Disk or System Disk. Once in dBASE II type "HELP dBASE."

Thank you again,

Product Marketing Department
ASHTON-TATE

dBASE II™
USER MANUAL

IMPORTANT INFORMATION REGARDING USE OF dBASE II AND THIS MANUAL

DEFINITION OF PRODUCT

When you purchase the dBASE II full system you should receive the following:

Serialized System Diskette in sealed plastic bag,
Demonstrator Diskette limited to 15 records per file,
Serialized Ashton-Tate Software License Agreement,
dBASE II User Manual,
Sample programs,
Post-sale support from your software dealer.

(continued next page)

Other products and services available from Ashton-Tate:

Updates to the dBASE II system,
End-user newsletter,
New product announcements,
dBASE Applied—Catalogue of existing applications.

If you believe that you have not received the full product that you purchased, have questions about your rights or obligations, or would like to be notified of these other services, please contact:

Ashton-Tate
10150 West Jefferson Boulevard
Culver City, California 90230
(213) 204-5570

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Introduction

dBASE II is a database management tool that allows easy manipulation of small and medium sized databases using English-like commands. With dBASE II you can:

- Create complete database systems.
- Easily add, delete, edit, display and print data from your database, with a minimum of data duplication on file.
- Gain a large measure of program/data independence, so that when you change your data you don't have to change your programs, and vice-versa.
- Generate reports from one or more databases, automatically do multiplication, division, sub-totals, totals and other data manipulation every time you use them.
- Use the full-screen editing capability to set up a screen format, so that you see exactly what you're going to get, and enter data by simply "filling in the blanks."

dBASE II is an extremely powerful system. To get the most out of it, please take the time to read the instructions before you start using it. The time will be well spent.

Typographic conventions used in this manual:

Lowercase in the screen representations (in squares) indicates material that you type in.

Uppercase in the screen representations indicates the dBASE II prompts and responses. In text, uppercase is used for dBASE II commands.

♦ . . . ♦ will be used in the text of this manual to set off dBASE II commands and materials *you* type. Occasionally, they may be used in the screen representations if needed for clarity. DO NOT TYPE THE SYMBOLS.

[. . .] square brackets will be used to indicate parts of a dBASE II command that are optional.

< . . . > angle bracket portions of a dBASE II command are to be filled in with real information. E.g.: <filename> means the name of a file is to be inserted. They are also used in text to bracket field names and file names.

<enter> means press the carriage return or "enter" key on your keyboard. DO NOT TYPE THIS WORD, NOR THE SYMBOLS.

Systems Requirements

dBASE II requires the following hardware and software environment:

- 8080, 8085 or Z-80 based microprocessor system (like the TRS-80/II, Northstar, Apple II with the Z-80 card, etc.) with CP/M Z.X, CDOS, or CROMIX operating systems.

or

- 8086 or 8088 based microprocessor system (like the IBM-PC, NEC APC etc.) with CP/M-86 or MSDOS operating systems.
- 48K bytes minimum of memory (dBASE II uses locations from 5CH to A400H) for most micros, 56k for Apple (Standard), Heath, North Star and a few others.
- One or more mass storage devices (usually floppy disk drives).
- A cursor-addressable CRT if full screen operations are to be used.
- Optional text printer (for some commands).

dBASE II Specifications

Records per database file	65535 max
Characters per record	1000 max
Fields per record	32 max
Characters per field	254 max
Largest number	$\pm 1.8 \times 10^{63}$ approx.
Smallest number	$\pm 1 \times 10^{-63}$ approx.
Numeric accuracy	10 digits
Character string length	254 characters max
Command line length	254 characters max
Report header length	254 characters max
Index key length	100 characters max
Expressions in SUM command	5 max

BEFORE YOU DO ANYTHING ELSE, MAKE A COPY OF THE dBASE II DISK. STORE THE ORIGINAL IN A SAFE PLACE AND USE THE COPY.

Install a system disk in drive A and the dBASE II disk in drive B. Now type:

♦PIP A:=B:*.*[OV]♦ or equivalent command

The letter "O" is necessary to make certain that your operating system will copy all of the data from the distribution disk.

If you are working with a single drive, use the COPY or BACKUP commands, and follow the screen prompts.

Backups are essential, and should be done frequently. If you have a short session on your computer, once a session may be enough, otherwise do it much more frequently than that. You can balance the cost of doing the backups versus the cost of your data better than we can, but since you can rewrite disks, the cost of the backups is low. What's your entire accounting database worth?

This can't be over-emphasized!

INSTALLING dBASE II ON YOUR SYSTEM.

Load the copy (you did make a copy, right?) of dBASE II into your logged-on drive and do any initialization that has to be done (control-C, reset, etc.)

Now type ♦INSTALL♦ to customize dBASE II to your system. (DO NOT TYPE THE "♦" SYMBOLS.)

If your terminal does not have cursor X-Y positioning (see your manual), type ♦N♦ in answer to the prompt. Otherwise type ♦Y♦. This provides you with the ability to do full-screen editing, a convenient way to enter data and work with your databases. Rather than ending up typing on the last line of the screen, with everything else scrolling up, you can position the cursor wherever you want it using dBASE II commands.

dBASE II then lists terminal types. If yours is listed, type the appropriate letter. If your terminal is not listed, type ♦Z♦.

```
A>Install

dBASE II INSTALLATION PROGRAM VER 2.8

ARE FULL SCREEN OPERATIONS WANTED (Y/N)? y
SELECT TERMINAL TYPE
A — HAZELTINE 1500                B — SOROC 120, 140, TELEVIDEO
C — HEATH 89                      D — PERKIN ELMER FOX 1100
E — ADM-3A                        F — ADM-31
G — VDP-80                        H — INTECOLOR
I — GNAT-SYSTEM 10                J — TRS-80 PICKLES TROUT
K — APPLE                         L — VECTOR GRAPHICS
M — SUPERBRAIN                    N — VISUAL 100
Y — CHANGE/MODIFY PREVIOUSLY INSTALLED TERMINAL
Z — USER SUPPLIED TERMINAL CHARACTERISTICS

K
```

If you selected one of the listed terminals, dBASE II then asks you which character you want to use for macro substitution (described in Section IV, and defined in Part II of this manual). If the ampersand will not conflict with your word processor, type <enter>. Otherwise, type in the symbol you want to use.

Initially, you will want to use the error correction dialogue, so type <enter>. This will allow you to correct an error without having to re-enter the entire command (page 22). (You can disable this feature later by using the "Y—CHANGE/MODIFY" option above).

```
ENTER A CHARACTER TO BE USED FOR INDICATING MACROS OR A RETURN FOR DEFAULT
CHARACTER OF AMPERSAND (&) < return>

TYPE A RETURN IF THE ERROR CORRECTION DIALOGUE IS TO BE USED OR ANY OTHER KEY
IF NO DIALOGUE IS WANTED :< return>

TYPE "Y" TO SAVE, ANY OTHER CHAR TO ABORT INSTALL
y

SAVING INSTALLATION PARAMETERS
```

At the end of the installation procedure, you can complete the installation by typing ♦Y♦, or you can abort the installation and return the terminal to whatever condition it was in before you started the procedure.

If your terminal is not listed and you typed ♦Z♦, dBASE II lists the terminal commands that you will require to complete the installation procedure for your terminal. You may also want to use this customization procedure to change the normal defaults that have been selected for your terminal (reverse video with certain commands, for example).

```
USER SUPPLIED SPECS ROUTINE

FOR THIS METHOD, YOU WILL NEED THE HEX OR DECIMAL CODES THAT CAN BE SENT FROM
YOUR COMPUTER TO THE VIDEO TERMINAL TO CONTROL IT

THE CODES OR SEQUENCES THAT YOU WILL NEED ARE:

    DELETE A CHAR SEQUENCE
    DIRECT CURSOR POSITIONING SEQUENCE
    CLEAR SCREEN COMMAND
    HOME CURSOR COMMAND
        (CLEAR AND HOME CAN BE COMBINED)
    OPTIONAL: BRIGHT/DIM COMMANDS OR

TYPE "Y" IF YOU WISH TO CONTINUE
y
```

If you know your terminal codes for the above procedures, type ♦Y♦ to continue. dBASE II then prompts you through the entry of the codes. The example shown below is for an IBM 3101/12 terminal. This terminal does not allow highlighting or reverse video, so <enter> was typed for these questions.

dBASE II shows the previous values of the control bytes, so we have indicated the new values we typed in between two "◆" symbols. DO NOT TYPE THESE SYMBOLS.

```
WILL YOU BE ENTERING COMMANDS AS HEX OR DECIMAL? TYPE "D" FOR DECIMAL OR "H"
FOR HEXADECIMAL
h

COMMANDS ARE ENTERED AS A SEQUENCE OF NUMBERS TYPE A CARRIAGE RETURN TO
END A SEQUENCE

NOW ENTER THE CODES FOR CHARACTER DELETION THIS IS THE SEQUENCE "BACKSPACE,
SPACE, BACKSPACE" ON MOST TERMINALS IF THIS IS TRUE FOR YOUR TERMINAL, THEN
TYPE "Y"

y
```

```
                    —DIRECT CURSOR POSITIONING—

THE CURSOR CONTROL SEQUENCE IS USUALLY A 3 TO 4 BYTE SEQUENCE. THE FIRST ONE
OR TWO BYTES ARE USUALLY FIXED AND THE REMAINING BYTES CONTAIN THE LINE AND
COLUMN NUMBERS

FIRST, ENTER THE POSITION IN THE SEQUENCE THAT HOLDS THE COLUMN NUMBER
◆4◆
NEXT, ENTER THE POSITION IN THE SEQUENCE THAT HOLDS THE LINE NUMBER
◆3◆

MANY TERMINALS ADD A CONSTANT TO THE LINE AND COLUMN NUMBERS. ENTER THE
CONSTANT BIAS FOR YOUR TERMINAL
◆20◆

NOW ENTER THE SKELETON FOR THE DIRECT CURSOR COMMAND, ENTER A ZERO IN THE
PLACES WHERE COLUMN AND LINE NUMBERS GO
(11 BYTE MAX)

ENTER CONTROL CODE BYTE 1:03 ◆1B◆
ENTER CONTROL CODE BYTE 2:00 ◆59◆
ENTER CONTROL CODE BYTE 3:00 ◆0◆
ENTER CONTROL CODE BYTE 4:00 ◆0◆
ENTER CONTROL CODE BYTE 5:00 < return>

IS THIS CORRECT (Y/N)? y
```

—DIM/BRIGHT VIDEO/REVERSE VIDEO—

ENTER THE COMMAND THAT WILL SWITCH TO HIGH INTENSITY OR NORMAL VIDEO
(5 BYTE MAX)

ENTER CONTROL CODE BYTE 1: 1D <return>

IS THIS CORRECT (Y/N)? y

—CLEAR AND HOME COMMAND(S)—

ENTER THE COMMAND(S) THAT WILL CLEAR THE SCREEN AND PLACE THE CURSOR IN THE
UPPER LEFT CORNER OF THE TERMINAL
(11 BYTE MAX)

ENTER CONTROL CODE BYTE 1:0C ♦1B♦
ENTER CONTROL CODE BYTE 2:00 ♦4C♦
ENTER CONTROL CODE BYTE 3:00 <return>

IS THIS CORRECT (Y/N)? y

ENTER THE COMMANDS TO BE ISSUED WHEN ENTERING THE FULL-SCREEN EDITING MODE
(IF ANY)
(11 BYTE MAX)

ENTER CONTROL CODE BYTE 1:00 <return>

IS THIS CORRECT (Y/N)? y

```
ENTER THE COMMAND THAT WILL SWITCH TO STANDARD INTENSITY OR NORMAL VIDEO TO
RESET THE SCREEN AFTER FULL SCREEN OPERATIONS
(5 BYTE MAX)

ENTER CONTROL CODE BYTE 1: 1D <return>

IS THIS CORRECT (Y/N)? y
```

```
ENTER THE COMMANDS TO BE ISSUED WHEN LEAVING THE FULL-SCREEN EDITING MODE

SUGGESTION: USE DIRECT CURSOR POSITIONING TO PUT CURSOR ON THE BOTTOM LINE
OF THE SCREEN
(11 BYTE MAX)

ENTER CONTROL CODE BYTE 1:1D ♦1B♦
ENTER CONTROL CODE BYTE 2:17 ♦59♦
ENTER CONTROL CODE BYTE 3:03 ♦31♦
ENTER CONTROL CODE BYTE 4:00 ♦20♦
ENTER CONTROL CODE BYTE 5:2E <return>

IS THIS CORRECT (Y/N)? y
```

```
ENTER A CHARACTER TO BE USED FOR INDICATING MACROS OR A RETURN FOR DEFAULT
CHARACTER OF AMPERSAND ( ) <return>

TYPE A RETURN IF THE ERROR CORRECTION DIALOGUE IS TO BE USED OR ANY OTHER KEY
IF NO DIALOGUE IS WANTED <return>

TYPE "Y" TO SAVE, ANY OTHER CHAR TO ABORT INSTALL
y
SAVING INSTALLATION PARAMETERS
```

```
MODIFY EXISTING SPECS ROUTINE

FOR THE METHOD, YOU WILL NEED THE HEX OR DECIMAL CODES THAT CAN BE SENT FROM
YOUR COMPUTER TO THE VIDEO TERMINAL TO CONTROL IT

TYPE "Y" IF YOU WISH TO CONTINUE
y

WILL YOU BE ENTERING COMMANDS AS HEX OR DECIMAL?
TYPE "D" FOR DECIMAL OR "H" FOR HEXADECIMAL
h

COMMANDS ARE ENTERED AS A SEQUENCE OF NUMBERS TYPE A CARRIAGE RETURN TO
END A SEQUENCE

1. DELETE A CHAR SEQUENCE
2. DIRECT CURSOR POSITIONING SEQUENCE
3. CLEAR AND HOME SCREEN COMMAND
4. BRIGHT/STD VIDEO COMMANDS
5. DIM/REVERSE VIDEO COMMANDS
6. INITIALIZATION SEQUENCE
7. EXIT SEQUENCE
8. RESET TO STANDARD VIDEO MODE

SELECT ITEM TO CHANGE
ANY CHAR OTHER THAN 1-8 TERMINATES SESSION
```

To modify an installed dBASE II system, type ♦INSTALL♦, then ♦Y♦ or ♦N♦ in response to the full-screen editing query, then select the ♦Y♦ option from the terminal listing. dBASE II responds with the following sequence of commands. In this example, we wanted to change the "EXIT" sequence to position the cursor on the 23rd line rather than the 17th line when leaving the full screen editing mode. (You'll find out about this as we go through dBASE instructions later in this manual.)

Notice that the numbers are entered in hexadecimal and the lines are numbered from 0 to 23, columns from 0 to 79.

```
ENTER COMMANDS TO BE ISSUED WHEN LEAVING THE FULL-SCREEN EDITING MODE

SUGGESTION: USE DIRECT CURSOR POSITIONING TO PUT CURSOR ON THE BOTTOM LINE
OF THE SCREEN
(11 BYTE MAX)
CURRENT SEQUENCE:
1B
59
31
20

IS THIS CORRECT (Y/N)? n
ENTER CONTROL CODE BYTE 1:1B ♦1B♦
ENTER CONTROL CODE BYTE 2:59 ♦59♦
ENTER CONTROL CODE BYTE 3:31 ♦36♦
ENTER CONTROL CODE BYTE 4:20 ♦20♦
ENTER CONTROL CODE BYTE 5:00 < return>

IS THIS CORRECT (Y/N)? y
1. DELETE A CHAR SEQUENCE
2. DIRECT CURSOR POSITIONING SEQUENCE
3. CLEAR AND HOME SCREEN COMMAND
4. BRIGHT/STD VIDEO COMMANDS
5. DIM/REVERSE VIDEO COMMANDS
6. INITIALIZATION SEQUENCE
7. EXIT SEQUENCE
8. RESET TO STANDARD VIDEO MODE

SELECT ITEM TO CHANGE
ANY CHAR OTHER THAN 1-8 TERMINATES SESSION

< return>

ENTER A CHARACTER TO BE USED FOR INDICATING MACROS OR A RETURN FOR DEFAULT
CHARACTER OF AMPERSAND ( ) < return>

TYPE A RETURN IF THE ERROR CORRECTION DIALOGUE IS TO BE USED OR ANY KEY IF NO DI-
ALOGUE IS WANTED: < return>

TYPE "Y" TO SAVE, ANY OTHER CHAR TO ABORT INSTALL
y

SAVING INSTALLATION PARAMETERS
```

dBASE II is now installed, and you can begin using it immediately.

Bring up dBASE II by typing ♦dBASE♦.

A prompt line asks for the date. If you enter a date, this will be recorded in your files as the last access every time you add to or delete from the file, and can be useful for keeping track of updates. If you want to ignore it, just hit <enter>.

dBASE II loads into memory, displays a sign-on message and shows the prompt dot (.) to indicate that it is ready to accept commands.

To show you how powerful and easy to use dBASE II actually is, the first thing we'll do is create a database and enter data into it.

It will only take a few minutes.

Section I:

In this section, we create a database and enter data. We also introduce you to some dBASE II commands that will be developed and added to throughout the rest of this manual. For a complete definition of a command, check Part II.

(This page is left intentionally blank)

How to CREATE a database

We'll start by creating a database of names for a mailing list system. Each record in the database will contain the following information:

NAME: up to 20 characters long
ADDRESS: up to 25 characters long
CITY: up to 20 characters long
STATE: 2 characters long
ZIP CODE: 5 characters

First, type ♦CREATE♦.

dBASE II responds with: ENTER FILENAME:.

Enter a filename starting with a letter and up to 8 characters long (limited by CP/M), no colons, no spaces. Since this is a file of names, let's call it something that makes sense to a human being: type ♦Names♦.

When you hit return, dBASE II creates a file called <NAMES.DBF>. The part of the name after the period is the CP/M file name extension, and is short for data base file (Section V, File Types).

In a database management system, each one of the items that we want to enter into a single related grouping is called a *field* and the grouping is called a *record* (Section V, Database Basics). In our example, each record will have 5 fields. dBASE needs to know the name of each field, what type of data it will contain, how long it is and how many decimal places if the data is numeric.

```
. create
ENTER FILENAME: names
ENTER RECORD STRUCTURE
AS FOLLOWS:
   FIELD     NAME,TYPE,WIDTH,DECIMAL
   001       PLACES
```

Field names can be up to 10 characters long, and may be entered in upper and/or lowercase. The name must start with a letter and cannot contain spaces, but can contain digits and embedded colons. Don't abbreviate any more than you have to: the computer will understand what you mean, but people might not.

The type of data is specified by a single letter: C for Character, N for Numeric and L for Logical. In this case, all fields contain character data.

Field width can be any length up to 254 characters. If the field is numeric and decimal places are specified, remember that the decimal point also takes one character position.

We know what names we want to give our fields, the type of data that they will contain, and their lengths so type the information in now. Here's what the screen looks like when you're finished:

```
. create
ENTER FILENAME:names
ENTER RECORD STRUCTURE AS FOLLOWS:
                NAME,TYPE,WIDTH,DECIMAL
   FIELD        PLACES
   001          name,c,20
   002          address,c,25
   003          city,c,20
   004          state,c,2
   005          zip code,c,5
BAD NAME FIELD
   005          zip:code,c,5
   006          <return>
```

Notice what happened at field 5: we made an error by entering a space in the field name, so dBASE II told us what the error was and gave us a chance to correct it.

Notice also that the data type for the zip code was specified as "character," even though we normally think of the digits here as numbers.

This was done because a dBASE II command such as ♦TOTAL♦ can total all the numeric fields in a record (without you specifically listing them all). Doing so with the zip code field would simply be a waste of time. We can still use the relational operators ("greater than," "less than," "equal or not equal to") with the character data, so this will not interfere with any zip code sorting we may want to do later.

When dBASE II asked us for the specifications for a sixth field, we hit <enter> to end the data definition. dBASE II saved the data structure, then asked if we wanted to enter data in it.

The <Names.DBF> database is immediately ready for data entry, so type ♦y♦. Next we'll tell you how to enter the data.

Entering data into your new database

If you do not have full screen editing on your terminal, the record number and the field names will appear one at a time below whatever has been typed on the screen up until now. The

length of each field is shown by two colons, with the cursor positioned for you to start writing. When you fill the field or press <enter>, the next field will appear. After the last field in a record has been filled (or ignored), you start on a new record.

To stop entering data, hit <enter> when the cursor is at the first character position of the first field in a new record.

If you installed dBASE II with full screen editing, the screen will be erased, then the record number and all the fields will be displayed starting in the upper left-hand corner of the screen, with the cursor at the first character position of the first field.

(If you chose one of the standard terminals on the installation list, the field names may be in reverse video or at half-intensity. If you want to change this later, you can disable it by using the "Y — CHANGE/MODIFY" option in the installation procedure).

```
RECORD 00001

NAME     :          :
ADDRESS  :                                          :
CITY     :                          :
STATE    :     :
ZIP CODE :          :
```

Note: If this doesn't look like your screen, there is a problem with INSTALL. Please re-do the installation.

Field lengths are indicated by two colons. When a field is filled or you hit <enter>, the cursor jumps down to the next field. The cursor can be moved back up to a previous field by holding the control key down and pressing the letter E once: ♦control-E♦, abbreviated as ♦ctl-E♦. When you are finished with the last field, dBASE II presents another empty record.

Enter the following names and addresses. We'll be using them soon to show you some of the powerful features of dBASE II.

ALAZAR, PAT	123 Crater Rd., Everett, WA	98206
BROWN, JOHN	456 Minnow Pl., Burlington, MA	01730
CLINKER, DUANE	789 Charles Dr., Los Angeles, CA	90036
DESTRY, RALPH	234 Mahogany St., Deerfield, FL	33441
EMBRY, ALBERT	345 Sage Ave., Palo Alto, CA	94303
FORMAN, ED	456 Boston St., Dallas, TX	75220
GREEN, TERRY	567 Doheny Dr., Hollywood, CA	90046
HOWSER, PETER	678 Dusty Rd., Chicago, IL	60631

If you make any mistakes that can't be corrected by backspacing and writing over them, read the next two pages on editing *before* moving on to the next record. If you accidentally get back to the dBASE dot prompt, type:

♦USE Names♦
♦APPEND♦.

and continue with your entries. (This will be explained later in the manual).

To stop entering data, after you've entered the last zip code and while you are on the first character of the first field of the next record, hit <enter>. If you have typed in some data or moved the cursor, hold the control key down and press the letter "Q" (♦control-Q♦).

dBASE leaves the data entry mode and presents its dot prompt (.) to show you that it's ready for your commands.

If you want to stop now, simply type ♦QUIT♦.

♦QUIT♦ must be typed *every* time you terminate a dBASE II session. This automatically closes all files properly. Unless you do so, you may destroy your database.

Note: Later, you'll be told how to set up FORMAT FILES (.FMT extension) that allow you to format the screen any way you want it. When a format file is being used, the fields and prompts will appear on the screen wherever you want them, rather than as the automatic listing you've just seen. With a format file, you'll also be able to use only fields that you select, rather than all the fields in the database. This applies to the CREATE, APPEND, EDIT and INSERT commands.

Modifying data with EDIT and BROWSE

If you made any errors in the entries, you can correct them quickly and easily in the Full Screen Edit mode. Type:

♦USE Names♦
♦EDIT <number>♦

where "number" is the number of one of the records in the database.

dBASE brings up the entire record and you can use the Full Screen Editing commands to modify any or all of the data in the record. To move to the next record, use ♦ctl-C♦. To move to the previous record, use ♦ctl-R♦. To try it, type ♦EDIT 3♦.

```
RECORD 00009                                DELETED

NAME      :CLINKER, DUANE          :
ADDRESS   :789 Charles Dr.                 :
CITY      :Los Angeles             :
STATE     :CA
ZIP:CODE  :90036
```

If you mark a record for deletion by using ♦ctl-U♦, "DELETED" appears at the top of the screen. Pressing ♦ctl-U♦ again removes the word and "un-deletes" the record. If you ♦LIST♦ (pp.16 and 18) or ♦DISPLAY♦ (pp. 16 and 20) your database, you will see an asterisk next to all records marked for deletion.

To abort full-screen editing, use ♦ctl-Q♦. This does *not* make the changes that were on the screen when you exited.

To exit gracefully and save the changes made so far, use ♦ctl-W♦ (♦ctl-O♦ —the *letter* "O"—with Superbrain).

BROWSE FIELDS [<field list>]

is one of the most powerful dBASE II commands for editing and displaying data.

BROWSE shows up to 19 records, displaying as many fields from each record as will fit within your screen "window." ♦ctl-B♦ moves the window right one field; ♦ctl-Z♦ moves the window left.

Fields (not records) longer than 80 characters "wrap" around your screen so that you always see the entire field. If you specify a list of fields (separated by commas), only those fields will be displayed.

The FULL SCREEN and EDIT commands (next page) will move your cursor around within fields, field to field, and record to record. You can make any changes you want to within the database and these will be saved if you exit with ♦ctl-W♦, ignored if you exit with ♦ctl-Q♦.

Full Screen Features: (all modes)

ctl-X moves cursor down to the next field (or ctl-F).
ctl-E moves cursor back to the previous field (or ctl-A).
ctl-D moves cursor ahead one character.
ctl-S moves cursor back one character.
ctl-V toggles between overwrite and insert modes.
ctl-G deletes the character under the cursor.
<Rubout> deletes the character to the left of the cursor.
ctl-P toggles your printer ON and OFF.
ctl-W saves any changes made and resumes normal dBASE II operation. With Superbrain, use ♦ctl-O♦ (the *letter* "O").
ctl-Q quits and returns to normal dBASE II operation without making changes, even in the MODIFY mode.

♦EDIT♦, ♦BROWSE♦ functions: (Do not use in ♦APPEND♦ mode)

ctl-C writes the record to disk and advances to the next record.
ctl-R writes the record to disk and backs up to the previous record.
ctl-U toggles the record deletion mark on and off.

♦BROWSE♦ functions:

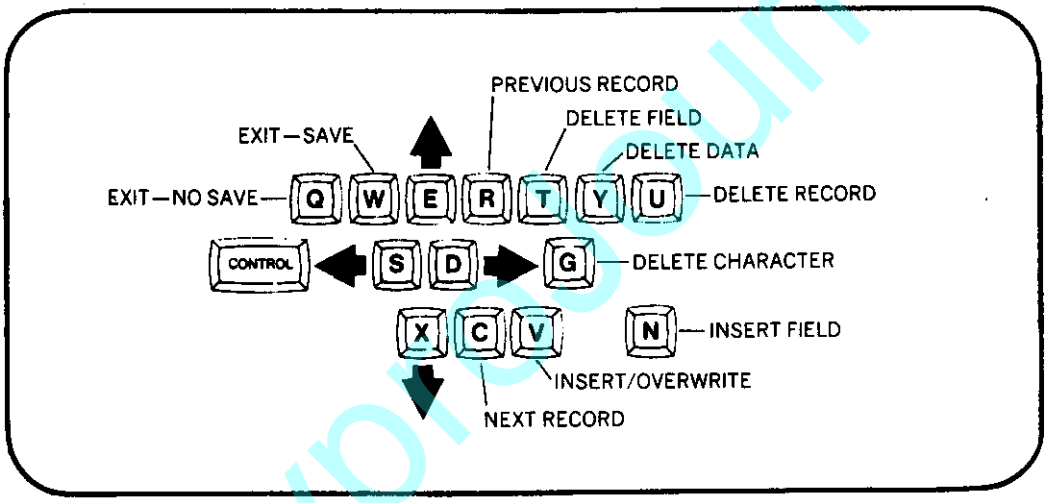
ctl-B pans the window right one field.
ctl-Z pans the window left one field.

♦MODIFY♦ functions:

ctl-T deletes current field, moves all the lower fields up.
ctl-Y blanks current field to the right of cursor position, leaves all fields where they were.
ctl-N moves fields down one position to make room for insertion of a new field at the cursor position.

♦APPEND♦ functions:

ctl-R writes the record to disk and moves to the next record.
<Enter> when cursor is at the initial position of a new record resumes normal dBASE II operation.
ctl-Q erases the record and resumes normal dBASE II operation.



An introduction to dBASE II commands and the error correction dialog (USE, LIST, DISPLAY)

dBASE II commands are generally verbs. You type them in when you see the dBASE II dot (.) prompt.

When you want to tell dBASE II which database file you want to work with, you type ♦USE <filename>♦.

To look at the record you are on, type ♦DISPLAY♦.

To see all the records in the database, type ♦LIST♦. (To stop and start the scrolling, use ♦control-S♦.)

dBASE II commands can be abbreviated to four letters, but if you use more letters they must all be correct (♦DISPLAY♦, ♦DISP♦ and ♦DISPLA♦ are valid commands; DISPRAY is not).

If you chose the error correction dialog when you installed dBASE II, the command line is scanned and you are prompted with error messages when mistakes are detected. You get a second chance to make corrections without having to retype the entire line.

Type ♦EDUT 3♦.

```
Edut 3
***UNKNOWN COMMAND
Edut 3
CORRECT AND RETRY (Y/N)? y
CHANGE FROM:u
CHANGE TO :i
Edit 3
MORE CORRECTIONS (Y/N)? n
```

dBASE II repeats a command it does not know. If you decide to change it, you do not have to retype the entire command.

In response to "CHANGE FROM:" type in enough of the wrong part of the command so that it is unambiguous, then hit <enter>.

In response to "CHANGE TO:" type in the replacement for the material you want changed.

In this example, we changed only a single letter, but you'll find this feature useful when you are testing and debugging long command lines.

Tip: The ♦ERASE♦ command erases the screen and positions the prompt dot at the upper left-hand corner of the screen so that you can start new commands with a clean slate.

Expanding commands with expressions and relational operators (LIST)

One of the most powerful features of dBASE II is the ability to expand and "tailor" the commands.

You can add "phrases" and expressions to most commands to further define what the commands will do. Commands can be entered in upper and lowercase letters, and command lines can be up to 254 characters long. To extend the line beyond the width of your display, type in a semicolon (;) as the *last* character on the line (*no space* after it). dBASE II will use the next line as part of the command.

Since dBASE II is a relational DBMS, you'll find the *relational operators* useful:

```
<      : less than
>      : greater than
=      : equal to
< =    : less than or equal to
> =    : greater than or equal to
```

These commands mean *exactly* what the explanation on the right says. They generate a logical value as a result (True or False). If the expression is True, the command is performed. If the expression is false, the command is not performed.

Earlier, we mentioned that the LIST command will show all the records in the database (to stop and start the scrolling, use ◆ctl-S◆). The full form of the command is:

◆LIST [OFF] [FOR <expression>]◆

If the optional OFF is used, the record numbers will not be displayed.

If the optional FOR clause is used, dBASE II will list only the records for which the expression is true. Type the following, using single quotes around the character data (more on data types in Section II):

```
◆USE Names◆
◆LIST◆
◆LIST OFF◆
◆LIST FOR Zip:Code = '9'◆
◆LIST OFF FOR Zip:Code < '8'◆
◆LIST FOR Name='GREEN'◆
```

Notice that when you enter only part of the contents of the field, that is all that is compared by dBASE. We did not need Mr. Green's full name, for example, although we might have used it if our database contained several GREEN's.

```
. use names
. list
00001   ALAZAR, PAT          123 Crater Rd.      Everett       WA 98206
00002   BROWN, JOHN          456 Minnow Pl.      Burlington    MA 01730
00003   CLINKER, DUANE       789 Charles Dr.     Los Angeles   CA 90036
00004   DESTRY, RALPH        234 Mahogany St.    Deerfield     FL 33441
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto     CA 94303
00006   FORMAN, ED           456 Boston St.      Dallas        TX 75220
00007   GREEN, TERRY         567 Doheny Dr.      Hollywood     CA 90046
00008   HOWSER, PETER        678 Dusty Rd.       Chicago       IL 60631

. list off
ALAZAR, PAT          123 Crater Rd.      Everett       WA 98206
BROWN, JOHN          456 Minnow Pl.      Burlington    MA 01730
CLINKER, DUANE       789 Charles Dr.     Los Angeles   CA 90036
DESTRY, RALPH        234 Mahogany St.    Deerfield     FL 33441
EMBRY, ALBERT        345 Sage Avenue     Palo Alto     CA 94303
FORMAN, ED           456 Boston St.      Dallas        TX 75220
GREEN, TERRY         567 Doheny Dr.      Hollywood     CA 90046
HOWSER, PETER        678 Dusty Rd.       Chicago       IL 60631

. list for zip:code ='9'
00001   ALAZAR, PAT          123 Crater Rd.      Everett       WA 98206
00003   CLINKER, DUANE       789 Charles Dr.     Los Angeles   CA 90036
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto     CA 94303
00007   GREEN, TERRY         567 Doheny Dr.      Hollywood     CA 90046

. list for zip:code <'8'
00002   BROWN, JOHN          456 Minnow Pl.      Burlington    MA 01730
00004   DESTRY, RALPH        234 Mahogany St.    Deerfield     FL 33441
00006   FORMAN, ED           456 Boston St.      Dallas        TX 75220
00008   HOWSER, PETER        678 Dusty Rd.       Chicago       IL 60631

. list for name ='GREEN'
00007   GREEN, TERRY         567 Doheny Dr.      Hollywood     CA 90046
```

In addition to precisely selecting data from your database, the LIST command can be used to provide you with system information.

♦LIST STRUCTURE♦ **shows you the structure of the database in USE.**

♦LIST FILES♦ **shows the names of the database (.DBF) files on the logged-in drive.** ♦.LIST FILES ON <drive>♦ **shows the database files on another drive (do NOT use the usual CP/M colon).**

```
. use names
. list structure
STRUCTURE FOR FILE: NAMES.DBF
NUMBER OF RECORDS:00010
DATE OF LAST UPDATE:00/00/00
PRIMARY USE DATABASE
 FLD          NAME              TYPE      WIDTH      DEC
001        NAME                  C         020
002        ADDRESS               C         025
003        CITY                  C         020
004        STATE                 C         002
005        ZIP:CODE              C         005
**TOTAL**                                 00073

. list files
DATABASE     FILES              #RCDS     LAST UPDATE
NAMES        DBF                00010     00/00/00
MIND         DBF                00007     00/00/00
KEYFILE      DBF                00211     00/00/00
CHECKS       DBF                00783     00/00/00
TEMP         DBF                00010     00/00/00
MONEYOUT     DBF                00000     00/00/00
ORDERS       DBF                00000     00/00/00
```

Looking at data with DISPLAY

The ♦DISPLAY♦ command is similar to ♦LIST♦. Its full form is:

```
        [All      ]
DISPLAY [Record n] [OFF][FOR <expression>]
        [Next n   ]
```

This gives you the option of specifying the *scope* for the ♦DISPLAY♦ command (also ♦LIST♦).

Specifying "Record n" displays only that record ; "Next n" displays the next "n" records, including the current record. ♦DISPLAY ALL♦ is the same as ♦LIST♦, except that ♦LIST♦ will scroll all the records in the database up the screen, while ♦DISPLAY ALL♦ shows you the database in groups of 15 records at a time (pressing any key displays the next 15 records). Type the following:

♦DISPLAY ALL♦
♦DISPLAY Record 3♦
♦DISPLAY Next 4♦

```
. display all
00001   ALAZAR, PAT          123 Crater Rd.      Everett        WA 98206
00002   BROWN, JOHN          456 Minnow Pl.      Burlington     MA 01730
00003   CLINKER, DUANE       789 Charles Dr.     Los Angeles    CA 90036
00004   DESTRY, RALPH        234 Mahogany St.    Deerfield      FL 33441
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto      CA 94303
00006   FORMAN, ED           456 Boston St.      Dallas         TX 75220
00007   GREEN, TERRY         567 Doheny Dr.      Hollywood      CA 90046
00008   HOWSER, PETER        678 Dusty Rd.       Chicago        IL 60631

. display record 3
00003   CLINKER, DUANE       789 Charles Dr.     Los Angeles    CA 90036

. display next 4
00003   CLINKER, DUANE       789 Charles Dr.     Los Angeles    CA 90036
00004   DESTRY, RALPH        234 Mahogany St.    Deerfield      FL 33441
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto      CA 94303
00006   FORMAN, ED           456 Boston St.      Dallas         TX 75220
```

As with ♦LIST♦, the optional FOR clause can be used to select specific data by using logical expressions.

The DISPLAY command can also be used like the LIST command for system functions:

```
DISPLAY STRUCTURE = LIST STRUCTURE.
DISPLAY FILES = LIST FILES.
```

Both ♦LIST and ♦DISPLAY♦ can show you specific types of files on a drive using the CP/M "wild cards." ♦DISPLAY FILES LIKE *.COM ON B♦, for example, would display all the ".COM" files on drive B. If uncertain, check your CP/M manual, then use this form:

♦DISPLAY FILES LIKE <wild card>♦

Positioning commands (GO or GOTO and SKIP)

Once you have your database set up, you can also move from record to record quickly and easily with dBASE II. Type the following:

```
♦USE Names♦
♦GO TOP♦
♦DISPLAY♦
♦GO BOTTOM♦
♦DISPLAY♦
♦GOTO 5♦
♦DISPLAY♦
♦8♦
♦DISPLAY♦
```

```
. use names
. go top
. display
00001   ALAZAR, PAT          123 Crater Rd.      Everett      WA 98206

. go bottom
. display
00008   HOWSER, PETER        678 Dusty Rd.       Chicago      IL 60631

. goto 5
. display
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto    CA 94303

. 8
. display
00008   HOWSER, PETER        678 Dusty Rd.       Chicago      IL 60631
```

♦GO TOP♦ (or ♦GOTO TOP♦) moves you to the first record in the database. ♦GO BOTTOM♦ moves you to the last record. You can go to a specific record by using ♦GOTO♦ <number> (or ♦GO <number>♦). And you can even eliminate the GO and just specify the record number.

♦SKIP♦ moves you to the next record. ♦SKIP ± n♦ moves you forward or backward "n" records. You can also use ♦SKIP ± <variable/expression>, with the number of records skipped determined by the value of the variable or expression (both defined later). Type the following:

```
♦DISPLAY♦
♦SKIP−3♦
♦DISPLAY♦
♦SKIP♦
♦DISPLAY♦
```

```
. display
00008   HOWSER, PETER        678 Dusty Rd.       Chicago      IL 60631

. skip−3
RECORD:00005

. display
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto    CA 94303

. skip
RECORD:00006

. display
00006   FORMAN, ED           456 Boston St.      Dallas       TX 75220
```

The interactive ? command

The ♦?♦ command allows you to use dBASE II in the calculator mode. Simply type in the question mark and a space followed by the quantity or mathematical function you want evaluated and dBASE II will provide the answer on the next line. Using ?? puts the answer on the same line.

Type the following:

♦? 73/3.0000♦
♦? 73.00/3♦
♦? 73/3♦

```
. ? 73/3.0000
    24.3333
. ? 73.00/3
 24.33
. ? 73/3
 24
. STORE 73/3 to s
 24
```

The ♦?♦ command shows the answers to a mathematical operation to the same number of decimal places as the maximum in the numbers entered.

You can also think of ♦?♦ as meaning: "What is . . .," with the dots replaced by an expression, a variable (a field name or a memory variable), a dBASE II function or a list of these separated by commas. Type the following:

♦USE Names♦
♦6♦
♦? Zip:Code♦
♦? Name♦
♦SKIP♦
♦GO BOTTOM♦
♦? City♦

```
. use names
. 6
. ? zip:code
75220
. ? name
FORMAN, ED
. ? state
TX
. skip
RECORD: 00007
. ? name
GREEN, TERRY
. go bottom
. ? city
CHICAGO
```

In the section on functions and commands, we'll show you how the ♦?♦ can be used to access other dBASE II functions, and to display CRT prompts to the operator from a command file.

Adding more data with the APPEND and INSERT commands

You can add data to any database quickly and easily with a one-word command. First choose the database file into which you want to enter data by typing ♦USE <filename>♦, then typing in the command ♦APPEND♦:

♦USE Names♦
♦APPEND♦

```
. use names
. append

RECORD # 00009

NAME    :                              :
ADDRESS :                                                  :
CITY    :                              :
STATE   :     :
ZIP:CODE :           :
```

dBASE II responds by displaying the record number that follows the last record in the file and the fields for that database. If you fill in the record, it is added onto the end of the file (appended).

The display includes the names of the fields, with colons showing field lengths. The cursor is at the first position where you can start to enter data. If you fill up the entire field with data, the cursor automatically moves down to the next field. If not, hit <enter>.

If there is no data to be entered in a field, use <enter> to move the cursor to the next field. Character fields will automatically be filled with blanks, numeric fields will show a zero. When entering numeric data, if there are no digits after the decimal, there is no need to type the decimal. dBASE II automatically puts in the decimal point and the necessary number of following zeros.

Records can be inserted into a specific location in a database (to keep them alphabetical, for example) by typing:

♦INSERT [BEFORE] [BLANK]♦

Using the word ♦INSERT♦ alone inserts the record just after the current record. Specifying BEFORE will insert the record just before the current record. In either case, you are prompted the same way as with the ♦APPEND♦ and ♦CREATE♦ commands. If BLANK is specified, an empty record is inserted and there are no prompts.

Add the following names alphabetically to the <Names.DBF> database:

EDMUNDS, JIM	392 Vicarious Way, Atlanta, GA	30328
INDERS, PER	321 Sawtelle Blvd., Tucson, AZ	85702
JENKINS, TED	210 Park Avenue, New York, NY	10016

The sequence of commands is:

♦USE Names♦
♦5♦
♦INSERT BEFORE♦ (enter the data for the first name)
♦APPEND♦ (enter the data for the last name)

In the ♦INSERT♦ mode, when you fill the last field, dBASE II will return to the command mode (dot prompt).

To exit the ♦APPEND♦ mode, at the beginning of a new, blank record hit <enter>.

In either mode, you can exit from inside a record by using ♦ctl-W♦ (♦ctl-O♦ with Superbrain). This will save what has been entered up to that point and return you to the command mode.

With both the APPEND and INSERT commands, you'll later learn how to set up a FORMAT FILE (.FMT extension) to show only selected fields from the database and any special prompt that you might want to include.

Cleaning up a database (DELETE, RECALL, PACK)

Deletions can be made directly from dBASE II as well as in the ♦EDIT♦ mode.

To delete the current record, type ♦DELETE♦.

To delete more than one record, use the form ♦DELETE♦ <scope>♦, where the scope is the same for other dBASE II commands: *All, Record n,* or *Next n.*

To make the deletions conditional, expand the command to:

♦DELETE [scope] [FOR <expression>]♦

where "expression" is a condition or set of conditions that must be met. (This is developed in more detail in Section II.)

Type ♦DELETE FILE <drive>:<filename>♦ to delete a file. *But once you've done this, the data is gone forever, so be careful.*

Unlike files, records marked for deletion can be recovered. Rather than erasing the data, ♦DELETE♦ marks each record with an asterisk. You will see the asterisks when you ♦LIST♦ or ♦DISPLAY♦ the records. dBASE II then ignores these records, and does not use them in any processing.

To restore the records, use the following command:

♦RECALL [scope] [FOR <expression>]♦

This operates the same way ♦DELETE♦ does, with the scope and condition being optional. If a conditional expression is used, it does not have to be the same as was used to mark the records for deletion.

At some point, however, you will want to clean up your files to clarify displays or to make more room for storage. To do this, type:

♦PACK♦.

This erases all records marked for deletion, and tells you how many records are in the database.

Note: once you use this command, the records are lost forever.

To see how these commands work, type the following:

```
♦USE Names♦
♦LIST♦
♦DELETE RECORD 2♦
♦DELETE RECORD 4♦
♦LIST♦
♦RECALL RECORD 4♦
♦LIST♦
♦PACK♦
♦LIST♦
```

The screen below shows the first few records in our <Names.DBF> as we perform these commands.

```
. list
00001    ALAZAR, PAT          123 Crater Rd.        Everett          WA 98206
00002   *BROWN, JOHN          456 Minnow Pl.        Burlington       MA 01730
00003    CLINKER, DUANE       789 Charles Dr.       Los Angeles      CA 90036
00004    DESTRY, RALPH        234 Mahogany St.      Deerfield        FL 33441
00005    EDMUNDS, JIM         392 Vicarious Way     Atlanta          GA 30328

. delete record 2
00001 DELETION(S)
. delete record 4
00001 DELETION(S)
. list
00001    ALAZAR, PAT          123 Crater Rd.        Everett          WA 98206
00002   *BROWN, JOHN          456 Minnow Pl.        Burlington       MA 01730
00003    CLINKER, DUANE       789 Charles Dr.       Los Angeles      CA 90036
00004   *DESTRY, RALPH        234 Mahogany St.      Deerfield        FL 33441
00005    EDMUNDS, JIM         392 Vicarious Way     Atlanta          GA 30328

recall record 4
00001 RECALL(S)
. list
00001    ALAZAR, PAT          123 Crater Rd.        Everett          WA 98206
00002   *BROWN, JOHN          456 Minnow Pl.        Burlington       MA 01730
00003    CLINKER, DUANE       789 Charles Dr.       Los Angeles      CA 90036
00004    DESTRY, RALPH        234 Mahogany St.      Deerfield        FL 33441
00005    EDMUNDS, JIM         392 Vicarious Way     Atlanta          GA 30328

. pack
PACK COMPLETE, 00004 RECORDS COPIED
. list
00001    ALAZAR, PAT          123 Crater Rd.        Everett          WA 98206
00002    CLINKER, DUANE       789 Charles Dr.       Los Angeles      CA 90036
00003    DESTRY, RALPH        234 Mahogany St.      Deerfield        FL 33441
00004    EDMUNDS, JIM         392 Vicarious Way     Atlanta          GA 30328
```

Section I Summary

At this point, you have learned about the power over data that a relational database management system like dBASE II can give you.

You can now ♦CREATE♦ a new database and start entering data in minutes.

If you want to change the data, this is easily done with ♦EDIT♦, ♦DELETE♦, ♦RECALL♦ and ♦PACK♦.

You can ♦APPEND♦ or ♦INSERT♦ more data as required, and ♦LIST♦ and ♦DISPLAY♦ entire files or precisely selected records. You can also ♦GOTO♦ and ♦SKIP♦ around within a database quickly and easily.

Additionally, dBASE II can be used interactively as a powerful calculator (and more) with the ♦?♦ command.

We have introduced you to expressions and how they can be used to expand the power of dBASE II commands. In the next section, we will go into this in more detail and show you how to get useful information out of your databases quickly and easily.

Before that, please ♦CREATE♦ these two files, as we will need them for other examples.

```
. create
ENTER FILENAME: MoneyOut
ENTER RECORD STRUCTURE
AS FOLLOWS:
              NAME,TYPE,WIDTH,
   FIELD      DECIMAL PLACES
   001        Check:Date,C,7
   002        Check:Nmbr,C,5
   003        Client,C,3
   004        JobNumber,N,3
   005        Name,C,20
   006        Descrip,C,20
   007        Amount,N,9,2
   008        Bill:Date,C,7
   009        Bill:Nmbr,C,7
   010        Hours,N,6,2
   011        Emp:Nmbr,N,3
   012
```

```
. create
ENTER FILENAME: Orders
ENTER RECORD STRUCTURE
AS FOLLOWS:
                NAME,TYPE,WIDTH,
  FIELD         DECIMAL PLACES
  001           CustNmbr,C,9
  002           Item,C,20
  003           Qty,N,4
  004           Price,N,7,2
  005           Amount,N,9,2
  006           BackOrdr,L,1
  007           OrdrDate,C,6
  008
```

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Section II:

In this section, we develop the use of expressions to modify dBASE II commands. This may be the most important part of learning how to use dBASE II effectively.

The dBASE II commands can be learned fairly easily because they are English-like, and learning another command is a matter of increasing your vocabulary (and your repertoire) by another word.

Expressions, combined with the commands, give you the fine control you need to manipulate your data to perform specific tasks. Once you have learned how to handle expressions, you will only have to learn two more things about programming to be able to write effective applications command files. (These are how to make decisions and how to repeat a sequence of commands, covered in Section III).

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Using expressions for selection and control

We gave you a brief introduction to expressions that can be used with dBASE II commands in Section I.

As you saw, they are a powerful way to extend the commands and manipulate your data quickly and easily. Many dBASE II commands can be modified in the form:

♦<COMMAND> [FOR <expression>]♦

This extended power gives you a flexibility that you simply do not get with other database management systems. We've been told by experienced programmers that they can write a program (a dBASE II command file) for an application in as little as one-tenth the time it would take them using BASIC or even higher level languages such as COBOL, FORTRAN and PL/1.

But to take advantage of this power, you need to understand how to work with expressions and operators, then how to combine the modified commands into command files that will perform the same tasks again and again.

The next few pages will get you started. Ultimately, experience is going to be the best teacher.

Reminder: as we introduce commands through the text, we try to explain a particular aspect of the command that will allow you to do a few more things with your database. This means that we do not cover the entire command at one time. To find out all that a command can do, use the summary at the end of Part I and the definitions of Part II.

Note: If, after you've finished this Section, you are still uncertain about how to write expressions that make the dBASE II commands do exactly what you want done, you may want to look at some beginning programming texts at your local library. Most of them discuss expressions within the first two chapters or so.

Constants and variables (STORE)

Expressions in dBASE II are used to help select and manipulate the data in your database (see ♦DISPLAY♦). The quantity that you manipulate may be either a *constant* or a *variable*.

Constants are data items that do not change, no matter where they appear in a database or within the computer. They are *literal* values because they are exactly what they represent. Examples are numerals such as 3 and the logical values T and F.

Characters and *character strings* (all the printable characters plus spaces) can also be constants, but must be handled a bit differently.

"Strings" are simply a collection of characters (including spaces, digits and symbols) handled, modified, manipulated and otherwise used as data. A *"substring"* is a portion of any specific string.

If a character or collection of characters is to be treated as a *string constant*, it must be enclosed in single or double quotes or in square brackets so the computer understands that it is to deal with the characters as characters. To see what we mean, get dBASE II up on your computer and USE <Names>. Type:

◆dBASE◆
◆USE Names◆
◆? 'Name'◆
◆? Name◆

In response to the first "What is..." (the ◆?◆ command), the computer responded with NAME because that was the value of the constant. When you eliminated the single quotes, the computer first checked to see if the word was a command. It wasn't, so it then checked to see if it was the name of a variable.

Variables are data items that can change. Frequently they are the names of database fields whose contents can change. In this case, the computer found that our database had a field called <Name> so it gave us the data that was in that field at that time. Type the following:

◆SKIP 3◆
◆? Name◆

```
. use names
. ? Name
Name
. ? Name
ALAZAR, PAT
. skip 3
RECORD: 00004
. ? Name
DESTRY, RALPH
```

Now type ◆USE◆. Since we do not specify a file name, the computer simply closes all files.

If we type ◆? Name◆ again, the computer tells us that we made an error. In this case, we tried to use a variable that did not exist because we were no longer using a file with a matching field name.

The variables can also be *memory variables* rather than field names. dBASE II reserves an area of memory for storing up to 64 variables, each with a maximum length of 254 characters, but with a maximum total of 1536 characters for all the variables.

You might want to think of this as a series of 64 pigeon-holes available for you to tuck data into temporarily while working out a problem.

Variable names can be any legal dBASE II identifier (start with a letter, up to ten characters long, optional embedded colon and numbers, no spaces).

You can use a memory variable for storing temporary data or for keeping input data separate from field variables. In one session, for example, we might "tuck" the date into a pigeon-hole (variable) called <Date>. During the session, we could get it by asking for <Date>, then place it into any date field in any database without having to re-enter it.

To get data (character, numeric or logical) into a memory variable, you can use the ♦STORE♦ command. The full form is:

♦STORE <expression> TO <memory variable>♦

Type the following:

```
♦STORE♦ "How's it going so far?" TO Message
♦STORE 10 TO Hours♦
♦STORE 17.35 TO Pay:Rate♦
♦? Pay:Rate*Hours♦
♦? Message♦
```

```
. STORE "How's it going so far?" TO Message
How's it going so far?
. STORE 10 TO Hours
  10
. STORE 17.35 TO Pay:Rate
  17.35
. ? Pay:Rate*Hours
                173.50
. ? Message
How's it going so far?
```

Notice that we used double quotes around the character string (a constant) in the first line because we wanted to use the single quote as an apostrophe inside the string.

If this isn't clear yet, try experimenting with and without the quotes to get the distinction between constants and variables. To start you off, type the following:

```
♦STORE 99 TO Variable♦
♦STORE 33 TO Another♦
♦STORE Variable/Another TO Third
♦STORE '99' TO Constant♦
♦? Variable/Another♦
♦? Variable/3♦
♦? Constant/3♦
♦DISPLAY MEMORY
```

```
. Store 99 to Variable
 99
. STORE 33 To Another
 33
. STORE Variable/Another TO Third
 3
. STORE '99' TO Constant
99
. ? Variable/Another
          3
. ? Variable/3
         33
. ? Constant/3
*** SYNTAX ERROR ***
          ?
? CONSTANT/3

. DISPLAY MEMORY
MESSAGE                          (C)                How's it going so far?
HOURS                            (N)                 10
PAY:RATE                         (N)                 17.35
VARIABLE                         (N)                 99
ANOTHER                          (N)                 33
THIRD                            (N)                  3
CONSTANT                         (C)                99
**TOTAL**          07 VARIABLES USED                00084 BYTES USED
```

Entering a value into a variable automatically tells dBASE II what the data type is. From then on, you cannot mix data types (by trying to divide a character string by a number, for instance.)

Rules: Character strings that appear in expressions must be enclosed in *matching* single or double quote marks or square brackets. Character strings may contain any of the printable characters (including the space). If you want to use the ampersand (&) as a character, it *must* be between two spaces because it is also used for the dBASE II macro function (described later).

The last command in the previous screen representation is another form of ♦DISPLAY♦ that you'll find useful. (You can also ♦LIST MEMORY♦.)

You can eliminate a memory variable by typing ♦RELEASE<name>♦, or you can get rid of all the memory variables by typing ♦RELEASE ALL♦.

Type the following (you may want to ♦ERASE♦ the screen first):

```
♦DISPLAY MEMORY♦
♦RELEASE Another♦
♦DISPLAY MEMORY♦
♦RELEASE ALL♦
♦DISPLAY MEMORY♦
```

Tip: When naming any variables, try to use as many characters as necessary to make the name meaningful to humans.

Another tip: If you use only nine characters for database field names, when you want to use the name as a memory variable, you can do so by putting an "M" in front of it. What it stands for will be clearer when you come back to clean up your programs later than if you invented a completely new and different name.

dBASE II operators

Operators are manipulations that dBASE II performs on your data. Some of them will be familiar; others may take a bit of practice.

Arithmetic operators should be the most familiar. They generate arithmetic results.

( )	: parentheses for grouping
*	: multiplication
/	: division
+	: addition
−	: subtraction

The *arithmetic operators* are evaluated in a sequence of precedence. The order is: parentheses; multiply and divide; add and subtract. When the operators have equal precedence, they are evaluated from left to right. Here are some examples:

17/33*72.00 + 8 = 45.09	(divide, multiply then add)
17/(33*72.00000 + 8) = 0.00644	(multiply, add then divide)
17/33*(72.00 + 8) = 41.21	(divide, add then multiply)

Relational operators make comparisons, then generate logical results. They take action based on whether the comparison is True or False.

<	: less than
>	: greater than
=	: equal to
< >	: not equal to
<=	: less than or equal to
>=	: greater than or equal to

Type the following:

```
♦USE Names♦
♦LIST FOR Zip:Code < ='70000'♦
♦LIST FOR Address < > '123'♦
♦LIST FOR Name = 'HOWSER'♦
```

```
. LIST FOR Zip:Code< ='70000'
00003   DESTRY, RALPH          234 Mahogany St.     Deerfield     FL 33441
00004   EDMUNDS, JIM           392 Vacarious Way    Atlanta       GA 30328
00008   HOWSER, PETER          678 Dusty Rd.        Chicago       IL 60631
00010   JENKINS, TED           210 Park Avenue      New York      NY 10016

. LIST FOR Address< >'123'
00002   CLINKER, DUANE         789 Charles Dr.      Los Angeles   CA 90036
00003   DESTRY, RALPH          234 Mahogany St.     Deerfield     FL 33441
00004   EDMUNDS, JIM           392 Vicarious Way    Atlanta       GA 30328
00005   EMBRY, ALBERT          345 Sage Avenue      Palo Alto     CA 94303
00006   FORMAN, ED             456 Boston St.       Dallas        TX 75220
00007   GREEN, TERRY           567 Doheny Dr.       Hollywood     CA 90046
00008   HOWSER, PETER          678 Dusty Rd.        Chicago       IL 60631
00009   INDERS, PER            321 Sawtelle Blvd.   Tuscon        AZ 85702
00010   JENKINS, TED           210 Park Avenue      New York      NY 10016
. LIST FOR Name='HOWSER'
00008 HOWSER, PETER            678 Dusty Rd.        Chicago       IL 60631
```

The *logical operators* greatly expand the ability to refine data and manipulate records and databases. Explaining them in depth is beyond the scope of this manual, but if you are not familiar with them, most computer texts have a chapter very near the beginning that explains their use. They generate logical results (True or False). They are listed below in the order of precedence within an expression (.NOT. is applied before .AND., etc.):

```
( )     : parentheses for grouping
.NOT.   : Boolean not (unary operator)
.AND.   : Boolean and
.OR.    : Boolean or
$       : substring logical operator
          (substring search)
```

```
♦LIST FOR (JobNumber=730 .OR. JobNumber=731);
          .AND. (Bill:Date > = '791001' .AND.;
                 Bill:Date < = '791031')
```

displays all the October, 1979 records for costs billed against job numbers 730 and 731 (notice how the command was extended to a second and third line with the semi-colons).

If you're not familiar with logical operators, start with the basic fact that these operators will give results that are *True* or *False*. In our example, dBASE II asks the following questions about *each* record:

1) Is JobNumber equal to 730 (T or F)?
2) Is JobNumber equal to 731 (T or F)?
3) Is Bill:Date greater than or equal to '791001' (T or F)?
4) Is Bill:Date less than or equal to '791031' (T or F)?

dBASE II then performs three logical tests (.OR., .AND., .AND.) before deciding whether the record should be displayed or not.

Parentheses are used as they would be in an arithmetic expression to clarify operations and relations. Because of the first .AND., dBASE II will display records only when the conditions in *both* parenthetical statements are true.

Evaluating the first expression, it first checks the <Job:Number> field. If the value in the field is 730 *or* 731, this sub-expression is set to True. If the field contains some other value, this sub-expression is False and the record will not be displayed.

If the first sub-expression is true, dBASE II must still check the contents of the <Bill:Date> field to evaluate the second sub-expression. If the contents of the field are between '791001' *and* '791031', inclusive, this expression is true, too, and the record will be displayed. Otherwise, the complete expression is false and dBASE II will skip to the next record, where it proceeds through the same evaluation.

Let's try some of this with <Names.DBF>. Type the following:

```
USE Names
DISPLAY all FOR Zip:Code > '5' .AND. Zip:Code < '9'
DISPLAY all FOR Name < 'F'
DISPLAY all FOR Address > '400' .AND. Address < '700'
DISPLAY all FOR Address > '400' .OR. Address < '700'
```

Apart from ~~[illegible]~~ for CHNUM > "NUM" ~~MONTH = "NOV"~~ , AND.;
List for (INCOME > 0.00 .AND. MONTH = "NOV")
MONTH = 'NOV .AND. INCOME > 70000
(.AND. DAY > 10)

```
. USE Names
. DISPLAY all FOR Zip:Code > '5'.AND.Zip:Code < '9'
00006   FORMAN, ED          456 Boston St.      Dallas          TX 75220
00008   HOWSER, PETER       678 Dusty Rd.       Chicago         IL 60631
00009   INDERS, PER         321 Sawtelle Blvd.  Tucson          AZ 85702
. DISPLAY all FOR Name < 'F'
00001   ALAZAR, PAT         123 Crater Rd.      Everett         WA 98206
00002   CLINKER, DUANE      789 Charles Dr.     Los Angeles     CA 90036
00003   DESTRY, RALPH       234 Mahogany St.    Deerfield       FL 33441
00004   EDMUNDS, JIM        392 Vicarious Way   Atlanta         GA 30328
00005   EMBRY, ALBERT       345 Sage Avenue     Palo Alto       CA 94303
. DISPLAY all FOR Address > '400'.AND.Address < '700'
00006   FORMAN, ED          456 Boston St.      Dallas          TX 75220
00007   GREEN, TERRY        567 Doheny Dr.      Hollywood       CA 90046
00008   HOWSER, PETER       678 Dusty Rd.       Chicago         IL 60631
. DISPLAY all FOR Address > '400'.OR.Address < '700'
00001   ALAZAR, PAT         123 Crater Rd.      Everett         WA 98206
00002   CLINKER, DUANE      789 Charles Dr.     Los Angeles     CA 90036
00003   DESTRY, RALPH       234 Mahogany St.    Deerfield       FL 33441
00004   EDMUNDS, JIM        392 Vicarious Way   Atlanta         GA 30328
00005   EMBRY, ALBERT       345 Sage Avenue     Palo Alto       CA 94303
00006   FORMAN, ED          456 Boston St.      Dallas          TX 75220
00007   GREEN, TERRY        567 Dohney Dr.      Hollywood       CA 90046
00008   HOWSER, PETER       678 Dusty Rd.       Chicago         IL 60631
00009   INDERS, PER         321 Sawtelle Blvd.  Tucson          AZ 85702
00010   JENKINS, TED        210 Park Avenue     New York        NY 10016
```

Notice what happened with the last command: all the records were displayed. If you're not familiar with logical operators, this kind of non-selective "selection" will have to be guarded against.

The *$ substring logical operator* is extremely useful because of its powerful search capabilities. The format is:

◆<substring> $ <string>◆

This operator searches for the substring on the left within the string on the right. *Either or both terms may be string variables as well as string constants.* To see how this works, type the following:

```
◆USE Names◆
◆LIST FOR 'EE' $ Name◆
◆LIST FOR '7' $ Address◆
◆LIST FOR 'CA'$ State◆
◆? '00' $ 'Hollywood'◆
◆. GO 5◆
◆. DISPLAY◆
◆? State $ "CALIFORNIA"◆
```

```
. USE Names
. LIST FOR 'EE' $ Name
00007   GREEN, TERRY          567 Doheny Dr.        Hollywood      CA 90044
. LIST FOR '7' $ Address
00003   CLINKER, DUANE        789 Charles Drive     Los Angeles    CA 90038
00007   GREEN, TERRY          567 Doheny Dr.        Hollywood      CA 90044
00008   HOWSER, PETER         678 Dusty Rd.         Chicago        IL 60631
. LIST FOR 'CA' $ State
00003   CLINKER, DUANE        789 Charles Drive     Los Angeles    CA 90038
00005   EMBRY, ALBERT         345 Sage Avenue       Palo Alto      CA 94303
00007   GREEN, TERRY          567 Doheny Dr.        Hollywood      CA 90044
. ? '00' $ 'Hollywood'
.T.
. go 5
. display
00005 EMBRY, ALBERT           345 Sage Avenue       Palo Alto      CA 94303
. ? State $ "California"
.T.
```

With this function we could have, for example, simplified the structure of our mailing list names file. The states could have been entered as part of the address. To call out names within a specific state, we could have simply typed the following, where XX is the abbreviation for the state we want:

```
♦<COMMAND> FOR 'XX' $ Address♦
```

String operators generate string results.

+ = string concatenation (exact)
− = string concatenation (moves blanks)

Concatenation is just another one of those fancy computor buzzwords. All it really means is that one character string is stuck on to the end of another one. Type the following:

```
♦USE Names♦
♦? Name + Address♦
♦? Name − Address♦
♦? 'The name in this record is ' + Name;
   − ' and the address is '+ Address♦
```

```
. USE Names
. ? Name + Address
ALAZAR, PAT 123 Crater Rd.
. ? Name — Address
ALAZAR, PAT 123 Crater Rd.
. ? 'The name in the record is ' + Name - ' and the address is ' + Address
The name in this record is ALAZAR, PAT and the address is 123 Crater Rd.
```

The ♦+♦ and ♦–♦ both join two strings. The "plus" sign joins the string exactly as they are found. The "minus" sign moves the trailing blanks in a string to the end of the string. They are not eliminated, but for many purposes this is enough, as they do not show up between the strings being joined.

If you want to eliminate the trailing blanks, you can use the ♦TRIM♦ function. This is used by typing ♦STORE TRIM(<variable>) TO <variable>♦. As an example, we could have typed: ♦STORE TRIM(Name) TO (Name)♦ to eliminate the blanks following the characters of the name.

To eliminate all of the trailing blanks in our example, we could have typed: ♦STORE TRIM(Name – Address) TO Example♦.

Now that we've introduced you to expressions and dBASE II operators, we'll continue with other dBASE II commands. We'll be giving you some practice in using expressions and operators as we work our way up to developing command files.

Changing an empty database structure (MODIFY)

Warning: the <MODIFY> command will destroy your database. Please follow instructions carefully.

When there is no data in your database, the ♦MODIFY♦ command is the fastest and easiest way to add, delete, rename, resize or otherwise change the database structure. *This destroys any data in the database so don't use it after you've entered data.* (Later we'll show you a way to do so, safely.)

<MoneyOut.DBF> has no data in it yet, so we'll work with it. A useful change would be to rename <JobNumber> to <Job:Nmbr> so that the abbreviation is consistent with <Emp:Nmbr> and <Bill:Nmbr>. Type the following:

```
♦USE MoneyOut♦
♦LIST STRUCTURE♦          (page 19)
♦MODIFY STRUCTURE♦
♦y♦                       (in response to the question)
```

```
. use MoneyOut
. list structure
STRUCTURE FOR FILE:  MONEYOUT.DBF
NUMBER OF RECORDS:  00000
DATE OF LAST UPDATE:  00/00/00
PRIMARY USE DATABASE
 FLD           NAME              TYPE        WIDTH        DEC
001         CLIENT                C           004
002         JOBNUMBER             C           003
003         BILL:DATE             C           006
004         SUPPLIER              C           028
005         DESCRIP               C           010
006         HOURS                 N           006          002
007         EMP:NMBR              C           002
008         AMOUNT                N           009          002
009         BILL:NMBR             C           006
010         CHECK:NMBR            C           005
011         CHECK:DATE            C           006
**TOTAL**                                    00085

. modify structure
MODIFY ERASES ALL DATA RECORDS...PROCEED?(Y/N) 'y'
```

dBASE II erases the screen and lists the first 16 (or fewer) fields in the database. Use ♦ctl-X♦ to move down one field. Just type in the new field name over the old one (use a space to blank out the extra letter).

You can exit ♦MODIFY♦ in either of two ways: ctl-W changes the structure on disk, then resumes normal dBASE II operation (♦ctl-O♦ for Superbrain). ctl-Q quits and returns to normal dBASE II operation without making the changes. This actually gets you back without destroying the database, but play it safe and have a backup file (see the following).

Duplicating databases and structures (COPY)

Duplicating a file without going back to your computer operating system is straightforward. Type the following:

♦USE Names♦
♦COPY TO Temp♦
♦USE Temp♦
♦DISPLAY STRUCTURE♦
♦LIST♦

```
. use names
. copy to temp
00010 RECORDS COPIED

. use temp
. display structure
STRUCTURE FOR FILE: TEMP.DBF
NUMBER OF RECORDS: 00010
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
 FLD          NAME            TYPE       WIDTH      DEC
001        NAME               C           020
002        ADDRESS            C           025
003        CITY               C           020
004        STATE              C           002
005        ZIP:CODE           C           005
**TOTAL**                                00073

. list
00001  ALAZAR, PAT      123 Crater Rd.     Everett       WA 98206
00002  BROWN, JOHN      456 Minnow Pl.     Burlington    MA 01730
00003  CLINKER, DUANE   789 Charles Dr.    Los Angeles   CA 90036
00004  DESTRY, RALPH    234 Mahogany St.   Deerfield     FL 33441
00005  EMBRY, ALBERT    345 Sage Avenue    Palo Alto     CA 94303
00006  FORMAN, ED       456 Boston St.     Dallas        TX 75220
00007  GREEN, TERRY     567 Doheny Dr.     Hollywood     CA 90044
00008  HOWSER, PETER    678 Dusty Rd.      Chicago       IL 60631
00009  INDERS, PER      321 Sawtelle Blvd. Tucson        AZ 85702
00010  JENKINS, TED     210 Park Avenue    New York      NY 10016
```

Warning: When you ♦COPY♦ to an existing filename, the file is written over and the old data is destroyed.

♦COPY TO TEMP♦ created a new database called <Temp.DBF>. It is identical to the <Names.DBF>, with the same structure and the same data. The command can be expanded even further:

♦COPY TO <filename> [STRUCTURE] [FIELD list]♦

With this command, you can copy *only* the structure or *some* of the structure to another file. Type the following:

♦USE Names♦
♦COPY TO Temp STRUCTURE♦
♦USE Temp♦
♦DISPLAY STRUCTURE♦

```
. use names
. copy structure to temp

. use temp
. display structure
STRUCTURE FOR FILE:TEMP.DBF
NUMBER OF RECORDS:00000
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
 FLD          NAME          TYPE        WIDTH        DEC
001           NAME            C           020
002           ADDRESS         C           025
003           CITY            C           020
004           STATE           C           002
005           ZIP:CODE        C           005
**TOTAL**                                 00073
```

We can copy a portion of the structure by listing only the fields we want in the new database. Type:

```
♦USE Names♦
♦COPY TO Temp STRUCTURE FIELDS Name, State♦
♦USE Temp♦
♦DISPLAY STRUCTURE♦
```

```
. use names
. copy structure to temp field name, state
. use temp
. display structure
STRUCTURE FOR FILE:TEMP.DBF
NUMBER OF RECORDS:00000
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
 FLD          NAME          TYPE        WIDTH        DEC
001           NAME            C           020
002           STATE           C           002
**TOTAL**                                 00023
```

For Advanced Programmers: COPY can also be used to give your program access to a database structure. Type:

```
♦USE Names♦
♦COPY TO New STRUCTURE EXTENDED♦
♦USE New♦
♦LIST♦
```

```
. use Names
. copy to New structure extended
00006 RECORDS COPIED
. use New
. display structure
STRUCTURE FOR FILE: NEW.DBF
NUMBER OF RECORDS: 00006
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
 FLD           NAME              TYPE        WIDTH       DEC
001        FIELD:NAME             C           010
002        FIELD:TYPE             C           001
003        FIELD:LEN              N           003
004        FIELD:DEC              N           003
**TOTAL**                                   00018

. list
00001      NAME                   C            20          0
00002      ADDRESS                C            25          0
00003      CITY                   C            20          0
00004      STATE                  C             2          0
00005      ZIP:CODE               C             5          0
00006      CUSTCODE               C             9          0
```

The <New.DBF> database records describe the <Names> database structure, and an application program has direct access to this information (see Review.CMD, Section VI).

Alternatively, a file with the same structure as <New.DBF> could be embedded in a program so that the operator could enter the structure for a file without learning dBASE II. The program would then create the database for him with the following command:

•CREATE <datafile> FROM <structurefile>

Adding and deleting fields with data in the database

As you expand the applications for dBASE II, you'll probably want to add or delete fields in your databases.

•MODIFY STRUCTURE• alone would destroy all the data in your database, but used with •COPY• and •APPEND•, it lets you add and delete fields at will.

The strategy consists of copying the structure of the database you want to change to a temporary file, then making your modifications on that file. After that is done, you bring in the data from the old file into the new modified structure.

As an example, we'll use our <Names> file and our <Orders> file. At some point, it would be useful to list the orders placed by a given customer. This could be done easily by adding a customer number field to <Names> file to match the field in the <Orders> file. To do so without destroying the records we already have, type the following:

♦USE Names♦
♦COPY TO Temp STRUCTURE♦
♦USE Temp♦
♦MODIFY STRUCTURE♦
♦y♦ (in answer to the prompt)

Use the Full Screen Editing features to move down to the first blank field and type in the changes in the appropriate columns (name is "CustNmbr", data type is "C", length is 9). Now type ♦ctl-W♦ (♦ctl-O-♦ with Superbrain) to save the changes and exit to the dBASE II dot prompt.

♦DISPLAY STRUCTURE♦ to make sure that it's right. If it is we can add the data from <Names> by typing:

♦APPEND FROM Names♦

We could also have changed field sizes: the ♦APPEND♦ command transfers data to fields with matching names.

```
. display structure
STRUCTURE FOR FILE: TEMP.DBF
NUMBER OF RECORDS:00010
DATE OF LAST UPDATE:00/00/00
PRIMARY USE DATABASE
 FLD          NAME            TYPE       WIDTH       DEC
001         NAME               C          020
002         ADDRESS            C          025
003         CITY               C          020
004         STATE              C          002
005         ZIP:CODE           C          005
006         CUSTNMBR           C          009
**TOTAL**                                00082
```

Our new file <Temp> should now have the new field we wanted to add and all of the old data. ♦DISPLAY STRUCTURE♦ then ♦LIST♦ to make sure that a power line glitch or a bad spot on the floppy hasn't messed anything up.

If the data got transferred correctly, we can finish up by typing:

♦COPY TO Names♦
♦USE Names♦

The ♦COPY♦ command writes over the old structure and data. After displaying and listing the new <Names> file, you can ♦DELETE FILE Temp♦.

To summarize, the procedure can be used to add or delete fields in a database in the following sequence:

♦USE <oldfile>♦
♦COPY TO <newfile> STRUCTURE♦
♦USE <newfile>♦
♦MODIFY STRUCTURE♦
♦APPEND FROM <oldfile>♦
♦COPY TO <oldfile>♦

```
. use names
. copy to temp structure
. use temp
. modify structure
MODIFY ERASES ALL DATA RECORDS...PROCEED?
(Y/N) 'y'

. append from names
00010 records added

. copy to names
00010 RECORDS COPIED

. use names
. display structure
STRUCTURE FOR FILE: NAMES.DBF
NUMBER OF RECORDS:00010
DATE OF LAST UPDATE:00/00/00
PRIMARY USE DATABASE
 FLD          NAME         TYPE     WIDTH     DEC
001        NAME            C         020
002        ADDRESS         C         025
003        CITY            C         020
004        STATE           C         002
005        ZIP:CODE        C         005
006        CUSTNMBR        C         009
**TOTAL**                           00032
```

Dealing with CP/M and other "foreign" data files (more on COPY and APPEND)

dBASE II information can be changed into a form that is compatible with other processors and systems (BASIC, PASCAL, FORTRAN, PL/1, etc.). dBASE II can also read data files that have been created by these processors.

With CP/M, the System Data Format (abbreviated as SDF in dBASE II) includes a carriage return and line feed after every line of text. To create a compatible data file (for word processing, for example) from one of your databases, you use another form of the COPY command. Type:

```
♦USE Names♦
♦COPY TO SysData SDF♦
```

This command creates a file called <SysData.TXT>. Now ♦QUIT♦ dBASE II and use your word processor to look at the file. You'll find that you can work with it exactly as if you had created it under CP/M.

The System Data Format also allows dBASE II to work with data from CP/M files. However, *the data must match the structure of the database that will be using it.*

If we had used a word processor to create a file called <NewData.TXT>. we could add it to the <Names.DBF> file with this command. NOTE: the spacing of the data must match the structure of the database. If the <NewData.TXT> file contained the following information:

```
FREITAG, JEAN      854 Munchkin Ave.    Houston     TX 77006
GOULD, NICOLE      73 Radnor Way        Radnor      PA 19089
PETERS, ALICE      676 Wacker Dr.       Chicago     IL 60606
GREEN, FRANK       441 Spicer Ave.      Tampa       FL 33622

    (20)               (25)                (20)        (2) (5)
```

we would add it to the <Names.DBF> file by typing the following:

```
♦USE Names♦
♦APPEND FROM NewData.TXT SDF♦
```

Adding data to an existing file from a system file takes only seconds.

The procedure is similar if your "foreign" files use different delimiters. A common data file format uses commas between fields and single quotes around strings to delimit the data. To create or use these types of data files, use the word DELIMITED instead of SDF. To see how this works, type:

```
♦COPY TO Temp DELIMITED♦
```

then go back to your operating system to look at your data.

If your system has a different delimiter, you can specify it in the command: ♦DELIMITED [WITH <delimiter>♦] (do NOT type the "<" and ">" symbols). If your system uses only commas and nothing around strings, use: ♦DELIMITED WITH ,♦.

The full forms of ♦COPY♦ and ♦APPEND♦ for working with system data files are:

```
                                          [SDF          ]
COPY [scope] TO <filename> [FIELD list] [STRUCTURE] [FOR <expression>]
                                          [DELIMITED [WITH <delimiter>] ]

APPEND FROM <filename>.TXT [SDF         ] [FOR <expression>]
                           [DELIMITED] [FOR <expression>]
```

Both commands can be made selective by using a conditional expression, and the scope of ♦COPY♦ can be specified as for other dBASE II commands.

Note: While dBASE II automatically generates extensions for files it creates, you *must* specify the ".TXT" filename extension when APPENDing from a system data file.

Note: With the APPEND command, any fields used in the <expression> *must* exist in the database to which the data is being transferred.

Renaming database fields with COPY and APPEND

As we said earlier, ♦APPEND♦ transfers data from one file to another for matching fields. If a field name in the FROM file is not in the file in USE, the data in that field will not be transferred.

However, the full form does allow you to transfer only data, and we can use this feature to rename the fields in a database. If we wanted to rename <CustNmbr> to <CustCode> in <Names.DBF>, we would type:

```
♦USE Names♦
♦COPY TO Temp SDF♦                    (data only to Temp.TXT)
♦MODIFY STRUCTURE♦
♦APPEND FROM Temp.TXT SDF♦            (after changing field name)
```

Now when you ♦"DISPLAY STRUCTURE"♦, the last field will be called <CustCode>. Don't forget to change the name of the <CustNmbr> field in our <Orders> database so that the fields match.

```
. use names
. copy to temp sdf
00015 RECORDS COPIED
. modify structure
MODIFY ERASES ALL DATA RECORDS...PROCEED?
(Y/N) Y

. append from temp.TXT sdf
00015 RECORDS ADDED
```

Data in a <.TXT> file created by using the SDF (or DELIMITED) option is kept in columns that are spaced like the fields were in the original file. While you can edit a <.TXT> file with your word processor, this can be dangerous:

Warning: Do not change field positions or sizes: the data you saved is saved by *position*, not by name! If you change the field sizes when you modify the structure, you will destroy your database when you bring the saved data back into it.

When you ♦COPY♦ data to a <.TXT> file, you can use the full command to specify the *scope*, *fields* and *conditions* (see earlier explanation.)

Modifying data rapidly (REPLACE, CHANGE)

Changes can be made rapidly to any or all of the records using the following command:

♦REPLACE [scope] <field> WITH <exp> [, <field> WITH <exp>, . . .]
[FOR <expression>]♦

This is an extremely powerful command because it REPLACES a "<field-that-you-name> WITH <whatever-you-write-in-here>". You can REPLACE more than one field by using a comma after the first combination, then listing the new fields and data as shown in the center brackets.

The "data" can be specific new information (including blanks), or it could be an operation, such as deducting state sales tax from all your bills because you have a resale number (REPLACE all Amount WITH Amount/1.06).

You can also make this replacement conditional by using the FOR and specifying your conditions as an expression.

To show you how this works, we need to add some data to both the <Names> and <Orders> database files.

First, ♦USE Name♦ then type ♦EDIT 1♦. Now enter a ♦1001♦ in the <CustCode> field, using the full screen editing features to get into position. Use ♦ctl-C♦ to move on to the next record when you are finished. Customer codes should be entered as four-digit numbers, with the record number as the last two digits (1001, 1002, 1003, etc.).

Now ♦USE Orders♦ and ♦APPEND♦ the following order information (do not type the column headings):

(Cust)	(Item)	(Qty)	(Price)
♦1012	38567	5	.83♦
♦1003	83899	34	.12♦
♦1009	12829	7	.17♦
♦1012	73833	23	1.47♦

♦USE Orders♦
♦REPLACE All Amount WITH Qty*Price♦
♦LIST♦

```
. use orders
. replace all amount with qty*price
00004 REPLACEMENT(S)
. list
00001    1012    38567     5    0.83    4.15
00002    1003    83899    34    0.12    4.08
00003    1009    12829     7    0.17    1.19
00004    1012    73833    23    1.47   33.81
```

You'll also find ♦REPLACE♦ useful in command files to fill in a blank record that you have appended to a file. Data from memory variables in your program is frequently used to fill in the blank fields.

Changes to a few fields in a large number of records can also be made rapidly by using:

♦CHANGE [scope] FIELD <list> [FOR <expression>]♦

The "scope" is the same as for other dBASE II commands. At least one field must be named, but several field names can be listed if separated by commas. This command finds the first record that meets the conditions in the "expression", then displays the record name and contents with a prompt. To change the data in the field, type in the new information. To leave it the way it was, hit <enter>. *If the field is blank and you want to add data, type a space.*

Once you have looked at all the listed fields within a record, you are presented with the first field of the next record that meets the conditions you set. To return to dBASE II, hit the ♦ESCAPE♦ key.

```
. use names
. change field custcode

RECORD:  00001

CUSTCODE:
CHANGE? ♦ ♦   (ENTER A SPACE TO CHANGE AN EMPTY FIELD)
TO        1001

CUSTCODE:  1001
CHANGE?  <enter>

RECORD:  00002

CUSTCODE:
CHANGE?
```

Reminder: If you want to make changes to a relatively small number of records, the BROWSE command (page 16) may be what you need.

Organizing your databases (SORT, INDEX)

Data is frequently entered randomly, as it was in our <Names> database. This is not necessarily the way you want it, so dBASE II includes tools to help you organize your databases by SORTING and INDEXING it.

INDEXED files allow you to locate records quickly (typically within two seconds even with floppy disks).

Files can be sorted in ascending or descending order. The full command is:

♦SORT ON <fieldname> TO <filename> [DESCENDING]♦

The <fieldname> specifies the *key* on which the file is sorted and may be character or numeric, (not logical). The sort defaults to ascending order, but you can over-ride this by specifying the descending option.

To sort on several keys, start with the least important key, then use a series of sorts leading up to the major key. During sorting, dBASE II will move only as many records as it must.

To sort our <Names> file so that the customers are in alphabetical order, type:

```
♦USE Names♦
♦SORT ON Name TO Temp♦
♦USE Temp♦
♦LIST♦
♦COPY TO Names♦
```

```
. use names
. sort on name to temp
. SORT COMPLETE
. use temp
. list

00001   ALAZAR, PAT          123 Crater Rd.      Everett        WA 98206 1001
00002   BROWN, JOHN          456 Minnow Pl.      Burlington     MA 01730 1002
00003   CLINKER, DUANE       789 Charles Dr.     Los Angeles    CA 90036 1003
00004   DESTRY, RALPH        234 Mahogany St.    Deerfield      FL 33441 1004
00005   EMBRY, ALBERT        345 Sage Avenue     Palo Alto      CA 94303 1005
00006   FORMAN, ED           456 Boston St.      Dallas         TX 75220 1006
00007   FREITAG, JEAN        854 Munchkin Ave.   Houston        TX 77006 1011
00008   GOULD, NICOLE        73 Radnor Way       Radnor         PA 19089 1012
00009   GREEN, FRANK         441 Spicer Ave.     Tampa          FL 33622
00010   GREEN, TERRY         567 Doheny Dr.      Hollywood      CA 90044 1007
00011   HOWSER, PETER        678 Dusty Rd.       Chicago        IL 60631 1008
00012   INDERS, PER          321 Sawtelle Blvd.  Tucson         AZ 85702 1009
00013   JENKINS, TED         210 Park Avenue     New York       NY 10016 1010
00014   PETERS, ALICE        676 Wacker Dr.      Chicago        IL 60606
. copy to names
00014 RECORDS COPIED
```

Note: You may not SORT a database to itself. Instead, sort to a temporary file, then ♦COPY♦ it back to the original file name after you've confirmed the data.

A database can also be INDEXED so that it appears to be sorted. The form of the ♦INDEX♦ command is:

♦INDEX ON <key (variable/expression)> TO <index filename>♦

This creates a file with the new name and the extension <.NDX>. Only the data within the "key" is sorted, although it appears that the entire database has been sorted. The key may be a variable name or a complex expression up to 100 characters long. It cannot be a logical field. To organize our customer database by ZIP code, type:

```
♦USE Names♦
♦INDEX ON Zip:Code TO Zips♦
♦USE Names INDEX Zips♦
♦LIST♦
```

We could also index our database on three keys by typing:

♦INDEX ON Name + CustCode + State TO Compound♦

Numeric fields used in this manner must be converted to character type. If CustCode were a numeric field with 5 positions and 2 decimal places, ♦STR♦ function (described later) performs the conversion like this:

♦INDEX ON Name + STR(CustCode,5,2) + State TO Compound♦

To take advantage of the speed built into an INDEX file, you have to specify it as part of the ♦USE♦ command:

♦USE <database name> INDEX <index filename>♦

Positioning commands (GO, GO BOTTOM, etc.) given with an INDEX file in use move you to positions on the index, rather than the database. ♦GO BOTTOM♦, for example, will position you at the last record in the index rather than the last record in the database.

Changes made to key fields when you ♦APPEND♦, ♦EDIT♦, ♦REPLACE♦, or ♦PACK♦ the database, are reflected in the index file in USE.

Other index files for the database can be updated by typing: ♦SET INDEX TO <index File 1>, <index File 2>, . . . <index File n>♦. Then perform your ♦APPEND♦, ♦EDIT♦, etc. All named index files will now be current.

A major benefit of an INDEXED file is that it allows you to use the ♦FIND♦ command (described next) to locate records in seconds, even with large databases.

Finding the information you want (FIND, LOCATE)

If you know what data you are looking for, you can use the FIND command (but *only* when your database is indexed, and the index file is in USE). A typical FIND time is two seconds with a floppy disk system.

Simply type FIND <character string> (without quote marks), where the "character string" is all or part of the contents of a field.

This string can be as short as you like, but should be long enough to make it unique. "th", for example, occurs in a large number of words; "theatr" is much more limited. Type the following:

```
♦USE Names INDEX Zips♦
♦FIND 10♦
♦DISPLAY♦
♦FIND 9♦
♦DISPLAY♦
♦DISPLAY Next 3♦
```

```
. use names index zips

. find 10
. display
00013   JENKINS, TED          210 Park Avenue      New York      NY 10016 1010

. find 9
. display
00003   CLINKER, DUANE        789 Charles Dr.      Los Angeles   CA 90036 1003

. display next 3
00003   CLINKER, DUANE        789 Charles Dr.      Los Angeles   CA 90036 1003
00010   GREEN, TERRY          567 Doheny Dr.       Hollywood     CA 90044 1007
00005   EMBRY, ALBERT         345 Sage Avenue      Palo Alto     CA 94303 1005
```

If the key is not unique, dBASE II finds the first record that meets your specifications. This may or may not be the one you're looking for. If no record exists with the *identical* key that you are looking for, dBASE II displays NO FIND.

♦FIND♦ can also be used with files that have been INDEXED on multiple keys. The disadvantage of a compound key (which may not be a disadvantage in your application) is that it must be used from the left when you access the data. That is, you can access the data by using the FIND command and just the Name, or the Name and CustCode, or all three fields, but could not access it using the State or CustCode alone. To do that, you would either have to use the LOCATE command (next), or have another file indexed on the State field as the primary key.

When looking for specific kinds of data, use

♦LOCATE [scope] [FOR < expression>]♦

This command is used when you are looking for specific data in a file that is not indexed on the key you are interested in (file is indexed on zip codes, but you're interested in states, etc.).

If you want to search the entire database between your pointer and the end of the file, you do not have to specify the scope. If you do want to search the entire file, either specify "all", or first position the pointer at the start of the file (GO TOP). If you are looking for data in a character field, the data should be enclosed in single quotes. Type the following:

```
♦USE Names♦
♦LOCATE FOR Name='GOU'♦
♦DISPLAY♦
♦LOCATE FOR Zip:Code> '8' . AND. Name < 'G'♦
♦DISPLAY Name, Zip:Code♦
```

If a record is found that meets the conditions in your expression, dBASE II signals you with: RECORD n. You can display or edit the record once it is located.

If there may be more than one record that meets your conditions, type CONTINUE to get the next record number.

♦CONTINUE♦
♦CONTINUE♦
♦CONTINUE♦

If dBASE II cannot find your record within the "scope" that you defined, it will display: END OF LOCATE or END OF FILE ENCOUNTERED.

```
. use names
. locate for Name='GOU'
RECORD: 00008
. display
00008   GOULD, NICOLE          73 Radnor Way          Radnor          PA 19089 1012

. locate for Zip:Code > '8' and Name < 'G'
RECORD: 00001
. display Name, Zip:Code
00001 ALAZAR, PAT              98208
. continue
RECORD: 00003
. continue
RECORD: 00005
. continue
END OF FILE ENCOUNTERED
```

Getting information out of all that data (the REPORT command)

FIND and LOCATE are fine for locating individual records and data items, but in most applications you will want data summaries that include many records that meet certain specifications. The ♦REPORT♦ command lets you do this quickly and easily.

If you are using single sheets or paper in your printer, first type ♦SET EJECT OFF♦ to turn the initial formfeed off. Now select the database you want the report from and create your custom report format by typing:

♦SET EJECT OFF♦
♦USE <database>♦
♦REPORT♦

dBASE II then leads you through a series of prompts to create a custom format for the report. You specify which fields from the database you want, report and column headings, which columns should be totalled, etc. The standard defaults are 8 columns from the left edge of the paper for the page offset, 56 lines per page, and a page width of 80 characters.

You can try this with the files you've created on the demonstration disk, but the <NAMES> and <ORDERS> databases that we've used as examples so far don't have enough data in them to really show you how powerful dBASE II can be. For our examples from here on we will be using <MoneyOut.DBF> and other databases that are part of an existing business system.

This would be a good time for you to create a database structure that you would actually use in your business. Enter data in it, then substitute it for <MoneyOut> in our examples.

```
. use MoneyOut
. report
ENTER REPORT FORM NAME:JobCosts
ENTER OPTIONS, M = LEFT MARGIN, L = LINES/PAGE, W = PAGE WIDTH
PAGE HEADING? (Y?N) Y
ENTER PAGE HEADING: COST SUMMARY
DOUBLE SPACE REPORT? (Y/N) n
ARE TOTALS REQUIRED? (Y/N) y
SUBTOTALS IN REPORT? (Y/N) n
COL             WIDTH,CONTENTS
001             10,Check:Date
ENTER HEADING: DATE
002             22,Name
ENTER HEADING: SUPPLIER
003             22, Descrip
ENTER HEADING: DESCRIPTION
004             12,Amount
ENTER HEADING: AMOUNT
ARE TOTALS REQUIRED? (Y/N) y
005             ♦<enter>♦

                PAGE NO. 00001
```

When you have defined all the contents of the report, hit <enter> when prompted with the next field number. dBASE II immediately starts the report to show you what you have specified, and will go through the entire database if you let it. To stop the report, hit the <escape> key.

At the same time, dBASE II saves the format in a file with the extension .FRM, so that you can use it without having to go through the dialog again. The full form of the command is:

♦REPORT FORM <formname> [scope] [FOR <expression>] [TO PRINT]♦

By typing

♦REPORT FORM JobCosts FOR Job:Nmbr='770'♦

we can get a listing of all the job costs for job number 770 without having to redefine the format.

```
. REPORT FORM JobCosts FOR Job:Nmbr=770

PAGE NO 00001

                              COST SUMMARY
  DATE          SUPPLIER              DESCRIPTON           AMOUNT
 810113      LETTER FONT            TYPE                   177.00
 810113      ABLE PRINTER           MAILER                 805.00
 810113      MARSHALL, RALPH        TYPE                    37.10
 810113      MARSHALL, RALPH        LAYOUT                 200.00
 810113      SHUTTERBUGS, INC.      PHOTOGRAPHY            565.00
 810113      MAGIC TOUCH            RETOUCHING              56.00
 **TOTAL**                                               1,840.10
```

You can change the information in the heading by typing ♦SET HEADING TO character string♦ (up to 60 characters and spaces, *no* quote marks). The "scope" defaults to "all" when not specified.

The expression could have been expanded with other conditions, and the entire report could have been prepared as a hardcopy by adding TO PRINT at the end of the command.

This report capability can be used for just about any business report, from accounts payable (FOR Check:Nmbr=' '), to auto expenses (FOR Job:Nmbr='4') to anything else you need.

Automatic counting and summing (COUNT, SUM)

In some applications, you won't need to see the actual records, but will want to know how many meet certain conditions, or what the total is for some specified condition (How many widgets do we have in stock? How many are on back order? What is the total of our accounts payable?)

For counting use:

♦COUNT [scope] [FOR conditions] [TO memory variable]♦

This command can be used with none, some or all of the modifiers.

Unqualified, it counts all the records in the database. The "scope" can be limited to one or a specified number of records, and the "condition" can be any complex logical expression (see earlier section on expressions). The result of the count can be stored in a memory variable, which is created when the command is executed if it did not exist.

To get totals, use:

♦SUM field(s)[scope] [FOR condition] [TO memory variable(s)]♦

You can list up to 5 numeric fields to total in the database in USE. If more than one field is to be totaled, the field names are separated by commas. The records totaled can be limited by using the "scope" and/or conditional expressions after the FOR (Client < > 'SEM' . AND. Amount > 10...).

If memory variables are used (separated by commas), remember that totals are stored based on position. If you don't want to store the last fields in memory variables but do want to see what the amounts are, there's no problem: simply name the first few variables that you want. If there's a gap (you want to save the first, third and fourth field totals out of six), name memory variables for the first four fields then RELEASE the second one after the SUM is done.

```
. USE MoneyOut
. COUNT FOR Amount < 100 TO Small
COUNT = 00067
. SUM Amount FOR Job:Nmbr = 770 TO Cost
 1640.10
. display memory
SMALL                    (N)                         67
COST                     (N)                    1640.10
**TOTAL**        02 VARIABLES USED       00012 BYTES USED
```

Summarizing data and eliminating details (TOTAL)

♦TOTAL♦ works similarly to the sub-total capability in the REPORT command except that the results are placed in a database rather than being printed out:

```
TOTAL ON <key> TO <database> [FIELDS list] [FOR conditions]
```

Note: The database that the information is coming from *must* be presorted or indexed on the key that is used in this command.

This command is particularly useful for eliminating detail and providing summaries. The screen shows what happens with our <MoneyOut> database:

```
♦USE MoneyOut♦
♦INDEX ON Job:Nmbr TO Jobs♦
♦USE MoneyOut INDEX Jobs♦
♦TOTAL ON Job:Nmbr TO Temp FIELDS Amount FOR Job:Nmbr > 699;
                                        .AND. Job:Nmbr < 800♦
♦USE Temp♦
♦LIST♦
```

The new database has one entry for each job number, and a total for all the costs against that job number in our <MoneyOut> database. One problem with the new database, however, is that only two of the fields contain useful information.

This can be handled with one more command line. ♦TOTAL♦ transfers all the fields if the database named did not exist, but uses the structure of an existing database. In the commands above, we could have limited the fields in the new database by creating it first, before we used the ♦TOTAL♦ command:

♦COPY TO Temp FIELDS Job:Nmbr, Amount♦

Now when we ♦TOTAL♦ to <Temp>, the new database will contain only the job numbers and totals. Try it with your database.

This same technique can be used to summarize quantities of parts, accounts receivable or any other ordered (SORTed or INDEXed) information.

```
. USE MoneyOut
. INDEX ON Job:Nmbr TO Jobs
0093 RECORDS INDEXED
. USE MoneyOut INDEX Jobs
. TOTAL ON Job:Nmbr TO Temp FIELDS AMOUNT FOR JOB:Nmbr> 699;
                                              .AND.Job:Nmbr< 800

00028 RECORDS COPIED
. USE Temp
. LIST
00011    810128    3145    SML    778    138.00    LETTER FONT       TYPE
810129     2633            0.00     0
00012    810128    3152    SML    782     59.49    MAGIC TOUCH       BACKGROUND TONE
810129     429             0.00     0
00013    810129    3148    SMM    784     46.00    LETTER FONT       TYPE
810129     3003            0.00     0
00014    810129    3148    DOC    786    251.00    LETTER FONT       TYPE
810129     2764            0.00     0
                          (Partial Listing)
```

Section II Summary

This section has broadened the scope of what you can now do with dBASE II.

We have shown you how different operators (arithmetic, relational and string) can be used to modify dBASE II commands to give you a greater degree of control over your data than is possible with other database management systems.

Since data structures are the basis of database systems, we have covered a number of different ways in which you can alter these structures, with or without data in the database.

We have also shown you how to enter, alter, and find the specific information you may be looking for. We have also introduced new global commands that make it possible for you to turn all that data into information with a single command (COUNT, SUM, REPORT, TOTAL).

In the next section, we will show you how to set up dBASE II command files (programs), so that you can automate your information processes.

Section III:

If you understand how to write expressions, you are very close to being able to write programs.

There are *four basic programming structures* that you can use to get a computer to do what you want to do:

- Sequence
- Choice/Decision
- Repetition
- Procedures

You've already seen that dBASE II processes your commands sequentially in the order in which you give them. In this section we'll explain how you make choices (IF...ELSE), how you can make the computer repeat a sequence of commands (DO WHILE..), and how to use sub-files of commands (procedures).

Then we'll show you how to use these simple tools to write command files (programs) that will solve your applications problems.

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Setting up a command file (writing your first program)

The commands we've introduced so far are powerful and can accomplish a great deal, yet only scratch the surface of the capabilities of dBASE II. The full power comes into play when you set up command files so that the commands you enter once can be repeated over and over.

When you create a command file you are programming the computer, but since dBASE II uses English-like commands, it's a lot simpler than it sounds. Also, because dBASE II is a relational database management system, you work with increments of data and information, rather than bits and bytes.

To set up a command file, you list the commands you want performed in a CP/M file with a <.CMD> extension to its name, using a text editor or word processor.

dBASE II starts at the top of the list and processes the commands one at a time until it is done with the list.

Other computer languages operate exactly the same way. In BASIC the sequence is highly visible because each program line is numbered. In other languages (dBASE II among them), the sequence is implied and the computer will process the first line on the page, then the second line, etc. Some languages use separators (such as colons) between command statements; dBASE II simply uses the carriage return to terminate the command line.

The only time the sequence is not followed is when the computer is specifically told to go and do something else. Usually, this is based on some other conditions and the computer must make a decision based on expressions or conditions that you have set up in the command file. We'll tell you more about this later.

For now, let's create a command file called <Test>.

You can do this using a text editor on word processor, but there's an easier way with dBASE II. Type:

```
♦MODIFY COMMAND Test♦
```

dBASE II now presents you with a blank screen that you can write into using the full screen editing features described earlier. Use them now to enter the short program at the top of the next page (do not type the "♦" symbols).

The end of a line indicates the end of a command (unless you use a semicolon), so keep the list of commands as shown on the next page.

```
♦USE Names♦
♦COPY Structure TO Temp FIELDS Name, ZipCode♦
♦USE Temp♦
♦APPEND FROM Names♦
♦COUNT FOR Name = 'G' TO G♦
♦DISPLAY MEMORY♦
♦? 'We have just successfully completed our first command file.'
```

When you're finished, use clt-W (ctl-O with Superbrain) to get back to the dBASE II prompt. Now type:

. ♦Do Test♦

If you typed the program in exactly the way it was printed, it crashed. Now type ♦MODIFY COMMAND Test♦ again and insert a colon to correct the <Zip:Code> field name.

Once you get to writing larger command files on your own, you'll find that this built-in editor is one of the most convenient features of dBASE II, since you can write, correct and change programs without ever having to go back to the system level of the computer. Currently, this built-in editor can back up only about 5,000 characters, so editing should be planned in one direction for larger files.

This command file itself is trivial but does show you how you can perform a *sequence of commands* from a file with a single system command. This is similar to the way you use .COM files in your operating system.

Tip: You may want to rename the main dBASE file to <DO.COM>, so that you can type ♦DO <filename>♦ whether you're in your system or in dBASE II. To do this with CP/M, type: A> ♦REN DO.COM=dBASE.COM♦

Making choices and decisions (IF..ELSE)

Choices and decisions are made in dBASE II with ♦IF..ELSE..ENDIF♦. This is used much as it is used in ordinary English: IF I'm hungry, I'll eat, (OR) ELSE I won't. With a computer, you use the identical construction, but you do have to use *exactly* the words that it understands.

Simple decisions: If only a single decision is to be made, you can drop the ELSE and use this form:

```
IF condition [.AND. cond2. OR. cond3 . . . .]
   do this command
   [cmd2]
   [. . . .]
ENDIF
```

The "condition" can be a series of expressions (up to a maximum of 254 characters) that can be logically evaluated as being true or false. Use the logical operators to tie them together. Using our <MoneyOut> file, we might set up the following decision:

```
IF Job:Nmbr = '730' .AND. Amount > 99.99;
      .OR. Supplier = 'MAGIC TOUCH';
      .OR. Bill:Date > '791231'
   do this command
   [cmd2]
   [. . .]
ENDIF
```

If *all* the conditions are met, the computer will perform the commands listed between the IF and the ENDIF (in sequence), then go on to the next statement following the ENDIF. If the conditions are not met, the computer skips to the first command following the ENDIF.

Two choices: If there are two alternate courses of action that depend on the condition(s), use the IF..ELSE statement this way:

```
IF condition(s)
   do command(s) 1
ELSE
   do command(s) 2
ENDIF
```

The computer does *either* the first set of commands *or* the second set of commands, then skips to the command following the ENDIF.

Multiple choice: Frequently, you have to make a choice from a list of alternatives. An example might be the use of a screen menu to select one of several different procedures that you want to perform. In that case, you use the IF..ELSE..ENDIF construction.

This is the same IF..ELSE that we've described, but you use it in several levels (called "nesting"), as shown below.

```
IF conditions 1
   do commands 1
ELSE
   IF conditions 2
      do commands 2
   ELSE
      IF conditions 3
         do commands 3
      ELSE



      ENDIF 3
   ENDIF 2
ENDIF 1
```

This structure can be nested as shown as far as it has to be to choose the one set of commands required from the list of alternatives. It is used frequently in the working accounting system at the end of Part I.

Notice that each IF *must* have a corresponding ENDIF or your program will bomb.

Tip: dBASE II does not read the rest of the line after an ENDIF, so you can add in any identification you want to, as we did above. It helps keep things straight.

Repeating a process (DO WHILE..)

Repetition is one of the major advantages of a computer. It can continue with the same task over and over without getting bored or making mistakes because of the monotony. This is handled in most computer languages with the DO WHILE command:

```
DO WHILE conditions
  do command(s)
ENDDO
```

While the conditions you specify are logically true, the commands listed will be performed.

Tip: Remember that these commands must change the conditions eventually, or the loop will continue forever.

When you know how many times you want the process repeated, you use the structure like this:

```
STORE 1 TO Index                    * Start counter at 1
DO WHILE Index < 11                 * Process 10 records
  IF Item = ' '                     * If there is no data,
    SKIP                            * skip the record and
    LOOP                            * go back to the DO WHILE,
  ENDIF blank                       * without doing ProcessA
  DO ProcessA                       * Do file ProcessA.CMD
  STORE Index+1 TO Index            * Increase counter by 1
ENDDO ten times
```

In this example, if there is data in the <Item> field, the computer performs whatever instructions are in another command file called ProcessA.CMD, then returns to where it was in this command file. It increases the value of the variable Index by 1, then tests to see if this value is less than 11. If it is, the computer proceeds through the DO WHILE instructions again. When the counter passes 10, the computer skips the loop and performs the next instruction after the ENDDO.

The LOOP instruction is used to stop a sequence and cause the computer to go back to the start of a DO WHILE that contains the instruction.

In this case, if the Item field is blank, the record is not processed because the LOOP command moves the computer back to the DO WHILE Index < 11. The record with the blank is not counted, since we bypass the command line where we add 1 to the counter.

The problem with LOOP is that it short-circuits program flow, so that it's extremely difficult to follow program logic. The best solution is to avoid the LOOP instruction entirely.

Procedures (subsidiary command files)

The ability to create standard **procedures** in a language greatly simplifies programming of computers.

In BASIC, these procedures are called sub-routines. In Pascal and PL/I, they are called procedures. In dBASE II they are command files that can be called by a program that you write.

In our previous example, we called for a procedure when we said *DO ProcessA*. "ProcessA" is another command file (with a .CMD extension to its name). The contents of this command file might be:

```
IF Status = M
   DO PayMar
ELSE
   IF Status = S
      DO PaySingle
   ELSE
      IF Status = H
         DO PayHouse
      ENDIF
   ENDIF
ENDIF
RETURN
```

Once again, we can call out further procedures which can themselves call other files. Up to 16 command files may be open at a time, so if a file is in USE, up to 15 other files can be open. Some commands use additional files (REPORT, INSERT, COPY, SAVE, RESTORE and PACK use one additional file; SORT uses two additional files).

This is seldom a limitation, however, since any number of files can be used if they are closed and no more than 16 are open at any time.

A file is closed when the end of the file is reached, or when the ◆RETURN◆ command is issued by a command file. The RETURN command returns control to the command file that called it (or to the keyboard if the file was run directly).

The RETURN command is not always strictly necessary, as control returns to the calling file when the end of a file is encountered, but it is good programming practice to insert it at the end of all your command files.

Big tip: Notice that the command lines are indented in our examples. This is not necessary, but it increases command file clarity tremendously, especially when you have nested structures within other structures. Using all uppercase for the commands, and both upper- and lowercase for the variables helps, too.

Entering data interactively during a run (WAIT, INPUT, ACCEPT)

For many applications, the command files will have to get additional data from the operator, rather than just using what is in the databases.

Your command files can be set up so that they prompt the operator with messages that indicate the kind of information that is needed. One good example is a menu of functions from which one is selected. Another use might be to help ensure that accounting data is entered correctly. The following commands can do this.

♦WAIT [TO memory variable]♦
halts command file processing and waits for a single *character input* from the keyboard with a WAITING prompt. Processing continues after *any* key is pressed (as with the dBASE II DISPLAY command).

If a variable is also specified, the input character is stored in it. If the input is a non-printable character (<enter>, control character, etc.), a blank is entered into the variable.

♦INPUT ['prompt'] TO memory variable♦
accepts *any data type* from the CRT terminal to a named memory variable, creating that variable if it did not exist.

If the optional prompting message (in single or double quotes, but both delimiters the same) is used, it appears on the user terminal followed by a colon showing where the data is to be typed in. The data type of the variable (character, numeric or logical) is determined by the type of data that is entered. Character strings must be entered in quotes or square brackets.

♦ACCEPT ['prompt'] TO memory variable♦
accepts *character data* without the need for delimiters. Very useful for long input strings.

Tips on which to use when:

WAIT can be used for rapid entry (reacts instantly to an input), but should not be used when a wrong entry can do serious damage to your database.

ACCEPT is useful for long strings of characters as it does not require quote marks. It should also be used for single character entry when the need to hit <enter> can improve data integrity.

INPUT accepts numeric and logical data as well as characters, and can be used like ACCEPT.

Placing data and prompts exactly where you want them (@..SAY..GET)

The ♦?♦, ♦ACCEPT♦ and ♦INPUT♦ commands can all be used to place prompts to the operator on the screen.

Their common drawback for this purpose is that the prompts will appear just below the last line already on the screen. This works, but there's a better way.

If your terminal supports X-Y cursor positioning, another dBASE II command lets you position your prompts and get your data from any position you select on the screen:

```
◆@ <coordinates> [SAY <'prompt'>]◆
```

This will position the prompt (entered in quotes or square brackets) at the screen coordinates you specify. The coordinates are the *row* and *column* on the CRT, with 0,0 being the upper left-hand "home" position. If we specified "9,34" as being the coordinates, our prompt would start on the 10th row in the 35th column.

Note: If you installed half intensity or reverse video, the prompt will be at half intensity or in reverse video. To disable this, re-do the installation procedure and use the "Modify/Change" option.

The SAY... is optional because this command can also be used to erase any line (or portion of a line) on the screen. Bring dBASE II up and type:

```
◆ERASE◆
◆@ 20,30 SAY 'What?'◆
◆@  5,67 SAY 'Here...'◆
◆@ 11,11 SAY "That's all."◆
◆@ 20, 0◆
◆@  5, 0◆
◆@ 11,16◆
```

Instead of just showing a prompt, the command can be used to show the value of an expression with one or more variables. The form is:

```
◆@ <coordinates> [SAY <expression>]
```

Type the following in dBASE II:

```
◆USE Names◆
◆@ 13,9 SAY Zip:Code
◆@ 13,6 SAY State
◆ SKIP 3◆
◆@ 23,5 SAY Name + ', ' + Address
```

The command can be expanded further to show you the values of variables being used (memory variables or field names in a database) at whatever screen position you specify. (The variables used by both GET and SAY must exist before you call them out or you will get an error.)

```
◆@ <coordinates> [SAY <expression>] [GET <variable>]
```

To see how this works, type the following (DO NOT QUIT dBASE when you're done—there's more to come):

```
♦ERASE♦
♦USE Names♦
♦@ 15, 5 SAY 'State' GET State
♦@ 10, 17 GET Zip:Code
♦@ 5, 0 SAY 'Name' GET Name
      (Stay in dBASE)
```

This sequence has positioned the values of the variables (with and without prompts) at various places on the screen. With this facility, you can design your own input forms so that the screens that your operator sees will look just like the old paper forms that were used before.

To get data into the variables on the screen at your chosen locations, type:

```
♦READ♦
```

The cursor positions itself on the first field you entered. You can now type in new data, or leave it the way it was by hitting <enter>. When you leave this field, it goes to the second variable you entered.

Change the data in the remaining two fields. When you finish with the last one, you are back in dBASE II. Now type ♦DISPLAY♦. The record now has the new data you entered.

As you can see, GET works somewhat like the INPUT and ACCEPT commands. It is much more powerful than either because it allows you to enter many variables.

A database may have a dozen or two fields (up to 32), but for any given data entry procedure, you may be entering data in only half a dozen of those. Rather than using APPEND, which would list all the fields in the database on the screen, you can use ♦APPEND BLANK♦ to create a record with empty fields, then GET only the data you want.

Our <Names> file is not a good example, but we can use it to show how to selectively get data into a database with a large structure.

To give you more practice with command files, create a file called <Trial.CMD> with the following commands in it:

```
♦ERASE♦
♦? 'This procedure allows you to add new records to the'♦
♦? 'NAMES.DBF database selectively. We will be adding'♦
♦? 'only the Name and the Zip:Code now.'♦
♦?♦
♦? 'Type S to stop the procedure,'♦
♦? '<enter> to continue.'♦
♦WAIT TO Continue♦
```

```
♦USE Names♦
♦DO WHILE Continue < > 'S' .AND. Continue < > 's'
♦    APPEND BLANK♦
♦    ERASE♦
♦    @ 10, 0 SAY "NAME" GET Name♦
♦    @ 10,30 SAY "ZIP CODE" GET Zip:Code♦
♦    READ♦

♦    ? ' S to stop the procedure.'♦
♦    ? '<enter> to continue.'♦
♦    WAIT TO Continue
♦ENDDO♦
♦RETURN♦
```

When you're back to CP/M, type ♦dBASE Trial♦ (or ♦DO Trial♦ if you renamed the dBASE.COM file as we suggested). Now enter data into several records. After you've finished, LIST the file to see what you've added.

As you can see, data entry is simple and uncluttered.

The screen can be customized by placing prompts and variable input fields wherever you want them.

Note: You must use the ♦ERASE♦ or ♦CLEAR GETS♦ command after every 64 ♦GET's♦. Use the latter command if you do not want to change the screen.

A command file that summarizes what we've learned

Before you read on, you can run the following file to see what it does. Type ♦dBASE Sample♦ if you're in CP/M or ♦DO Sample♦ if you're in dBASE II. Respond to the prompts. After you've run it, you can come back and go through the documentation. It summarizes most of what we've covered so far and includes copious commentary.

```
********** SAMPLE.CMD **********
* This command file prompts the user with screen messages and accepts data into a
* memory variable, then performs the procedure selected by the user. This is only a
* program fragment, but it does work.
*
* We haven't written the procedures that are called by the menu yet, so instead, we can
* have the computer perform some actions that show us what it does and which paths it
* takes (stubbing).
*
* Normally, dBASE II shows the results of the commands on the CRT. This can be
* confusing, so we SET TALK OFF.

SET TALK OFF
USE MoneyOut
ERASE
```

```
* It's good housekeeping to erase the screen before you display any new data on it.
*
* Our substitute display function can be used to put information on the CRT screen like
* this:

?
?
?
?
? '          OUTGOING CASH MENU'
?
?
? '          0 = Exit'
? '          1 = Accounts Payable Summary'
? '          2 = Enter New Invoices'
? '          3 = Enter Payments Made'
?
? '          Your Choice is Number'
WAIT TO Choice
ERASE

* Since we haven't developed the procedures to do these three items yet we'll have the
* computer display different comments, depending on which alternative is selected from
* the menu.

IF Choice = '1'
   @ 0,20 SAY 'One'
ELSE
   IF Choice = '2'
      @ 1,20 SAY 'Two'
   ELSE
      IF Choice = '3'
         @ 2,20 SAY 'Three'
      ELSE
         @  7,20
         @  8,20 SAY ' ANY OTHER CHARACTER INPUT EXCEPT 1, 2, OR 3      '
         @  9,20 SAY ' CAUSES THIS COMMAND FILE TO TERMINATE AFTER      '
         @ 10,20 SAY ' PRINTING OUT THIS MESSAGE. NOTICE THAT THE       '
         @ 11,20 SAY ' DIGITS HAD TO BE IN QUOTE MARKS IN THE "IF"      '
         @ 12,20 SAY ' STATEMENTS ABOVE BECAUSE THE WAIT COMMAND        '
         @ 13,20 SAY ' ACCEPTS ONLY CHARACTER INPUTS                    '
         @ 14,20 SAY '
      ENDIF 3
   ENDIF 2
ENDIF 1

* Each IF must have a corresponding ENDIF. We've also put a label after the ENDIF to
* indicate which IF it belongs with, to make certain that we have closed all the loops.
```

```
?
?
?
?
INPUT 'Do you want to continue (Yes or No)?' TO Decision
ERASE
IF Decision = "yes"
   INPUT "Okay let's have a number, quickly." TO Number
ELSE
   @ 10,20 SAY " WHY NOT? "
   WAIT
ENDIF
ERASE
@ 10,20 SAY " I'M NOT READY FOR THAT. GOOD-BYE. "
```

```
* This next DO WHILE loop provides a delay of a few seconds to keep the last message on
* the CRT long enough to be read before the program terminates. You may find this useful
* in command files that you write. To change the delay time, either change the limit (100)
* or the step (+ 1).

STORE 1 TO X
DO WHILE X < 100
   STORE X + 1 to X
   ENDDO
   ERASE
   RETURN
```

You may want to run the program again. Try all the alternatives, then try entering inputs that are definitely wrong. You'll see how the program works and how dBASE II handles errors.

While it's only a program fragment and doesn't do any useful work, <Sample.CMD> does point up quite a few things:

1. Using ERASE frequently is good housekeeping that's easy to do.

2. Using indentation helps make the operation of the program clearer. That's also why we used upper- and lowercase letters. The computer sees them all as uppercase, but this way is much easier for us humans.

3. The "?" can be used to space lines on the display and to show character strings (in quotes or brackets).

4. The WAIT command waits for a *single* character before letting the program move on. The input then *must* be treated as a character, the way we did in the nested IF's by putting quotes around the values we were looking for.

5. The INPUT command waits for and accepts any data type, but characters and strings must be in single or double quotes or square brackets. When you have an apostrophe in your message, use the double quote or square brackets to define the string or the computer gets confused.

6. You don't have to predefine variables. Just make up another name whenever you need one (up to a maximum of 64 active at any one time).

7. Logical values can be treated in shorthand. "IF Decision" in the program worked as if we had said: "IF Decision = T".

8. The RETURN at the end of the program isn't necessary, but was tacked on because you *would* need it if this were a sub-procedure in another command file. That's how the computer knows that it should go back where it came from, rather than just quitting.

Working with multiple databases (PRIMARY, SECONDARY SELECT)

As we've seen, when you first start working with dBASE II, you type ♦USE <filename>♦ to tell dBASE II which file you're interested in, then proceed to enter data, edit, etc.

To work on a different database, you type ♦USE <NewFile>♦. dBASE II closes the first file and opens the second one, with no concern on your part. You can use any number of files this way, both from your terminal and in command files. You can also close a file without opening a new one by typing ♦USE♦.

When you USE a file, dBASE II "rewinds" it to the beginning and positions you on the first record in the file. In most cases, this is exactly what you want. In some applications, however, you will want to access another file or files without "losing your place" in the first file.

dBASE II has an exceptionally advanced feature that permits you to work in *two* separate active areas at the same time: PRIMARY and SECONDARY. You switch between them with the ♦SELECT♦ command.

You are automatically placed in the PRIMARY area when you first start. To work on another database without losing your position in the first one, type in ♦SELECT SECONDARY♦, then ♦USE <newfile>♦. To get back to the original work area, type ♦SELECT PRIMARY♦, then continue with that database.

The two work areas can be used independently. Any commands that move data and records operate only in the area in USE.

Information, however, *can* be transferred from one area to the other using P. and S. as prefixes for field names. If you are in the PRIMARY area, use the S. prefixes for field names you need from the SECONDARY area; if you are in the SECONDARY area, use the P. prefix for field names you need from the PRIMARY area.

As an example, this command is used in the <NameTest.CMD> file in the accounting system at the end of this Part of the manual. Individual records in a file in the PRIMARY area are checked against all the records in another file in the SECONDARY area.

The same command is also used in the <TimeCalc.CMD>, <DepTrans.CMD> and <Payroll.CMD> files.

While you may not think of an application now, keep the command in mind: you'll find it useful.

Generally useful system commands and functions

MODIFY COMMAND <filename> lets you modify the named command file directly from dBASE II using the normal full screen editing features.

BROWSE displays up to 19 records and as many fields as will fit on the screen. To see fields off the right edge of the screen, use ctl-B to scroll right. Use ctl-Z to scroll left.

CLEAR resets dBASE II, clearing all variables and closing all files.

RESET is used after a disk swap to reset the operating system bit map. Please read the detailed description in the command dictionary (Part II) before using it.

* allows comments in a command file, but the comments are not displayed when the command file is executed. This allows notes to the programmer without confusing the operator. There *must* be at least one space between the word or symbol and the comment, and the note cannot be on the same line as a command. REPEAT: commands and comments must be on separate lines.

REMARK allows comments to be stored in a command file, then displayed as prompts to the operator when the file is used. There must be at least one space between the word and the remark, and the remark cannot be on a command line.

RENAME <oldfile> TO <newfile> changes file names in the CP/M directory. *Do NOT try to rename files in USE.*

QUIT TO <system .COM file list>' allows you to terminate dBASE II and automatically start execution of CP/M and other .COM files. Each .COM file named must be in single quotes, and separated from other file names (in single quotes) by commas.

You can also use the '?' command to call out the following functions:

is the *record number function*. When called, it provides the value of the current record number.

* is the *deleted record function*, and returns a True value if the record is deleted, False if not deleted.

EOF is the *end of file* function. It is True if the end of the file in USE has been reached, False if it has not been reached.

A few words about programming and planning your command files

The first thing to do when you want to set up a command file is to turn the computer off.

That's right: that's where many programmers go wrong. They immediately start "coding" a solution, before they even have a clear idea of what they're to do.

A much better approach is covered in a number of texts on structured programming and some of the structured languages. One reference you might check is Chapter 2 in "An Introduction to Programming and Problem Solving in Pascal" by Schneider, Weingart and Perlman. Another is Chapters 1, 4 and the first few pages of 7 in "Pascal Programming Structures" by Cherry. Then if you really want to get into programming, there's an excellent text on PL/I called "PL/I Structured Programming" by Joan Hughes.

Briefly, here's the approach:

Start by defining the problem in ordinary English. Make it a general statement.

Now define it further. What inputs will you have? What form do you want the outputs and reports in?

Next, take a look at the exceptions. What are the starting conditions? What happens if a record is missing?

Once you've defined what you want to do, *describe the details in modified English.* The texts call it "pseudocode". All this means is that you use English terms that are somewhat similar to the instructions that the computer understands.

You might write your program outline like this:

```
Use the cost database
Print out last month's unpaid invoices
Write a check for each unpaid invoice.
```

Adding a bit more detail, it looks like this:

```
USE CostBase
Print out last month's unpaid invoices using the SUMMARY.FRM file
Start at the beginning of the database
And go through to the end:
If the invoice has not been paid
   Pay the invoice
   And enter it in the database
Do this for every record
```

In perhaps two more steps, this could be translated into a command file like this:

```
USE CostBase
* Print a hardcopy summary for December, 1980.
REPORT FORM Summary FOR Bill:Date >= '801201' .AND;
   Bill:Date <= '801231' TO PRINT
GOTO TOP                                  * Go to the first record
DO WHILE .NOT. EOF                        * Repeat for the entire file
   IF Check:Nmbr=' '                      * If the invoice isn't paid,
      DO WriteCheck                       * write a check, then
      DO Update                           * update the records
   ENDIF
SKIP                                      * Go to the next record
ENDDO
```

The term *top-down, step-wise refinement* can be applied to this procedure, but that's forty-three dollars worth of words to say: "Start at the top, then divide and conquer."

Actually, it's just a sensible approach to solving most kinds of problems. First state the overall problem, trying to define what it is and what it isn't. Then gradually get into more and more detail, solving the details that are easy to solve, putting the more complicated details aside for later solution (again, perhaps in parts).

At this stage in our example, we haven't done the <Summary.FRM> file nor the <WriteCheck.CMD> and <Update.CMD> files, but it dosen't matter.

And in fact, we're probably better off not worrying about these details because we can concentrate on the overall problem solution. We can come back after we've tested our overall solution and clean up these procedures then.

Tip: You can still test a partial program like this by using what programmers call *stubs*. Set up the command files that you've named in the program and enter three items: a message that let's you know the program reached it, WAIT and RETURN. dBASE II will go to these procedure files, give you the message, then return and continue with the rest of the program after you hit any key.

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Section IV:

By now you should be writing command files that can perform useful work for you.

To help you further, in this section we will introduce more functions a few more commands and go into quite a bit of detail on how you can print out your data in exactly the format you want it.

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Expanding your control with functions

Functions are special purpose operations that may be used in expressions to perform things that are difficult or impossible using regular arithmetic, logical and string operations. dBASE II functions fall into the same three categories, based on the results they generate.

Functions are called up by typing in ♦?♦ then a space and the function. They can be called from the terminal or within command files.

Note: the parentheses shown below *must* be used.

(Remember that "strings" are simply a collection of characters (including spaces, digits and symbols) handled, manipulated and otherwise used as data. A "substring" is a portion of any specific string.)

Don't worry about memorizing them now, but do scan the descriptions so that you know where to look when you need one of them in a command file.

!(<variable/string>)

is the *lower- to uppercase function.* It changes all the characters from 'a' ... 'z' in a string or string variable to uppercase. Any other characters in the string are unaffected. You'll see this used frequently in the accounting system (Section VI) to convert inputs from the keyboard into a standard form in the files. This makes it simpler when searching for data later, since you will know that all of the data is stored in uppercase, regardless of how it was entered.

TYPE(<expression>)

is the *data type function* and yields a *C, N,L* or *U,* depending on whether the expression data type is *Character, Numeric, Logical,* or *Undefined.*

INT(<variable/expression>)

is the *integer function.* It "rounds off" a number with a decimal, but does it by throwing away everything to the right of the decimal. The term inside the parentheses (you *must* use the parentheses) can be a number, the name of a variable or a complex expression. In the latter case, the expression is first evaluated, then an integer is formed from the results.

Note that INT(123.86) yields 123, while INT(−123.86) yields −123. A call to a variable yields a truncated integer formed from the current value of that variable. If we were on record 7 of MoneyOut.DBF, a call to INT(Amount) would produce 2333, the integer part of $2,333.75.

To *round to the nearest whole number* (rather than chop), use this form: INT(value + 0.5). The value within parentheses is first determined, then the integer function of that is taken.

The integer function can also be used to round a value to any number of decimal places. INT(value*10 + 0.5)/10 rounds a value to the nearest decimal place because of the

order of precedence of operations (parentheses, then integer, then divide). To round to two places, use "100" in place of the "10"s. For 3 places, use "1000," etc.

VAL(<variable/string/substring>)

is the *string to integer function.* It converts a character string or substring made up of digits, a sign and up to one decimal point into the equivalent numeric quantity. VAL('123') yields the number 123. VAL(Job:Nmbr) yields the numeric value of the contents of the job number field in our MoneyOut database, since we stored all Job Numbers as characters. You can also use it with the substring operator: VAL($(<string>)).

STR(<expression/variable/number>,<length>,<decimals>)

is the *integer to string function.* It converts a number or the contents of a numeric variable into a string with the specified length and the specified number of digits to the right of the decimal point. The specified length *must* be large enough to encompass at least all the digits plus the decimal point. If the numeric value is shorter than the specified field, the remaining portion is filled with blanks. If the decimal precision is not specified, "0" is assumed.

This function is used quite often in the accounting system to simplify displays. Numbers are converted to strings then concatenated with (joined to) other strings of characters for displays.

LEN(<variable/string>)

is the *string length function.* It tells you how many characters there are in the string you name. This can be useful when the program has to decide how much storage to allocate for information with no operator intervention. However, if a character field variable name is used, this function returns the size of the field, not the length of the contents (since any unused positions are filled with blanks by dBASE II).

$(<expression/variable/string>,<start>,<length>)

is the *substring function.* It selects characters from a string or character variable, starting at the specified position and continuing for the specified length.

As an example, if we had a variable called <Date> whose value was '810823', the function ♦$(Date,5,2)♦ would give us '23'. To convert these numerals to a number, we could use ♦VAL($(Date,5,2))♦

Don't confuse this with the substring *logical* operator described in Section II.

@(<variable1/string1>,<variable2/string2>)

is the *substring search function.* You might think of this as "Where is string1 AT in string2?" When you use this function, it produces the character position at which the first string or character variable starts in the second string or character variable. If the first string does not occur, a value of "0" is returned.

One use for this is to find out where a specific string starts so that you can use the preceding substring function. Another use is to find out if a specific string occurs at all.

(If you only need to know whether one string is in another one, you can use the relational string operator: *String1$String2*, Section II.)

You'll find these useful in a command file when the computer is searching without operator intervention, and you can't simply step in and look to see where the data is.

CHR(<number>)

yields the *ASCII character equivalent* of the number. Depending on how your terminal uses the standard ASCII code, ? CHR(12) may clear your screen, CHR(14) might produce reverse video while ? CHR(15) would cancel it. Other functions can be used to control hardware devices, such as a printer. Check your manual—you'll probably find a few interesting features.

To get underlining on your printer, try joining a character string, the carriage return and the underline like this: ? 'string' + CHR(13) + '___'. You could even set up a command file that uses the LEN function to find out how long the string is, then produces that many underline strokes.

&

is the *macro substitution* function. When the symbol is used in front of a memory variable name, dBASE II replaces the name with the value of the memory variable (must be character data). This can be used when a complex expression must be used frequently, to pass parameters between command files, or in a command file when the value of the parameter will be supplied when the program is run.

It could also be used as an abbreviation of a command: ♦STORE 'Delete Record' TO D♦. The command: ♦&D 5♦ would then delete record 5 when the program runs.

If the macro command is *not* followed by a valid string variable, it is skipped. This means that you can use the symbol itself as part of a string without getting an error indication.

FILE(<"filename"/variable/expression>)

yields a True value if the file exists on the disk, False if it does not. If you use a specific file name, use the quote marks. The name of a string variable does not require the quote marks. You can also use any valid string expression: ♦FILE("B:"+Database)♦ would tell you whether the file name stored in the memory variable <Database> is on drive B.

TRIM (<string>)

eliminates the trailing blanks in the contents of a string variable. This is done by typing:

♦STORE TRIM (<variable>) TO <newvariable>♦

RANK (<string>)

returns the decimal value of the first character of a string. This function corresponds to the ASC function common in many versions of BASIC.

Changing dBASE II characteristics and defaults

dBASE II has a number of commands that control how it interacts with your system setup. You can change these parameters back and forth "on the fly," or set them up once at the beginning of your command file and leave them. In many applications, the defaults will be just what you need.

Parameters are changed in your command files (or interactively) by using the SET command. In the list below, normal *default values are underlined.*

Once again, there's no need to memorize these. As you work with the established defaults, you can decide if you want to change any of the parameters on the list.

SET TALK ON Displays results from commands on console.
OFF No display.

SET PRINT ON Echoes all output to your 'list' device.
OFF No listing.

SET CONSOLE ON Echoes all output to your console.
OFF Console off.

SET SCREEN ON Turns on full screen operation for APPEND, EDIT, INSERT AND CREATE commands.
OFF Turns full screen operation off.

SET FORMAT TO SCREEN sends output of @ commands to screen.

SET FORMAT TO PRINT sends output of @ commands to printer

SET FORMAT TO <.FMT file> uses format previously created for APPEND, EDIT, INSERT AND CREATE commands.

SET MARGIN TO <nnn> sets the left-hand margin on your printer ("nnn"< =254)

SET RAW ON DISPLAYs and LISTs records without spaces between the fields.
OFF DISPLAYs and LISTs records with an extra space between fields

SET HEADING TO <string> Changes the heading in the REPORT command

SET ECHO ON All commands in a command file are displayed on your console as they are executed.
OFF No echo

SET EJECT ON enables page feed with REPORT command
OFF disables page feed

SET STEP ON Halts after completing each command, for debugging command files.
OFF Normal continuous operation.

SET DEBUG	ON	sends output from the ECHO and STEP commands to the printer only
	OFF	sends ECHO and STEP output to the screen
SET BELL	ON	enables bell when field is full
	OFF	disables bell
SET COLON	ON	uses colons to delimit input variables on the screen
	OFF	disables the colons
SET CONFIRM	ON	waits for <enter> before leaving a variable during full screen editing
	OFF	leaves the variable when the field is full
SET CARRY	ON	carries data from the previous record forward to the new record when in APPEND
	OFF	shows a blank record in APPEND mode
SET INTENSITY	ON	enables dual intensity for full screen operations
	OFF	disables dual intensity
SET LINKAGE	ON	permits databases to be linked for display with up to 64 fields and up to 2000 bytes per displayed record. The P. or S. prefix must be used when field names are similar in both databases
	OFF	disables linkage
SET EXACT	ON	requires that all characters in a comparison between two strings match exactly
	OFF	allows different length strings. E.g., 'ABCD'='AB' would be True (Also affects FIND command)
SET ESCAPE	ON	allows the <escape> key to abort command file execution
	OFF	disables the <escape> key

♦SET ALTERNATE TO <filename>♦ creates a file with a .TXT extension for saving everything except full-screen displays that goes to your CRT screen. To start saving, type ♦SET ALTERNATE ON♦.

You can change the file that you are saving to by typing ♦SET ALTERNATE TO <newfile>♦.

To stop, type ♦SET ALTERNATE OFF♦. This also terminates when your QUIT dBASE II.

Merging records from two databases (UPDATE)

Data can be transferred from one database file to another with the following command:

```
                                    [ADD <field list>]
UPDATE FROM <database> ON <key>     [REPLACE <field list>] [RANDOM]
                                    [REPLACE <field> WITH <from field>]
```

Note: Both databases must be presorted or indexed on the "key" field if the optional RANDOM command is not used.

Without the RANDOM command, both files are "rewound" to the beginning, then key fields are compared. If they are identical, then data from the FROM data base is either *added* numerically to data in the USE file, *or* is used to *replace* data in the use file for the fields specified in the field list. When "key" fields do not match, those records are skipped. This command can be used to keep inventory updated, for example.

If the fields in both databases use the same names, you can simply list the fields in which data is to be replaced. If the databases use different field names, you can use the second form of the REPLACE option to specify which field in the USE database is to be replaced by which field in the FROM database.

If RANDOM is used, the database being updated must be indexed on the "key" field, but the FROM <file> records can be in any order. As each record is read from the FROM <file>, a FIND command locates the correct record in the database being updated.

JOINing entire databases

JOIN is one of the most powerful commands in dBASE II. It can combine two databases (the USE files in the PRIMARY and SECONDARY work areas) to create a third database. The form of the command is:

```
JOIN TO <newfile> ON <expression> [FIELD <list>]
```

In operation, the command positions dBASE II on the first record of the primary USE file and evaluates each of the records in the secondary USE file. Each time the "expression" yields a true result, a record is added to "newfile." If you are in the primary area when you issue the JOIN command, prefix variable names from the secondary USE file with S.. If you are in the secondary area, prefix variables from the primary USE file with P.. (See example below.)

When each record in the secondary USE file has been evaluated against the first record of the primary USE file, dBASE II advances to the second record of the primary USE file, then evaluates all of the records from the secondary USE file again. This is repeated until all records from the files have been compared against each other.

Note: This can take a great deal of time to complete if the two databases are very large. It may also not be possible to complete at all if the constraints are too loose. Two files with 1,000 records each would create a JOIN database with 1,000,000 records if the JOIN expression was always true, while dBASE II is limited to 65,535 records in any single database.

To use the command, use this sequence of instructions:

```
USE Inventory
SELECT SECONDARY
USE Orders
JOIN TO NewFile FOR P.Part:Number=Part:Number;
        FIELD Customer,Item,Amount,Cost
```

This creates a new database called <NewFile.DBF> with four fields: Customer, Item, Amount and Cost. The structure of these fields (data type, size) are the same as in the two joined databases. (Notice that the "P." prefix is used to call a variable from the work area not in USE.)

Full screen editing and formatting (TEXT/ENDTEXT, @..SAY..GET..PICTURE, .FMT files)

To display or print a large block of text, the text can be bracketed like this:

TEXT

Any text you want can be entered here and will be sent directly to the screen or printer without any command processing. The only exception is; lines that are continued using the semicolon. Processing resumes after the command: ENDTEXT

For more precise format control, dBASE II has a powerful series of commands that allow you to position information precisely where you want it. You saw this in action in our <Sample.CMD> program, where we used:

@ <coordinates> SAY ['prompt'] GET <variable>

This command was able to position prompts and variables (and their values) at any location we specified on the screen. When we listed a series of commands, then followed them with READ, we were able to control the format of the entire screen. You might want to create and run the following command file fragment to refresh your memory:

```
STORE "          " TO MDate
STORE "          " TO MBalance
STORE "          " TO MDraw
@ 5,5 SAY "Set date MM/DD/YY " GET MDate
@ 10,5 SAY "What is the balance? " GET MBalance
@ 15,5 SAY "How much is requested" GET MDraw
READ
ERASE
@ 5,5 SAY "Should we do an evaluation?" GET MEvaluate
READ
```

The command can also be used without the SAY phrase as @ <coordinates> GET <variable> (with a later READ in the command file). This display only the colons delimiting the field length for the variable.

Tip: In the SCREEN mode the line numbers do not have to be in order, but it's good practice to write them this way since they *must* be in order for PRINT formatting.

This command can also be expanded for special formatting like this:

@ <coordinates> SAY [expression] GET <variable> [PICTURE <format>]

The optional PICTURE phrase is filled in using the format symbols listed below. The command:

@ 5,1 SAY "Today's date is" GET Date PICTURE '99/99/99'

would display:

Today's date is: / / :

assuming that the Date variable was blank. In this example, only digits can be entered.

The GET function symbols are:

9 or #	accepts only digits as entries.
A	accepts only alphabetic characters.
!	converts character input to uppercase.
X	accepts any characters.
$	shows '$' on screen.
*	shows '*' on screen.

With this command, you can format your menu and input screens any way you want them, quickly and easily.

If you use only @...SAY...GET commands and comments (preceded by an asterisk), you can save this as a format file with an .FMT extension. You can then use these format files for custom input screens for your databases, rather than using the dBASE II default which

simply lists all the fields in the database. The .FMT format file can include special instructions, etc. that help the operator enter the correct data, and the names of only the fields in which data is to be entered.

To use a .FMT format file, type:

SET FORMAT TO < filename>

Now when you use the APPEND, EDIT or INSERT commands, the format in the named file will be displayed on the screen.

Formatting the printed page (SET FORMAT TO PRINT, @..SAY..USING)

When you SET FORMAT TO PRINT, the @ command sends its information to the printer instead of the screen.

The GET and PICTURE phrases are ignored, and the READ command cannot be used.

Data to be printed on checks, purchase orders, invoices or other standard forms can first be organized on the screen with this command, then printed exactly as you see it:

@ coordinates SAY variable/expression/'string' [USING format]

For printing, the coordinates must be in order. The lines must be in increasing order (print line 7 before line 9, etc.). On any given line, the columns must be in order (print column 15 before column 63, etc.).

As in the SCREEN mode, the GET phrase can be used to output the current value of a variable that you name, the result of an expression, or a literal string prompt message.

If the USING phrase is included, this command specifies which characters are printed as well as where they appear on the page. The symbols used are:

9 or #	prints a digit only.
A	prints alphabetic characters only
X	prints any printable character.
$	prints a digit or a '$' in place of a leading zero.
*	prints a digit or a '*' in place of a leading zero.

The command 10,50 SAY Hours*Rate USING '$$$$$$$.99' could be used in both the screen and the printer modes since it has no GET phrase. For Hours = 8 and Rate = 12.73, it would print or display $$$$101.84, useful for printing checks that are more difficult to alter.

Setting up and printing a form

To set up a form, use measurements based on your printer spacing (ours prints 10 characters per inch horizontally, with 6 lines per inch vertically).

The "Outgoing Cash Menu" that we used in our earlier command file could very well have had another selection item called "4 = Write checks," so we're going to do part of the WriteCheck command file.

To start with, we'll have to input the date. The following command lines accept the date to a variable called MDate, and checks to see whether it is (probably) right:

```
ERASE
SET TALK OFF
STORE "          " TO MDate
STORE T TO NoDate
DO WHILE NoDate
   @  5,5 SAY "Set date MM/DD/YY" GET MDate PICTURE "99/99/99"
   READ
   IF VAL($(MDate,1,2)) < 1;
      .OR. VAL($(MDate,1,2,)) > 12;
      .OR. VAL($(MDate,4,2,)) < 1;
      .OR. VAL($(MDate,4,2,)) > 31;
      .OR. VAL($(MDate,7,2,)) <> 81
      STORE "          " TO MDate
      @  7,5 SAY "**** BAD DATE, PLEASE RE-ENTER. ****"
      STORE T TO NoDate
   ELSE
      STORE F TO NoDate
   ENDIF
ENDDO because we now have a valid date
ERASE
```

In English, the above first sets the value of MDate to 8 blanks, then the @..SAY command displays:

```
Set date MM/DD/YY:   /   /   :
```

When the date is entered, it is checked by the IF to see whether the month is in the range 1-12, day is in the range 1-31, and year = 81. This is done in three steps:

- the substring function $ takes the two characters representing the month, day or year (e.g., for month it starts in the 4th position and takes 2 characters)
- the VAL function converts this to an integer
- this integer is then compared against the allowed values

If the value is out of range, MDate is set to blanks again and an error message comes up. When a date within the allowed range is entered, the program continues.

The printout for the check itself could be the next portion of the program. Using the measurements of our checks, this is the list of commands:

```
@ 8,3 SAY Script*  A character variable that prints the amount in script. This is filled in by
                 * another procedure called Chng2Scrpt. We stubbed this for now like this:
                 *    STORE 'Script Stub' TO Script
                 *    RETURN
@ 11,38 SAY Vendr:Nmbr
@ 11,50 SAY MDate
@ 11,65 SAY Amount
@ 13,10 SAY Vendor
@ 14,10 SAY Address
@ 15,10 SAY City:State
@ 15,35 SAY ZIP
@ 17,10 SAY Who
```

You can check this out on your screen before you print it, then switch from SCREEN to PRINT modes with the SET command. The values for the variables are provided elsewhere in your command file.

Longer forms are no problem: a printer page can be up to 255 lines long. To reset the line counter, issue an ♦EJECT♦ command with the printer selected.

Time to regroup

Because dBASE II is such a powerful system, it has a large number of commands and techniques for dealing with your database needs and allowing you to get more information more easily than any other database system or file handler currently running on micros.

The easiest way to learn the techniques is to go through the examples and use them, changing names as you go to reflect *your* needs rather than our examples.

You may want to check some of the other database structures, then see how they are used in the programs. We tried to keep the field names and their individual structures the same for all our databases to allow for file merges and other uses. Data from one database will fit into corresponding fields in another, and with common names the transfer is straightforward.

You might want to check through the command files in the example programs. Most of the dBASE II commands have been used, and the files work the way they are set up. Each program is intended to have a useful purpose now, and is well-documented so you can learn the purpose of each. Also, each is intended to be modified as you grow and learn in dBASE. The first command file is usually the main menu for the system, with sub-files selected by pressing a number.

Writing these command files, we used the exact procedures that we recommended earlier: first define the problem in a general sense. Gradually keep dropping down in levels of detail, using ordinary English at first, then pseudocode, putting terms that dBASE II would understand in capitals when we finally got to that level.

When we came up with something that had to be done, but we weren't sure how to do it, we simply made up a procedure name for it, then went back to it later.

The indentation and mixture of upper- and lowercase letters was not done just for this manual: it's the way we work all the time. It makes writing the command files a lot easier because you can see groupings of the structures that you are using.

The identifiers were pulled out of our semi-English pseudocode, modified a bit to fit within the 10 characters allowed, but not enough to destroy the meaning.

Comments are sprinkled throughout the files for documentation, although in many cases the programs are almost self-documenting because so many of the dBASE II commands are similar to English equivalents. You are invited to play with these programs at your leisure, using the rules and techniques we have already discussed.

Section V:

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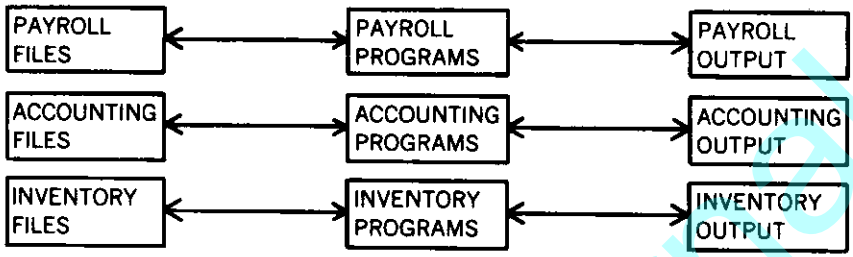
Database Basics

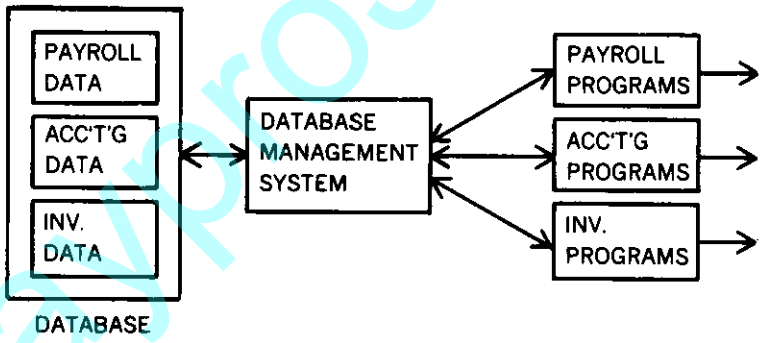
A database management system (DBMS) like dBASE II is considerably different from a file handling system.

A *file handling system* is usually configured like this:



The payroll programs process the payroll files. The accounting programs process the accounting files. And the inventory programs process the inventory files. To get reports that combine data from different files, a new program would have to be written and it wouldn't necessarily work: the data may be incompatiable from file to file, or may be buried so deeply within the other programs that getting it out is more trouble than it's worth.

A *database management system* integrates the data and makes it much easier to get useful *information* from your records, rather than just reams of *data*. Conceptually, a DMBS looks something like this:



Data is monitored and manipulated by the DBMS, not the individual applications programs. All of the applications systems have access to all of the data. In a file handling system, this would require a great deal of duplicated data. Aside from the potential for entry errors, data integrity is extremely hard to maintain when the same data is supposed to be duplicated in different files: it never is.

To generate a new processing system in a file handling system, a new program and new files must be set up. Using a DBMS, a new access program is written, but the data does not have to be restructured: the DBMS takes care of it.

If a new kind of data is added to a record (salary history in a personnel file, for example), file handling programs have to be modified. With a DBMS, additions and changes have no effect on the programs that don't need to use the new information: they don't see it and don't know that it's there.

Database management systems come in two flavors: hierarchical and relational. These terms refer to how the DBMS keeps track of data.

A **hierarchical system** tends to get extremely complex and difficult to maintain because the relationships between the data elements are maintained with sets, linked lists, and pointers telling the system where to go next. Very quickly, you can end up with lists of lists of lists and pointers to pointers to pointers.

A **relational database management system** like dBASE II is a great deal simpler. Data is represented as it is, and the relation between data elements can be considered a two-dimensional table like this one:

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5
Invoice Number	Supplier	Description	Amount	Number
2386	Graphic Process	Prints	23.00	BBQ-747
78622	Brown Engraving	Litho plates	397.42	TFS-901
M1883	Air Freight, Inc.	Shipping	97.00	SPT-233

Each row going across the table is called a *record*. Each column is called a *field* of the record. Each entry in the table must be a single value (no arrays, no sets, etc.) All the entries in a column must be of the same type. Each record (row) is unique, and the order of records (rows) doesn't matter.

When we show you more realistic examples later, you'll see that records don't get any more complicated, just larger.

A brief introduction to database organization

Once you've got your database set up, you'll want to access your data in an orderly, ordered manner.

With some databases, the order in which you enter the data will be the order in which you want to get your information out. In most cases, however, you'll want it organized differently.

With dBASE II you can organize data using the SORT command or the INDEX command. (Both of these are described in more detail in Section II: Organizing your databases.)

The SORT command moves entire records around to set up your database in ascending or descending order on any field that you specify (name, zip code, etc.). This field is called the *key*.

One drawback of sorting is that you may want to access the database on one field for one application, on another field for a different application. Another drawback is that any new records added are not in order, and would require a sort every time you entered data if you wanted to maintain the order.

Finding data is also relatively slow, since the sorted database must be searched sequentially.

INDEXING is a way around these problems.

Indexing is a method of setting up a file using only the keys that you are interested in, rather than the entire databases. A *key* is a database field (or combination of fields) that make up the "subject" of the record. In an inventory system, the part number might be the subject, and the amount-on-hand, cost, location, etc. the descriptive fields. In a personnel database, names or employee numbers would probably make the best keys.

With an indexed database, the keys alone are organized, with pointers to the record to which they belong. dBASE II uses a structure called B*-trees for indexes. This is similar to a binary tree, but uses storage much more efficiently and is a great deal faster. A FIND command (described in Section II) typically takes 2 seconds with a medium to large database.

If you need your data organized on several different fields for different applications, you can set up several index files (one for each of the fields) and use the appropriate index file whenever required. You could have index files ordered by supplier name, by customer number, by zip code or any other key, all for a single database.

New entries to a database are automatically added to the index file being used.

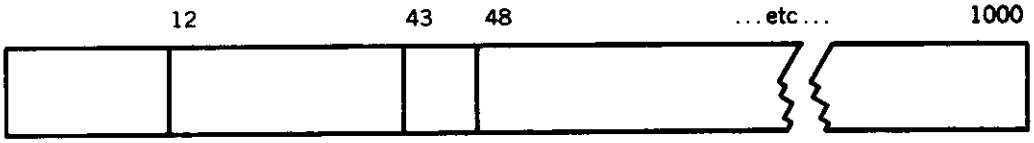
Another advantage of indexed databases is the rapid location of data that you are interested in.

dBASE II Records, Files and Data Types

dBASE II was designed to run on your micro so its scope stops short of infinity, but you'll find that you'll have to work at figuring out how to get to its maximums.

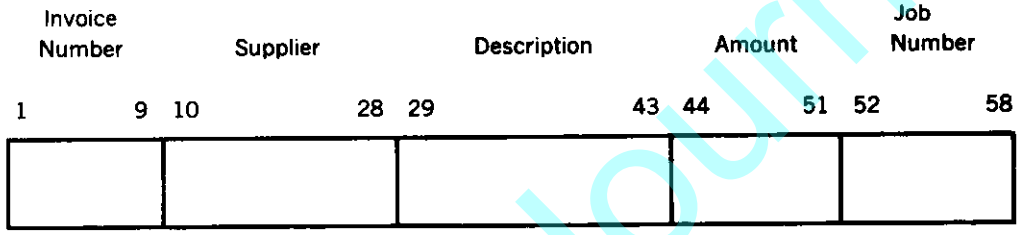
dBASE II limits you to 65,535 records per file, but with the memory and even "mass storage" limitations of a micro, this is really no limitation at all.

A dBASE II record can be as large as 32 fields and 1000 characters long (whichever comes first):



You might want to think of this as a 1000 character long strip that you can segment any way you want to up to the maximums, or shorten if you don't need to use it all. You can have four fields that use the full 1000 characters (254 characters per field maximum). Or a record one character (and field) long. Or anything in between.

In our previous example, each record had five fields and the total record length was 58 characters:



Data Types

As we said earlier, each field must contain a single type of data, and in dBASE II these are:

Character
All the printable ASCII characters, including the integers, symbols and spaces.

Numeric
Positive and negative numbers as large as 1.8 x 10<63> down to numbers as small as 1.0 x 10< −63>. Accuracy is to ten digits, or down to the penny for dollar amounts as high as $99,999,999.99.

Logical
These are true/false (yes/no) values that occupy a field one character long. dBASE II recognizes T, t, Y and y as TRUE, while F, f, N and n are recognized as FALSE.

Field Names

Each field has a name so that dBASE II can recognize it when you want to find it. Field names can be up to 10 characters (no spaces) long, and *must* start with a letter, but can include digits and an embedded colon:

A	(valid)
A123456789	(valid)
Job:Number	(valid: upper and lowercase okay)
A123,B456	(illegal comma)
Reading:	(illegal: colon not embedded)

Tip: Use as many characters as it takes to make the name meaningful. 'Job:Nmbr' is a lot better than 'No.' and infinitely better than 'J'. Using a maximum of nine characters will make handling memory variables much easier (discussed later).

Another tip: Once you get into setting up Command files, You'll find it useful to use capital letters for words that dBASE II understands and upper and lowercase for fields, variables and other items that you control. You'll appreciate this the first time you go back into a command file to make changes.

dBASE II File Types

File names are limited to 8 characters and a 3 character extension after a period. You can use the colon in the file name, but then you'll only be able to manipulate the files through dBASE II: CP/M will store the files and get the names right, but won't recognize them if you ask it to perform a function like PIP. Ten character long filenames aren't a problem: CP/M simply chops them down to eight. If you use upper and lower case letters to name your files, CP/M will change them to capitals, but they'll still show up better in your command files.

A dBASE II file is simply a collection of information of a similar type under a single name, something like a giant file folder. dBASE II operates with the six different file types described below.

.DBF Database files:

This is where all your data is kept. The extension is assigned by dBASE II when you CREATE a new file. Each .DBF file can store up to 65,535 records. *Do not* use a word processor on these files.

.FRM Report form files

These files are automatically created by dBASE II when you go through the REPORT dialog. They contain headings, totals, column contents, etc. They can be modified using a word processor or text editor, but we recommend not using this practice: make your changes using dBASE II.

.CMD Command files (.PRG with 16-bit version)

These files contain a sequence of dBASE II statements to perform frequently-used functions, and can be as complex as a complete payroll system. These are created using a text editor or word processor or MODIFY COMMAND.

.NDX Index files

These are automatically created by the INDEX command. Indexing provides very rapid location of data in larger databases.

.MEM Memory files

These are automatically created when you SAVE the results of computations, constants or variables that you will want later. You can SAVE up to 64 items, each up to 254 characters long, then RESTORE them the next time you need them.

.TXT Text output files

This file is created when you use the SET ALTERNATE command to store everything that goes to the CRT on your disk, too. This feature can be used as a system logging function, and the information can later be edited, printed, and/or saved. They are also created when you COPY...SDF.

.FMT format files

These files may only contain @...SAY statements and comments preceded by an asterisk. Use them to format screens with the APPEND, INSERT and EDIT commands.

dBASE II OPERATIONS SUMMARY

Arithmetic Operators (generate arithmetic results: p. 35)

( )	: parentheses for grouping
*	: multiplication
/	: division
+	: addition
-	: subtraction

Relational Operators (generate logical results: p. 35)

<	: less than
>	: greater than
=	: equal
# or < >	: not equal
< =	: less than or equal
> =	: greater than or equal

Logical Operators (generate T/F logical results: p. 36)

( )	: parentheses for grouping
.NOT.	: Boolean not (unary operator)
.AND.	: Boolean and
.OR.	: Boolean or
$	: substring logical operator (p. 38) (is string1 in string2?)

String Operators (generate string results: p. 39)

+	: string concatenation (joining)
-	: string concatenation with blank shift-right

dBASE II FUNCTION SUMMARY

 # record number (p. 73)

*** deleted record (p. 73)**

EOF **end of file (p. 74)**

!(< variable/string>) **convert to uppercase (p. 77)**

TYPE(< expression>) **data type (p. 77)**

INT(< variable/expression>) **integer function (p. 77)**

VAL(< variable/string/substring>) **string to integer (p. 78)**

STR(< expression/variable/number>, < length>, < decimals>) **integer to string (p. 78)**

LEN(variable/string) **string length (p. 78)**

$(expression/variable/string>, < start>, < length>) **substring select (p. 78)**

@(< variable1/string1>, < variable2string2>) **substring search (p. 78)**

CHR(< number>) **number to ASCII (p. 79)**

&(< variable>) **macro substitution (p. 79)**

FILE(< "filename"/var/exp>) **file exists? (p. 79)**

TRIM (< string>) **trailing blanks (p. 80)**

RANK(< string>) **ascii value of character (p. 80)**

dBASE II COMMAND SUMMARY

The following abbreviations are used in this summary:

<exp>	= expression
<var>	= variable
<str>	= string
<coord>	= coordinates

The symbols < . . > bracket items that are to be specified by the user. Square brackets [. .] enclose optional items. In some cases, options are nested (themselves have other options).

?<exp [,list]>
Display an expression (or list separated by commas) (p. 23)

@ <coord> [SAY <exp> [USING 'picture']] [GET <var> [PICTURE 'picture']]
Format console screen or printer output (p. 67)

ACCEPT ['prompt'] TO <var>
Input a character string from the console, no quotes (p. 65)

APPEND [BLANK]
APPEND FROM <filename> [SDF] [FOR <exp>]
[DELIMITED] [FOR <exp>]
Add data to a database (pp. 25, 48, 68)

CANCEL
Abort a command file execution

CHANGE [scope] FIELD <list> [FOR <exp>]
Make multiple changes to a database (p. 50)

CLEAR
Reset dBASE data files and memory variable environment (p. 73)

CONTINUE
Continue a LOCATE command (p. 55)

[SDF]
COPY [scope] TO <filename> [STRUCTURE] [FIELD <list>] [FOR <exp>]
[DELIMITED [WITH delimiter]]
Copy data from a database to another file (pp. 42, 47, 48)

COPY TO <filename> STRUCTURE EXTENDED
Creates a new DBF file whose records show the structure of the old file. (See also CREATE <newfile> FROM <oldfile>) (p. 42)

COUNT [scope] [FOR <exp>] [TO <var>]
Counts records that satisfy some condition (p. 57)

CREATE [< filename>]
Make a new database (p. 11)

CREATE < newfile> FROM < oldfile>
Creates < newfile> with structure determined by the data in the records of < oldfile>. (See also COPY STRUCTURE EXTENDED) (p. 43)

DELETE [scope] [FOR < exp>]
Mark specified records for deletion (p. 26)

DELETE FILE < filename>
Erase a file from the system (p. 26)

DISPLAY [scope] [FOR < exp>] [OFF]
Show data based upon request (pp. 16, 20)

DISPLAY [scope] [< field> [,list]]
Shows only the selected field(s) (p. 20)

DISPLAY STRUCTURE
Show structure of the database in USE (p. 21)

DISPLAY MEMORY
Show the contents of the memory variables (p. 32)

DISPLAY FILES [ON disk drive]
Show a disk directory (p. 21)

DISPLAY STATUS
Show current files open, index files and keys, and all SET parameters.

DO < filename>
Execute a command file (p. 62)

DO WHILE < exp>
Perform a group of commands repeatedly (p. 64)

EDIT
Alter the data in a database (p. 14)

EDIT [number]
Presents a specific record for editing (p. 14)

EJECT
Do a form feed on the printer

ELSE
Alternate execution path in an IF command (p. 62)

ENDDO
Terminator for DO WHILE command (p. 64)

ENDIF
Terminator for an IF command (p. 62)

ENDTEXT
Terminator for a TEXT command (p. 83)

ERASE
Clear console screen (pp. 17, 67)

FIND <key>
Locate a record in an indexed database based upon key value (no quotes needed for character keys) (p. 53)

GO or GOTO [RECORD], or [TOP], or [BOTTOM], n
Position to a given place in a database (p. 22)

HELP [<command verb>]
Give a short explanation of a dBASE command

IF <exp>
Conditional execution command (p. 62)

INDEX ON <key> TO <filename>
Create an index file for the database in USE (p. 52)

INPUT ['prompt'] TO <var>
Accept user inputs into memory variables. User prompt string is optional (p. 66)

INSERT [BEFORE]
[BLANK]
Add a new record to a database among other records (p. 25)

JOIN TO <filename> FOR <exp> [FIELDS <list>]
Create a database composed of matching records from two other databases (p. 82)

LIST
Show data records (pp. 16, 17)

LOCATE [scope] [FOR <exp>]
Find the record that matches a condition (p. 54)

LOOP
Escape mechanism for DO WHILE groups (p. 64)

NOTE or *
A command file comment that is not displayed when the command file is run (p. 73)

MODIFY COMMAND <filename>
Permits modification of a file directly from dBASE II (p. 73)

MODIFY STRUCTURE
Alter the structure of a database. Destroys all data in the database (p. 40)

PACK
Eliminates records marked for deletion (p. 26)

QUIT [TO list of CP/M level commands or .COM files]
Terminate dBASE and execute a program chain. Each command must be in quote marks, and commands must be separated by commas (p. 73)

READ
Enter full screen editing of a formatted screen. Accepts data into GET commands (p. 68)

RECALL [scope] [FOR <exp>]
Unmark records that have been marked for deletion (p. 26)

RELEASE [<var> [,list]] or [ALL]
Eliminate unwanted memory variables (p. 34)

REMARK
A comment that is shown on the screen when the command file is run (p. 73)

RENAME <oldfile> TO <newfile>
Give a file a new name (p. 73)

REPLACE [scope] <field> WITH <exp> [,<field> WITH <exp>...] [FOR <expression>
Alter data in a database. Make sure that you have a backup, because dBASE II will do precisely what you ask it to do, even if it's not exactly what you had in mind (p. 49)

REPORT [scope] [FORM <filename>] [TO PRINT] [FOR <exp>]
Generate a report (p. 56)

RESET
Tell CP/M that a diskette swap may have occurred

RESTORE FROM <filename>
Remember SAVEd memory variables. Destroys all existing memory variables

RETURN
Terminate a command file and return to calling file

SAVE TO <filename>
Write memory variables to a file for future use

SELECT [PRIMARY] or [SECONDARY]
Switch working areas (p. 72)

SET parameter [ON], or [OFF], or [TO < condition, filename>]
Dynamically reconfigure dBASE operation (p. 80)

SKIP ± < exp/number>
Move forward or backwards in the database (p. 22)

SORT ON < key> TO < filename> [ASCENDING]
[DESCENDING]
Generate a database that is sorted on a field (p. 51)

STORE < exp> TO < var>
Place a value into a memory variable (p. 33)

SUM [scope] < field [,list]> [TO < var [,list]> [FOR < exp>]
Total fields in a database (p. 57)

TEXT
Display a block of text without special formatting until ENDTEXT encountered. (p. 83)

TOTAL TO < filename> ON < key> [FIELDS < field> [,list]>
Generate a database with sub-totals for records (p. 58)

UPDATE FROM < filename> ON < key> [ADD < field [,list]>]
[REPLACE < field [,list]>]
Modify a database with data from another database (p. 82)

USE < filename> [INDEX < filenames>]
Open a database file for future operations (p. 16)

USE
Close all previously opened database files.

WAIT [TO < var>]
Pause in program operation [for input] (p. 66)

dBASE II COMMANDS GROUPED FUNCTIONALLY

FILE STRUCTURE:

CREATE
Defines an entirely new file structure

CREATE < newfile> FROM < oldfile>
Creates a new file whose structure is described in the records of the old file

USE < oldfile>
COPY TO < newfile> STRUCTURE
These two commands combined create a new file with the same structure as an old file

USE < oldfile>
COPY TO < newfile> STRUCTURE EXTENDED
Create a new file that contains the structure of the old file as data

CREATE < newfile> FROM < oldfile>
Creates a new file whose structure is defined by the records in the old file

DISPLAY STRUCTURE
LIST STRUCTURE
Both show the structure of the file in USE

MODIFY STRUCTURE
Changes file names, sizes, and overall structure, but destroys data in the database

TO CHANGE STRUCTURE WITH DATA IN THE DATABASE:

USE < oldfile>
COPY TO < newfile>
USE < newfile>
MODIFY STRUCTURE
APPEND FROM < oldfile>
COPY TO < oldfile>
USE < oldfile>
DELETE FILE < newfile>

TO RENAME FIELDS WITH DATA IN THE DATABASE:

USE < oldfile>
COPY TO < newfile> SDF
MODIFY STRUCTURE
APPEND FROM < newfile> .TXT SDF
DELETE FILE < newfile>

FILE OPERATIONS:

USE < filename>
Opens a file

USE < newfile>
Closes the old file, opens a new file

USE
Closes all files

RENAME <oldname> TO <newname>
Must NOT rename an open file

COPY TO <filename>
Creates a backup copy

CLEAR
Closes all files and erases all memory variables

SELECT [PRIMARY][SECONDARY]
Allows two files to be independently open at the same time. Data can be transferred with P. and S. prefixes

DISPLAY FILES [ON <d>] DBF Files only
Lists databases on logged-in drive (or drive specified), can use LIST instead

DISPLAY FILES LIKE <wildcard> [ON <d>]
Shows other types of files on drives

QUIT
Closes both active areas, all files, terminates dBASE II operation

ORGANIZING DATABASES:

SORT ON <key> TO <newfile>
INDEX ON <key> TO <newfile>
Can use multiple keys for both commands

Combining Databases

COPY TO <newfile>
Creates a duplicate of the file in USE

APPEND FROM <otherfile>
Adds records to the file in USE

UPDATE FROM <otherfile> ON <key>
Adds to totals or replaces data in the file in USE. Both files must be sorted on the <key>.

JOIN
Creates a third file from two other files

EDITING, UPDATING, CHANGING DATA:

DISPLAY, LIST, BROWSE
Let you examine the records

DELETE
Marks record so it is not used

RECALL
Unmarks record

PACK
Erases deleted records

EDIT
Lets you make changes to specific records

REPLACE < field WITH data>
Global replacement of data in fields, can be conditional as with most dBASE II commands

CHANGE..FIELD
Edit based on field, rather than record

@ < coord> GET < var>
READ
Displays the variable, lets you change it

INSERT [BEFORE]{BLANK]
Inserts a record in a database

UPDATE FROM < otherfile> ON < key>
Adds to totals or replaces data in file in USE from another file

MODIFY COMMAND < filename>
Allows changes to your command files without having to go through your text editor

USING VARIABLES:

(Allowed up to 64 memory variables plus any number of field names.)

LIST MEMORY, DISPLAY MEMORY
Both show the variables, their data types and their contents, returns the contents of a character memory variable (i. e., provides a *literal* character string)

STORE < value> TO < var>
Sets up or changes variables

RELEASE < var>
Cancels the named variable

SAVE MEMORY TO < filename>
Stores memory variables to the named file (with .MEM extension)

RESTORE FROM <filename>
Reads memory variables back into memory (destroys any other existing memory variables)

INTERACTIVE INPUT:

WAIT
Stops screen scrolling, continues with any key

WAIT TO <var>
Accepts character to memory variable

INPUT ['prompt'] TO <var>
Accepts any data type to a memory variable (creates it if it did not exist), character input must be in quotes

ACCEPT ['prompt'] TO <var>
Same as INPUT, but no quotes around character input

@ <coord> SAY ['prompt'] GET <var> [PICTURE]
READ
Displays memory variable, replaces it with new input

SEARCHING:

SKIP [+<exp>]
Moves forward or backward a specific number of records

GO[TO] <number>, GO TOP, GO BOTTOM
Move you to a specific record, the first record, or the last record in the database

FIND <str>
Works with indexed file in USE, very fast

LOCATE FOR <exp>
CONTINUE
Searches entire database

OUTPUT:

?, DISPLAY, LIST
Show expressions, records, variables, structures

REPORT [FORM <formname>]
Creates a custom format for output, then presents data in that form when called

@ <coord> SAY <var/exp/str>
Formats output to screen or to printer ([USING <format>] can be added to provide PICTURE format for the printer)

TEXT

Displays a block of text without special formatting with ? or @ <coord> SAY command.

PROGRAMMING:

(Programs stored in COMMAND FILES with .CMD extension.)

DO <filename>

Starts the program

IF <conditions>
  perform commands
ELSE
  perform other commands
ENDIF

Makes choices, single or multiple (when nested)

DO WHILE <conditions>
  perform commands
ENDDO

<Conditions> must be changed by something in the loop eventually

DO CASE
  CASE <expression>
    <commands>
  CASE <expression>
    <commands>
  OTHERWISE
    <commands>
ENDCASE

Multiple choices.

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dBASE II

Version 2.41

Documentation Update

What this Package Contains

Documentation

- dGEN, an applications program generator for dBASE II.
- dSORT, a rapid sort program for your dBASE II files
- dBASE II change summary.

Disks

- dBASE II System Disk containing the following files,
  - dBASE.COM
  - dBASEOVR.COM
  - dBASEMSG.TXT (CPM-80 disks also have INSTALL.COM)
  - dGEN.CMD
  - dSORT.COM
  - dBASE II Sample Programs

How to Use Your Sample Program Diskette

1. Insert your installed dBASE II diskette in drive A.

2. Start up your system using the instructions in your computer system manual.

3. At the A> type,

   A>DBASE

4. You see the dBASE II copyright message and the . prompt.

5. At the . type,

   . *DO SP-MAIN*

6. To see a list of the programs and a brief description of each, select item 4. help, from the menu on the screen.

```
==================================================
    DBASE II SAMPLE PROGRAMS
==================================================

                0. exit
                1. mailing labels
                2. inventory program
                3. checkbook program
                4. help

==================== select : : ====================
```

---

dGEN

dBASE II applications program generator

Software by Luis Castro

dBASE II Utility
dGEN

CONTENTS

dGEN

SUMMARY

dGEN makes it easy to create and run programs that facilitate use of a dBASE II database. To create the programs, you simply answer the questions displayed by the dGEN utilities.

PROGRAMS

The dGEN programs are as follows

(1) dGEN – Brings up the dGEN Main Menu. From here, you press just one key to go into any of the utility programs described below. You can also go directly into any of the utilities by entering a DO command at the dBASE II dot prompt.

(2) FILEGEN – Creates a main menu and a set of programs for editing an existing database. Options on the new menu allow you to view, add, edit, or pack records on your database.

(3) FORMGEN – Creates a menu and programs for making reports from your database. The menu and reports are similar to those you get by using the dBASE II REPORT command.

(4) LABELGEN – Creates a program for making mailing labels from your database. Also convenient for displaying or printing contents of a database with large records.

(5) MENUGEN – Creates menus for programs written on

dBASE II. Results in substantial time savings for dBASE II programmers. Before using MENUGEN, users should be able to make simple modifications to dBASE II programs since the generated programs will require your addition of small portions of code.

RESERVED WORDS The words below are reserved for use by dGEN. Do not use them in your file or field names.

char	filesystem	line	select
choice	formfile	linecount	stackcount
col	heading	lmargin	string
col:hdg	indexname	Mcontents	subfield
col:opts	infile	Mwidth	substack
colcount	issubtotal	option	subtotal
counter	istotal	outfile	totalopts
datafile	item	pagehdg	totstack
equals	keyfield	pagelen	width
expanded	keyvalue	pagewidth	word
expression	lastline	pos	y:n
extension	length	prompt	yourname
field:save			

HOW TO USE dGEN

PROCEDURES dGEN and the programs it creates run under dBASE II and work only with a database CREATED in dBASE II. No records are needed; you can add them later through the editing programs you create with the FILEGEN utility.

Create .DBF

1. To create a duplicate of the database used in these examples, proceed as shown below.

NOTE
<RETURN> means "Press the <RETURN> key."

```
A>DBASE <RETURN>

PLEASE ENTER TODAYS DATE MM/DD/YY OR RETURN FOR NONE
***DBASE II   VERSION 2.41   1 February 1984

. CREATE <RETURN>

ENTER FILENAME: SEARCH <RETURN>
ENTER RECORD STRUCTURE AS FOLLOWS:

FIELD    NAME,TYPE,WIDTH,DECIMAL PLACES
  001   TO:PERSON,C,25 <RETURN>
  002   DEPARTMENT,C,30 <RETURN>
  003   COMPANY,C,30  <RETURN>
  004   STREET,C,25  <RETURN>
  005   CITY,C,20  <RETURN>
  006   STATE,C,2 <RETURN>
  007   ZIP:CODE,C,9 <RETURN>
  008   DATE,C,5  <RETURN>
  009   COMMENT,C,25 <RETURN>
  010   <RETURN>

INPUT DATA NOW? N  <RETURN>
.
```

Display Structure

2. **For all utilities other than MENUGEN, you need the database field names as they are spelled in the database directory.**

   To get a listing from dBASE II, enter commands as shown below. If you don't need a printout, omit the . *set print on* and . *set print off* commands.

REMEMBER **<RETURN> means, press the <RETURN> key.**

```
. Display structure <RETURN>

STRUCTURE FOR FILE:   SEARCH.DBF
NUMBER OF RECORDS:    00000
DATE OF LAST UPDATE:  03/17/84

PRIMARY USE DATABASE
 FLD  NAME          TYPE       WIDTH     DEC
  01  TO:PERSON,      C        025
  02  DEPARTMENT      C        030
  03  COMPANY         C        030
  04  STREET          C        025
  05  CITY            C        020
  06  STATE           C        002
  07  ZIP:CODE        C        009
  08  DATE            C        005
  09  COMMENT         C        025
  ** TOTAL **                  00172
```

Access **3. You can go into dGEN from the system prompt (if you have a database) or from the dBASE II dot prompt.**

From the System	From dBASE II	Result
A>DBASE DGEN	*. DO DGEN*	**DGEN Main Menu.**
A>DBASE FILEGEN	*. DO FILEGEN*	**Direct to FileGEN.**
A>DBASE FORMGEN	*. DO FORMGEN*	**Direct to FormGEN.**
A>DBASE LABELGEN	*. DO LABELGEN*	**Direct to LabelGEN.**
A>DBASE MENUGEN	*. DO MENUGEN*	**Direct to MenuGEN.**

Main Menu

4. If you enter A>*DBASE DGEN* or . *DO DGEN*, the following screen is displayed:

```
DGEN MAIN MENU
---------------------------------------------------------

        0. exit
        1. MENU generator
        2. FILE generator
        3. REPORT FORM generator
        4. LABEL generator

------------------ select :2: ---------------------
```

When you get this menu, press the number for the utility you want – or press *0* (zero) to get the dBASE II dot prompt.

Each dGEN utility is explained in the order listed on the dGEN MAIN MENU, except the MENU generator – which requires some knowledge of programming – is discussed last. The other utilities can be mastered quickly by a beginning dBASE II user.

HOW TO CREATE EDITING PROGRAMS

FILEGEN

FILEGEN generates a set of dBASE II programs that you can use to view, add, edit, and pack records in a specific indexed database file. To create the new programs, enter responses to prompts FILEGEN displays.

If any of your responses is unacceptable to FILEGEN, an error message displays, followed by a blank line and the dBASE II dot prompt. To start over, enter *. DO FILEGEN* <RETURN>.

Access

1. The fastest way to begin FILEGEN is to enter:

   A>DBASE FILEGEN – from the system prompt or
   . DO FILEGEN – from the dBASE II dot prompt.

   You may prefer to bring up the dGEN and select option *2* to begin FILEGEN. To bring up the Main Menu, enter *A>DBASE DGEN* or *. DO DGEN*.

Prompts

2. FILEGEN displays the header and first prompts for the "View, Add, Edit, and Pack" program generator

SCREEN
COMMENT NUMBERS VIEW, ADD, EDIT & PACK GENERATOR MM/DD/YY

(a) Enter DATABASE filename *:search*
(b) Enter INDEX filename *:search*
(c) Enter index keyfield *:company*
(d) INDEX FILE DOES NOT EXIST. Create it? (Y/N) *Y*

(e) Creating index file...
Getting field names...

(f) Check for existing file names...

SCREEN
COMMENTS

(a) Enter DATABASE filename. Use any existing database – SEARCH is specified as an example.

(b) Enter INDEX filename. The Filename may be different from the DATABASE filename or be the same.

(c) Enter index keyfield. This is the field or key expression you want the database indexed on.

(d) The following prompt will display if the index file does not exist

INDEX FILE DOES NOT EXIST. Create it? (Y/N) *Y*

Enter *Y*. If you enter an *N* or press <RETURN>, you see a dot prompt (no message) and you must start again with the *. DO FILEGEN* command.

(e) The "Creating index file" message appears only if the index file does not exist and must be created. The "Getting field names" message appears when FILEGEN is getting the field names from the database directory.

(f) "Check for existing file names..." appears while FILEGEN check

to see if any file names already exist on the disk directory. If they do, FILEGEN displays prompts allowing you to decide whether or not to delete the existing ones.

Generate

3. FILEGEN generates the set of command files that provide the view, add, edit and pack functions for the SEARCH database. The lines of programming code display as it is written, just slowly enough so you can see what FILEGEN is doing.

4. When the new programs are ready for use, FILEGEN displays the message shown below.

TO START "SEARCH" SYSTEM, TYPE THE FOLLOWING
.
.
. *DO SE-MAIN* <RETURN>
.
.

Note
In the . DO-MAIN command format, the two letters before the hyphen are the first two letters of your database name.

End FILEGEN

5. You are at the dBASE II dot prompt, and can enter any dBASE II command.

HOW TO USE PROGRAMS CREATED ON FILEGEN – AN EXAMPLE

USE PROGRAMS Anytime you wish to use the programs created by FILEGEN for the SEARCH database, proceed as explained below.

1. At the dBASE II dot prompt, enter

. *DO SE-MAIN* <RETURN>

to get this screen:

S E A R C H   M A I N   M E N U

0. exit
1. view
2. add
3. edit
4. pack

select :*2*:

Add Records 2. Press *2* to add (APPEND) records to the SEARCH database, which has no records in it so far. The data entry screen appears as shown below.

A D D   S E A R C H   MM/DD/YY

```
TO:PERSON.....:Ms. Marty Anderson <RETURN>
DEPARTMENT :Personnel Department <RETURN>
COMPANY.........:SABERSAW MANUFACTURING <RETURN>
STREET...........:                    :
CITY..............:                 :
STATE............: :
ZIP:CODE.........:        :
DATE..............:     :
COMMENT.......:                    :
```

Press <control-W> to exit

Fill in the information for each field, and press <RETURN>. Each time you enter all information for the first record, a new screen appears for the next record.

When you finish, hold down the CONTROL key, and press the letter *W* at a blank record to get back to the SE-MAIN MENU. Press *0* (zero) if you want the dBASE II dot prompt; *1* to view the records in the SEARCH database; *3* to edit them; *2* to add more records.

Since you have not edited, there are no records marked for deletion, and option *4*, pack, has no work to do.

Edit Records

3. Select Option *3* to edit the records already in the database. The first record displays on the screen as follows:

```
E D I T     S E A R C H                          MM/DD/YY
═══════════════════════════════════════════════════════════

     TOPERSON..... :Ms. Callie Stevens
     DEPARTMENT :Human Resources
     COMPANY.....:Tallerdyne Electronics
     STREET.....:890 Becker Street
     CITY.....:Marion
     STATE.....:CA
     ZIPCODE..... :95623
     DATE.....:2/12
     COMMENT..... :Production Manager

COMMAND: (E)dit, (D)elete, (U)ndelete (C)ontinue (P)osition P
```

The prompt line for EDIT Screen is repeated for easy reference.

COMMAND: (E)dit, (D)elete, (U)ndelete (C)ontinue (P)osition P

E – **Edit. Lets you correct any field in the record except the key field, which displays at half-intensity. If the key field is wrong, delete the record and use option 2, the ADD screen, to re-enter the entire record.**

D – **Delete. Message "DELETED" appears left of the date in the screen header. You must run option 4, PACK, to erase the record.**

U – **Undelete. Erases the "DELETED" message.**

C – **Continue. If you didn't edit, delete, or undelete the record currently displayed, Continue brings up the next record.**

P – **Position. Brings up different a "prompt line" for Edit screen; as follows.**

E D I T S E A R C H MM/DD/YY

TO PERSON. :*Ms. Callie Stevens*
DEPARTMENT :*Human Resources*
COMPANY... :*Tallerdyne Electronics*
STREET.... :*890 Becker Street*
Same CITY..... :*Marion*
Record STATE..... :*CA*
ZIP CODE.. :*95623*
DATE..... :*2/12*
COMMENT... :*Production Manager*

Edit – 2nd
Prompt Line COMMAND (D)isplay (F)ind, (L)ocate (C)ontinue (S)kip

To get the 2nd EDIT prompt line, select option *P* at the first edit screen. The prompt line is repeated for easy reference:

COMMAND: (D)isplay (F)ind (L)ocate (C)ontinue (S)kip

D – Display. Allows you to view more than one record at a time based on the LOCATE expression. Enter LOCATE expression. For example

COMPANY="CTS Electronics"

Next enter DISPLAY string. For example,

To:PERSON+COMPANY

F – Find. Enter text of keyword (COMPANY) for desired record. For example

CTS Electronics

L – Locate. Based on LOCATE expression. Enter LOCATE expression. For example, Company="CTS Electronics" This is the basis for (D)isplay and (C)ontinue

C – Continue. Go to the next record. At end of file, press <RETURN> to get back to the COMMAND prompt.

S – Skip to the next record. At end of file, press <RETURN> to get back to the COMMAND prompt.

View

```
V I E W   S E A R C H                    MM/DD/YY
```

4. Select option *J* to "VIEW" any record in the database. The screen header says VIEW instead of EDIT, but otherwise looks like the EDIT screen with the second line of prompts.

   The VIEW options work the same way they do in the second EDIT screen – the difference is that VIEW will not allow any changes to the records, while EDIT allows changes to any field except the index key field.

Pack Records

```
P A C K   SEARCH                         MM/DD/YY

PACK the entire file? [YES/NO] YES <RETURN>

SEARCH.OLD will be your backup data file.

COPY TO SEARCH

00004 RECORDS INDEXED...

USE

SET ECHO OFF

Strike any key to continue...
```

5. Select option *4* to irrevocably delete all records marked for deletion in the first EDIT screen.

   When asked if you want to PACK the entire file, you must type *YES* or *NO*.

   If you type NO, you return to the Main Menu for edits.

   If you type YES, a backup file is created with the pre-PACK data in it, and the working database file is PACKED.

   Strike (press) any key to get back to the Main Menu.

REPORT WRITING PROGRAM

FORMGEN FORMGEN creates a command file that takes data from an existing database file and formats it into reports similar to those created with the dBASE II REPORT command. Output may be printed on screen or hard copy (paper). Following is a brief report created from the SEARCH database.

JOBHUNT

JOB ADVERTISED	COMPANY NAME	DATE
Operations Manager	P.O. Box 5021	3/7
Requirements Planner	Northrop Aviation	3/8
Manufacturing Cnsltn	Handley-Walker Co.	3/10
Production Manager	LH Research	3/5
Project Manager	Lear Siegler, Inc.	3/3
Production Manager	MICOM Systems, Inc.	3/14
Mgr. - Mtl. Planning	Western Digital	2/25
Production Superviso	Sewell Plastics, Inc	2/15

NOTE
The above output might be more useful if the database had been sorted on COMMENT or COMPANY name before the report is run.

PROCEDURES **To create and use a REPORT program, proceed as follows:**

Access

1. **Access FORMGEN directly by entering a command from the system prompt or the dBASE II dot prompt:**
   A>DBASE FORMGEN **or** *. DO FORMGEN*

   If you prefer, you can get to FORMGEN from the dGEN Main Menu. Select option *3*.

Prompts

2. **FORMGEN displays the prompts shown below, one or two at a time. Your responses applicable to the *SEARCH* database are shown in italics.**

Screen Comments

(a) Enter database filename :*SEARCH* <RETURN>

(b) Enter REPORT FORM filename :*JOBHUNT* <RETURN>

ENTER OPTIONS.

(c) Left Margin..<1> :*10* <RETURN>
Lines/Page..<56> :<RETURN>
Page Width..<80> :*55* <RETURN>

(d) Enter Page Heading : *JOBLOG* <RETURN>

(e) Are Totals Required? (Y/N) :*N*<RETURN>
Subtotals in Report? (Y/N) :*N*<RETURN>

(f) ENTER COLUMN DESCRIPTORS.
1. Width, Contents. :*20,COMMENT* <RETURN>
Heading . . . . . :*JOB ADVERTISED* <RETURN>

2. Width, Contents. :*20,COMPANY* <RETURN>
Heading . . . . . :*COMPANY NAME* <RETURN>

3. Width, Contents. :*5,DATE* <RETURN>
Heading . . . . . :*DATE* <RETURN>

4. Width, Contents. : <RETURN>

Screen Comments

(a) Enter database filename you want the report on.

(b) Enter REPORT filename. This is the name you will use when you want to create this report.

(c) ENTER OPTIONS for Left Margin, Lines/Page, and Page Width. If the default values are satisfactory, press <RETURN>. Otherwise, enter the desired values and press <RETURN>.

(d) Enter Page Heading – Enter any set of characters that can fit on one line. The page heading is centered on the page width you specify above.

(e) Totals and subtotals. Are totals required? Subtotals? If *Y*, FORMGEN creates the necessary programming for each column, as applicable. You can designate any field in the database as a subtotal field. If the field name you enter is not found in the database directory, the "Enter subtotal field" prompt redisplays.

(f) ENTER COLUMN DESCRIPTORS. You use these prompts to specify the column widths, field names, and column headings (if desired.)

Width If the column width you specify is less than the width of the field in the database, the information in that column is truncated.

Next column After you describe each column, a new column number and fresh prompts appear for entering the next set of column descriptors. After you describe all desired columns press <RETURN>.

NOTE
There is a maximum of twelve column descriptors that can be entered.

Create

3. **FORMGEN begins to write the program that creates the report on request. The commands display on the screen as the program is written – too fast to read, but slowly enough to understand what is being done.**

Output

4. **To print the new report – on the screen or on paper – you must exit to dBASE II. Press option *0* (zero) to exit.**

   At the dot prompt, type the DO <reportfilename> command, where <reportfilename> is the name you entered at step 2. In our example, the command looks like this:

   . *DO JOBHUNT* <RETURN>

   The program asks you if you want to output to the screen (S) or to the printer (P). Enter your choice, and the program runs immediately. When the program is finished, you will be returned to the dBASE II dot prompt.

MAILING LABELS PROGRAM

LABELGEN

LABELGEN creates a program that takes data from an existing database file and puts it in one-up, mailing label format. Following are 3 labels printed by running a program written with LABELGEN, and using the SEARCH data base:

```
1  Mr. Dave Coffee
2  Employment Office
3  Northrop Aviation
4  126 Myford
5  Van Nuys, CA  92645
-
-
1  P.O. Box 2437
2  Pico Rivera, CA  97389
3
4
5
-
-
1  Ms. Jessie Williams
2  MICOM Systems, Inc.
3  P.O. Box A-732
4  Belvedere, CA  94342
5
```

Another Use for LABELGEN

The SEARCH database has large records consisting of 9 fields -- too much information to fit on a single 80-column or 132 column REPORT. LABELGEN allows you to create a program you use to print the complete contents of every record in a neat, easy-to-use format. To do this, use LABELGEN the usual way, but list all the fields desired (in whatever order you like) and print on paper rather than mailing labels.

PROCEDURES To create and use a mailing label program, proceed as follows:

Access 1. Bring up LABELGEN directly by entering a command from the system prompt or the dBASE II dot prompt:
A>DBASE LABELGEN or *. DO LABELGEN*

If you prefer, you can get to LABELGEN from the dGEN MAIN MENU. Select option *4*.

Enter Prompts 2. The following prompts display when you bring up LABELGEN; your responses applicable to the *SEARCH* database are shown in italics.

See Note

(a) Enter database filename: *SEARCH* <RETURN>

(b) Enter LABEL filename: *JOBLIST* <RETURN>

(c) Enter LABEL lines (example):
1:NAME
2:[COMPANY] <---(Will print only when non-blank)
3:ADDRESS
4:TRIM(CITY)+', '+STATE+' '+ZIP
5:

(d) Enter LABEL Lines:
1:TO PERSON <RETURN>
2:[DEPARTMENT] <RETURN>
3:COMPANY <RETURN>
4:STREET <RETURN>
5:TRIM(CITY)+' '+STATE+' '+ZIP CODE <RETURN>

(e) *6:*<RETURN>

Notes

(a) Enter database filename. If LABELGEN does not find the database you specify, the screen clears, and then the following message displays: Strike any key to continue.... When you press a key, you get the dBASE II dot prompt. Be sure you kn the correct database name, and that you specify the drive if it is not on the default drive.

(b) Enter LABEL filename. The label filename is a command file name that will identify this particular mailing label format; it will create labels only from information in the database listed on the previous line.

(c) Enter LABEL lines (example): shows how to enter prompts to produce a 4–line mailing label. This example actually appears on your screen, above the label prompts.

(d) Enter LABEL lines. This is where you actually enter the information LABELGEN needs to create your label–generating program. Any field name listed in [brackets] is printed on a label only if that field is filled in. You use the choices displayed in italics to create the labels from the SEARCH database file.

(e) After you enter all label lines, press <RETURN>.

Create

3. LABELGEN generates the command file that creates the mailing labels on request. The command lines display on screen as the program is generated.

When the new program is ready for use, LABELGEN will return you either to the dBASE II dot prompt if you started LABELGEN directly from dBASE, or to the dGEN Main Menu if you entered LABELGEN from the dGEN Main Menu.

Output

4. To print the mailing labels – on the screen or on paper – you must be at the dBASE II dot prompt.

   At the dot prompt, type the DO <label filename> command, where <label filename> is the name for the labels program. In our example, the command looks like this

   . *DO JOBLIST* <RETURN>

5. The "MAILING LABELS" screen displays with the prompt shown below. Enter S for screen; P for printer, or <RETURN> to cancel the command and go back to the dBASE II dot prompt.

```
SEARCH        MAILING LABELS  MM/DD/YY

Output to the screen or printer? |S/P| P
```

HOW TO CREATE MAIN MENUS

MENUGEN

MENUGEN creates program menus for you. For example, the dGEN Main Menu was created by MENUGEN. You can use MENUGEN to create the menus shown below,

Menu Heading

S E A R C H M A I N M E N U

Options

0 exit
1. View, Edit, or Delete Records
2. Print JOBLOG Report
3. Print MAILING LABELS

Message Line

---------- select : :----------

Menu Heading

G A M E S M A I N M E N U

Options

0 exit
1. Play Donkey Kong
2. Play Pakman
3. Play Dungeons and Dragons

Message Line

---------- select : :----------

IMPORTANT

After you create a menu, you can display it by calling up the program with a DO command. However, if you select any option, the screen will blink and come back again unchanged (redisplay the main menu.)

To make your menu work, you need two things – programs that do the things your options require, and minor modifications to the program created by MENUGEN. To learn what must be done, see "For Programmers Only."

REQUIREMENTS

You do not need an existing database to create a menu using MENUGEN. You do not even need working programs to support the options. You need only the list of functions (options) that the menu should allow.

PROCEDURES

To create and use a main menu for any dBASE II programs you have, proceed as follows:

Access

1. The fastest way to begin MENUGEN is to enter

   A>DBASE MENUGEN – from the system prompt or
   . DO MENUGEN – from the dBASE II dot prompt

   You may prefer to bring up the dGEN Main Menu and select option *1* to begin MENUGEN. To bring up the Main Menu, enter

   A>DBASE DGEN or
   . DO DGEN

Enter Prompts

2. MENUGEN displays the prompts as shown below; the responses shown in italics create the program that can be used to display the main menu for the *SEARCH* database.

Screen Comment
Number

(a) Enter PROGRAM name :*FINDJOB* <RETURN>
(b) Enter MENU heading :*Jobsearch Main Menu* <RETURN>
(c) Enter menu options :
0. exit <RETURN>
1. View, Edit, or Delete Records <RETURN>
2. Print JOBLOG Report <RETURN>
3. Print MAILING LABELS
4. <RETURN>

(d) COMMAND: (E)xit, (R)edo, (S)ave *S*

Screen Comments

(a) Use the PROGRAM name to call up the main menu when you are ready to use the options.

(b) The MENU Heading is the expanded heading that displays at the top of the new main menu. The responses shown in the above example let you call up the Jobsearch Main Menu by entering the command . *DO FINDJOB* <RETURN>

(c) Enter the menu options. Option *0* (zero) is always "exit" – the option to get the dBASE II dot prompt – unless you modify the MENUGEN program. Enter option 1, then press <RETURN> to enter the next option, etc. Enter up to 14 options When you finish, press <RETURN>.

Screen Comments
(continued)

(d) COMMAND (E)xit, (R)edo, (S)ave

Where:

(E)xit – Takes you to the dBASE II dot prompt or to dGEN without creating a menu program.

(R)edo – Repeats all the prompts from the very beginning (program name and menu heading). You simply start over.

(S)ave – MENUGEN generates the main menu program according to your responses to the prompt questions.

PROCEDURES
(Continued)

Generate Program

3. When you select the (S)ave option MENUGEN generates the program that displays the new Main Menu on request. The program is displayed on the screen as it is generated.

4. When the new Main Menu program is ready for use, MENUGEN will return you either to the dBASE II dot prompt if you started MENUGEN directly from dBASE, or to the dGEN Main Menu if you entered MENUGEN from the dGEN Main Menu.

View Menu

5. To call up the new Main Menu, type the DO <program filename> command; in this case

. *DO FINDJOB* <RETURN>

FOR PROGRAMMERS ONLY

CREATING MENUS

The Main Menu programs you create with MENUGEN do not work until you modify the program. Use the dBASE II MODIFY COMMAND to call up the program.

1. Go to the . *DO CASE* instructions. Observe that each option from the Main Menu is listed as a CASE.

2. Now, insert a new line at each CASE command and enter the DO <program filename> command. For example

   DO JOBHUNT

3. While you are inside MODIFY COMMAND, you may also like to

(a) Enter your name at the head of the program, as Author, and

(b) Make any desired changes to the text of the options as they are displayed at the Main Menu. For example, you may wish to change the text of the *0* (zero) option from "exit" to "Exit" or "Exit to dot prompt".

dGEN

FILEGEN uses the following format to name the programs you create under the FILEGEN utility.

DD–PROGRAM.EXT

Where

DD = the first 2 letters of the database name; SE for the SEARCH database.

PROGRAM = MAIN, FRAME, SOME, GETS, EDIT, PACK, POSN and LOCAT; and

EXT = the program extension; .CMD for CP/M–80 programs, and .PRG for MS–DOS or CP/M–86 programs.

NOTE Reserved words on page 2.

dSORT

dBASE II rapid sort program

dBASE II SORT Utility
(8-BIT)

CONTENTS

dBASE SORT - 8-BIT PACKAGE

DESCRIPTION

dBASE SORT is a fast, flexible utility for sorting databases created on dBASE II with a CP/M operating system. With dBASE SORT, you can

(1) Sort on up to 32 fields simultaneously, with no appreciable increase in sorting time;

(2) Specify ascending or descending order for any sort field;

(3) Specify if character fields are to be alphabetized like a phone directory, or as the internal dBASE II sort does it, listing upper-case entries first;

(4) Find out if there is enough disk space available before attempting a sort.

CAPABILITIES

You may sort as many as 65,535 records, up to a maximum database size of 8 megabytes. The sort key (total length of all fields being sorted at one time) cannot be greater than 1000 bytes - add one extra byte for each numeric field when calculating this total.

PERFORMANCE

Tests were run on a 64K CP/M system with double density floppy drives. The database consisted of 2000 80-byte records, with 16 fields.

Records Per minute	Number & Type of Sort Fields	Size of Sort Key
1000	1C	10-byte

dBASE SORT - PROCEDURES OVERVIEW

Initiate dBASE SORT

1. If you are using dBASE II, you must *QUIT* the session. Use any of these command formats to initiate dBASE SORT

   PROMPT Format - Type answers to questions asked on the screen; when you finish, the sorting starts.

   FREEFORM Format - Enter a one-line command giving all sorting details, including database name, sort fields, the name of the new (output) file, and codes for any desired sorting options.

   PARAMETER Format - Type a modified freeform command in a separate file, named <filename.PRM>. To run the sort, enter the command **SORT @<filename>** - without the .prm. extension.

Automatic Disk Space Check

2. Before beginning the sort, dBASE SORT checks for enough disk space to complete the run. For "core sorts," where the entire database will fit into main memory, only the output file space is required. Otherwise, dBASE SORT requires twice the amount of space used by the input database; once for an intermediate disk work space, and the same amount again for the output file.

   If there isn't enough space, dBASE SORT does not do the sort and displays the error message d26 - `INSUFFICIENT DISK SPACE ON x: - nnnnK AVAIL nnnnK REQ'D.` You may assign the work file to another drive, and/or overwrite the input database to overcome disk deficiencies.

Interrupt

3. If you want to cancel the sort after it has started, press the *<ESCAPE>* key. Within 4 or 5 seconds, this message is displayed:

   `DO YOU WANT TO ABORT? (Y/N).`

   If you answer **Y**, the sort will end. If you press **N**, the sort will continue where it left off.

   Don't answer "Y" if the overwrite option was used.

   **This is very important because it will corrupt the existing database file.

nn% SORTED

4. The % SORTED message, tells you how much of the sort, process has been completed. "Core sorts" do not display % SORTED, since they take less than 60 seconds to run.

Complete

5. The SORT COMPLETE message is always displayed after a sort has been completed successfully. The new database can be used like any database created in dBASE II.

dBASE SORT - PROMPT COMMAND FORMAT

Usage

To use the PROMPT COMMAND FORMAT, simply type **dSORT** and press *<RETURN>*. You will be asked a series of questions. Each time you answer the question and press *<RETURN>*, the next question will be displayed. After you answer all applicable questions, sorting begins automatically.

Example

The entire series of questions is shown below, with sample responses shown in boldface type. The sample responses shown would produce a list of all checks written by a small business, in alphabetical order by payee name. Each record in the OUTGO database represents one check drawn on the account.

```
A>dSORT
*** dSORT  Ver 2.41 Copyright (C) 1983 RSP Inc.
    (Note:  Use ^C to abort)

(1) ENTER NAME OF DATABASE TO BE SORTED:  OUTGO

(2) ENTER NEW NAME FOR SORTED DATABASE (or RETURN): A:PAYEES

(3) ENTER FIELD NAME(S) TO CONTROL SORT (? for info): PAYEE:NAME

(4)    ANY SORT OPTIONS ? (Y/N):  Y
       (For default press RETURN for each question.)
(5) ENTER OPTIONAL WORK DRIVE:  B
(6)    FORCE CAPITALS ? (Y/N):  Y
(7)    OVERWRITE INPUT DATABASE ? (Y/N): N
(8)    RETAIN DELETED RECORDS ? (Y/N): N
```

WARNING
If you <RETURN> at prompt #2, you overwrite the input database, even though you may answer NO to prompt #7.

Screen Comments

The PROMPT questions from the above screen are explained in detail in the below list.

(1) ENTER NAME OF DATABASE TO BE SORTED. Use the drive identification for the file (A: or B: may be used). Omit the .DBF extension.

(2) ENTER NEW NAME FOR SORTED DATABASE (or <RETURN>).

Default Simply press <RETURN> if you want to use the name of the input database (OUTGO, in the example.) You can type the input file name or press <RETURN> for the same result.

Option Enter a new name for the new database using the drive identifiers (A: or B:). No .DBF extension.

(3) ENTER FIELD NAME(S) TO CONTROL SORT (? for info):

Spelling If you don't know the exact spelling of the field names for the desired sort field(s), press *?* and <RETURN>. All fields in the database will be listed as shown in the example below, then the original question is repeated.

```
   (Put (D) after a field name for descending seq)
** DATABASE=A:OUTGO      REC COUNT= 642     REC LENGTH=  80**

  field  type len      field    type  len      field    type len
PAYEE:NAME C   30    ITEM:DESC  C     25    CHK:DATE    C     8
CHK:NMBR   C    4    PURPOSE    C      4    AMOUNT      N     8

ENTER FIELD NAME(S) TO CONTROL SORT (? for info):
```

Order Type the sort field names in order of importance to the sort; one space between each sort field name. Press *<RETURN>*.

Type *(D)* after the field name if you want that field sorted in descending order rather than ascending (or alphabetical) order.

(4) ANY SORT OPTIONS ? (Y/N):

Default You do not want any of the sort options. Either type *N* or press <RETURN> to begin sorting.

Option Enter *Y* to call up the sort option questions. Any time after you've entered *Y* for the options you want, you may press the <ESCAPE> key to begin the sort immediately.

(5) ENTER OPTIONAL WORK DRIVE.

Default Press <RETURN> if dBASE SORT has room to create its sort work file (intermediate file) on the same drive as the input database. Screen will display the code for the default drive.

Option To use another drive for the intermediate file, enter its code then press <RETURN>. Only drives A through P can be accepted.

(6) FORCE CAPITALS ? (Y/N):

Default Press *N* or *<RETURN>* to use the same sorting sequence as used in the dBASE II internal SORT. Upper case letters are sorted ahead of lower case letters. For example, ABC, ACE, ART, Abyss, Airline.

Option Press *Y* if you want lower case letters to be sorted as if they were capitals. For example, ABC, Abyss, ACE, Airline, ART.

(7) OVERWRITE INPUT DATABASE ? (Y/N):

> WARNING
> **Make a back-up copy of your input database *before you overwrite.***

Default Press *N* or <RETURN> to allow dBASE SORT to use 2 disk space areas, each the size of the original database. One is used for the work (intermediate) sort and the other for final output.

Option Press *Y* - Use this option only if there is insufficient work space to run the sort with 2 disk areas as described in the above paragraph. The overwrite input database option forces dBASE SORT to use a single work area the size of the original database.

In order to manage with one less work area, the sort must overwrite the input database after its records have been read and transferred to the intermediate work file. The sorted output file then occupies the space that was originally the input file.

Before beginning the sort, dBASE SORT tells you INPUT DATABASE WILL BE DESTROYED AFTER BEING READ – DO YOU WANT TO PROCEED? (Y/N). If you have not prepared a backup of the input database, enter *N* to cancel the sort, and make the backup. Otherwise, a power failure during the sort would destroy your only copy of the database.

(8) RETAIN DELETED RECORDS ? (Y/N)

Default Press *N* or <RETURN>, and any records that have been marked for deletion will be eliminated during the sort.

Option

Press *Y*, and any records that have been marked for deletion will be sorted to the output file according to the sort, still marked for deletion.

dBASE SORT - FREEFORM COMMAND FORMAT

Usage

To use the freeform command format

1. Enter all sorting details in a one-line command. Two examples are as follows; the format is explained below and on the following page.

```
A>dSORT Outgo ON Chk:no; checks for 83 tax year.

A>dSORT Outgo TO B:Payees ON Payee:Name Chk:No(D) $WB C
```

2. Press <RETURN>

3. If all details are accepeable to dBASE SORT, the sort will begin immediately; otherwise an error message will be displayed.

Format

The freeform format is shown below. Each expression may be in upper or lower case and must be separated by one or more blanks and/or a comma. If you wish to add a comment, enter a ; at the end of the command. Anything following the semicolon is read as a comment.

A>dSORT <input file> [TO <output file>] ON <field list> [$<options>]

<input file> A new name for the input file. If none is specified, the original name is retained.

<output file> The name for the new (sorted) file. The sorted output file is always constructed in a file called <input file>.0$$. After the sort, this file is renamed to the <output file> name.

If none is specified, the input file is deleted and the intermediate file is called <input file>.W$$. Also, the records in the output file will have new record numbers based on their new sorted order.

<field list> List of sort field(s) in order of importance; the first field is the primary order, the next is secondary, etc. Separate each field name by a comma and/or blanks. Each field name may be followed by (D) to indicate descending sequence for that field.

For an on-screen display of all fields in the database, enter *dSORT <input file>* with no other expressions; no sort will be run.

<options> The sort options. If you want to specify one or more of the sorting options, enter a $ followed by the applicable code(s). Multiple option codes may be adjacent, or separated by blanks.

<options>

Sort option codes used in the freeform format correspond to the sort option questions asked in the PROMPT format. These options are explained in more detail on pages 4 and 5.

Code	Prompt Format Question & Comments
Wx	(5) ENTER OPTIONAL WORK DRIVE . Sort Work file normally is created on the default drive. To use another drive, enter its code (A - P) instead of the x. The drive code must be adjacent to the W, with no intervening character or spaces.
C	(6) FORCE CAPITALS ? *(Y)*. When this option is used, the value of all fields changes only during the sort process; the change is not permanent.

O (7) **OVERWRITE INPUT DATABASE ?** *(Y)*. When using the Overwrite option, do NOT specify TO <output file> on a different disk drive than the input file. The final sorted output file will replace the <input file> and have the same name.

A (8) **RETAIN DELETED RECORDS ?** *(Y)*.

dBASE SORT - PARAMETER COMMAND FORMAT

Format & Usage

To use the parameter command form A>dSORT @<parmfile> proceed as follows:

1. Use any text editor to create a "parameter file" containing the sorting instructions. Use freeform command format, except use the term SORT instead of dSORT to begin the statement.

2. Name the file <parmfile>.PRM - for example: JOIN.PRM.

3. When ready to sort, "call in" the parameter file by issuing a command in the parameter format. Do not use the .prm extension. In the following example - `A> dSORT @B:JOIN` the file B:JOIN contains the modified freeform SORT command.

EXAMPLES

DATABASE In these examples, each record in the OUTGO database represents one check drawn on a commercial bank account.

EXAMPLE NO. 1 * * * PAYEES * * *

Description The new database represents all checks written, in alphabetical order by payee name. You can simply list the new database to create a list in payee order - and quickly find any checks written to J&R Supply. Because the FORCE CAPITALS option is used, the sort will be in "telephone directory order."

Freeform Format `A>dSORT Output to Payees on Payee:name $C`

```
ENTER NAME OF DATABASE TO BE SORTED:  OUTGO
ENTER NEW NAME FOR SORTED DATABASE (or RETURN): A:PAYEES
ENTER FIELD NAME(S) TO CONTROL SORT (? for info): PAYEE:NAME
ANY SORT OPTIONS ? (Y/N):  Y
(For default press RETURN for each question.)
ENTER OPTIONAL WORK DRIVE:  A
FORCE CAPITALS ? (Y/N):  Y
OVERWRITE INPUT DATABASE (Y/N).  <ESCAPE>
```

EXAMPLE NO. 2 * * * AMOUNTS * *

Description

The new database represents all checks written, in numerical order with highest amount first. By listing the database, you can quickly find the payee for a check written in the amount $333.23. Because space is limited, the disk work space is done on drive B.

Freeform Format

```
A>dSORT Outgo to Amounts on Amount(D) #WB
```

```
ENTER NAME OF DATABASE TO BE SORTED:  OUTGO
ENTER NEW NAME FOR SORTED DATABASE (or RETURN): A:AMOUNTS
ENTER FIELD NAME(S) TO CONTROL SORT (? for info): AMOUNT
ANY SORT OPTIONS ? (Y/N):  Y
(For default press RETURN for each question.)
ENTER OPTIONAL WORK DRIVE:  B
FORCE CAPITALS ? (Y/N):  <ESCAPE>
```

EXAMPLE NO. 3 * * * TAXMAN * * *

Description

This creates a new database which categorizes all expenditures by purpose such as Rent, Supp, Comm, Misc. Within each purpose, PAYEES are listed in alphabetical order. If more than one check is paid to the same payee, for the same purpose, the oldest (lowest CHECK NUMBER) are listed before the more recent checks.

Freeform Format

```
A>dSORT Outgo to Taxman on Purpose Payee:name Chk:nmbr(D)

ENTER NAME OF DATABASE TO BE SORTED:  OUTGO

ENTER NEW NAME FOR SORTED DATABASE (or RETURN):A:TAXMAN

ENTER FIELD NAME(S) TO CONTROL SORT:PURPOSE PAYEE:NAME CHK:NMBR(D)

ANY SORT OPTIONS ? (Y/N):  N
```

OUTPUT EXAMPLE

The database structure – the order of columns shown when the database is listed – does not change. If set up in order by date, check number, payee, purpose, and amount, the new database has the same structure. Only the records are in the new order.

Column headers shown below (based on TAXMAN - Example No. 3 above) do not actually appear on a dBASE II list, but are provided here for convenience.

Record	Chk:date	Check Number	Payee:name	Purpose	Amount
00001	10/03/ 84	638	Bob Burns	Comm	245.21
00002	09/26/ 84	625	Bob Burns	Comm	360.08
00003	09/15/ 84	616	Bob Burns	Comm	294.12
00004	10/03/ 84	634	Joe Jones	Comm	481.63

00005	09/26/	84	626	Joe Jones	Comm	513.27
00006	10/01/	84	638	Marty Weiss	Rent	692.50
00007	10/02/	84	639	DWP	Util	56.32
00008	10/02/	84	640	GTE	Util	48.51
00009	09/18/	84	620	SCE	Util	12.14

Review **For TAXMAN**

Primary Order:	Purpose.	Comm, then Rent, then Util.
Second Order:	Payee:name.	Within Comm, Bob Burns is listed before Joe Jones.
Third Order:	Chk:No.(D)	For Bob Burns, 638, then 625, then 616.

EXAMPLE NO. 4 * * * TAXMAN * * *

Description

This example performs the same function as example number three and, in addition, illustrates how to use the parameter command format in conjunction with the QUIT TO command in dBASE II. The file AUTOSORT.PRM contains

```
SORT Outgo TO Taxman ON Purpose Payee:name Chk:nmbr(D)  $WB
```

From dBASE II

```
• QUIT TO "DSORT @AUTOSORT","DBASE"
• USE TAXMAN
```

The QUIT TO command closes any database files that may be open at the time, so dBASE SORT will not have any problem sorting the file.

AUTO DISK SPACE CHECK

The "Auto Disk Space Check" feature described on page 2 may not work properly with an unusual disk device. To disable this feature, use the Dynamic Debugger Tool (DDT) in CP/M to change location 113B in the dSORT.COM program from a *00* to a *01* and then resave the program, as follows:

```
                A>DDT dSORT.COM                NOTE: USER INPUT IS UNDERLINED
   DDT VERS 2.2
NEXT PC
3000 0100
    -S113B
    113B 00 01
    113C 00 .<RETURN>
    -GO

A>SAVE 47 SORT.COM
```

SCREEN MESSAGES

DATABASE x:filename ALREADY EXISTS – OVERWRITE ? (Y/N) : The name you selected for the new sorted database already exists on the specified drive. Enter **Y** to overwrite the old file, or **N** to end the program so that you may pick a new name. The file type is assumed to be .DBF.

INPUT DATABASE WILL BE DESTROYED AFTER BEING READ DO YOU WANT TO PROCEED ? (Y/N): This warning is always issued when you are using the **$0** (Overwrite) option.

SORT COMPLETE. This message is displayed after each successful sort.

DO YOU WANT TO ABORT ? (Y/N): This message is issued during the sort if you press the <ESCAPE> key. If you answer **Y**, the sort ends. If you answer **N**, the sort continues where it left off.

nn% SORTED. Tells you how much of the sort process has been completed; lets you know that the sort is working and lets you gauge when it will complete. Not displayed for "core sorts," since they take less than 20 seconds.

AN UNDETERMINED ERROR OCCURRED –x. A serious program error has occurred. If it re-occurs, contact your vendor for support.

d01 DO NOT SPECIFY FILE TYPE, .DBF OR .PRM ALWAYS ASSUMED.

d03 EXPECTED OPERAND MISSING.

d04 KEYWORD "TO" EXPECTED, NOT FOUND.

d05 KEYWORD "ON" EXPECTED, NOT FOUND. You must enter at least one sort field name.

d06 SORT INPUT FILE CANNOT BE FOUND ON SPECIFIED DRIVE. You may have specified the wrong drive or misspelled the database name.

d07 SORT INPUT FILE IS NOT A VALID dBASE .DBF FILE. If it is definitely a dBASE II database file, it has been damaged.

d08 NO SORT FIELDS WERE SPECIFIED. You must always specify at least one sort field name.

d09 INVALID FIELD NAME SPECIFIED. If you spelled the sort field name(s) correctly, error may be that you entered the ON keyword before the TO keyword. Check your comand format.

d10 LOGICAL FIELDS CANNOT BE SORTED. dBASE SORT sorts only numerical and character fields.

d11 INVALID SORT OPTION SPECIFIED. Or drive code was not adjacent to the W (with no intervening blanks.)

d12 **INVALID DISK DRIVE CODE SPECIFIED.** Only drive codes A - P are valid.

d13 **MORE THAN 32 FIELDS WERE SPECIFIED.**

d14 **.PRM FILE NOT ON SPECIFIED DRIVE.**

d15 **.PRM FILE EMPTY OR DOES NOT CONTAIN "SORT" COMMAND.** The SORT command in the parameter file must start with the word SORT even if you have renamed the regular command something other than SORT.

d17 **COMBINED SORT KEY LENGTH CANNOT EXCEED 1000 BYTES.**

d20 **OVERWRITE OPTION INVALID WHEN FILE2 ON DIFFERENT DRIVE.** When using the $0 (overwrite) option, it is best not to specify an output database name. If you do, it is only valid if it will be on the same drive as the input database. In any case, the input database will always be destroyed.

d23 **INPUT FILE IS TOO LARGE FOR THIS VERSION OF dBASE SORT.** Maximum 65,535 records.

d24 **FILE NAME CONTAINS INVALID CHARACTERS.** File names may not be more than 8 characters and cannot contain special characters . , ; : [ ] = < > /.

d25 **INPUT FILE IS EMPTY.** There are no records in the specified database.

d26 **INSUFFICIENT DISK SPACE ON x: - nnnnK AVAIL mmmmK REQ'D.**
x = drive code, nnnn = the amount of disk space available on this drive, and mmmm = the amount of disk space required on this drive to complete the sort.

d28 **EXTRANEOUS INFORMATION FOUND.** In PROMPT mode. Prompt question is repeated. You can only enter the information requested by each question.

APPENDIX
8-BIT CP/M ON COMPUPRO

Using: BIG.DBF
225-Byte
16 Fields

SORTING ON ONE FIELD

Field Name	Field Char	Time to Sort dBASE SORT	200 Records dBASE II
C:ZIP	9C	43 - 48 sec. (267 rec/min)	3 min. 50 sec. (52 rec/min)
STATUS	14C	48 - 50 sec. (245 rec/min)	4 min. 15 sec. (47 rec/min)
CREDITOR	30C	47 - 48 sec. (255 rec/min)	4 min. 20 sec. (46 rec/min)

dBASE SORT takes 20% of time dBASE II sort function takes.

dBASE SORT ONLY - Multiple Fields

Length of Sort Key	Number of Sort Fields	Description of Sort Fields	Time to dBASE SORT 200 225-BYTE Rec.
32	3	4C, 8C, 20C	48 sec. (250 rec/min)
49	6	2C, 20C, 10C, 9C, 8C	67 sec. (182 rec/min)
57	6	9N, 14C, 4C, 2C, 20C, 8C	65 sec. (185 rec/min)

dBASE II

Version 2.41
Change summary from
version 2.4

dBASE II
Version 2.4 to 2.41
Change Summary

April 1, 1984

ENHANCEMENTS AND NEW FEATURES:

● <coordinates> GET <variable> PICTURE 'AAAAAAAA' —Space entry

In addition to allowing the entry of any alpha character when the PICTURE clause contains the letter 'A', dBASE II now permits the entry of a space.

CLEAR — Effect on format files

The CLEAR command now closes format files in addition to releasing all active memory variables and closing all open database files. SET FORMAT TO, with no argument, still closes format files without disturbing anything else.

CREATE — Aborting with the <ESCAPE> key

Previously, if the <ESCAPE> key was pressed in response to the ENTER FILENAME prompt, dBASE II did not recover properly.

dBASE II now recovers properly when <ESCAPE> is pressed in response to the ENTER FILENAME prompt.

CREATE <newfile> FROM <structure extended file> --- Limitation

Previous versions imposed a limit of 14 consecutive new files that could be CREATEd by this method.

Now there is no limit.

INSTALL --- Selecting full screen variable delimiters

Any characters may now be specified as variable delimiters for full screen operations. Although the default delimiters are still colons, any two characters such as <> or [] may be chosen.

INS and DEL keys on the IBM-PC --- Have been enabled

The INSert and DELete keys on the IBM-PC now operate in dBASE II as they do in PC-DOS.

* INS toggles the insert function on and off.
* DEL deletes the character at the cursor.

JOIN, SORT, and TOTAL --- Aborting with the <ESCAPE> key

If the <ESCAPE> key is pressed to abort a JOIN, SORT, or TOTAL command, the new file which was being created is now closed automatically.

Previously, it remained open and the message FILE IS CURRENTLY OPEN appeared if an attempt was made to DELETE it.

REPORT FORM <report form filename> --- Error in report form file

Previously, when the REPORT command detected an error in a report form file, the SYNTAX ERROR message displayed and control transferred to the error-correcting dialogue. Any attempt to correct the syntax and return to the report in progress resulted in the FILE IS CURRENTLY OPEN message being displayed.

Now, the REPORT stops running when it reaches an error, displays a new message, SYNTAX ERROR IN FORMAT SPECIFICATION, and aborts execution of the REPORT command. If the REPORT command is issued from the dot prompt, control will return there. If REPORT is issued from a command file, command execution will resume with the line of code following the REPORT command.

RESTORE FROM <memory filename> ADDITIVE -- Memory variables of same name

If a memory variable exists with the same name as one saved in a memory file, issuing the RESTORE command with the ADDITIVE parameter now causes the restored memory variables to overwrite the existing one.

SAVE TO <memory filename> ALL EXCEPT <skeleton> -- New parameter

In addition to the parameter ALL LIKE <skeleton>, the SAVE TO command now accepts ALL EXCEPT <skeleton>.

LOCK() -- Multi-user function

The LOCK() function, the LOCKNDX() function, and the UNLOCK command all help avoid simultaneous editing of records by more than one station in a multi-user environment. The LOCK() function is enabled for multi-user systems only.

Whenever called, the LOCK() function returns:

.T. if the current record has not been locked from another position, is available to you, and has been locked by you.
.F. if the current record has been locked from another position. Try again later. For example,

```
GO RECORD <n>
IF LOCK( )
   <edit record>
   UNLOCK
ELSE
   ? "This record is currently locked"
ENDIF
```

An alternative example,

```
GO RECORD <n>
STORE LOCK( ) TO <memvar>
IF <memvar>
   <edit record>
   UNLOCK
ELSE
   ? "This record is currently locked"
ENDIF
```

The LOCK() function does not physically protect a record from multiple simultaneous edits. It simply warns other users that the record is already in use. It is possible to have a program which uses the LOCK() function as a safety mechanism and which only allows updating of unlocked records. It is common convention to LOCK() Record 1 in a file to indicate that the file is to be considered locked against the addition of new records.

A locked record automatically unlocks when you close the database file with a USE, CLEAR, or QUIT command. The UNLOCK command unlocks a record without closing the database file.

LOCKNDX() — Multi-user function

The LOCK() function, the LOCKNDX() function, and the UNLOCK command all help avoid simultaneous editing of records by more than one station in a multi-user environment. The LOCKNDX() function is enabled for multi-user systems only.

Whenever called, the LOCKNDX() function returns:

.T. if the master in-use index file has not been locked from another position, is available to you, and is now locked by you.

.F. if the master in-use index file has been locked from another position. Try again later.

For example,

```
USE <database file> INDEX <index file>
IF LOCKNDX()
   <commands which automatically update the index file>
   UNLOCK
ELSE
   ? "This index file is currently locked"
ENDIF
```

The LOCKNDX() function does not physically protect an index file from multiple simultaneous edits. It simply warns other users that the index is already in use. It is possible to have a program which uses the LOCKNDX() function as a safety mechanism and which only allows updating of unlocked index files.

The UNLOCK command unlocks an index file without closing its database file.

UNLOCK — Multi-user command

LOCK() function, the LOCKNDX() function, and the UNLOCK command all help avoid simultaneous editing of records by more than one station in a multi-user environment. The UNLOCK command is enabled for multi-user systems only.

Whenever executed, the UNLOCK command sets to false (.F.) any LOCK() or LOCKNDX() flags that were set to true (.T.) by the same user. A locked record or index file automatically unlocks when you close its associated database file with a USE, CLEAR, or QUIT command. The UNLOCK command unlocks a record or index file without closing its database file.

FIXES

● <coordinates> GET <logic variable>. . . READ -- Value unchanged

Previously when <RETURN> was pressed in a <logic variable> that had a value of true (.T.), it changed the value to false (.F.).

The value now remains as it was until the operator intentionally alters it.

APPEND FROM <database filename> -- Aborting with <ESCAPE>

In previous versions, if an APPEND FROM command was aborted with the <ESCAPE> key, the USE file became corrupted.

Now, the <ESCAPE> key aborts APPEND in an orderly fashion (after each 100 records), and the integrity of the USE file is maintained.

APPEND FROM <database filename> -- 1,000 character records

Previously, if the USE file and the FROM file both had the same structure with 1,000 characters per record, APPEND FROM appended blank records into the USE file.

All data now correctly appends to the USE file.

APPEND FROM <text filename>.TXT -- Omitting the 'SDF' parameter

Previously, when you tried to APPEND FROM a text file without including SDF in the command, dBASE II gave you the message NOT A dBASE II DATABASE. If you then corrected the error within the error-correction dialogue, dBASE II gave you the message FILE IS CURRENTLY OPEN.

Now, when you make the correction, dBASE II processes the corrected command.

Command Files -- Foreign word processors and command truncation

Some previous versions did not recognize the end-of-file marker in command files that were prepared with word processors or text editors other than MODIFY COMMAND. This prevented the last partial 128-byte block of code from executing.

All code now executes, even if the total file size is less than 128 bytes.

CREATE |<filename>| -- In MS(PC)-DOS versions 2.01 and 2.1

Previous versions displayed the message END OF FILE FOUND UNEXPECTEDLY when the CREATE command was issued. These DOS versions allow filenames to contain international characters.

dBASE II now supports this feature.

INDEX -- Updating time

Now index updating no longer takes an unusually long time during commands such as APPEND, EDIT, and READ.

INSERT -- With a format file

Previously, when using the INSERT command with SET FORMAT TO <format file name>, the error message RECORD OUT OF RANGE occured upon completion of the data entry.

Now, there is no error message and dBASE II simply returns to the dot prompt, if in the interactive mode, or to the next line of code if in a command file.

JOIN TO <new filename> FOR P.<key> = S.<key> -- Duplicate fields

In previous versions, JOINing two files with matching field names created duplicate fields in the new file. If the new file exceeded 32 fields, the system would lock.

Now, JOIN does not create duplicate fields, and the new file includes only the first 32 fields.

Logical Fields -- In a large database structure

Previously, if a database structure was near the 1000 character limit and a logical field followed a numeric field in the structure, executing the LIST command corrupted the file structure.

Now, this structure is acceptable.

QUIT TO <executable file list> -- In 16-bit systems

QUIT TO has been implemented for CP/M-86, version 1.1, and MS-DOS, version 2.0. For CP/M-86, version 1.1, QUIT TO works exactly as it does for 8-bit CP/M 2.0: To return to dBASE II, *dBASE* must be specified in the <executable file list>.

For MS(PC)-DOS, version 2.0, when the <executable file list> completes, command operation returns to dBASE II at the place where the QUIT TO was executed. In a command file, the QUIT TO command returns to the next line of code and command execution resumes. Memory variables and all parameters remain undisturbed. However, all data files and their associated index and format files are closed to prevent any interaction with file usage in other programs. If *DBASE* is specified in the <executable file list>, a "new" session of dBASE II is begun which is "nested" in the old one. The old one is still re-entered on completion of the <executable file list>. The DOS command processor,COMMAND.COM must be present on both the boot drive and the drive where dBASE II is located.

REPLACE <numeric fieldname> WITH <number> -- Greater than 50 digits

Previously if the <number> was greater than 50 digits, the USE file was destroyed.

Now, the <number> is truncated to 34 digits which are successfully replaced in the field. Only the first ten digits are significant, the rest are zeros and the entire number is right-justified in the field.

SKIP <negative memvar> -- Negative <memvar> recognized

SKIP previously read <negative memvar> as a positive number.

It now recognizes the minus sign and moves backwards the specified number of records. 'SKIP -<negative memvar>' moves forward in the file.

SKIP VAL("-1") -- Negative number recognized

SKIP previously read VAL(<negative number>) as a positive number.

It now recognizes the minus sign and moves backwards the specified number of records.

System Date -- Changing formats

As in earlier versions, a choice of dBASE II system date formats is available from the INSTALL program: American <mm/dd/yy> or European <dd/mm/yy>. Previously, this could be selected only once.

Now, formats can be changed whenever you want by running the INSTALL program again.

TOTAL ON <key field> TO <filename> -- Pre-existing TO database

Previously, both databases needed corresponding numeric fields to be of identical size or incorrect totals would result.

Now you may pre-establish the TO database with larger field widths than the USE database. If the numeric fields in the TO database are large enough to hold the final totals, those numbers TOTAL correctly.

UPDATE with REPLACE -- Numeric overflow

Now, when doing an UPDATE with a REPLACE of a numeric field to a smaller field in the master database, the number in the numeric field is not truncated. Instead, a series of asterisks (*****) take the place of the numbers to indicate numeric overflow.

WRAP-AROUND on the IBM-PC screen -- Loss of a character

Previously, when an output exceeded the screen width of 80 characters and wrapped around to the next line, the 81st character appeared to be missing.

All characters now display.

ADDED DOCUMENTATION

- <coordinates> GET <numeric variable> PICTURE '<template>' -- Overflow

  If the <template> width is narrower than the <numeric variable> width, as in the example

  ```
  STORE 123.45 TO number
  @ 5,5 GET number PICTURE '99.99'
  READ
  ```

  the following is displayed

  ```
  **34
  ```

  Asterisks indicate a numeric overflow.

  If the number is a fraction, the <template> must be large enough to hold the zero integer and decimal point

  ```
  STORE .12 TO decimal
  @ 5,5 GET decimal PICTURE '#.##'
  ```

- <coordinates> GET <numeric field> PICTURE '<template>' -- Overwrite

  If the <numeric field> has decimal places, the data entered is incorrect when an attempt is made to write over the decimal point. This is due to the presence of a fixed decimal point in the field which can not be overwritten as it can in a memory variable. Use the memvar for entry, and REPLACE the data from the memvar into a database field.

- <coordinates> SAY <expression> USING '<template>' -- Expansion

  dBASE II does not expand a character string in a USING clause as it did in version 2.3. For example

  ```
  STORE '120883' TO mdate
  @ 5,5 SAY mdate USING '99/99/99'
  ```

  The resulting display is '12/88/ ' To work around this, use the substring function ($).

  ```
  @ 5,5 SAY $(mdate,1,2) + '/' + $(mdate,3,2) + '/' + $(mdate,5,2)
  ```

  The display is now 12/08/83.

DELETE FILE <parameter> -- Valid and invalid syntax

LIKE <skeleton> and *EXCEPT <skeleton>* are not valid syntax for <parameter>. The only valid syntax for <parameter> is a filename which may include *?* as a wildcard character. * is not a valid wildcard character in <parameter>. For example,

DELETE FILE TE??.DBF

deletes all four-letter filenames beginning with TE and having the extension DBF. In contrast,

DELETE FILE TE.DBF*

results in the message FILE NOT FOUND.

FUNCTION KEYS -- Commands issued from are not abortable

When commands are executed from the function keys, pressing the <ESCAPE> key will not stop the process if the semicolon is included in the function key string. If more than one command is executed from the function keys in this manner, they will all complete execution before command is returned to the dot prompt or command file.

The semicolon is used in the function key string as an automatic <RETURN> to begin execution of the command. If there is a need to abort a command, it must not be issued from the function keys with a semicolon. Commands are abortable only if the <RETURN> key is entered from the keyboard.

GO/GOTO <parameter> -- GOing to deleted records

The GO/GOTO commands will GO to any record regardless of its deleted status. Even with SET DELETED ON, if the first record of a file has been marked for deletion, GO TOP

still takes you to that record. A conditional command can be used to detect a record marked for deletion.

```
IF *
   SKIP
ELSE
   DISPLAY
ENDIF
```

INSERT BLANK -- With an Open Index File

When used with an open index file, the INSERT BLANK command places you into the inserted record in full-screen mode. To place a blank record in an indexed file without entering full-screen mode, use the APPEND BLANK command.

LOCATE <scope> FOR <logical expression> -- 'WHILE' not valid

The use of WHILE instead of FOR is not valid syntax and will produce an error message.

MODIFY STRUCTURE -- Known bug in PC-DOS version

This sequence of commands causes garbage to display on the screen and the computer to hang.

```
USE <data file name>
MODIFY STRUCTURE
<control-C>
<control-C>
<control-N>
<control-T>
<control-Q or W>
MODIFY STRUCTURE
<control-C>
<control-C>
<control-N>
```

The execution of a WAIT command before the second MODIFY STRUCTURE will prevent any problem from occurring.

PEEK(<address>) -- Known bug

The PEEK() function is inoperable from 1000 hex (4096 decimal) to 7A00 hex (31232 decimal). Although it returns a number when used within these addresses, the number is inaccurate.

RELATIVE ADDRESSING ON THE PRINTER -- Not Implemented

The use of the dollar sign ($) in the <coordinates> parameter of the @. . SAY command is not supported when SET FORMAT TO PRINT is in effect. Relative addressing is implemented for use on the screen only.

REPLACE P.<field> WITH S.<field> -- Selecting appropriate area

A REPLACE command only replaces into fields in the database file which is open in the currently SELECTed area. For example, this works:

```
SELECT PRIMARY
REPLACE P.<field> WITH S.<field>
```

This does not work:

```
SELECT PRIMARY
REPLACE S.<field> WITH P.<field>
```

SET COLOR TO <n1>,<n2> -- Omission of '<n1>,'

Version 2.4 allowed the omission of the <n1> parameter and executed SET COLOR TO <n2>. This form of the command was never considered valid nor was it intended to be used this way, even though 2.4 allowed it. Version 2.41 does not change the screen attributes unless both parameters <n1> and <n2> are included, although no syntax-error will occur.

SET LINKAGE ON -- Improper syntax

Linkage is appropriately set on before opening database files. If the files are opened, and then SET LINKAGE ON is issued, no link is established. Commands, such as LIST, that move sequentially through the file will perform erratically.

SORT ON <key> TO <sorted file name> — After APPENDing:

The file must be closed between APPENDing records and SORTing the file. This is easily accomplished with the USE command by naming the same file already in use:

```
USE File2
APPEND
USE File2
SORT ON <key field> TO <sorted file name>
```

STORE — Strings greater than 254 characters

STORE <string1>+<string2> TO <string3> allows concatenation of up to 254 characters into <string3>. A SYNTAX ERROR appears if <string3> exceeds 254 characters, which is the maximum number of characters allowed in a string.

If there is an error in STORing a string of 254 characters to a <variable>, expanding the length of the string while correcting the error will cause a SYNTAX ERROR message. To avoid this, the error must be deleted before the correction can be made.

STORE <expression> TO <memvar> -- Changing the <memvar> type:

Neither the STR() nor the VAL() function may be used in the <expression> to change the type of a particular memory variable by storing it back to itself. The result will always be 0:

```
STORE "123" TO char
STORE VAL(char) TO char
```

or

```
STORE 123 TO num
STORE STR(num,3) TO num
```

When the type of a memvar must be changed, create a new memvar with the function and then overwrite the old one:

```
STORE "123" TO char
STORE VAL(char) TO char2
STORE char2 TO char
```

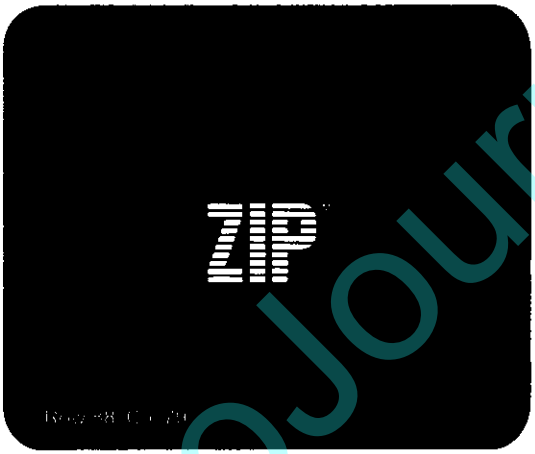
TOTAL ON <key field> TO <filename> -- Substring not valid

The substring function may not be used in the <key field> parameter. If a total on a substring is needed, add another field to the database file, replace it with the substring of the key field, and use the new substring field as the <key field> parameter.

TOTAL ON <key field> TO <filename> -- Fields big enough for totals

If the TO database does not exist, the USE database must have numeric fields of a size that can accept the ultimate totals. The structure does not expand when copied to the TO database and will contain incorrect totals if it is not large enough to begin with.

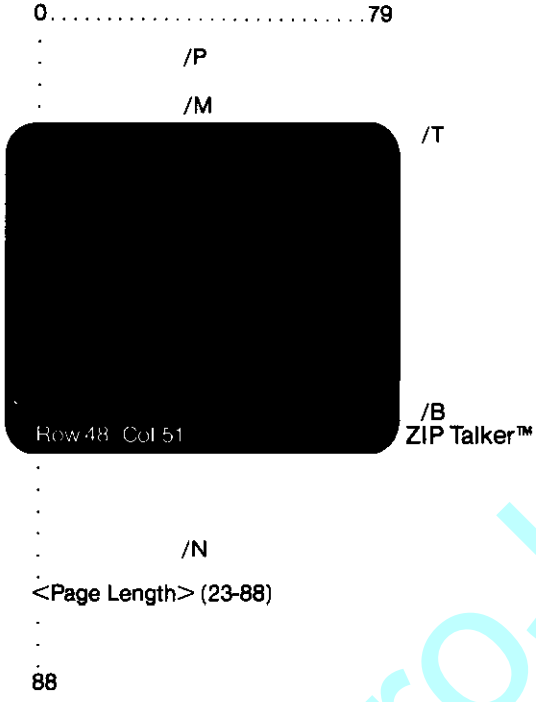
Changing the field size in the USE database may be avoided by pre-establishing the TO database with a larger structure.



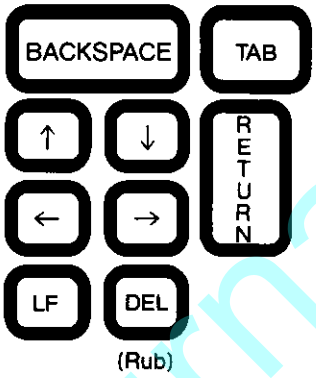
The screen and printout Form Writer for dBASE II.

ZIP SUMMARY

ZIP turns your CRT into a "window" for creating 23-line input screens and printouts up to 88 lines long:



Your ASCII keyboard works like a keyboard: these keys all do exactly what you expect them to do:



Enter up to 12 characters for CLEAR & HOME, CURSOR MOVE and ARROW code sequences.

ZIP's SCREEN COMMANDS (Typeable, changeable)

/ : Command lead-in marker
/T : Top of screen
/M : Middle of line
/I : Insert a space
/A : Add line at cursor
/H : Draw/Erase horizontal line
/N : Next screen
/F : First screen
/E : Erase work file
/Q : Quit to system

/ / : Help screen
/B : Bottom of screen

/D : Delete a character
/K : Kill cursor line
/V : Draw/Erase vertical line
/P : Previous screen
/L : Last screen
/S : Save file, write program

For dBASE II:
@ : SAY variable
# : GET variable
[ ] : RESERVED for EMBEDDED dBASE II COMMANDS

Dynamic values you can change during a ZIP session:
. : <V>ertical Marker
- : <H>orizontal Marker
5 : <T>ab Spacing (1-9)
88 : <P>age Length (23-88)
40 : <M>argin for printer (0-127)

ZIP[tm] DOCUMENTATION:)

(Cover:)

ZIP tm

Row 88, Col 79

The screen and printout Form Writer for dBASE II.

ZIP SUMMARY:

ZIP turns your CRT into a "window" for creating 23-line input screens and printouts up to 88 lines long:

```
0 ..............................  79
.
.                 /P
.
.
.                                 /T
.
.                 /M
.
.
.
.
.                                 /B
Row 28, Col 51                    ZIP Talker™
.                 /N
.
.
.
< Page Length> (23–88)
.
.
.
88
```

Your ASCII keyboard works like a keyboard: these keys all do exactly what you expect them to do:

BACKSPACE TAB

R
E
T
U
R
N

LF DEL (Rub)

Enter as many characters you need (50 max) for CLEAR & HOME, CURSOR MOVE and ARROWs.

ZIP's SCREEN COMMANDS
(Typeable, changeable)

/ : Command lead-in marker	/Q : Quit to system
/C : Center text on-line	// : Help screen
/T : Top of screen	/< tab> : Edge of screen
/I : Insert mode	/B : Bottom of screen
/M : Middle of line/screen	/D : Delete a character
/A : Add row or column	/K : Kill row or column
/H : Draw/Erase horizontal line	/V : Draw/Erase vertical line
/N : Next screen	/P : Previous screen
/F : First screen	/L : Last screen
/E : Erase work file	/S : Save file, write program

For dBASE II:

@ : SAY variable # : GET variable
[ ] : RESERVED for EMBEDDED dBASE II COMMANDS

Dynamic values you can change during a ZIP session:

. : < V> ertical Marker — : < H> orizontal Marker
5 : < T> ab Spacing (1-79) 88 : < P> age Length (23-88)
40 : < M> argin (0-132)

Now dBASE II really has ZIP< tm>.

dBASE II has been the most powerful, easiest to use relational database management system for a micro since the day it was introduced. Now it's even more so, because we've included a program called ZIP.

I think you'll like the way ZIP simplifies setting up screens and output forms in your programs. ZIP's key features are:

- You can prepare your *output forms for your printer* as well as *input formats for your screen* on your CRT because ZIP handles up to 88 lines.
- *ZIP creates running code automatically:* it writes READ at the end of every file that uses GET's and every 64 GET's in a longer file, validates variable names, writes .FMT files, or writes complete .CMD files with ERASE or SET FORMAT TO PRINT/SCREEN, SET MARGIN TO xx and RETURN by itself.
- *Embed dBASE II commands in your form files:* save both form and function with the ZIP editing capabilities.
- *Use any ASCII files:* if you have any forms prepared with a text editor, you can load them (up to 88 lines) and have ZIP write the code for you.
- *The ZIP Talker< tm>*, a line at the bottom of your screen, tells you which row and column your cursor is on so that you can set your format locations quickly and easily, and provides prompts during a ZIP session.
- With ZIP, you can *dynamically change* your Horizontal and Vertical Markers, Tab Spacing, Page Length and Printer Margin *while working up a form or screen format.*
- Horizontal and Vertical Markers both *draw and undraw lines,* making it easy to create boxes and draw or erase entire rows or columns.
- Operation is faster because there are *no control keys* to press. Your keyboard works just like it always did: <Return>, <Line Feed>, <Delete>, <Backspace>, <Tab> and the cursor Arrows do exactly what you expect them to do.
- You have *access to the defaults,* so that you can set ZIP up the way *you* want it.

I think you're going to like it. Drop me a line and let me know.

Sincerely,

Geo. Tate

CONTENTS

INSTALLING ZIP

The single-density distribution disk you received contains ZIPIN.COM, ZIP.COM, ZSCRN.OVL and DGEN.OVL.

After you have made copies onto a system working disk and a backup system disk, *please* place the distribution disk in a safe place.

Now place a disk with ZIP.COM into your logged-in drive. The installation program, ZIPIN. COM, may be on any drive. Type:

```
<drive:> ZIPIN
```

If your terminal is listed on the first screen that ZIPIN shows you, press the number next to it, then the carriage <Return>; otherwise, choose 0 (zero) and follow the installation procedure that starts on the next page.

APPLE II and III: if you have the Apple version, the menu allows you to install the 24 x 40 screen, 24 x 80 screen or the Apple III.

Osborne 1: the Osborne version is pre-installed to give you more room on your disk.

Press the carriage <Return> again to confirm your selection.

Regardless of what your selection was, the next screen shows the values that were installed. At this time, you can change any or all of them.

The Hazeltine 1500, for example, is installed with control key functions instead of arrows since it does not have any arrow keys. The functions are, however, the same as in dBase II:

```
UP    = control-E
DOWN  = control-X
LEFT  = control-S
RIGHT = control-D
```

If you want to use some other combinations, including multiple character sequences, choose the number of the installed value you want to change, then enter your new data as described in the following section on custom installation.

INSTALLATION NOTES:

1. Optional Auto Scroll should be turned ON (e.g., TRS-80 II with P & T CP/M).
2. Optional Local Echo should be turned OFF (e.g., HP 125).

If your terminal is not listed, you'll need to know your terminal code sequences for:

- CLEAR SCREEN AND HOME CURSOR
- DIRECT CURSOR POSITIONING (and the BIAS/OFFSET)
- ARROWS
- SET UP/RESET (usually unnecessary)

The key word is sequences. Most terminals have some single keys that send multiple characters when they are pressed. "CLEAR", for example, probably sends at least two characters, one to clear the screen and the other to home the cursor. The arrows may also send multiple characters.

These must be entered as sequences, and cannot be installed by simply pressing the key.

Check the manual for your terminal, then enter the *individual characters* in the sequences when ZIPIN asks for them. Individual control sequences may be as long as needed, as long as the total length of all the sequences is no more than 50 characters.

Any other *special* keys and sequences that are unique to your terminal may or may not work, but are not needed to use ZIP effectively.

During installation, ZIPIN will only accept the *characters* in a sequence, *not* the codes for them. If your codes are given as decimal, hex or names, use this chart to translate them:

IF THE CODE IS THIS: DECIMAL	HEX	NAME	ENTER: KEY	IF THE CODE IS THIS: DECIMAL	HEX	NAME	ENTER: KEY
0	0	NUL	ctl-@	16	10	DLE	ctl-P
1	1	SOH	ctl-A	17	11	DC1	ctl-Q
2	2	STX	ctl-B	18	12	DC2	ctl-R
3	3	ETX	ctl-C	19	13	DC3	ctl-S
4	4	EOT	ctl-D	20	14	DC4	ctl-T
5	5	ENQ	ctl-E	21	15	NAK	ctl-U
6	6	ACK	ctl-F	22	16	SYN	ctl-V
7	7	BEL	ctl-G	23	17	ETB	ctl-W
8	8	BS	ctl-H/BS	24	18	CAN	ctl-X
9	9	HT	ctl-I/Tab	25	19	EM	ctl-Y
10	A	LF	ctl-J/LF	26	1A	SUB	ctl-Z
11	B	VT	ctl-K	27	1B	ESC	ctl-[
12	C	FF	ctl-L	28	1C	FS	ctl-\
13	D	CR	<Return>	29	1D	GS	ctl-]/ESC
14	E	SO	ctl-N	30	1E	RS	ctl-^
15	F	SI	ctl-O	31	1F	US	ctl-_

As an example, to enter the ESCAPE character, press either your (Escape) key or (control-[). To enter a control character, *hold down* the control key (sometimes labelled "ALT") while pressing the letter or graphic key.

<RETURN> may not be used in control sequences.

To start the custom installation of your terminal, type 0 (zero) as your terminal selection, then <Return> to confirm your choice.

The screen now shows the values — if any — installed for the terminal control sequences. Individual sequences may be any length as long as the total of all the sequences is 50 characters or less.

First choose 1, the CLEAR SCREEN AND HOME CURSOR sequence, the then press return.

ZIP will show the installed value and ask if you want to change it. Press C.

Now you can enter as many characters as you need. When you are done, press <Return> again to confirm your entry.

Next, choose 2 for DIRECT CURSOR POSITIONING.

When entering this sequence, type 0 (zero) in the character positions where the row and column data go. ZIP will then ask you which is the row and the column.

Most terminals have a numeric OFFSET or BIAS that is added to the row and column values. This is often decimal 32, but can be 0, 128 or some other value.

Cursor positioning is usually done using the ASCII technique (positions sent as complete numbers) or the ANSI method (position *digits* are sent individually). If in doubt, choose ANSI. You can use ZIPIN again later if this doesn't work.

Some terminals need a delay after they send the Clear and Home signal, or the first few dozen characters at the top of a new screen will not be displayed. Most terminals do NOT need the delay (Hazeltine 1500 needs it) and ZIP will run faster if the delay is not installed. If you're not certain, install ZIP without the delay first. You can re-install ZIP if the delay is required.

If your keyboard does not have arrow keys, you may want to enter the codes used by dBASE II (control-E for up, control-X for down, control-S for left, control-D for right).

You will also be asked if your keyboard has an *erasing BACKSPACE key*. Some terminals use the Backspace signal for the left arrow, moving the cursor without erasing the characters under it. If this is the case with your terminal, you can type "N" and have your left arrow work the same way it always has, or you can type "Y" and have it erase as it moves.

At this time, you can also specify the height and width of your terminal screen. ZIP will run on terminals with screens from 24 to 60 rows high and 40 to 80 columns wide.

CHANGING ABBREVIATIONS AND SYMBOLS.

After you've installed the cursor controls, ZIPIN clears the screen and shows you the dynamic variables.

Regardless of what you select as the defaults now, you can change the Tab Spacing, the Horizontal and Vertical Markers, the Page Length and the Printer Margin as often as you want while creating your screens and forms with ZIP later.

To make the changes during installation, type these sequences:

C	T	39	to change Tab spacing
C	V	|	to change Vertical Marker
C	H	*	to change Horizontal Marker
C	M	40	to change Printer Margin

When you're finished, type F and ZIP will then show you all the default command symbols and abbreviations.

To change any of the command abbreviations or symbols, type "C" then press the key you want to change, followed by the key for the symbol you want to use instead.

As an example, to change the command marker:

- Type C
- Type /
- Type \ (if that's what you want to change it to).

Note: The square brackets ([ ]) are used as the string delimiters in the dBASE II command files that ZIP writes for you and cannot be entered as new symbols.

You'll probably want to change the "/" command lead-in character to "\" or some other character (lowercase to make it easier to type) that you won't normally want to use as part of the screens or printer forms you create.

Note: *Do not* set two commands or symbols to the same character: it totally confuses ZIP. If you do so inadvertently, you can recover by running through the installation procedure again.

WHEN THE INSTALLATION IS COMPLETE, ZIPIN IS NO LONGER NEEDED ON YOUR WORK DISK.

***** File B: SAMPLE ***

****
SAMPLE INVOICE
****

INVOICE @invnmbr DATE #date

CLIENT @client

```
[USE B:GETCOST]#[STORE 0 TO Sum]
[DO WHILE .NOT. EOF]@[? Job:Nmbr,Descrip, Taxable]#[STORE SUM + TAXABLE TO SUM]
[ENDDO]
```

TOTAL BILLING @Sum 37,79

```
* SAMPLE. CMD
SET FORMAT TO PRINT
SET MARGIN TO 40
@  0, 23 SAY "+  ---------+"
@  1, 23 SAY "|     SAMPLE    |"
@  2, 23 SAY "+  ---------+"
@  7,  5 SAY " *************************"
@  8,  7 SAY "SAMPLE INVOICE"
@  9,  5 SAY " *************************"
@ 12,  5 SAY "INVOICE"
@ 12, 13 SAY invnmbr
@ 12, 40 SAY "DATE"
SET FORMAT TO SCREEN
@ 23, 79 SAY "      "
@ 23  0 SAY "date" GET date
READ
SET FORMAT TO PRINT
@ 15,  6 SAY "CLIENT"
@ 15, 13 SAY client
@ 17,  0 SAY " ---------------------------------------- "
@ 17, 50 SAY " ------------------------- "
USE B: GETCOST
STORE 0 TO Sum
DO WHILE .NOT. EOF
? Job:Nmbr,Descrip, Taxable
STORE SUM + TAXABLE TO SUM
ENDDO
@ 35, 0 SAY " ---------------------------------------- "
@ 35, 50 SAY " ------------------------- "
@ 37, 42 SAY "TOTAL BILLING"
@ 37, 58 SAY Sum
@ 37, 75 SAY "37, 79"
SET FORMAT TO SCREEN
@ 23, 79 SAY "      "
RETURN
```

WHAT ZIP DOES, IN A NUTSHELL.

ZIP wrote the *command file (.CMD extension)* on the facing page from the input screen(s) above it.

The box was created using commands that both draw and undraw the horizontal and vertical markers, automatically inserting "+" wherever the two cross. Both marker symbols can be changed while creating a form or printout.

The text, variable names (preceded by @ or #) and embedded commands (in square brackets) were simply typed in, using no control functions. When the form looked like the output that was wanted, the operator typed "/S" and ZIP went to work.

ZIP set the format to PRINT because the operator answered "Yes" when asked if the form was to be printed, and set the printer margin for the value the operator wanted.

ZIP then scanned the form and automatically wrote in all the @<Row,Column> SAY <text> commands.

Wherever it came across a DISPLAY symbol (@), it wrote the @ <Row,Column> SAY <variable>.

ZIP also wrote a GET command, with code to position the cursor on the bottom line of the terminal and show the name of the variable when the .CMD file is run.

In this example, the operator also embedded a number of dBASE II commands enclosed in square brackets, so that the Sample.CMD file is a combination of form and function.

ZIP then tidied up the file by writing SET FORMAT TO SCREEN and RETURN, placing the cursor in the lower lefthand corner after the format is done. This file can now be used in any other dBASE I I command file by simply adding: DO Sample in that other file.

The screen could also have been saved as a *format file (.FMT extension)* by specifying the type you wanted.

For a format file, ZIP would have written in only the @..SAY statements and any items enclosed within square brackets. The SET statements would not have been included, and the first comment would have read: * SAMPLE.FMT.

Remember, though, that *only comments may be embedded in format files.* ZIP does not check to see whether the embedded statements are correct.

We'll show you how easily all of this can be done, starting on the next page.

WORKING WITH ZIP.

Type:

```
ZIP
```

ZIP starts by showing you the Help screen as a reminder of the commands and the system defaults.

For now, it doesn't matter if you haven't memorized all the commands. You can check them again while working with ZIP by pressing the Command key twice (/ / or whatever symbol you installed). Press any key to continue.

The screen should clear and the ZIP Talker (on the bottom line of your screen) should say:

```
<NEW> or <OLD> file (Q to Quit)?
```

ZIP won't start working until you tell it whether you want to create a new file (by typing N) or want to update an old file (by typing the letter O). Or you can change your mind and exit back to your operating system by typing Q. Since we do not have a previously written file to load, type:

```
N
```

The ZIP Talker now asks you to name the new file by saying:

```
FILE NAME (drive optional):
```

If you do not specify a disk drive (character followed by a colon), files will be saved to and retrieved from your logged-in drive.

File names can be up to 14 characters long: 2 characters for the drive and colon; 8 characters for the file name; and 4 characters for a period and file type. The name may contain only the following characters:

```
A-Z (a-z), 0123456789, .$@#/ and the colon (:)
```

ZIP will save an image of your work file as <name>.ZIP and will write command files as <name>.CMD, format files as <name>.FMT.

Alphabetic characters may be entered in upper- or lowercase — ZIP converts them all to uppercase in file names.

CP/M requires the colon as the second character in the name. If you've entered a colon in some other position, ZIP will intercept the name and ask you to re-enter it.

After you've entered the file name and pressed the carriage return, the cursor will move to 0,0 and the ZIP Talker will tell you precisely where it is.

Now try the tab key or the carriage return. If your key repeats automatically, hold it down and the cursor will drop line by line until it reaches the bottom of the screen, with the Talker tracking it every step.

Now hold the up arrow down and the cursor will start climbing line by line.

But there's a much faster way to get to the top. Type these three commands (upper- or lowercase):

```
/T
/B
/M
```

These three keys can quickly move you around the screen. The Top and Bottom commands stay in the same column to make it easier to align your entries.

The Middle command moves the cursor to the middle of a row to make it easier to center headings. If the cursor is at the middle of the row, /M move the cursor to the middle of the screen.

Now type:

```
/<tab>      (press the tab key)
/<tab>
```

This first moves you to the right edge, then will switch from edge to edge every time you use it again.

Notice that the ZIP Talker is with you all the way. When you pressed the command marker, it even let you know that it was waiting for your instructions by displaying the marker on the bottom line of the screen.

Whenever you start a new session with ZIP, Tab Spacing is automatically set at the value you installed (originally 5) and the Page Length is set at the size of your screen. The Tab Spacing and Page Length can be changed any time during a ZIP session. Type these three commands (wait for the Help screen after the first command):

```
//
T           (command marker is not used here)
19          (any value from 1 to screen width)
```

Press any key to get back to your work screen, then press the Tab key. The ZIP Talker shows that tabs are now set at multiples of 19 across the screen. You can change this spacing as often as you want during a ZIP session by going back to the Help screen.

Page Length can be modified during a ZIP session the same way as the Tab Spacing. From the Help screen, you can select any Page Length from the size of one screen (the ZIP minimum) to 88 lines. This allows you to prepare legal forms on your CRT, or print with as many as 8 lines per inch on regular paper.

Note: If you shorten the Page Length during a ZIP session, any information on the lines beyond the end of the new page will be erased. Permanently.

Now position the cursor at the top left corner of the screen (type <Return>, ^T) and type:

```
  /H
  /V
<Tab twice>
  /V
<Tab twice>
  /V
  /H
```

The same commands both draw and erase the horizontal and vertical lines, automatically drawing and undrawing a "+" symbol where the two lines cross, to make it easier for you to "paint" your screens and forms exactly the way you want them.

If the cursor is on a Horizontal Marker symbol when you enter the Horizontal Command, ZIP erases the remainder of the line to the right.

If the cursor is on a "+" symbol, ZIP can respond in different ways.

If the cursor is on a "+" symbol and has other characters to its left, the plus sign will be left where it is, but the remainder of the horizontal line to the right will be erased. If there are no characters immediately to the left of the cursor and the next symbol to the right is not a "+", the horizontal line will be erased and the "+" symbol will be changed to the current value of the vertical marker.

If the symbol is surrounded by other "+" symbols, they will *all* be left intact, and only the horizontal line beyond the "+" symbol farthest to the right will be erased. In this case, ZIP will not redraw this portion of the horizontal line until you move the cursor to the right-most "+" symbol.

The Vertical Marker command uses the same logic.

Both commands are a great deal easier to use than this may sound because ZIP makes the decisions.

Note: Using a Marker Command twice (/H,/H or /V,/V) is a quick way to erase an entire row or column.

Now type these commands (wait for the Help screen):

```
//
P
40
        (current value of your Vertical Marker)
*
```

This changes the Page Length to 40 lines and the Vertical Marker to an asterisk. Press any key to return to the ZIP work screen.

Use the carriage return to drop down a few lines. Type /H then /V. Instead of erasing the vertical line, the last Command changed all the symbols to asterisks. This is because it was not on top of the *current* vertical marker.

Now type:

```
/N      (wait for the new screen)
/B
```

This places you at the bottom of the next screen, with the ZIP Talker saying: "Row 39, Col 0" (our Page Length is 40 lines numbered 0 to 39). Notice that the last vertical line you drew goes all the way to the bottom of the page, even though it was off your screen.

With longer screens, you may want to use:

/F to position you within the FIRST SCREEN of your form, with Row 0 at the top of the screen; or

/L to position you within the LAST SCREEN of your form, with the last Row at the bottom of the screen.

To save what you have entered, type:

```
/S
```

The ZIP Talker responds with:

```
SAVE< name> as CMD or as FMT file (C, F or stop)?
```

If you type any key except "C" or "F", ZIP will put you back into the work file.

If you type "C", ZIP asks:

```
Is this form to be printed (Y or N)?
```

Any key except "Y" is equivalent to "No".

Next, ZIP gives you a chance to change the file name (for both .CMD and .FMT file types) by asking

```
File < name> : do you want to change its name (Y or N)?
```

If you answer "Y", ZIP asks you for the new name. You can also specify a different disk drive as part of the new name to make your backups on a different drive. Or you can press any other key and ZIP uses the name you've been working with.

ZIP first saves an image of the screen or printer format you have created. The Talker tells you what it is doing by saying:

Writing screen image <name>.ZIP.

When it has saved the screen image, ZIP writes a printable copy of it, too, with the Talker saying:

Writing printable file <name>.ZPR.

When writing a dBASE II command file, ZIP first inserts the file name as a comment (* <NAME>.CMD or * <NAME>.FMT.

If the file is a .CMD file type, it then writes

ERASE (if it is a screen format)

or

SET FORMAT TO PRINT
SET MARGIN TO xx (if it is a form to be printed).

For both file types (.CMD and .FMT), ZIP writes all the @..SAY and GET statements, and inserts a READ into your file after every 64th GET. The ZIP Talker tells you which row(s) this happens on.

ZIP finishes by writing a READ at the end of screen input files, or SET FORMAT TO SCREEN for print files, just before the final RETURN at the end of the file.

After ZIP saves your work file and writes the program, you will still have the original screen and can modify it then save it as another file name.

If ZIP finds a GET in a print form the Talker says:

"GET" in PRINTOUT: Okay (Y or N)?

and waits for your response. If you used the GET deliberately, type "Y" and ZIP will continue writing the <name>.CMD file.

If the GET was accidental, press any other key. ZIP terminates the .CMD file, marking it with INCOMPLETE COMMAND FILE, then positions your cursor on the offending GET symbol so that you can either change it or remove it.

Note: You will have to save your file again (/S), since it was aborted, but the seconds it takes with ZIP could save you a great deal of time on your applications programs.

ZIP validates your variable names to make certain that the command files it writes will run in your dBASE II programs.

If you inadvertently started a variable name with a character that dBASE II would not accept (anything except the alphabet, digits and colon), ZIP tells you with:

NO VARIABLE: continue (Y or N)?

Pressing any key except the "Y" (upper- or lowercase), terminates the Save and positions your cursor on the error in your work file for a quick fix.

The ZIP Talker also tells you if you start or end a variable name with a colon:

HANGING COLON: continue (Y or N)?

Again, any key except a "Y" terminates your Save and positions your cursor at the error within the screen file so that you can fix it quickly and easily, then save the file again.

In most cases, you'll find that there is no need to even look at the files that ZIP writes unless you want to add code for error trapping, etc. Just go into your main application program, add:

DO < name>

or

SET FORMAT TO < name>

then run it. If your program provides values for the variables you entered with ZIP, you'll get exactly the screen or form you wanted.

To start on a new file, first erase the old one by typing:

/E

then press "Y" when ZIP asks:

Erase everything (Yes or No)?

ZIP then asks you whether you want a new or old file. *If you want to stop* now type Q when the ZIP Talker says:

< NEW> or < OLD> file (Q to QUIT)?

then answer "Y" when ZIP asks:

QUIT to system (Yes or No)?.

You can also quit at anytime while working *in* a screen by typing:

/Q

Once again, ZIP confirms that you do want to quit before erasing everything and closing the files.

When you quit, if the file was longer than your screen, ZIP gives you one last, fast look at the entire file, then returns you to your operating system.

NEVER SAY @..SAY..GET AGAIN.

Now let's use ZIP to write some @.. SAY's and GET's. It's going to be a lot easier than it ever was.

You might want to start on one of your real forms or input screens because you'll probably have a file that you can run when you've finished this section.

ZIP automatically sets the Page Length at a single screen whenever you start working on a new file. When you load a previously created file, ZIP sets the Page Length at the length of that file.

If this file is for an output form to be printed, set your Page Length at any value up to 88.

The Row and column readout on the ZIP Talker will then help you position your headings, dates, comments and variables exactly where you want them.

To position a variable, type the @ symbol (to SAY a variable) or the # symbol (to GET a variable) at the position you want your field to start.

Now type in the name of the variable. You do not need an end-of-name character, as ZIP knows the rules for dBASE II variable names. ZIP ends the name after it has read 10 acceptable characters, or when it comes across a character that dBASE II does not allow (including a space). If your variable name is 10 characters long, you can use the very next position, with no separator between the variable name and the rest of the line.

These are the characters that dBASE II will accept in a variable name:

A-Z, a-z, 0123456789 and an *embedded* colon (:)

ZIP will let you type a colon in any position for a variable name, but will intercept an incorrect entry when writing the <name>.CMD file and will give you a chance to correct it (see earlier Save section).

If a variable name is entered with a character that dBASE II does not allow, ZIP truncates the name and assumes that you wanted your next message or heading to start with the unacceptable character.

Now check the Help screen again by typing the Command Marker twice (/ /). You'll probably find the /D (or your Delete/Rubout key), /I, /K and /A commands useful before you're finished with your form. You may also want to use /C to center text on a line.

EMBEDDING dBASE II COMMANDS IN YOUR FORM FILES.

To help reduce the need for an external editor, ZIP allows you to embed as many dBASE II commands as you can fit in around your forms.

However, these rules *must* be followed:

1. Square brackets ([ ]) must enclose the command.

2. Both brackets must be on a single line (use the dBASE II semicolon for longer commands).

3. Bracketed commands must be separated from text and other bracketed commands.

To separate them, use a single command character just in front of the left bracket, or *two* command characters (@@,##,@# or #@). Bracketed commands do not need to be separated from preceding variable names.

ZIP wrote the command file on the next page from the input shown below (lines 35 and 37 were off-screen). The rules are illustrated on the screens.

```
* B. CMD
SET FORMAT TO PRINT
SET MARGIN TO 40
RESTORE FROM B:CONSTANT
@  7, 5 SAY " ***************************** "
@  8, 7 SAY "SAMPLE INVOICE"
ANOTHER dBASE II COMMAND
@  9, 5 SAY " ***************************** "
@  12, 5 SAY "INVOICE"
@  12, 13 SAY invnmbr
SAVE TO A
@  12, 40 SAY "DATE"
@  12, 45 SAY date
DO DateTest
@  15, 6 SAY "CLIENT"
@  15, 13 SAY client
Do Verify
@  17, 0 SAY " ---------------------------------------- "
@  17, 50 SAY " ------------------------ "
USE B:GETCOST
STORE 0 TO Sum
DO WHILE .NOT. EOF
? Job:Nmbr,Descrip, Taxable
STORE SUM + TAXABLE TO SUM
ENDDO
@  35,  0 SAY " ---------------------------------------- "
@  35, 50 SAY " ------------------------ "
@  37, 41 SAY "TOTAL BILLING"
@  37, 57 SAY Sum
SET FORMAT TO SCREEN
RETURN
```

QUESTION: *How do you display the results of expressions, or show several fields close together when their names cover the positions where you want them ?*

ANSWER: If being able to embed dBASE II commands in your file doesn't help, this is one case where you'll have to edit the <name>.CMD file that ZIP writes.

But ZIP *will* make it easier, because it can handle as many as 40 GET and SAY symbols in an 80 character line.

One way to use this facility is to enter *only* the symbols at the positions you want your short fields to be displayed or entered. Then when the ZIP Talker says: NO VARIABLE — continue (Y or N)?, enter "Y".

The advantage of doing it this way is that it will be easier to find the places to enter the expressions or variable names because ZIP will have written:

```
      @ xx,yy SAY          (remainder of line is blank)
or    @ xx,yy GET          (remainder of line is blank)
```

in the <name>.CMD file.

The disadvantage is that you'll get a lot of Talk (and prompts to respond to) from ZIP. To prevent this, you might prefer to simply enter single digits or letters in ZIP, then replace these with the proper names and expressions by editing the <name>.CMD file.

When you're done with your screen or form, save the file by typing /S, then type /Q to quit.

Warning:

> Don't touch the screen image file <name>.ZIP. It's in ASCII code, so you can use your CP/M "TYPE" function to look at it (use control-S to stop and start the scrolling), but because of the way it is saved, a text editor will probably destroy it.

If you want a hardcopy of the screen, use your word processor to print out the <name>.ZPR file or press <control-P> then use the CP/M TYPE command.

If you want to, you can use your text editor to look at the dBASE II command file <name>.CMD or <name>.FMT that ZIP wrote. You may only want to use the CP/M "TYPE" command for a quick check before running it.

Get dBASE up and make sure that there are values for the variables you wrote into the form, then type:

```
      DO <name>
or    SET FORMAT TO <name>
```

OTHER FILE TYPES, EDITING

Normally, ZIP works with a <name>.ZIP file that is one continuous long string, an image of the format you created in the memory of the computer. (This is similar to and interchangeable with files that IBM uses in one of their systems.)

The limitation of a *.ZIP file is that it can only be edited with ZIP or with great difficulty.

To get around this, ZIP will also load any standard ASCII file. To do so, simply specify an extension in the file name, but *DO NOT USE ".ZIP"* as the extension for an ASCII file.

One way to use this feature is to load screens that you might have created using WordStar, Magic Wand or some other text editor. The limitations are that each line should end in a carriage return and that you are limited to 88 lines.

Another way to use this is to edit the <name>.CMD files that ZIP writes. These are usually quite short and fit within the 88 lines available.

The embedded commands that ZIP allows are useful, but in some cases (such as some loops) may be performed in the "wrong" order.

To solve this, I first use ZIP to set up my report format, save it, then load the <name>.CMD file. Now, I use the /A command to add as many blank rows as I need for the DO WHILE...ENDDO loop to access my database and print the body of the report, usually only two or three additional lines.

I then save it again, and the dBASE II code for the loop is in the proper place.

You'll probably find other applications for this facility.

FOR dBASE II:

@ indicates position to SAY a variable
# indicates position to GET a variable

No end-of-field character is required, as ZIP assumes that the variable name is complete when it reaches the first character that dBASE II would not accept (10 characters max). The valid characters for dBASE II variable names are:

A-Z, a-z, 0123456789 and an embedded colon (:)

ZIP checks for colons that are not embedded, missing variable names and GET's in a print file, then lets you correct them or ignore them. ZIP writes in a READ after every 64 GET's, with a marker in the .CMD file and a message on the screen to let you know where it is.

ZIP writes command files (<name>.CMD and <name>.FMT) that you can run with no further editing. In a screen file, ZIP writes ERASE at the start of the file. In printout files, ZIP writes SET FORMAT TO PRINT and SET MARGIN TO XX at the start of the file and SET FORMAT TO SCREEN just before the final RETURN.

ZIP also saves an image of your screen as <name>.ZIP and a printable copy as <name>.ZPR.

ZIP can also be used to edit standard ASCII files (88 lines maximum).

Square brackets ([ ]) are RESERVED as text delimiters, and may only be used to enclose dBASE II commands and comments that you want to embed in your forms.

DYNAMIC VALUES:

is installed as the **Vertical Marker,** but can be changed to "|" or any other character when you install ZIP. It can also be changed temporarily at any time while setting up a form with ZIP.

– is the **Horizontal Marker** and can be changed during installation, and dynamically while working with ZIP (like the Vertical Marker).

TAB SPACING is set at 5 spaces, but can be changed to any value from 1 to the width of your screen minus one when you install ZIP, then can be changed while working with ZIP.

PAGE LENGTH can be dynamically set at any value from a single screen to 88 lines while working with ZIP.

PRINTER MARGIN may be set at any value from 0 to 132.

OTHER ZIP COMMANDS AND SYMBOLS:

/ is the **Command Marker,** but should be installed as "\" or some other character that you will not want to use as text in your screens and output forms.

//: pressing the Command Marker ***twice*** while working with ZIP displays a summary of the commands and lets you modify the Horizontal Marker, Vertical Marker, Tab Spacing, Page Length and Printer Margin. To change the Page Length to 47, for example, you would type:

```
//
P
47
```

To use the commands below, first type the command marker you installed, then the character.

H is the **Horizontal Line** DRAW/UNDRAW command. To use it, type:

```
/H
```

If the cursor is on any character except the one you are using as the Horizontal Marker, it will draw a line from the cursor position to the right edge of the screen. If the cursor is on the current character being used as the Horizontal Marker, it will erase all the characters from the cursor position to the right edge of the screen.

V is the **Vertical Line** DRAW/UNDRAW command. To use it, type:

/V

If the cursor is on any character except the one you are using as the Vertical Marker, it will draw a line from the cursor position to the bottom line of your page. If you have set your Page Length greater than 23, the line will extend beyond the bottom of your screen. If the cursor is on the current character being used as the Vertical Marker, it will erase all the characters from its position to the last line of your page.

A "+" symbol will automatically be drawn and undrawn by ZIP whenever the Horizontal and Vertical lines cross (current values only — see "Working With ZIP"). ZIP keeps track of these so that you can quickly and easily draw and erase boxes and even more complex shapes.

/H,/H and /V,/V can be used to erase rows and columns, respectively.

T and B (preceded by the command lead-in character) move the cursor to the **top** and **bottom of the screen** respectively, keeping the cursor in the same column.

M moves the cursor to the **middle of the row** the first time, then the middle of the screen.

<tab> first moves the cursor to the right edge of the screen, then toggles from edge to edge as it is used.

C **centers text** on the cursor line.

N displays the **Next screen**, advancing through your work file one screen at a time until the last line of your page is at the bottom of the screen.

P displays the **Previous screen**, backing up one screen at a time until Row 0 is at the top of the screen.

F displays the **First Screen**, and is a fast way to get back to the beginning.

L displays the **Last Screen**, and is a fast way to get to the end of the form.

I **inserts a space** at the cursor. If any characters are pushed off the right edge of the screen, they are lost forever.

D **deletes the character** under the cursor (as does your Delete or Rubout key).

A **adds a row or column** at the cursor. If any text is pushed past the end of the Page Length that you have set or the edge of the screen, it is lost forever.

K **kills the cursor row or column** and closes up the text.

E **erases your work file** and allows you to start on a new file.

S **saves your work file** as <name>.ZIP and <name>.ZPR, then **writes the command file** for your screen or printout as <name>.CMD or <name>.FMT (your choice).

Q **quits** to your system.

INDEX

— D —

— E —

PART B
CONTENTS

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1.0 USING dBASE

To execute the dBASE program, place the dBASE distribution diskette (or preferably, a copy of that diskette) into any available disk drive. Set that drive to be the default drive (e.g. if the disk is placed into the "B" drive, type in "B:" followed by a carriage return) and then type in the following line:

```
dBASE
```

The program will then be loaded into memory, and will start execution with a date request:

```
ENTER DATE AS MM/DD/YY OR RETURN FOR NONE:
```

This date will be posted on any database that is altered during the following run and will also be printed in REPORT headings for any report generated in that run. The date is checked for calendar accuracy. WARNING: The calendar check is not valid for February 29 in the years 1900 and 2100. A slash or any special character (except a period) may be used to delimit the numbers.

Examples of valid dates:

```
1,1,81
02 02 82
3/17/83
```

Then the sign-on message is displayed:

```
*** dBASE II    VER 2.xxx***
```

The period on the second line is the dBASE prompt, indicating that dBASE is ready to accept commands. Commands to dBASE are generally imperative sentences: a verb possibly followed by phrases that give further direction about the action to be taken. dBASE scans each line completely before executing any part of it. If dBASE detects an error in the command then the user is notified via error messages on the console. Generally, the user may correct the erroneous command and re-issue rather than re-enter the entire command. When dBASE detects an error that it can't describe explicitly, it assumes that the error is a syntax error and displays the erroneous line with a question mark at the beginning of the phrase that caused the confusion.

Error recovery examples:

```
. DISPRAY MEMORY
*** UNKNOWN COMMAND
DISPRAY MEMORY                  erroneous command echoed
CORRECT AND RETRY? Y            Yes, correct
CHANGE FROM :PR                 change the letters PR
CHANGE TO :PL                   to PL
DISPLAY MEMORY                  after the change
MORE CORRECTIONS? (cr)          return = no more changes

. STORE (2+2 TO X
*** SYNTAX ERROR ***
        ?                       the string (2+2 is indicated
STORE (2+2 TO X
CORRECT AND RETRY? Y
CHANGE FROM :+2
CHANGE TO :+2)
STORE (2+2) TO X
MORE CORRECTIONS? N             N(o) more changes
   4                            the result

. SUM TO X
NO EXPRESSION TO SUM            explanation
SUM TO X
CORRECT AND RETRY? N            no change, abort this command
```

The program can also be executed in the following manner:

DBASE <filename>

This will load dBASE into memory, access a command file <filename>, and begin immediate execution of the command file. This form is expecially useful when using dBASE in a SUBMIT file or when using the chaining option of the dBASE QUIT command.

CONTROL CHARACTERS

ctl-P — Toggles print switch (see also SET PRINT command)

ctl-U — Deletes current line

ctl-X — Deletes current line (except in full screen edit)

Rubout — Deletes last character entered

ctl-H (or backspace) — Deletes the last character entered

ESC — Escapes from certain possibly long-running commands. I.e. DISPLAY, COUNT, DELETE, INPUT, LIST, LOCATE, RECALL, REPLACE, SKIP, AND SUM. Also ESC serves as an escape from ACCEPT, INPUT, REPORT (dialogue), and WAIT. In all cases, ESC returns control to the interactive monitor and displays a dot prompt.

When in a command file execution, dBASE checks for an ESC character before starting every command line.

Note: This escape capability can be disabled by the SET ESCAPE OFF command.

2.0 SYSTEM REQUIREMENTS

In order for dBASE to operate properly, a system with the following attributes should be available.

I. For a 8080 or Z-80 based microprocessor system:

a) 48K bytes (or more) of memory including CP/M (dBASE uses memory up to A400 hex). Note: on some machines, including Apple, Heath, and Northstar, more than 48K is required because of an oversized CP/M module;

b) CP/M operating system version 2.x or later.

c) One or more mass storage devices operating under CP/M (usually floppy or rigid disk drives);

d) A cursor addressable CRT device (preferably a 24 line by 80 column CRT) if full screen operations are to be used;

e) Optional text printer (for some commands).

II. For a 8086 or 8088 based microprocessor system:

a) 128K bytes (or more) of memory including operating system;

b) CP/M-86 or MSDOS operating system;

c) One or more mass storage devices;

d) A cursor addressable CRT (preferably a 24 line by 80 column CRT); full screen operations are to be used;

e) Optional text printer (for some commands).

3.0 dBASE FILES

Basically, a file is a collection of information residing on a mass storage device that contains the user's data. The information can be stored to or retrieved from the file. Files can be grouped into six types, each one either concerned with a particular operation of or created by dBASE.

All dBASE files are standard CP/M files with a name field of eight characters and a file type of three characters. Listed below are the default file types used by dBASE. For each command that accesses a file, the type field may be left off and dBASE will assume the default type for that command. For instance, if a database file already has DBF as its type, then it need not be specified in any of the file manipulation commands.

DATABASE FILES	— .DBF
MEMORY FILES	— .MEM
COMMAND FILES	— .CMD (or .PRG in 16-bit version)
REPORT FORM FILES	— .FRM
TEXT OUTPUT FILES	— .TXT
INDEX FILES	— .NDX
FORMAT FILES	— .FMT

Any legitimate CP/M filename may be used to refer to dBASE files. Remember, if during an access of any file, the type is not supplied by the user, dBASE will assume the above file types. For further information regarding the use of filenames and types refer to the Digital Research publication "CP/M User's Guide".

3.1 DATABASE FILES (.DBF)

Databases are what dBASE is all about. dBASE's database files consist of a structure record and zero to 65535 data records. The structure record is essentially a map of the data record format. The structure can contain up to thirty-two different entries. Each entry in the structure refers to a field of data in the data records. The structure holds the following data:

* The name of the data fields
* The type of data within data fields
* The size of the data fields
* The position of the data within records

DATA FIELD NAME — The name may be up to 10 characters long. In all operations during a dBASE run, the data fields will be referenced by this name. Field names are alphanumeric (plus colons) by nature. However, fields must begin with a letter and colons must be embedded in the name. Some examples follow.

Examples of data field names:

A	
A123456789	
ABC:DEF	
A:B:C:D:E	
ABCD:	invalid, colon not embedded
ABC,DEF	invalid, comma is illegal

DATA TYPE — dBASE allows three types of data to be used to specify the contents of the data fields. They are: character strings ('ABCD'), numeric quantities (2 or 5*18), and logicals (true/false).

FIELD SIZE — This is the number of character positions (width) needed to contain the data that will be placed into this field. Character string fields and numeric fields may be from 1 to 254 positions in length. The count for a numeric field should include the decimal point. Logical fields are always one position in length. Also, for numeric fields, the number of positions to the right of the decimal point may also be contained in the structure.

Once the structure has been defined, the user can enter data values into the fields for as many records as are desired. Usually, there is only one structured data file available to the user at any given time (this is referred to as the USE file or the file in USE). There is, however, a way to use two databases at one time. See the commands SELECT and JOIN.

3.2 MEMORY FILES (.MEM)

Memory files are static files of memory which are divided into variables similar to record variables. These variables are known as memory variables and are limited to 64 in number.

The values of memory variables are independent of the database in use. That is, the record position of the file in USE has no bearing on the variables in the memory file. Memory variables are used to contain constants, results of computations, and symbolic substitution strings (see Section 5), etc. The rules of naming, typing, and sizing of memory variables are identical to those of the field variables described above.

The SAVE command will write all current memory variables to a memory file; and the RESTORE command will read a saved memory file back into the memory variables.

3.3 COMMAND FILES (.CMD) (.PRG in 16-bit version)

A command file contains a sequence of dBASE command statements. This provides the user with a method of saving a set of frequently used command sequences which then allows one to more easily manipulate database files.

Command files may be created and modified by text editors and/or word processors, although dBASE now has the capability to create/edit command files itself with the MODIFY COMMAND. Command files are started by the DO command. Command files may contain any dBASE commands, however, one should be careful since some of the commands (CREATE, INSERT, APPEND (from the keyboard)) require user inputs beyond the command file contents.

Command files may be nested, i.e. command files may contain DO commands which are then executed. Again, care should be exercised in that dBASE allows, at most, 16 files to be open at any given time. Therefore, if there is a file in USE, only 15 command files may be nested. Certain commands also use work files (e.g. SORT uses 2 additional files; REPORT, INSERT, COPY, SAVE, RESTORE, and PACK each use one additional file). For instance, if a SORT command is issued from the lowest command file in a nest, then only 13 levels of command file could be used (i.e. the USE file, 2 SORT work files and 13 command files = 16). Whenever a command file issues the RETURN command or whenever the end-of-file is encountered on a command file, the command file is closed and its resources are available for other commands.

3.4 REPORT FORM FILES (.FRM)

The REPORT command either generates a new form file or uses an existing form file. The form file contains instructions to the report generator on titles, headings, totaling, and column contents. Form files are constructed by dBASE as part of the REPORT dialog. They can be modified by text editors or word processors; however, it is fairly easy to make mistakes and this practice is discouraged except for advanced dBASE users.

3.5 TEXT OUTPUT FILE (.TXT)

The text output files are created when the "SET ALTERNATE TO <filename>" and "SET ALTERNATE ON" commands have been specified. See SET command for more details. Also, the COPY and APPEND commands assume a text (.TXT) file whenever the SDF (System Data Format) or DELIMITED options are used.

3.6 INDEX FILES (.NDX)

Index files are generated by the INDEX command of dBASE. They contain keys and pointers to records of a database file. Indexing is a dBASE technique that gives rapid location of data in a large database. See the INDEX command for more information.

3.7 FORMAT FILES (.FMT)

A format file contains only "@" statements and "*" comments. It is identified by the "SET FORMAT TO <filename>" command and is activated by subsequent READ commands. Like command files (which format files resemble), format files are created and modified by any good text processor or the MODIFY COMMAND capability. Format files are not, however, necessary. "@"'s and "*"'s statements are usually built into the command file that needs them.

4.0 EXPRESSIONS

An expression in dBASE is a group of simple items and operators that can be evaluated to form a new simple value. For example "2+2" is an expression that can be evaluated to the value "4". Expressions are not necessarily always numeric in nature. The expression 'abc'+'def' can be evaluated to the value 'abcdef' (character string concatenation), or the expression 1>2 can be evaluated to the logical (Boolean) value of ".F." (false).

Expressions in dBASE are formed from the following components:

* Database field variables
* Memory variables
* Constants within the commands (literals)
* Functions
* Operations

VARIABLES — A variable in dBASE is any data field whose value may change. There are two types of variables: data field names, (the information contained in the field of a dBASE database record is subject to change any time the database is repositioned or edited); and memory variable names (which contain information which is subject to change whenever a STORE, RESTORE, COUNT, SUM, WAIT, ACCEPT, INPUT, etc. command is issued).

There are three types of variables:

* Character strings
* Numeric quantities
* Logicals

CONSTANTS — A constant (or literal) is a data item which has an invariant, self-defined value. For instance, 1, 'abc', and .T. are constants which have a constant value regardless of the position of the database or any memory variable commands. They are literals since they ARE the value they represent (as opposed to variables which are names representing a value). The values they represent are, respectively: a numeric one, a character string (containing the letters "a", "b", and "c"), and a logical (Boolean) value of TRUE (".T.").

Character string constants must be enclosed in single quotes ('), double quotes ("), or in square brackets ([,]). If a character string contains one of these "delimiters", then it should be enclosed in a pair of one of the other ones. For example, the strings 'abc[def]ghi' and [abc'def'ghi] are valid character strings while 'abc'def'ghi' is not.

Logical constants (true/false) are represented by "T", "t", "Y", or "y" for true values (denoting true or yes) and "F", "f", "N", or "n" for false values (denoting false or no).

4.1 FUNCTIONS

Functions are special purpose operations that may be used in expressions to perform things that are difficult or impossible using regular expressions. In dBASE, there are three basic types of functions: numeric, character, and logical. The function type is based on the type of value that functions generate.

Integer Function

INT(<numeric expression>)

This function evaluates a numeric expression and discards the fractional part (if any) to yield an integer value. The value of the INT function is the truncated value of the numeric expression within.

Examples:

```
. ? INT(123.456)
  123
. STORE 123.456 TO X
  123.456
. ? INT(X)
  123
```

Record Number Function:

#

The value of the record number function is the integer corresponding to the current record number.

Examples:

```
. ? #
  4
. SKIP
. ? #
  5
```

(assuming that a database is in USE and is positioned at record number 4)

String Function:

STR(<numeric expression>, <length>,[<decimals>])

This function evaluates a numeric expression and yields a character string. The value of the STR function is a character string of length <length>. If <decimals> are specified, it is the number of digits to the right of the decimal point. All specifiers may be literals, variables, or expressions.

Caution: When this function is used to generate a key for indexing, the specifiers MUST be literals.

Example:

```
. ? STR(123.456,9,3)

  123.456
```

Substring Function

$(<char expression>,<start>,<length>)

This function forms a character string from the specified part of another string. The value of the substring function is a character string of length <length> filled with characters from the character expression starting with character number <start> for <length> characters. <start> and <length> may be literals, variables or expressions.

If <length> is longer than the <char expressions>, or if between the <length> and <start> the <char expression> "runs out" of characters, then the result will be only those characters that are there. See the following examples.

Caution: When the function is used to generate a key for indexing, the specifiers MUST be literals.

Examples:

```
. ? $('abcdefghi',3,3)
  cde
. store 3 TO m
  3
. store 3 TO n
  3
. ? $('abcdefghi',m,n)
  cde
. ? $('abcdefghi',6,7)
  fghi
. DISPLAY FOR '8080'$TITLE
```

String to Numeric Function

VAL(<char string>)

This function forms an integer from a character string made of digits, signs, and up to one decimal point. The length of the integer is equal to the number of characters in the string. If the character string begins with numeric characters but also contains non-numeric characters, then the value generated by the VAL function equals the leading numeric characters.

Another way to convert character numbers into numerics is the use of "&" (see 5.0 Macros). The "&" will convert the string into a numeric (including the decimal) when the substitution is encountered.

Examples:

```
. ? VAL('123')
  123
. ? VAL('123xxx')
  123
. ? VAL('123.456')
  123
. STORE '123.456' TO NUM
123.456
. ? 14 + &NUM
137.456
```

Rank Function

RANK (<char string>)

This function returns the integer value of the leftmost character of the <char string>). This function corresponds to the ASC function in many versions of the BASIC language.

Example:

```
? RANK('A')
65
```

Length Function

LEN(<char string>)

This function yields an integer whose value is the number of characters in the named string.

Example:

```
. STORE 'abc' TO STRING
. ? LEN(STRING)
  3
```

Deleted Record Function

*

This is a logical function which is .TRUE. if the current record has been marked for deletion, and .FALSE. otherwise.

Example:

```
. ? * .
.T.
```

(assuming that a database is in USE and that its current record has been deleted using the DELETE command)

End-of-File Function

EOF

This is a logical function which is .TRUE. if the end of file has been reached for the file in USE (the current record will be the last record in the database).

Examples:

```
. ? EOF
.F.
. GOTO BOTTOM
. ? EOF
.F.
. SKIP
. ? EOF
.T.
```

(assuming that a database is in USE and is not positioned at the last record).

Substring Search Function

@ (<char string 1>,<char string 2>)

This function yields an integer whose value is the character number in <char string 2> which begins a substring identical to <char string 1>. If string 1 does not occur in string 2 then the @ function will be of value zero. Note: the @ function is similar to the substring operator "$" except that it tells where the first string is found in the second string, and can well be pronounced "where is string 1 AT in string 2".

Example:

```
. ? @ ('def','abcdefghi')
  4
```

Upper Case Function

!(< char string expression>)

This function yields the same string as the character string expression except that all lower case characters are converted to upper case.

Example:

```
. ? !('abc')
ABC
```

Number to Character Function

CHR(< numeric expression>)

This function yields the ASCII character equivalent of the numeric expression. That is, if the expression were the number 13, then CHR(13) generates a carriage return ASCII character. This function is useful when the user needs to send direct controls to hardware devices, most often printers.

Example:

```
. ? 'abcd' + CHR(13) + '____'
abcd
```

Date Function

DATE( )

This function will generate a character string that contains the system date in the format XX/XX/XX. The character string always has a length of 8. Nothing goes between the parentheses, they only indicate a function (to avoid problems with variables named "DATE").

The dBASE system date can be entered at dBASE start-up time or at anytime using the SET DATE TO command. At start-up the date is checked for calendar conformity (see the format option on the INSTALL program). With the SET DATE TO <string> (no quotation marks), no checking is done, so the user can enter a date that is in MM/DD/YY, DD/MM/YY, or YY/MM/DD format.

Examples:

```
. ? DATE( )
06/15/81
. STORE DATE( ) TO MEMVAR
06/15/81
. SET DATE TO 4 1 82
. ? DATE( )
04/01/82
```

File Function

FILE(<string exp>)

This is a logical function which is .TRUE. if the <string exp> exists and is .FALSE. if it does not.

Example:

```
. USE TRACE
. ? FILE('TRACE')
.T.
```

Type Function

TYPE(<exp>)

This function yields a one-character string that contains a 'C', 'N', 'L', or 'U' if the <exp> is of type Character, Numeric, Logical, or Undefined respectively.

Example:

```
. STORE 1 TO X
. ? TYPE(X)
N
```

Trim Function

TRIM(<cstring>)

The TRIM function removes trailing blanks from a field. Usually dBASE carries trailing blanks on all variables to avoid column alignment problems on displays.

Note: This function must NOT be used in the INDEX command as the key length must be computable for internal dBASE usage.

Examples:

```
. STORE 'ABC' TO S
. ? LEN(S)
  6
. STORE TRIM(S) TO S
. ? LEN(S)
  3
```

4.2 OPERATIONS

There are four basic types of operations, arithmetic, comparison, logical and string. The specific operators in each class are listed below, and examples follow for the less familiar ones.

It is important to know that both "sides" of the operators must be the same type. That is, one may only add integers to integers or concatenate characters with characters, adding an integer to a character results in dBASE seeing a syntax error.

```
. STORE 3 TO A
  3
. STORE '3' TO B
3
. ? A+B
*** SYNTAX ERROR ***
  ?
? A+B
CORRECT AND RETRY(Y/N)?
```

This error occurs because numerics and characters are seen differently at the machine level; a numeric 3 is just that—3 hex, while a character 3 has the ASCII value of 33 hex. The program becomes confused, it does not know whether or not an addition is taking place or a concatenation. Using the same variables as in the previous example:

```
. ? A+VAL(B)
  6
```

The string '3' has been converted to an integer and the addition performed.

ARITHMETIC OPERATORS (generate arithmetic results)

+ = addition
– = subtraction
* = multiplication
/ = division
( ) = parentheses for grouping

Examples:

```
. ? (4+2)*3
  18
. ? 4+(2*3)
  10
```

An example of use of arithmetic parentheses used for grouping in calculations

COMPARISON OPERATORS (generate logical results)

< = less than
> = greater than
= = equal
< > or # = not equal
<= = less than or equal
>= = greater than or equal
$ = substring operator (e.g., if A and B are character strings, A$B will be TRUE if and only if string A is equal to B, or is contained in B

Examples:

```
. ? 'abc'$'abcdefghi'
 .T.
. ? 'abcd'$'ghijkl'
 .F.
. DISPLAY FOR '8080'$TITLE
```

An example of the $ substring operator

Results in all records with '8080' somewhere in the field TITLE being displayed on the screen

LOGICAL OPERATORS (generate logical results)

.OR. = **Boolean or**
.AND. = **Boolean and**
.NOT. = **Boolean not (unary operator)**

Examples:

```
. STORE T TO A
 .T.
. STORE F TO B
 .F.
. ? A .OR. B
 .T.
. STORE .NOT. B TO C
 .T.
. ? A .AND. C
 .T.
```

STRING OPERATORS (generate string result)

\+ = **string concatenation**
\- = **string concatenation with blanks moved to far right**

Examples:

```
. STORE 'ABCD  ' TO A
ABCD
. STORE 'EFGH' TO B
EFGH
. ? A+B
ABCD  EFGH
```

In a string concatenation the two strings are just appended to each other.

```
. STORE 'ABCDE  ' TO A
ABCDE
. STORE '1234  67' TO B
1234  67
. ? A-B
ABCDE1234  67
```

In a string concatenation with blank move, the trailing blanks are moved to the end of the string. Leading and embedded blanks are not altered.

Note: The lengths of A − B and A + B are equal.

ORDER OF EXECUTION

The sets of operators for the arithmetic, string and logical have an order in which they are satisfied. That is, what operation is done before what other operations. The following table indicates the order of precedence for each of the three major operator classes. In each of the "levels" (1, 2, etc.) the order of execution is left-to-right.

Example:

```
. ?? 4+2*3

10
```

Arithmetic operator precedence	String operator precedence	Logical
1) parenthesis, functions	parenthesis, functions	.NOT.
2) unary +,−	relations, $(substring op)	.AND.
3) *,/	+,− (concatenation)	.OR.
4) +,−		
5) relations		

5.0 MACRO SUBSTITUTION

Whenever an ampersand (&) followed by the name of a character string memory variable is encountered in a command, dBASE replaces the & and memory variable name with the memory variable's character string. This allows the user to define some parts of a command once and call it out any number of times in various commands.

Macros are useful when complex expressions must be frequently used. They also allow parameter passing within command file nests. All characters between the ampersand and the next special character (including space) are taken as the memory variable name.

If the user desires to append characters to the symbolic substitution, then the memory variable name should be terminated with a period. The period will be removed like the ampersand at substitution time.

If an ampersand is not followed by a valid memory variable name then no expansion is attempted and the ampersand remains in the command line.

Examples:

```
. ACCEPT "Enter data disk drive letter" to DR
. STORE DR + 'DATAFILE' TO DR
USE &DR
```

(at execution time this becomes USE B:DATAFILE if "B" was entered in response to the ACCEPT)

```
. STORE 'DELETE RECORD ' TO T
&T 5
```

(at execution time will be DELETE RECORD 5)

6.0 INTERFACING WITH NON-dBASE PROCESSORS

dBASE can read data from files which were created by processors other than dBASE (e.g. BASIC, FORTRAN, PASCAL) and can generate files which can be accepted by other processors.

The APPEND command has the ability to read standard ASCII text files (using the CP/M convention of a line of text followed by a carriage return and line feed) by specifying the SDF (System Data Format) option. Similarly, the COPY command generates standard ASCII format files when the SDF option is used. Unless explicitly overridden, the file types of files created with the SDF and DELIMITED options will be .TXT.

Some processors and languages read and write files in a delimited format. In this form all fields are separated by commas and character strings are enclosed in quotes. dBASE can APPEND and COPY these files when the DELIMITED keyword is included in the command. If the DELIMITED feature is used, SDF is assumed.

Since some processors use single quotes and some use double quotes to delimit character strings, APPEND will accept either. The COPY command normally generates single quotes but will output any character as defined by the WITH phrase of the DELIMITED clause. It is strongly recommended that only single and double quotes be used.

A special case occurs when a "," is used in the WITH phrase for a COPY. All trailing blanks in character strings and leading blanks in numerics are trimmed. Also, character strings will not be enclosed with quotes or any other character.

Examples:

```
.USE <FILENAME>.DBF
.COPY TO <FILENAME>.TXT DELIMITED WITH "

.USE <FILENAME>.DBF
.APPEND FROM <FILENAME>.DAT SDF
```

7.0 CLASSES OF COMMANDS

During the normal use of dBASE, various commands are used in combination to accomplish a particular task. Such groups are shown below. Some dBASE commands are patterned after the structured constructs that most "modern" computer languages use. These commands are in the COMMAND FILE class of commands. There are some special rules that control the use of these commands, which are expounded upon in section 9.0.

CREATION OF FILES — the following commands create database files and associated files:

* CREATE — create new structured database files
* COPY — copy existing databases to create copies
* MODIFY — alters database structures
* REPORT — create a report form file
* SAVE — copy the memory variables to mass storage
* INDEX — creates an index file
* REINDEX — realigns an old index file
* JOIN — outputs the JOIN of two databases
* TOTAL — outputs a database of totalled records

ADDITION OF DATA — the following commands add new data records to databases:

* APPEND — add data at end of a file
* CREATE — allows addition of data at creation
* INSERT — insert data into a file

EDITING OF DATA — the following commands edit the data within a database:

* CHANGE — edit columns of fields
* BROWSE — full screen window viewing and editing
* DELETE — marks records for deletion
* EDIT — alter specific data fields in a database
* PACK — removes records marked for deletion
* RECALL — erases mark for deletion
* REPLACE — replaces data fields with values
* READ — replaces data from user defined full-screen
* UPDATE — allows batch updates of a database

USER ASSISTANCE COMMANDS — the following commands give user on-line information:

* DISPLAY STATUS — current information about datafile and system parameters
* DISPLAY FILES — show files on currently logged disk drive
* HELP — explanation of dBASE commands and other information

DATA DISPLAYING COMMANDS — the following commands display selected data from a database:

* @ — displays user formated data on CRT or printer
* BROWSE — displays up to 19 records with as many fields as will fit on the screen
* COUNT — count the number of records that meet some conditional expression
* DISPLAY — displays records, fields, and expressions
* READ — displays data and prompting information in full-screen mode
* REPORT — format and display a report of data
* SUM — compute and display the sum of an expression over a group of database records
* ? — displays an expression list
* TEXT — displays a block of text data

POSITIONING COMMANDS — the following commands position the current record pointer to records as directed:

* CONTINUE — positions to next record with conditions specified in the LOCATE command
* FIND — positions to record corresponding to a key on indexed files
* GOTO — position to a specific record
* LOCATE — find a record that fits a condition
* SKIP — position forwards or backwards

FILE MANIPULATING COMMANDS — the following commands affect entire database files:

* APPEND — append dBASE files or files in System Data Format (SDF)
* COPY — copy databases to other databases or SDF files
* DELETE — delete files
* DO — specifies a command file from which subsequent commands are to be taken
* RENAME — rename a file
* SELECT — switches between USE file
* SORT — create a copy of a database which is sorted on one of the data fields
* USE — specifies the database file to be used for all operations until another USE is issued

MEMORY VARIABLE COMMANDS — the following commands manipulate the memory variables:

* ACCEPT — stores a char string into memory variables
* COUNT — stores counts into memory variables
* DISPLAY — can display memory variables
* INPUT — stores expressions into memory variables
* RESTORE — retrieves sets of stored memory variables
* SAVE — save the memory variables to a file
* STORE — stores expressions into memory variables
* SUM — stores sums into memory variables
* WAIT — accepts a single keystroke into a memory variable

COMMAND FILE COMMANDS — the following commands assist in the control and usage of command files:

* ACCEPT — allows input of character strings into memory variables
* CANCEL — cancels command file execution
* DO — causes command files to be executed and allows structured loops in command files
* IF — allows conditional execution of commands
* ELSE — alternate path of command execution within IF
* ENDDO — terminator for DO WHILE command
* ENDIF — terminator for IF command
* INPUT — allows input of expressions into memory variables
* LOOP — skips to beginning of DO WHILE
* MODIFY COMMAND — allows editing of command files
* RETURN — ends a command file
* SET — sets dBASE control parameters
* WAIT — suspends command file processing

DEVICE CONTROLLING COMMANDS — the following commands control peripheral devices like printers and CRT's:

* EJECT — ejects a page on the list device
* ERASE — clears the CRT

8.0 FULL SCREEN OPERATION

The following are cursor control keys for full screen operation:

ctl-E,A — Backs up to previous data field.

ctl-X,F — Advances to next data field.

ctl-S — Backs up one character in data field.

ctl-D — Advances one character in data field.

ctl-Y — Clears out rest of current field to blanks.

ctl-V — Switches (toggles) between overwrite and insert modes.

ctl-G — Deletes character under cursor.

RUBOUT — Deletes character to left of cursor.

ctl-Q — Aborts full screen and returns to normal dBASE control. Changes to database variables are abandoned.

When in EDIT:

ctl-U — Switches (toggles) the current record between being marked for deletion and unmarked.

ctl-R — Writes current record back to disk and displays previous record i.e. backs up a record.

ctl-C — Writes current record back to disk and displays next record i.e. advances to next record.

ctl-W or ctl-O — Writes current record to disk and exits screen edit mode. (ctl-O is for Superbrain)

When in MODIFY:

ctl-N — Moves all lines down one to make room for an insertion of a new line.

ctl-T — Deletes the line where the cursor is and moves all lower lines up.

ctl-C — Scrolls page down.

ctl-R — Scrolls line up; scrolls page up if at top of screen.

ctl-W or ctl-O — Writes data to the disk and resumes normal operations (ctl-O is for Superbrain).

ctl-Q — Exits without saving changes.

When in APPEND, CREATE, or INSERT:

ctl-C or ctl-R — Write current record to disk and proceed to next record.

Carriage return when no changes have been made and cursor is in initial position — terminate operation and resume normal dBASE operations.

When in BROWSE:

ctl-U — Switches (toggles) the current record between being marked for deletion and unmarked.

ctl-R — Writes current record back to disk and displays previous record i.e. backs up a record.

ctl-C — Writes current record back to disk and displays next record i.e. advances to next record.

ctl-W or ctl-O — Writes current record to disk and exits screen edit mode. (ctl-O is for Superbrain)

ctl-Z — Pans the window left one field.

ctl-B — Pans the window right one field.

9.0 COMMANDS

The explicit definitions of the dBASE commands are in this section. The user should familiarize him/herself with the information in this front material before reading the rest of the command information.

9.1 SYMBOL DEFINITIONS

Understanding what the special symbols in the general formats of the dBASE commands really mean is vitally important. Not only does it help in understanding just what the form of the command really is, it helps to show the potential of each command. Please read the following table thoroughly.

<commands> or <statements>
: Means any valid dBASE statements; it also means *whole* statements. An IF without an ENDIF, (or a DO WHILE without an ENDDO), is only half of a statement, while a REPORT is a whole statement in itself.

<char string> or <cstring>
: Means any character string; character strings are those characters that are enclosed in single quotes (') doublequotes ("), or square brackets ([ ]).

<delimiter>
: Means any special character; special characters are those characters from the keyboard that are punctuation marks like any of the following: "()*=,@'.

<exp>
: Means an expression; an expression can be created by tacking together numbers, functions, field names or character strings in any meaningful manner. "4+8," and "doc = '3' .or. doc = '4'," are both expressions as well as "$('abc'+&somestr,n,3) = 'abcdefg'."

<exp list>
: Means a list of expressions separated by commas; usually simple expressions are used. Two of the examples in the previous paragraph are rather complicated, the first one could be considered as simple.

<field>
: Means any record field name; in one of the examples that are in the following commands, one of the databases has field names like ITEM, COST, DATE, etc.

<field list> or <list>
: Means a list of record field names separated by commas.

<file> or <file name>
: Means any filename; these are file names that must obey the rules for file names that were stated in section 3.0

<form file>
Means the name of a report form filename; see section 3.4 and the REPORT command for the how and why of this type of file.

<index file>
Means the name of the file where indexing information is placed; see section 3.6 and the INDEX command for the how and why of this type of file.

<key>
Means the field name which will be indexed on; keys are important. There may be several indexes for any given database, each on different (or on a combination of) keys. Keys may be <expressions> or field names. See the INDEX command for more information.

<memvar>
Means any memory variable; memory variables are those variables that are created by STOREs or by use of a command that saves some value for later use (ACCEPT, INPUT, etc.) There is a maximum of 64 memory variables allowed in dBASE.

<memvar list>
Means a list of memory variables separated by commas.

<n>
Means a literal; literals are numbers which are not gotten from memory variables or calculations. "4+8" is not a literal, while "4" and "9876" are literals.

<scope>
Means a specification of the scope of the command; scope means how much does the command cover. There are three values that <scope> may take on.

ALL
Means all the records in the file. ALL means that the file is rewound and whatever the command ALL, the records in the file are searched for compliance. ALL is the default for some of the commands. For other commands, the default will be the current record (especially for the more potentially destructive commands like DELETE). Each command description tells what is the default scope. In the case of using a FOR phrase in any of the commands, ALL will be the default.

NEXT n
Means the next n records, including the current record; NEXT also begins with the record currently being pointed at. An n must have a literal value, that is, it must not be a memory variable or an expression.

RECORD n
Means only record n; again, n must not be a memory variable or an expression—it must be a literal before it will work.

FOR <exp>

Any record so long as some logical expression has a true value. Unless otherwise specified, the presence of a FOR clause causes ALL records to be scanned (with a rewind of the database). It is exclusive of the WHILE clause.

WHILE <exp>

Operate on the next block of records, as long as some logical expression (<exp>) has a true value. For the command to execute at all, the expression must be true for the current record. The command stops when the first false expression is encountered. The presence of a WHILE clause implies NEXT 65534 unless otherwise specified and does not rewind the database. It is exclusive of the FOR clause.

There are other special symbols used in the command formats. These are special to the command and will be explained in the body of the command.

9.2 RULES TO OPERATE BY

As with all command "languages," there are a set of rules which must be followed to successfully operate the program. The following rules are to be used in translating the general format of the commands into the more useful specific forms.

1. The verb of any command must be the first non-blank character of the command line; the phrases may follow in any order. A verb is an action word; CREATE, APPEND, REPORT, SET, DISPLAY and ERASE are all examples of verbs—they cause a specific action. Phrases are equivalent to adverbs; they more fully describe the action. FOR, NEXT, and WITH are examples of words that begin phrases. All of these example words are referred to as "keywords."

2. Any number of blanks may be used to separate words and phrases. Remember though, blanks are counted in the 254 limit described in Rule #3.

3. All commands must be less than 254 characters in length (even after a macro expansion).

4. Commands and keywords can be abbreviated to the first four (or more) characters. E.g. DISPLAY STRUCTURE could be input as DISP STRU or DISPL STRUCT or etc. Just remember that the abbreviation must also be spelled correctly up to the point where it ends.

5. Either upper or lower case letters may be used to enter commands, keywords, field names, memory variable names, or file names.

6. Parts of the commands are optional, that is, some parts of the commands may be left off when the command is used. Square brackets ([ ]) are used in the command formats to show which phrases are the optional constructs that may be left off These are the phrases which are used to modify the action of commands. The upper case words are the keywords and they must be entered whenever the phrase that contains them is used.

7. A reserved word is a keyword that will generate an error if it is used for something other than what it is supposed to be. There are no reserved words in dBASE. However, certain field names and file names can cause difficulty, e.g., a command file named WHILE will be incorrectly interpreted as a DO WHILE statement by the DO command processor; ALL as a field name cannot be used in a number of commands. (Also STATUS, STRUCTURE, FILE, RECORD). In general, it is a good practice to avoid the use of dBASE keywords as field names or file names.

8. dBASE statements in a command file must nest correctly. To nest something means that one statement must fit inside another statement. This is especially important to proper execution of the IF-ELSE-ENDIF and the DO WHILE-ENDDO groups. Indenting a command file will show if the statements are correctly nested. dBASE does not catch nesting errors; it will, however, execute the command file in an unknown manner. On the following page are examples of how to correctly nest these two statements.

```
DO WHILE .NOT. EOF
  statements
  .
  IF A .AND. B
    .
    more statements
    .
  ELSE
    .
    DO WHILE A < = 57
      .
      some more statements
      .
    ENDDO
    .
    even more statements
    .
  ENDIF
  .
  infinitely more statements
  .
ENDDO
```

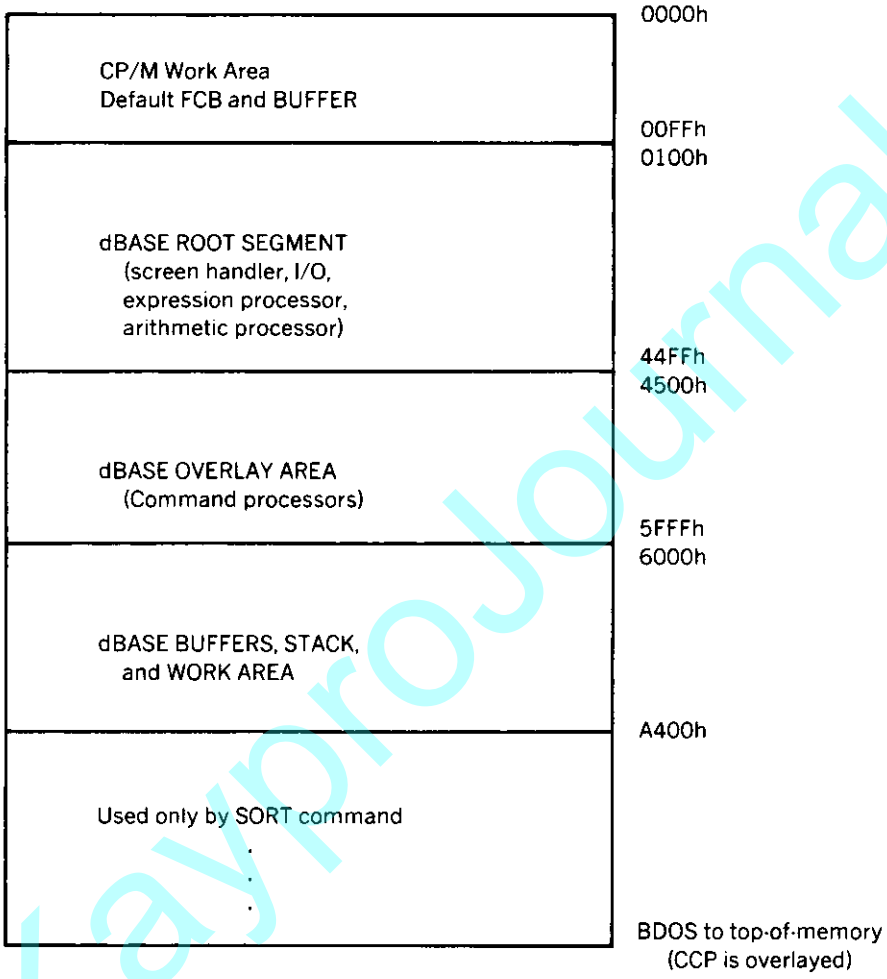
This is the correct way to nest. The IF-ELSE-ENDIF statement is totally within the DO WHILE-ENDDO statement, just as the second DO WHILE-ENDDO statement is totally within the ELSE part of the IF-ELSE-ENDIF. It would be just as easy to show more levels of nesting, since dBASE allows many more levels to exist.

```
DO WHILE .NOT. EOF
  .
  statements
  .
  IF something changes values
  .
  ENDDO
  .
  more statements
  .
  ENDIF
```

This is an example of a NO NO. The ENDDO crossed over the boundary of the IF-ENDIF group; that is, the two statements do not nest properly.The command file that holds these statements will not work as expected and dBASE will not explain why.

10.0 MACHINE LANGUAGE INTERFACE

10.1 MEMORY MAP



10.2 MACHINE LANGUAGE COMMANDS

SET CALL TO <address>

Sets the decimal address that will be called by a dBASE CALL command.

CALL [<memvar>]

Performs a machine language call to the address set by a SET CALL TO or the default address if no SET CALL has been done. There are about 254 bytes of stack available, the HL register pair points to the first byte if the <memvar> was a character string. It is most important that no attempt be made to lengthen or shorten a character string. Control can be passed back to dBASE with a RET instruction.

LOAD [<file>]

This command loads a file that is assumed to be a .HEX file in INTEL HEX format into memory.

POKE <address>,<data byte> [,<data byte> . . .]

Places data directly into memory

PEEK (<address>)

A function that returns a number corresponding to the unsigned binary value of the byte at <address>.

(This page is intentionally left blank)

?

? [<exp list>]
?? [<exp list>]

This command is a specialized form of the DISPLAY command; it is equivalent to DISPLAY OFF <exp>. It can be used to show the value of an expression or list of expressions. The question mark command (possibly pronounced "what is") can use memory variables, database fields, constants, or functions. A "?" with no expression spaces down a line on the output. This feature is particularly useful in command files to "open up" the displays.

The second form of this command "??" behaves like a single "?" except that no line feed or carriage return is done before the expression is printed. This can be used in command files to output more than one expression to the same output line.

If a SET RAW ON command is in effect, then no spaces will be placed between items in a list, otherwise one space separates items.

Examples:

```
. USE EXAMPLE
. 4
. ? #
 4
. ? NAME
CHANG, LEE
. ? 5+9
 14
```

Following is a sample command file that uses the ? to space out the display. The command file is set up to be executed with the command: "DBASE H:FILE." The dBASE response to the command file follows the command file.

```
SET DEFAULT TO G
USE trace INDEX trace
DISP STRU
?
ACCEPT "Enter today's date." TO dte
SET DATE TO &dte
RELEASE dte
RETURN
```

STRUCTURE FOR FILE: TRACE.DBF
NUMBER OF RECORDS: 02359
DATE OF LAST UPDATE: 10/08/82
PRIMARY USE DATABASE

FLD	NAME	TYPE	WIDTH	DEC
001	UP	C	024	
002	TRFLD	C	005	
003	DOC	C	024	
004	DESCR	C	080	
005	NATURE	C	010	
006	STATUS	C	006	
007	TESTED	C	004	
** TOTAL **			00154	

Enter today's date:10 14 81

@

@ <coordinates> [SAY <exp> [USING <format>]]
[GET <variable> [PICTURE <format>]]

This command works with the SET FORMAT TO, ERASE, EJECT, CLEAR, GETS and READ commands and is a most powerful way to display specific, formatted information on the screen or the printer. The way an "@" is interpreted changes according to how the SET FORMAT TO command is used. Also whether or not one of the other commands has an effect also depends on the SET command. All combinations are discussed below.

The <coordinates> are an "x,y" pair and may take on one of two meanings, either they are screen coordinates or they are printer coordinates. The "x,y" denotes line (x) and column (y). On most CRTs, the screen oriented coordinates have an "x" range of 0-23, and a "y" range of 0-79, that is 24 lines by 80 columns. dBASE uses the 0th line for messages to the user and the user should avoid using it. The printer oriented coordinates have both an "x" and a "y" range of 0-254. For either of these two meanings, the coordinates can be any literal, numeric memory variable, or numeric expression. The SET FORMAT command is used to choose between either of these two meanings.

The <coordinates> can also be relative addresses on the screen. That is, the new <coordinates> can reference the ending location on the screen or printer. A "$ + <expression>" construct is used to signal relative addressing and means the <coordinate> where the last @-command left off plus the value of the expression. If an @ 10,10 say 'HI' had been issued, then @ $,$+2 say 'THERE' will generate "HI THERE" on line 10 starting in column 10. Either the row or column can be relatively addressed. Only positive offsets are allowed (e.g. $ – <expression> is NOT permitted).

When a SET FORMAT TO SCREEN command has been issued (which is the default), the "@" command causes data to be displayed on the screen. A coordinate pair of 0,0 means the first character location on the upper left corner of the display. (This is frequently referred to as the home position.) The pair 10,15 means the 11th line and the 16th column of the display. Again the 0th line on the screen should not be used. "@" commands may be issued in any order to the screen. That is, one may SAY something to line 15 before one SAYs something to line 10. Likewise columns may be filled in any order.

When a SET FORMAT TO PRINT command has been issued, the "@" command will cause data to be printed on the printer. The coordinate pair 0,0 refers to the upper left hand corner of the paper. "@" commands to the printer must be output in order. Much paper will be wasted if this is not done. The user may like to pretend that a typewriter is being used (indeed, it is). All commands to line 5 must preceed commands to line 6; also, all commands to column 10 must preceed commands to column 20, etc. If this is not done, a page eject will occur before the new line is printed.

When the SET FORMAT TO SCREEN has been issued, an ERASE will clear the screen of all information that was previously on it, will release all the GETs (see below), and will reset the cooordinates to 0,0. When the SET FORMAT TO PRINT has been issued, an EJECT will do a page feed and reset the coordinates to 0,0.

The SAY phrase is used to display an expression that will not be altered by subsequent editing via the READ command. The USING subphrase is used to format the expression emitted by the SAY phrase. Formatting directives are explained below. It is a good thing to always use the USING subphrase. dBASE will take liberties with the expression if there is no USING.

SAY phrases may be used on either the screen or the printer. GETs however, will only be recognized when the SET FORMAT TO SCREEN command has been issued.

The GET phrase displays the current value of a field variable or memory variable. The variable must exist prior to issuing of the GET and is subject to later editing by the READ command. The PICTURE phrase may be used with a GET phrase to allow special formatting and validation of the data as it is entered (see the READ command for further information). If no PICTURE clause is given, then the data type (character, numeric or logical) forms an implicit PICTURE.

If the data type of the field variable or memory variable in the GET is logical, then the data validation allows only the characters 'T', 'F', 'Y', 'N', and their lower case equivalents to be entered.

A maximum of 64 GETs can be active at any given time. Either the ERASE command or the CLEAR GETS command may be used to release the existing GETs.

When SET FORMAT TO SCREEN is in effect and if neither a SAY or a GET phrase is given, then the remainder of the line indicated by the coordinates is cleared to spaces. Thus @ 10,0 will clear the entire 11th line.

When the SET FORMAT TO SCREEN is in effect, a READ must be issued in order to "fill" the GETs. (See the READ command). However when SET FORMAT TO PRINT is in effect, "@" commands require no subsequent READ commands to complete their action.

Not needing a READ to print allows the user to directly format the output for any pre-printed material (such as checks, purchase orders, etc.) in a most convenient manner. The user need only to remember that "@" commands must be issued as if one were typing on a typewriter.

In using the SET FORMAT TO PRINT capability, it is often necessary to print out more than one item. The ability to substitute memory variables for the coordinate values is important. The following example is from a command file that generates a special report form for a special task.

```
SET FORMAT TO PRINT
GOTO TOP
STORE 7 TO CNTR
DO WHILE  .NOT.  EOF
   IF CNTR > = 50
      EJECT
      STORE 7 TO CNTR
   ENDIF
   @  CNTR,12 SAY P USING 'XXXXXXXXXXXXXXXXXXXXXXXXXXXXX'
   @  CNTR,48 SAY D USING 'XXXXXXXXX'
   @  CNTR,64 SAY P1 USING 'XXXXXXXXXXXXXXXXX'
   @  CNTR,88 SAY U USING 'XXXXXXXXX'
   @  CNTR,104 SAY P2 USING 'XXXXXXXXXXXXXXXXX'
   IF RCD < > 0
      @  CNTR,130 SAY RCD USING '9999'
   ENDIF
   STORE CNTR + 1 TO CNTR
   SKIP
ENDDO
RETURN
```

In this command file, a maximum of 57 lines will be printed on the printer before a page eject is done. The purpose here was to print out most of the fields of a database (and selectively print out one of the fields). Care must be taken to make sure enough room is given to the SAY phrase to emit the variable. If the USING is shorter than the variable or the field, the variable or field is truncated. The <format> for the USING (the 'XXX...X') strings are explained in the table below.

Also, in the SET FORMAT TO PRINT mode, if the coordinates of the next "@" allow information to be printed on the same line but start it in a column that has already been printed, the printer may not output the proper information. In fact, the printer may go to the extreme right and print (in one square) all the information in the rest of the line. In the SET FORMAT TO SCREEN mode, the old information will be written over by the new information.

The last form of the SET FORMAT command is: SET FORMAT TO <format file>. When this command is in effect and when a READ command has been issued, the "@" commands are READ from the predesigned <format file>. In this manner, the user may design the screen into a format for more specialized purposes. It is important to note here that the use of format files is not necessary for use of "@"s, since "@"s may reside in command files. See READ for more information.

Formats:

Both the USING and PICTURE clauses have a format as their objective. The format is a series of characters that indicate which characters appear on the screen or page. The following table defines the characters and their functions:

Format character	SAY function	GET function
#	causes the next number to be output	allows only a digit (1, 2,...,8, 9, 0) and the characters "." "+," "–," and " " (a space) to be entered
9	same as #	same as #
X	outputs the next character	allows any character to be entered
A	outputs the next character	allows only alpha to be entered
$ or *	outputs either a digit or a $ or * instead of leading zeros	output as is
!	no effect	converts lowercase alpha characters to uppercase

Example:

. @ 5,1 SAY 'ENTER PHONE NUMBER' GET PNO PICTURE '(999)999—9999'

The message 'ENTER PHONE NUMBER' would be displayed, followed by '(bbb) bbb-bbbb' (b indicates a blank), assuming that the value of PNO was all blanks prior to issuance. When (and if) the READ command is issued, only digits can be entered. The value of PNO after the READ command might well be '(213)555-5555' after editing. All of the non-functional characters in the PICTURE format are inserted into the variable. In this example, the parentheses, minus sign and the blank are non-functional.

. @ 10,50 SAY HOURS*RATE USING '$$$$$$$.99'

This "@" command could be used with either the screen or the printer since it has no GET phrase. It might well be used to print payroll checks. The dollar signs will be printed as long as there are leading zeros in the item to be printed. If hours = 40 and rate = 12.50, then '$$$$500.00' will be displayed. This feature is known as floating dollar and is valuable for printing checks that cannot be easily altered in value.

When commas are used in the integer part of a picture, they are replaced by the picture character in front of them, if there are no significant digits in the item to the left of where the comma would otherwise be placed.

. @ 10,50 SAY HOURS*RATE USING '$$$,$$$.99'

Would output $$$$500.00 and specifically not output $$$,500.00.

Normally, a number of "@" commands are issued then, if any GET phrases were included, a READ command is issued to allow editing or data entry into the GET variables. In the following example, the screen is formatted with several "@"s and a database is filled with information according to these "@"s. The last record in the database will have a "0" in the field "name"; this is the record that will be deleted, since it is not necessary.

```
SET FORMAT TO SCREEN
USE F:EXAMPLE
ERASE
DO WHILE NAME # '0'
   APPEND BLANK
   @ 5,0   SAY "ENTER NEXT NAME" ;
           GET NAME PICTURE 'XXXXXXXXXXXXXXXXXXX'
   @ 6,0   SAY "ENTER TELEPHONE NUMBER";
           GET TELE:EXTSN PICTURE 'XXXXX'
   @  6,40 SAY "ENTER MAIL STOP" ;
           GET MAIL:STOP PICTURE 'XXXXXXXXXX'
   READ
ENDDO
GOTO BOTTOM
DELETE
PACK
LIST
RETURN
```

The following commands affect the operation of the "@" command:

- SET INTENSITY ON/OFF (default is ON) affects the screen intensity of GETs, and SAYs.
- SET BELL ON/OFF (default is ON) affects the bell alarm when invalid characters are entered or a data boundary is crossed.
- SET COLON ON/OFF (default is ON) affects whether GET variables are bounded by colons.
- SET DEBUG ON/OFF (default is OFF) allows easier debugging of "@" commands by shifting ECHO and STEP messages to the printer.
- SET SCREEN ON/OFF (default is ON) allows use of full screen operations.
- SET FORMAT TO SCREEN/PRINT/<format file> determines device destination of output (SCREEN or PRINTer). SET FORMAT TO <format file> establishes a format file as the source of "@" commands for the READ command. SCREEN is the default value.
- READ enters the editing mode so that GET variables can be altered.

ACCEPT

ACCEPT ["<string>"] TO <memvar>

This construct permits the entry of character strings into memory variables just as the INPUT command, but without the necessity of enclosing them in the quote marks required by the INPUT command. ACCEPT makes a memory variable of the type 'character' out of whatever is entered; INPUT determines the data type from the syntax of the entry and makes a memory variable of that type.

The <memver> is created, if necessary, and the input character string is stored into <memvar >. If "<cstring>" is present, it is displayed on the screen, followed by a colon, as a prompt message before the input is accepted. If a carriage return is entered in response to an ACCEPT request, <memvar> will receive a single space character. Either single quotes, double quotes, or square brackets may be used to delimit the prompt string, however, both the beginning and ending marks must correspond.

Examples:

```
. ACCEPT "ENTER PERSONS NAME" TO NAM
ENTER PERSON'S NAME:John Jones

. ACCEPT "ENTER PERSON'S NAME" TO NAM2
ENTER PERSON'S NAME:DaveSmith

. DISP MEMO
NAM          (C)        John Jones
NAM2         (C)        Dave Smith
** TOTAL **              02 VARIABLES USED        00020 BYTES USED

. ACCEPT TO ANY
 :ANY CHARACTERS

. DISP MEMO
NAM                     John Jones
NAM2                    Dave Smith
ANY                     ANY CHARACTERS
** TOTAL **             03 VARIABLES USED        00034 BYTES USED
```

USE INPUT for Numeric & Logical DATA

APPEND

a. APPEND FROM <file> [FOR <exp>] [SDF] [DELIMITED]
[WHILE <exp>]
b. APPEND BLANK
c. APPEND

In all three forms, records are appended onto the database in USE. APPEND, CREATE, and INSERT are the only commands that allow the addition of records to a database. APPEND and CREATE allow multiple additions at one time, INSERT allows only one.

In the first form, the records to be appended are taken from another file, i.e. <file>. If the SDF clause is present, the records are assumed to be in System Data Format (see section 6.0). If the new records are smaller than the old records in the USE file, then the new record is padded on the right side with blanks; if the new records are longer than the USE file records, then the newly appended records are truncated. Records are added to the USE file until end-of-file is detected upon the FROM file.

If the DELIMITED keyword is in the APPEND command, then the records taken from the FROM file are assumed to be delimited and appended accordingly. Many computer languages generate files where character strings are enclosed in single or double quotes and fields are separated by commas. In the delimited mode, dBASE removes the quotes and commas from delimited files and stores the data into a dBASE-structured database, according to the database's structure.

If the SDF and DELIMITED clauses are not present, then the FROM file is assumed to be a dBASE-structured database file. The structures of the USE and FROM file are compared. Fields which occur in the records of both files are taken from the FROM file and appended onto the USE file. Padding and truncation are performed as appropriate to force the FROM data items into the USE file's structure.

If the FOR phrase is used, then dBASE appends the records in the FROM <file> one by one, each time checking to see if the condition in the FOR is true. That is, the first record is appended. If the expression is true then the record is kept and dBASE will skip on to the next record. If the expression is false, then the record is discarded and dBASE will again skip on to the next record. This procedure will continue until the end-of-file is reached for the FROM <file>. The implication of this is that the fields used in the expression must reside in the file *receiving* the new records.

If the BLANK clause (form b) is specified, a single, space filled record is appended to the USE file. This record can then be filled by the EDIT or REPLACE statements.

If no clauses follow the APPEND command (form c.), the user is prompted with the field names from the USE file's structure. Any number of new records may be created from the keyboard. The append mode is terminated when a carriage return is entered as the first character of the first field.

If the database in USE is an indexed database, then the index files specified in the USE command are automatically updated when the new records are appended (except for APPEND BLANKs). Any other index file associated with that database must be re-indexed.

When APPENDing in the full-screen mode, the SET CARRY ON command will cause all of the data from the previous record to be carried over to the next record. Changes can then be made. This is especially useful if successive records have a lot of common data.

If a SET FORMAT TO <file> is in effect, then APPEND will use the @-commands from the format file to form the full-screen and allow complete control of the screen and the data that will be appended. Otherwise, APPEND displays all fields in tabular form.

The APPEND command is especially useful when it is necessary to expand/contract fields or add/delete fields from an existing database. Using the CREATE command, set up a new database containing the desired structure and then APPEND the old database to the new. Fields which appear only in the new database will be blank filled.

Examples:

```
. USE EXAMPLE

. DISPLAY STRUCTURE
STRUCTURE FOR FILE:   EXAMPLE
NUMBER OF RECORDS:  00005
DATE OF LAST UPDATE: 12/31/82
PRIMARY USE DATABASE
FLD          NAME          TYPE      WIDTH      DEC
001          NAME          C           020
002          TELE:EXTSN    C           005
003          MAIL:STOP     C           010
** TOTAL **                            00036

. DISPLAY ALL
00001   NEUMAN, ALFRED E.        1357        123/456
00002   RODGERS, ROY             2468        180/103
00003   CASSIDY, BUTCH           3344        264/401
00004   CHANG, LEE               6743        190/901
00005   POST, WILEY              1011        84/13B

. APPEND

RECORD 00006

NAME:        LANCASTER, WILLIAM J
TELE:EXTSN:  6623
MAIL:STOP:   170/430

RECORD 00007

NAME:        NORRIS, R. "BOB"
TELE:EXTSN:  8093
MAIL:STOP:   427/396
```

```
RECORD 00008

NAME:          (cr)

.DISPLAY ALL OFF NAME,   TELE:EXTSN
NEUMAN, ALFRED E.                    1357
RODGERS, ROY                         2468
CASSIDY, BUTCH                       3344
CHANG, LEE                           6743
POST, WILEY                          1011
LANCASTER, WILLIAM J.                6623
NORRIS, R. "BOB"                     8093

. APPEND FROM DUPE3
00007 RECORDS ADDED

. DISPLAY ALL
00001   NEUMAN, ALFRED E.            1357      123/456
00002   RODGERS, ROY                 2468      180/103
00003   CASSIDY, BUTCH               3344      264/401
00004   CHANG, LEE                   6743      190/901
00005   POST, WILEY                  1011      84/13B
00006   LANCASTER, WILLIAM J         6623      170/430
00007   NORRIS, R. "BOB"             8093      427/396
00008   NEUMAN, ALFRED E.            1357
00009   RODGERS, ROY                 2468
00010   CASSIDY, BUTCH               3344
00011   CHANG, LEE                   6743
00012   POST, WILEY                  1011
00013   LANCASTER, WILLIAM J.        6623
00014   NORRIS, R. "BOB"             8093

. APPEND BLANK

. DISPLAY
00015   RINEHART, RALPH

. REPLACE NAME WITH 'RINEHART, RALPH'

00001   REPLACEMENT(S)
```

```
. DISPLAY ALL NAME, ' ex =', TELE:EXTSN
00001   NEUMAN, ALFRED E.                    ex = 1357
00002   RODGERS, ROY                         ex = 2468
00003   CASSIDY, BUTCH                       ex = 3344
00004   CHANG, LEE                           ex = 6743
00005   POST, WILEY                          ex = 1011
00006   LANCASTER, WILLIAM J.                ex = 6623
00007   NORRIS, R. "BOB"                     ex = 8093
00008   NEUMAN, ALFRED E.                    ex = 1357
00009   RODGERS, ROY                         ex = 2468
00010   CASSIDY, BUTCH                       ex = 3344
00011   CHANG, LEE                           ex = 6743
00012   POST, WILEY                          ex = 1011
00013   LANCASTER, WILLIAM J.                ex = 6623
00014   NORRIS, R. "BOB"                     ex = 8093
00015   RINEHART, RALPH                      ex =

. USE B:SHOPLIST

. DISP STRU
STRUCTURE FOR FILE:   B:SHOPLIST.DBF
NUMBER OF RECORDS:    00009
DATE OF LAST UPDATE:  06/22/82
PRIMARY USE DATABASE
FLD            NAME          TYPE        WIDTH        DEC
001         ITEM              C           020
002         NO                N           005
003         COST              N           010          002
** TOTAL **                              00036

. CREATE
FILENAME:  NEWSHOP
ENTER RECORD STRUCTURE AS FOLLOWS:
   FIELD          NAME,TYPE,WIDTH, DECIMAL PLACES
   001            ITEM, C, 25
   002            NO,N,5
   003            COST,N,10,2
   004            NEED:DATE,C,8
   005            (cr)
INPUT NOW? N

. USE NEWSHOP

. APPEND FROM B:SHOPLIST
00009   RECORDS ADDED
```

```
. LIST
00001   BEANS                   5       0.75
00002   BREAD LOAVES            2       0.97
00003   T-BONE                  4       3.94
00004   PAPER PLATES            1       0.86
00005   PLASTIC FORKS           5       0.42
00006   LETTUCE                 2       0.53
00007   BLEU CHEESE             1       1.96
00008   MILK                    2       1.30
00009   CHARCOAL                2       0.75

. REPLACE ALL NEED:DATE WITH ' 7/4/82'
00009   REPLACEMENT(S)

. LIST
00001   BEANS                   5       0.75    7/ 4/82
00002   BREAD LOAVES            2       0.97    7/ 4/82
00003   T-BONE                  4       3.94    7/ 4/82
00004   PAPER PLATES            1       0.86    7/ 4/82
00005   PLASTIC FORKS           5       0.42    7/ 4/82
00006   LETTUCE                 2       0.53    7/ 4/82
00007   BLEU CHEESE             1       1.96    7/ 4/82
00008   MILK                    2       1.30    7/ 4/82
00009   CHARCOAL                2       0.75    7/ 4/82
```

(The following example demonstrates the DELIMITED file append. This file could have been created by a number of different versions of BASIC)

```
'BARNETT, WALT',31415,6
'NICHOLS, BILL',76767,17
'MURRAY, CAROL',89793,4
'WARD, CHARLES A.',92653,15
'ANDERSON, JAMES REGINALD III','11528', 16
```

(Append the file into a dBASE-structured database)

```
. USE ORDERS

. DISP STRU
STRUCTURE FOR FILE:   ORDERS.DBF
NUMBER OF RECORDS:  00008
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD             NAME            TYPE        WIDTH       DEC
001             CUSTOMER          C           020
002             PART:NO           C           005
003             AMOUNT            N           005
** TOTAL **                                   00031
```

```
. LIST
00001   SWARTZ, JOE              31415    13
00002   SWARTZ, JOE              76767    13
00003   HARRIS, ARNOLD           11528    44
00004   ADAMS, JEAN              89793    12
00005   MACK, JAY                31415     3
00006   TERRY, HANS              76767     5
00007   JUAN, DON                21828     5
00008   SALT, CLARA              70296     9

. APPEND FROM DELIM.DAT DELIMITED
00005 RECORDS ADDED

. LIST
00001   SWARTZ, JOE              31415    13
00002   SWARTZ, JOE              76767    13
00003   HARRIS, ARNOLD           11528    44
00004   ADAMS, JEAN              89793    12
00005   MACK, JAY                31415     3
00006   TERRY, HANS              76767     5
00007   JUAN, DON                21828     5
00008   SALT, CLARA              70296     9
00009   BARNETT, WALT            31415     6
00010   NICHOLS, BILL            76767    17
00011   MURRAY, CAROL            89793     4
00012   WARD, CHARLES A.         92653    15
00013   ANDERSON, JAMES REGI     11528    16
```

(The following examples demonstrate an APPEND FROM <file> FOR <exp>. Note that the fields in the FOR are in the USE file also.)

```
. USE CHECKS
. DISP STRU
STRUCTURE FOR FILE:   CHECKS.DBF
NUMBER OF RECORDS:   00013
DATE OF LAST UPDATE:  10/18/82
PRIMARY USE DATABASE
FLD          NAME          TYPE      WIDTH      DEC
001        NUMBER           N         005
002        RECIPIENT        C         020
003        AMOUNT           N         010        002
004        HOME             L         001
005        OUTGOING         L         001
** TOTAL **                          00038
```

```
. LIST
00001          1 Phone Company              104.89 .F. .T.
00002          2 Gas Company                  4.14 .F. .T.
00003          3 Electricity                250.31 .F. .T.
00004          4 Grocery Store             1034.45 .F. .T.
00005         34 Me                         561.77 .T. .F.
00006          6 Bank, service charge         4.00 .T. .T.
00007          7 Doctor Doolittle           100.00 .T. .T.
00008          8 Pirates                    101.01 .F. .T.
00009          9 Car Repair Man             500.01 .T. .T.
00010         10 Me                         561.01 .T. .F.
00011         11 Tupperware                  50.02 .F. .T.
00012         12 Me                         561.77 .T. .F.
00013         13 Me                         750.03 .T. .F.

. USE MONTH
. DISP STRU
STRUCTURE FOR FILE:    MONTH.DBF
NUMBER OF RECORDS:     00003
DATE OF LAST UPDATE:   10/18/82
PRIMARY USE DATABASE
FLD        NAME        TYPE   WIDTH     DEC
001        NUMBER       N      005
002        AMOUNT       N      010      002
003        HOME         L      001
** TOTAL **                   00017

. LIST
00001         29                 14.89 .T.
00002         16                764.09 .T.
00003         78                 97.96 .T.

. APPEND FROM CHECKS FOR HOME
00006 RECORDS ADDED

. APPEND FROM CHECKS FOR OUTGOING
*** SYNTAX ERROR ***
                          ?
APPEND FROM CHECKS FOR OUTGOING
CORRECT AND RETRY (Y/N)? N
```

That last append was to show what would happen if the FOR field was not in the USE file.

BROWSE

BROWSE [FIELDS < field list>]

The BROWSE command is one of the most powerful dBASE commands for data editing and viewing. The data from up to 19 records is displayed onto the screen (fewer if fields are greater than 80 characters). As many fields as will fit are put on each line. The screen should be considered as a window into a database. You can scroll backwards and forwards through the records and you can pan left and right through the fields of the database. Any data can be edited with the standard full-screen editing method (see section 8 for additional information).

If no < field list> is supplied, then BROWSE will show all fields in the same order as the structure.

This is a summary of the full-screen control keys that will work in BROWSE:

ctl-E,A backs up to the previous data field;
ctl-X,F advances to the next data field;

ctl-D advances to the next character;
ctl-S backs up to the last character;

ctl-G deletes the character under the cursor;
RUBOUT deletes the character before the cursor;

ctl-Q exits without saving the changes;
ctl-W exits and saves the changes (ctl-O for Superbrain);

ctl-B pans the window right one field;
ctl-Z pans the window left one field;

ctl-C writes the current record and advances one record;
ctl-R writes the current record and backs up one record;

ctl-U switches (toggles) the current record between being marked for deletion and not being marked.

Example:

```
. BROWSE

. BROWSE FIELDS NAME, ADDRESS, ZIP, COMPANY
```

CANCEL

CANCEL

Cancel a command file execution and return to the normal keyboard interpretive mode.

Example:

```
INPUT 'IS JOB DONE (Y/N)' TO X
IF X
    CANCEL
ENDIF
```

This is a fragment from a command file. The INPUT command asks for a yes/no answer. If the answer is yes ('Y', 'y', 'T', or 't') then the IF X line of the command file will be satisfied (since X will be logically .TRUE.) and the CANCEL command will be executed.

CHANGE

CHANGE [< scope>] FIELD < list> [FOR < exp>]

CHANGE is a command that allows the user to make a number of alterations to a database with minimum effort. All database fields that are referenced in the list are presented to the user in the order given by < list>. The user has the opportunity of entering new data, modifying the data or skipping to the next field. When the < list> has been exhausted, CHANGE will proceed to the next record as specified in the < scope>. The default scope is the current record.

A field can be deleted in its entirety by typing a control-Y (followed by a return) in response to the CHANGE? message. The CHANGE command can be aborted by typing an ESCAPE character.

Example:

```
. USE CARDS
. CHANGE FIELD DATE

RECORD: 00001

DATE:  08/19/81
CHANGE?  81
TO             82

DATE: 08/19/82
CHANGE? (cr)
```

CLEAR

CLEAR [GETS]

If the GETS (or GET) keyword is used, then all of the GETs that are pending (i.e. a GET set up by the @ command) are cleared and the screen is left intact. This is opposed to the ERASE command which clears pending GETs and also erases the screen.

If there is no GETS keyword, then this command resets dBASE II. All databases in USE are closed and un-used, all memory variables are released, and the PRIMARY work area is re-selected.

This command gives dBASE II a "clean slate." For instance: if a command file finished executing and left dBASE in the SECONDARY state, then executing a new command file that assumes that the PRIMARY state was selected will cause unknown things to happen.

CLEAR should be used at the beginning of a command file to give the command file a known state.

Example:

```
. CLEAR
```

CONTINUE

This command is used with the LOCATE command. LOCATE and CONTINUE may be separated by other commands, however there are limitations. See the LOCATE command for more information.

COPY

COPY TO <file> [<scope>] [FIELD <fieldlist>] [FOR<exp>] [SDF]
[WHILE <exp>] [DELIMITED [WITH <delimiter>]

COPY TO <file> STRUCTURE [EXTENDED]
[FIELD<fieldlist>]

This command copies the database in USE to another file. The <file> may be in dBASE format or in the System Data Format (if the SDF option is specified).

If the STRUCTURE clause is specified, then only the structure of a dBASE file in USE is copied to the "TO" file.

If a list of fields is supplied following a FIELD clause, then only those data fields are copied TO the file. For the COPY STRUCTURE FIELD <list>, only the structure of the listed fields is copied TO the file. In either case, the new structure will be made up of only those fields specified by the FIELD clause. No FIELD clause specifies that all fields will be copied.

If the SDF clause is specified, then the file in USE is copied to another file without the structure. This new file will be in ASCII standard format. This allows the generation of files which can be input to processors other than dBASE. The STRUCTURE and SDF clauses are mutually exclusive.

If the DELIMITED keyword is also in the command, then the output file will have all of its character string type fields enclosed in quotes and the fields will be separated by commas. This is the converse of a delimited APPEND. By default, the DELIMITED type of COPY uses single quotes as delimiters to mark character string fields. The WITH sub-phrase of the DELIMITED phrase allows any character to be the delimiter. If a "," is used as the delimiter, then the character fields will have trailing blanks trimmed, the numeric fields will have the leading blanks trimmed, and the character strings will not be enclosed in quotes. The APPEND command will only respond to single and double quotes.

If either the DELIMITED or SDF option is used; then the output <file> name will default to a .TXT extension, otherwise the output file will default to a .DBF extension.

The "TO" file is created if it does not exist, and will destroy any existing file of the same name.

COPY TO <file> STRUCTURE [EXTENDED] [FIELD] <fieldlist>]

This command copies the structure of the database file in USE to the specified database as records. The structure may then be examined during program execution.

Example:

```
. USE VTESTDB
. DISP STRU
```

```
STRUCTURE FOR FILE:   C:VTESTDB.DBF
NUMBER OF RECORDS:   00008
DATE OF LAST UPDATE: 12/20/82
PRIMARY USE DATABASE

FLD        NAME          TYPE      WIDTH      DEC
001        CHAR           C         010
002        LOG            L         001
003        NUMDEC         N         010       002
004        NUMINT         N         010
** TOTAL **                        00032

. COPY STRUCTURE EXTENDED TO TEST
00004 RECORDS COPIED

. USE TEST
. DISP STRU

STRUCTURE FOR FILE:   C:TEST.DBF
NUMBER OF RECORDS:   00004
DATE OF LAST UPDATE: 12/20/82
PRIMARY USE DATABASE
FLD        NAME          TYPE      WIDTH      DEC
001        FIELD:NAME     C         010
002        FIELD:TYPE     C         001
003        FIELD:LEN      N         003
004        FIELD:DEC      N         003
** TOTAL **                        00018

. LIST

00001        CHAR          C          10          0
00002        LOG           L           1          0
00003        NUMDEC        N          10          2
00004        NUMINT        N          10          0
```

(Modifications could be made here to the data [which is a structure]).

Examples:

```
. DISPLAY ALL OFF NAME, TELE:EXTSN
NEUMAN, ALFRED E.              1357
RODGERS, ROY                   2468
CASSIDY, BUTCH                 3344
CHANG, LEE                     6743
POST, WILEY                    1011
LANCASTER, WILLIAM J.          6623
NORRIS, R. "BOB"               8093
```

```
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:   EXAMPLE
NUMBER OF RECORDS:  00007
DATE OF LAST UPDATE:  12/14/82
PRIMARY USE DATABASE
FLD          NAME              TYPE       WIDTH      DEC
001         NAME                C          020
002         TELE:EXTSN          C          005
003         MAIL:STOP           C          010
** TOTAL **                               00036

. COPY TO DUPE
00007 RECORDS COPIED

. COPY TO DUPE2 FOR TELE:EXTSN < '8000'
00006 RECORDS COPIED

. USE DUPE2

. DISPLAY ALL
00001   NEUMAN, ALFRED E.           1357          123/456
00002   RODGERS, ROY                2468          180/103
00003   CASSIDY, BUTCH              3344          264/401
00004   CHANG, LEE                  6743          190/901
00005   POST, WILEY                 1011          84/13B
00006   LANCASTER, WILLIAM J.       6623          170/430

. USE EXAMPLE

. COPY FIELD NAME, TELE:EXTSN TO DUPE3
00007 RECORDS COPIED

. USE DUPE3

STRUCTURE FOR FILE:   DUPE3
NUMBER OF RECORDS:  00007
DATE OF LAST UPDATE:  12/20/82
PRIMARY USE DATABASE
FLD          NAME              TYPE       WIDTH      DEC
001         NAME                C          020
002         TELE:EXTSN          C          005
** TOTAL **                               00036
```

```
. DISPLAY ALL
00001   NEUMAN, ALFRED E.              1357
00002   RODGERS, ROY                   2468
00003   CASSIDY, BUTCH                 3344
00004   CHANG, LEE                     6743
00005   POST, WILEY                    1011
00006   LANCASTER, WILLIAM J.          6623
00007   NORRIS, R. "BOB"               8093
. USE EXAMPLE

. COPY NEXT 4 TO DUPE5
00004 RECORD COPIED

. USE DUPE5

. DISPLAY ALL
00001   NEUMAN, ALFRED E.              1357          123/456
00002   RODGERS, ROY                   2468          180/103
00003   CASSIDY, BUTCH                 3344          264/401
00004   CHANG, LEE                     6743          190/901
```

(The delimited COPY)

```
. USE ORDERS

. DISP STRUCTURE
STRUCTURE FOR FILE:   ORDERS.DBF
NUMBER OF RECORDS:  00012
DATE OF LAST UPDATE: 07/01/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH      DEC
001          CUSTOMER      C             020
002          PART:NO       C             005
003          AMOUNT        N             005
** TOTAL **                              00031

. LIST
00001   SWARTZ, JOE                    31415          13
00002   SWARTZ, JOE                    76767          13
00003   HARRIS, ARNOLD                 11528          44
00004   ADAMS, JEAN                    89793          12
00005   MACK, JAY                      31415           3
00006   TERRY, HANS                    76767           5
00007   JUAN, DON                      21821           5
00008   SALT, CLARA                    70296           9
00009   BARNETT, WALT                  31415           6
00010   NICHOLS, BILL                  76767          17
00011   MURRAY, CAROL                  89793           4
00012   WARD, CHARLES A.               92653          15
```

```
. COPY TO DELIM.DAT DELIMITED
00012 RECORDS COPIED

'SWARTZ, JOE          ' , '31415' ,  13
'SWARTZ, JOE          ' , '76767' ,  13
'HARRIS, ARNOLD       ' , '11528' ,  44
'ADAMS, JEAN          ' , '89793' ,  12
'MACK, JAY            ' , '31415' ,   3
'TERRY, HANS          ' , '76767' ,   5
'JUAN, DON            ' , '21828' ,   5
'SALT, CLARA          ' , '70296' ,   9
'BARNETT, WALT        ' , '31415' ,   6
'NICHOLS, BILL        ' , '76767' ,  17
'MURRAY, CAROL        ' , '89793' ,   4
'WARD, CHARLES A.     ' , '92653' ,  15
```

COUNT

COUNT [<scope>] [FOR<exp>] [TO<memvar>]
[WHILE<exp>]

Count the number of records in the USE file. If the FOR clause is invoked, then only the number of records which satisfy the expression are counted. If the TO clause is included, the integer count is placed into a memory variable. The memory variable will be created if it did not exist prior to this command. Count will count deleted records if DELETED is set OFF, and ignore them if DELETED is set ON.

dBASE responds with the message:
COUNT = xxxxx

Examples:

```
. USE INVNTRY

. DISPLAY STRUCTURE

STRUCTURE FOR FILE:   INVNTRY
NUMBER OF RECORDS:  00010
DATE OF LAST UPDATE: 10/23/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH        DEC
001          ITEM:NO       N           006
002          CLASS:NO      N           003
003          VENDOR:NO     N           005
004          DESCR         C           013
005          UNIT:COST     N           007          002
006          LOCATION      C           005
007          ON:HAND       N           004
008          SOLD          N           004
009          PRICE         N           007          002
** TOTAL **                             00055

. DISPLAY ALL
00001  136928  13  1673  ADJ. WRENCH     7.13  189  9  0  9.98
00002  221679   9  1673  SM. HAND SAW    5.17  173  4  1  7.98
00003  234561   0    96  PLASTIC ROD     2.18   27 112 53  4.75
00004  556178   2   873  ADJ. PULLEY    22.19  117  3  0 28.50
00005  723756  73    27  ELEC. BOX      19.56  354  6  1 29.66
00006  745336  13    27  FUSE BLOCK     12.65   63  7  2 15.95
00007  812763   2  1673  GLOBE           5.88  112  5  2  7.49
00008  876512   2   873  WIRE MESH       3.18   45  7  3  4.25
00009  915332   2  1673  FILE            1.32   97  7  3  1.98
00010  973328   0    27  CAN COVER       0.73   21 17  5  0.99
```

```
. COUNT
COUNT = 00010

. COUNT FOR ITEM:NO> 500000
COUNT = 00007

. COUNT FOR 'ADJ'$DESCR
COUNT = 00002

. GOTO TOP

. COUNT FOR PRICE< 10 NEXT 6
COUNT = 00003

. GOTO TOP

. COUNT NEXT 6 FOR PRICE< 10
COUNT = 00003

. USE B:SHOPLIST

. LIST
00001   BEANS                5        0.75
00002   BREAD LOAVES         2        0.97
00003   T-BONE               4        3.94
00004   PAPER PLATES         1        0.86
00005   PLASTIC FORKS        5        0.42
00006   LETTUCE              2        0.53
00007   BLEU CHEESE          1        1.96
00008   MILK                 2        1.30
00009   CHARCOAL             2        0.75

. DISPLAY STRUCTURE

STRUCTURE FOR FILE:   B:SHOPLIST. DBF
NUMBER OF RECORDS:  00009
DATE OF LAST UPDATE:  12/10/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH        DEC
001          ITEM          C             020
002          NO            N             005
003          COST          N             010        002
** TOTAL **                              00036

. COUNT TO XX FOR COST> 1
COUNT = 0003

. ? XX
3
```

CREATE

CREATE [<filename>]
[<filename> FROM <FILENAME>]

A new dBASE structured file is CREATEd. The user provides the structure, field names, and file name for the database file.

If not supplied in the command, the user is first prompted for the <filename> to be used by the message:

FILENAME:

The user enters a valid filename with the following added restriction: the filename may contain no special characters other than those normally used by CP/M for special purposes (such as B: to denote disk drive "B").

dBASE is now ready to accept the structure of the data base from the user. The following message is displayed:

```
ENTER RECORD STRUCTURE AS FOLLOWS:
FIELD        NAME,TYPE,WIDTH,DECIMAL PLACES
001
```

The user now enters field names and associated structure information. A field name is a character string up to 10 characters long which consists of alphabetic letters, numeric digits, and colons. Field names must begin with an alphabetic character. Fields may be any of three types: character string, numeric, or logical. The type field is specified by one character, as:

C — character string
N — numeric
L — logical

The width refers to the length of the field; for instance, a character string may be 20 characters long (i.e. its width is 20). Numeric data may be either integer or decimal. The width of integers is the maximum number of digits that they may be expected to contain. For decimal numbers, two widths are required; the first is the maximum number of digits that the decimal number is expected to contain (including the decimal point), the second width is the number of digits which are to be allowed on the right side of the decimal point. Logical data may only be of length 1.

The CREATE <filename> FROM <filename> command creates a new file by reading the structure from the records of the FROM file. The contents of the FROM file may be input by the COPY STRUCTURE EXTENDED command, or by the usual data entry methods.

Example:

```
. USE TEST
. DISP STRU

STRUCTURE FOR FILE:    C:TEST.DBF
NUMBER OF RECORDS:   00004
DATE OF LAST UPDATE:  12/14/82
PRIMARY USE DATABASE
FLD            NAME            TYPE        WIDTH        DEC
001         FIELD:NAME           C           010
002         FIELD:TYPE           C           001
003         FIELD:LEN            N           003
004         FIELD:DEC            N           003
** TOTAL **                                00018

. LIST

00001       CHAR                 C            10          0
00002       LOG                  L             1          0
00003       NUMDEC               N            10          2
00004       NUMINT               N            10          0
```

(Modifications could be made here to the data [which is a structure])

```
. CREATE TEST2 FROM TEST
. USE TEST2
. DISP STRU

STRUCTURE FOR FILE:    C:TEST2.DBF
NUMBER OF RECORDS:   00000
DATE OF LAST UPDATE:  12/14/82
PRIMARY USE DATABASE
FLD            NAME            TYPE        WIDTH        DEC
001         CHAR                 C           010
002         LOG                  L           001
003         NUMDEC               N           010          002
004         NUMINT               N           010
** TOTAL **                                00032

. CREATE
FILENAME: EXAMPLE
ENTER RECORD STRUCTURE AS FOLLOWS:
FIELD                NAME,TYPE,WIDTH, DECIMAL PLACES
001                  NAME,C,20
002                  TELE:EXTSN,C,5
003                  MAIL:STOP,C,10
004                  (cr)
INPUT DATA NOW?      Y
```

```
RECORD 00001

NAME                NEUMAN, ALFRED E.
TELE:EXTSN:         1357
MAIL:STOP:          123/456

RECORD 00002

NAME:               RODGERS, ROY
TELE:EXTSN:         2468
MAIL:STOP:          180/103

RECORD 00003

NAME:               CASSIDY, BUTCH
TELE:EXTSN:         3344
MAIL:STOP:          264/401

RECORD 00004

NAME                CHANG, LEE
TELE:EXTSN          6743
MAIL:STOP           190/901

RECORD 00005

NAME                POST, WILEY
TELE:EXTSN:         1011
MAIL:STOP:          84/13B

RECORD 00006

NAME:               (cr)

. DISPLAY STRUCTURE
NO DATABASE FILE IN USE, ENTER FILENAME:  EXAMPLE
STRUCTURE FOR FILE:    EXAMPLE
NUMBER OF RECORDS:  00005
DATE OF LAST UPDATE:  12/14/82
PRIMARY USE DATABASE
FLD          NAME              TYPE          WIDTH          DEC
001          NAME              C             020
002          TELE:EXTSN        C             005
003          MAIL:STOP         C             010
** TOTAL **                                  00036
```

```
. DISPLAY ALL
00001   NEUMAN, ALFRED E.       1357        123/456
00002   RODGERS, ROY            2468        180/103
00003   CASSIDY, BUTCH          3344        264/401
00004   CHANG, LEE              6743        190/901
00005   POST, WILEY             1011        84/13B
```

DELETE

DELETE [< scope>] [FOR < exp>]
[WHILE < exp>]
DELETE FILE < filename>

All records which are within < scope> (and which satisfy the FOR expression if present) are marked for deletion. The default scope is the current record only. Records are not physically deleted until a PACK operation; however records marked for deletion will not be copied, appended, or sorted. The RECALL operation may be used to revive records marked as deleted. Records which are marked for deletion can be displayed. The mark of deletion appears as an asterisk between the record number and the first field. See also the SET DELETED ON/OFF command.

In the second form, the file named < filename > will be removed from the disk drive where it resides (if possible), and the space it was occupying will be released to the operating system for reassignment. If, however, the < filename> is currently in use, the file will not be deleted.

Examples:

```
. LIST
00001   136928   13   1673   ADJ. WRENCH      7.13   189    9   0   9.98
00002   221679    9   1673   SM. HAND SAW     5.17   173    4   1   7.98
00003   234561    0     96   PLASTIC ROD      2.18    27  112  53   4.75
00004   556178    2    873   ADJ. PULLEY     22.19   117    3   0  28.50
00005   723756   73     27   ELECT. BOX      19.56   354    6   1  29.66
00006   745336   13     27   FUSE BLOCK      12.65    63    7   2  15.95
00007   812763    2   1673   GLOBE            5.88   112    7   3   7.49
00008   876512    2    873   WIRE MESH        3.18    45    7   3   4.25
00009   915332    2   1673   FILE             1.32    97    7   3   1.98

. DELETE RECORD 2
00001 DELETION(S)

. 5

. DELETE NEXT 3
00003 DELETION(S)
```

```
. LIST
00001   136928   13   1673   ADJ. WRENCH      7.13   189    9   0   9.98
00002  *221679    9   1673   SM. HAND SAW     5.17   173    4   1   7.98
00003   234561    0     96   PLASTIC ROD      2.18    27  112  53   4.75
00004   556178    2    873   ADJ. PULLEY     22.19   117    3   0  28.50
00005  *723756   73     27   ELECT. BOX      19.56   354    6   1  29.66
00006  *745336   13     27   FUSE BLOCK      12.65    63    7   2  15.95
00007  *812763    2   1673   GLOBE            5.88   112    5   2   7.49
00008   876512    2    873   WIRE MESH        3.18    45    7   3   4.25
00009   915332    2   1673   FILE             1.32    97    7   3   1.98

. RECALL ALL
00004 RECALL(S)

. LIST
00001   136928   13   1673   ADJ. WRENCH      7.13   189    9   0   9.98
00002   221679    9   1673   SM. HAND SAW     5.17   173    4   1   7.98
00003   234561    0     96   PLASTIC ROD      2.18    27  112  53   4.75
00004   556178    2    873   ADJ. PULLEY     22.19   117    3   0  28.50
00005   723756   73     27   ELECT. BOX      19.56   354    6   1  29.66
00006   745336   13     27   FUSE BLOCK      12.65    63    7   2  15.95
00007   812763    2   1673   GLOBE            5.88   112    5   2   7.49
00008   876512    2    873   WIRE MESH        3.18    45    7   3   4.25
00009   915332    2   1673   FILE             1.32    97    7   3   1.98

. DISP FILES ON B
DATABASE FILES                 # RCDS          LAST UPDATE
SHOPLIST        .DBF           00007           06/06/82
SHOPSAVE        .DBF           00007           06/05/82

. DELETE FILE B: SHOPSAVE
FILE HAS BEEN DELETED

. DISPLAY FILES ON B
DATABASE FILES                 # RCDS          LAST UPDATE
SHOPLIST        .DBF           00007           06/06/82
```

DISPLAY

a. DISPLAY [< scope >] [FOR < exp >] [< exp list >] [OFF] [FIELDS < list >]
[WHILE < exp >]
b. DISPLAY STRUCTURE
c. DISPLAY MEMORY
d. DISPLAY FILES [ON < disk drive >] [LIKE < skeleton >]
e. DISPLAY STATUS

Display is the foundation of dBASE. The end goal of all database operation is to display the data in the database (or cross sections and abstractions of the data) upon demand. DISPLAY satisfies that goal by allowing a wide variety of forms that select the wanted data.

In case a., all or part of the database in USE is displayed. If < scope > is not specified and the FOR < exp > is not in the command, only the current record can contribute information for display. If < scope > is not specified and there is a FOR < exp >, then all records in the database may contribute to the display. All fields are displayed unless the < exp list > clause is specified. Valid expressions may consist of data fields, memory variables, or any valid literal number, character or logical. The current record number is prefixed to each line displayed unless the OFF option is selected. If the FOR clause is specified, then only those records that satisfy the FOR's conditional expression can contribute information for display. DISPLAY FIELDS < list > allows you to use (and DISPLAY) field names that are otherwise ambiguous i.e., STATUS, FILE, STRUCTURE.

After groups of 15 records have been displayed, DISPLAY waits for any keystroke to continue. This allows the user to "page" through a long display. The LIST command is identical to the DISPLAY command except that LIST does not wait after record groups and its default scope is ALL records. An ESCape character terminates the DISPLAY or LIST commands.

In case b., only the structure of the database in USE is displayed.

In case c., all currently defined memory variables are displayed as memory variable name and associated value.

Case d. is a way to display .DBF files that are residing on the default unit (or on < disk drive >) along with some of the database's statistics. The LIKE phrase allows other types of files to be displayed. The < skeleton > is usually of the form *.type, where type is .TXT, .FRM, .MEM, or any other three letter string. These files are displayed just as in the CP/M DIR command.

Case e. displays any files that are in USE along with the index files any key expressions that have been USEd or SET on. DISPLAY STATUS also shows the setting of all SET commands.

Examples:

```
. USE B:INVENTRY

. DISPLAY STRUCTURE
STRUCTURE FOR FILE:   B:INVENTRY.DBF
NUMBER OF RECORDS:  00008
DATE OF LAST UPDATE: 12/18/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH        DEC
001          ITEM          C           020
002          COST          N           010          002
003          PART:NO       C           005
004          ON:HAND       N           005
** TOTAL **                            00041 BYTES
(note:  total includes 1 overhead byte)

. DISPLAY ALL ITEM, PART:NO, COST*ON:HAND ,$(PART:NO,1,2) FOR ;
 COST > 100 .AND. ON:HAND > 2 OFF
TANK, SHERMAN                 89793                404997.00  89
TROMBONES                     76767                 15076.12  76
RINGS, GOLDEN                 70296                  1000.00  70

. DISPLAY MEMORY
CLIENT:NAM    (C)       DANGLEMEYER, PRENTICE
BUDGET        (N)        123456.70
EF:STATUS     (L)       .T.
** TOTAL **             03 VARIABLES USED        00027 BYTES USED

. DISPLAY FILES ON B: LIKE *.FRM
TEST .FRM ADMIN .FRM ORDERS .FRM

. DISPLAY FILES
DATABASE FILES                # RCDS          LAST UPDATE
TEST          .DBF            00077          00/00/00
ADRECS        .DBF            00073          09/23/81
HISTSTR       .DBF            00000          06/29/81
TMPADMIN      .DBF
NOT A dBASE II DATABASE
```

The last .DBF file in the list above is the file that is not a dBASE database.

Only representative examples of DISPLAY are given here; refer to other commands for other examples.

DO

a. DO <file>
b. DO WHILE <exp>
   <statements>
   ENDDO
c. DO CASE

In case a. <file> is opened and read. The file in this case is known as a COMMAND FILE. It consists entirely of dBASE commands. The input is interpreted and executed as keyboard commands are. DO's can be stacked up to 16 deep (i.e. command files can contain DO commands which invoke other command files). Control is released by a command file with an end-of-file or by the RETURN command. If the current command file was called by a command file, control will be given back to the higher level command file. If, during the execution of a command file, a CANCEL command is encountered, all command files are closed and the keyboard is made the source for future commands.

In case b. if the <exp> evaluates as a logical TRUE, the statements following the DO are executed until an ENDDO statement is encountered. If the <exp> evaluates to a logical FALSE, control is transferred to the statement following the ENDDO statement.

Note: <statements> refers to entire statements. The DO WHILE statement ends with an ENDDO. Statements must nest properly; if there is an IF "inside" a DO WHILE, then an ENDDO may not occur before the ENDIF. See section 9.2 Rule 8 for more information.

Examples:

```
DO ACCNTPAY

DO WHILE .NOT.EOF
   DISPLAY NAME
   .
   .
   .
   SKIP
ENDDO
```

CASE is an extension of the DO command and takes the form shown above. There is no limit to the number of CASE phrases that a DO CASE may contain. The OTHERWISE phrase is optional.

DO CASE is a structured procedure. The individual CASEs in the construct could be viewed as the exceptions to the rule that defines the OTHERWISE. If some condition needs some special processing, then the condition would be a CASE and all other conditions would be the OTHERWISE. OTHERWISE may also be viewed as the default condition. See the first example below.

How dBASE handles the DO CASE construct may best be explained as a series of IFs. That is, dBASE will execute the DO CASE as if it were a list of IF-ENDIFs.

```
DO CASE
   CASE ITEM='ORANGES'
      any statements
   CASE ITEM='APPLES'
      any statements
   OTHERWISE
      any statements
ENDCASE
```

```
IF ITEM='ORANGES'
   any statements
ELSE
   IF ITEM='APPLES'
      any statements
   ELSE
      any statements
   ENDIF
ENDIF
```

Thus, dBASE will examine the <exp>s in the individual CASEs and the first one that is true will have the statements after it executed. When dBASE reaches the next phrase beginning with a "CASE," it will exit to the ENDCASE. This means that if more than one CASE is true, only the first one will be executed.

If the OTHERWISE clause is present and none of the CASEs are true, then the <statements> in the OTHERWISE clause will be executed. If there is no OTHERWISE clause and none of the CASEs are true, then the DO CASE will be exited with none of the <statements> executed at all.

Any statements that are placed between the "DO CASE" and the first "CASE" will not be executed.

Examples:

```
DO CASE
   CASE ITEM = "BROWN"
        <statements> that process BROWN
   CASE ITEM = "JONES"
        <statements> that process JONES
   CASE ITEM = "SMITH"
        <statements> that process SMITH
   OTHERWISE
        <statements> that process all the other names
ENDCASE
```

In the case above, all the expressions were for the same field name. This is not necessary. An <exp> may contain anything and the series of CASEs need not have a tight relationship.

```
DO CASE
    CASE TODAY = "MONDAY"
        <statements> for MONDAY
    CASE WEATHER = "RAIN"
        <statements> for RAIN
    CASE CITY = "LOS ANGELES"
        <statements> for LOS ANGELES
ENDCASE
```

Of course, if it is a rainy Monday in Los Angeles only the CASE for MONDAY will be executed.

CASEs need not be all character strings as in these two examples. Any expression will work.

```
DO CASE
    CASE 3 = 2 + 1
        <statements> for addition
    CASE .NOT. A
        <statements> for boolean logic
    CASE "A"$"ABCDEF"
        <statements> for string logic
    OTHERWISE
        <statements>
ENDCASE
```

EDIT

EDIT [n]

The EDIT command allows the user to selectively change the contents of the data fields in a database. Edit's usage and action varies, depending on whether or not dBASE is in the full-screen mode (see the SET SCREEN command).

When dBASE is in the full-screen mode, editing can be done by either "EDIT" or "EDIT n" (n represents the record to be edited). If n is not present, then dBASE will ask for the coordinates of the record to be edited. This is similar to the non-full-screen mode; however, full-screen capabilities will still be used after the record number is supplied. See section 8, full-screen operations, for a description of control keys and cursor movement.

If a SET FORMAT TO <file> is in effect, then EDIT will use the @- commands from the format file to form the full-screen and allow complete control of the screen and the data that will be appended. Otherwise, EDIT displays all fields in tabular form.

When the edit command is used in the non-full-screen mode, dBASE responds with:

COORD:

The user then enters the coordinates of the data field to be changed and (optionally) the new value. The coordinates of the data field are: the record number, and the field number (or the field name). If a new value is supplied, dBASE will replace the contents of the specified field with the new value. If a new value is not supplied, dBASE displays the current value of the data field and prompts the user for changes. If no changes are desired, a carriage return will cause dBASE not to alter the contents of the field. Whether changes are made or not, dBASE will prompt the user for the next pair of coordinates with another "COORD:" message.

After the first set of coordinates have been entered, the user may omit either of the coordinate values and dBASE will use the previous value of that coordinate. The EDIT mode is exited by entering a carriage return as the response to the COORD request.

The entire data field can be erased by entering a control-Y, RETURN whenever the CHANGE? message is displayed. This permits a field to be completely reentered if desired. The editing of a data field can be aborted by entering a ctl-Q character. This discards any editing done and restores the data field to its original contents.

If an INDEXed file is being EDITed and the index clause was USEd, then dBASE will adjust the index if the key field is altered. If more than one index file is associated with the database, then the un-USEd files will be unaffected by the edit.

Examples:

```
. USE SHOPLIST

. DISPLAY STRUCTURE
STRUCTURE FOR FILE:   SHOPLIST
NUMBER OF RECORDS:  00006
DATE OF LAST UPDATE: 07/03/82
PRIMARY USE DATABASE

FLD          NAME          TYPE        WIDTH        DEC
001          ITEM          C             020
002          NO            N             005
003          COST          N             010          002
** TOTAL **                               00036

. LIST
00001  BEANS #303 CAN          5      0.69
00002  BREAD                   2      0.89
00003  T-BONE STEAKS           4      3.59
00004  LETTUCE                 1      0.49
00005  MILK (1 GAL BOTTLES)    2      1.19
00006  CHARCOAL                1      0.69

. EDIT
COORD:   5, ITEM, MILK (1/2 GAL)

COORD:   2, 1

ITEM:  BREAD

CHANGE?  D
TO       D LOAVES

ITEM: BREAD LOAVES
CHANGE?  (cr)
COORD:   6, 1

ITEM:  CHARCOAL
CHANGE?  AL
TO       AL, 5# BAGS

ITEM:  CHARCOAL, 5# BAGS
CHANGE?  (cr)
COORD:   , 2

NO:      1
TO:      2
COORD:   4
```

```
NO:       1
TO:       2
COORD:    (cr)

. LIST
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAKS           4       3.59
00004   LETTUCE                 2       0.49
00005   MILK (1/2 GAL)          2       1.19
00006   CHARCOAL, 5# BAGS       2       0.69
```

(The following portion of a command file would also allow one to edit a database on a selective basis. The "&" is vital to making these commands work; it will change the string accepted by the ACCEPT into numbers that EDIT will recognize.)

```
STORE '1' TO X
DO WHILE X <> '0'
    ACCEPT "Enter Record Number" TO X
    EDIT &X
ENDDO
```

EJECT

EJECT

This command causes the printer to do a form feed (eject the page) if either PRINT is SET ON or FORMAT is SET TO PRINT. When using the @ command to do direct page formatting, the EJECT command also zeros the line and column registers. See also the SET EJECT ON/OFF command.

Example:

```
.EJECT
```

ERASE

ERASE

This command clears the screen and places the cursor in the upper left corner of the screen. When using the @ command with the SET SCREEN ON in effect, ERASE clears memory of prior @ command GETS and PICTURES.

Example:

```
. ERASE
```

FIND

FIND <char string> or '<char string>'

This command causes dBASE to FIND the first record in an indexed database (in USE) whose key is the same as <char string>. FIND allows very rapid location of records within an indexed database. A typical FIND time is two seconds on a floppy diskette system.

FIND operates only on databases that have previously been indexed (see the INDEX command description). If the INDEX command used a character string expression as the key, then FIND will operate when it is given only the first few characters of the key. The found record will be the first one whose key has the same order and number of characters as the <char string>. For example: a record whose key is 'SMITH, JOHN' could be found by the statement 'FIND SMI' provided that there are no other keys starting with 'SMI' proceeding SMITH, JOHN in the index. FIND will always find only the first record whose key is the same as <char string>. Even if the record pointer is moved down further in the file, a subsequent FIND on the same key will find the FIRST record.

If the index was created with a numeric key, then the found record will be the first record whose key is arithmetically equal to the object of the FIND.

Note: For indexes keyed on both characters and numbers, the FIND object is a character string with or without quote delimiters. Quote marks only become necessary for character strings if the original key had leading blanks. In that case, the exact number of leading blanks should be inside the quotes.

If a memory variable is desired as a FIND object, it must be placed after the FIND command by means of an &-macro replacement, e.g. FIND &NAME where NAME is a character string memory variable. Numeric memory variables must first be converted to a string by means of the STR function before they can be "macro-ized." See Section 5 for a discussion on macros.

Once a record in a database has been located by means of the FIND command, it can be processed just as any other database record. That is, it can be interrogated, altered, used in calculations, etc. dBASE commands that cause movement of the database (e.g. LIST, REPORT, COPY, etc.) will process the found record first and proceed to the next record in sequence, based upon the key.

If no record exists whose key is identical to the <char string > then the message: "NO FIND" will be displayed on the screen and the record number function "#" will give the value of zero.

If a second record with the same key is wanted, then a SKIP or a LOCATE FOR <exp> should be used. The SKIP will not know when there is no longer a match, the LOCATE (as long as the key was used in the expression) will be able to find additional matches.

SET EXACT ON will cause FIND to get a 'hit' only if there is a character for character match for the ENTIRE key (except for trailing blanks).

SET DELETE ON will cause FIND to NOT find any records that have been marked for deletion by the DELETE command.

Examples:

```
. USE SHOPLIST INDEX SHOPINDX

. LIST
00001   Beans           5       0.75
00007   Bleu cheese     1       1.96
00002   Bread loaves    2       1.06
00009   Charcoal        2       0.75
00006   Lettuce         2       0.53
00008   Milk            2       1.30
00004   Paper plates    1       0.94
00005   Plastic forks   5       0.42
00003   T-Bone steak    4       4.33

. FIND Bread

. DISPLAY
00002   Bread loaves    2       1.06

. DISPLAY NEXT 3
00002   Bread loaves    2       1.06
00009   Charcoal        2       0.75
00006   Lettuce         2       0.53

. FIND P

. DISPLAY
00004   Paper plates    1       0.94

. FIND Plas

. DISPLAY
00005   Plastic forks   5       0.42

. FIND P

. DISPLAY
00004   Paper plates    1       0.94
```

FIND will work in the file indexed with a multiple key, if the key includes all the spaces between the parts of the key.

```
. LIST
00001  Flying High              Bird, I. M.       IMB001   02/29/04
00005  Nesting Procedures       Bird, I. M.       IMB002   09/25/06
00002  Diving                   Fish, U. R.       URF001   12/30/23
00008  Nursing                  Knight and Gale   KG001    08/04/44
00010  Vacationing in Europe    Knight and Gale   KG002    06/24/42
00004  101 Ways to Tie a Knot   Lynch, I.         IL001    04/01/00
00003  How to Survive a Crash   Lynch, M.         ML001    01/01/30
00007  Even Primes              Sladek, L         LS001    12/01/73
00009  Even More Primes         Sladek, L         LS002    04/24/73
00006  Thinking Big             Tim, Tiny         TT001    05/07/42

. FIND "Bird, I.M.                IMB002"

. DISP
00005  Nesting Procedures       Bird, I. M.       IMB002   09/25/06

. FIND "Lynch, M."

. DISP
00003  How to Survive a Crash   Lynch, M.         ML001    01/01/30

. FIND "Sladek,L                LS002"

. DISP
00009  Even More Primes         Sladek, L         LS002    04/24/73
```

GO or
GOTO

a. GOTO RECORD <n>
b. GOTO TOP
c. GOTO BOTTOM
d. <n>
e. GOTO <memvar>

This command is used to reposition the record pointer of the database.

In either case a or d, the current-record pointer is set to record number <n>. Case d is a shorthand method for case a.

In cases b and c, the file in USE is rewound/unwound (TOP/BOTTOM) and the first/last record in the file is pointed to by the current-record pointer. When the file in USE has been INDEXed, then first/last record is not necessarily the first/last physical record in the database but rather is first/last according to the key used to index the database.

Case e can be used to position to a record number contained in a memory variable.

Examples:

```
. USE SHOPLIST

. GOTO RECORD 6
 6

. DISPLAY
00006   LETTUCE                2          0.53

. GOTO TOP

. DISPLAY
00001   BEANS                  5          0.75

. GOTO BOTTOM

. DISPLAY
00009   CHARCOAL               2          0.75
```

```
. LIST
00001   BEANS              5        0.75
00002   BREAD LOAVES       2        0.97
00003   T-BONE             4        3.94
00004   PAPER PLATES       1        0.86
00005   PLASTIC FORKS      5        0.42
00006   LETTUCE            2        0.53
00007   BLEU CHEESE        1        1.96
00008   MILK               2        1.30
00009   CHARCOAL           2        0.75

. STORE 4 TO RECORDNO
 4

. GOTO RECORDNO

. DISP
00004   PAPER PLATES       1        0.86
```

HELP

HELP < command verb>

The HELP command displays a brief synopsis of the dBASE commands and their syntax.

This command looks for the file DBASEMSG.TXT on the disk. DBASEMSG.TXT is a CP/M type file that may be modified by a text editor to pass any information to the user.

Example:

```
. HELP CREATE
```

IF

```
IF <exp>
   <commands>
[ELSE
   <commands>]
ENDIF
```

The IF command allows conditional execution of other commands usually in command files. When the <exp> evaluates to TRUE, the commands following the IF are executed. When the expression evaluates to FALSE, the commands following the ELSE are executed. If no ELSE is specified, all commands are skipped until an ENDIF is encountered. IF commands may be nested to any level.

Note: <commands> refers to whole command statements. The IF command begins with IF and ends with ENDIF. Statements must nest properly, an IF with a DO WHILE in the true (or false) path must not end before the DO WHILE. See section 9.8 Rule 8 for more information.

Examples:

```
IF STATUS='MARRIED'
   DO MCOST
ELSE
   DO SCOST
ENDIF

IF X=1
   STORE CITY+STATE TO LOCATION
ENDIF
```

INDEX

INDEX ON <expression> TO <index file name>
INDEX

The INDEX command causes the current file in USE to be indexed on the <expression>. The <expression> is known as the "key." This means that a file will be constructed by dBASE (the <index file>) that contains pointers to the records in the USE file. The index file is made in such a way that the USE database appears to be sorted on the key for subsequent operations. The file in use is not physically changed. Sorting will be in an ascending order. A descending sort may be done on an expression that is a numeric. See below for an example.

Indexing allows very rapid location of database records by specifing all or part of the key by means of the FIND command. (See FIND). A database need not be indexed unless the application being worked would be enhanced by it. An indexed database can be used later with or without the indexing feature.

Many times, the INDEX command need only be done once for any given file. For instance, the APPEND command will automatically adjust the index file when new records are added.

If an indexed database is reUSEd (in a later dBASE run or later in the same run that did the original INDEX operation), then a special form of the USE command must be used (i.e. USE <database filename> INDEX <index filename>).

Any number of index files may be constructed for any database, however, only the USEd index files will be automatically updated by the APPEND, EDIT, REPLACE, READ or BROWSE commands.

An indexed file can be packed with the PACK command and the database, as well as the index file, will be properly adjusted. However if more than one index file is associated with the PACKed database, then that database must be reINDEXed on those keys.

Warning: The TRIM function must NOT be used as part of an index key. Also, if the $ or STR functions are used as part or all of a key, they must have literal numbers (not variables or expressions) as their length parameters (e.g. INDEX ON $(NAME,N,5)+STR(AMOUNT,5) TO NDXFILE instead of INDEX ON $(NAME, N,N+5)+STR(AMOUNT, SIZEVAR) TO NDXFILE).

The command INDEX alone (with no parameters) will index the current record to the index files in use. This allows an index to be built which does not include all the records in a database. See also the REINDEX command.

Examples:

```
. USE SHOPLIST

. LIST
00001   Beans                    5          0.75
00002   Bread loaves             2          1.06
00003   T-Bone steak             4          4.33
00004   Paper plates             1          0.94
00005   Plastic forks            5          0.42
00006   Lettuce                  2          0.53
00007   Bleu cheese              1          1.96
00008   Milk                     2          1.30
00009   Charcoal                 2          0.75

. DISPLAY STRUCTURE

STRUCTURE FOR FILE:   SHOPLIST.DBF
NUMBER OF RECORDS:  00009
DATE OF LAST UPDATE: 07/03/83
PRIMARY USE DATABASE
FLD         NAME          TYPE        WIDTH      DEC
001         ITEM          C             020
002         NO            N             005
003         COST          N             010      002
** TOTAL **                           00036

. NOTE CREATE INDEX FILE SHOPINDX

. INDEX ON ITEM TO SHOPINDX

. NOTE NOW LIST IN INDEX ORDER

. LIST
00001   Beans                    5          0.75
00007   Bleu cheese              1          1.96
00002   Bread loaves             2          1.06
00009   Charcoal                 2          0.75
00006   Lettuce                  2          0.53
00008   Milk                     2          1.30
00004   Paper plates             1          0.94
00005   Plastic forks            5          0.42
00003   T-Bone steak             4          4.33

. NOTE INDEXING ALLOWS FIND COMMAND
```

```
. FIND Milk

. DISPLAY
00008   Milk                    2           1.30

. FIND Be

. DISPLAY
00001   Beans                   5           0.75
. SKIP

RECORD: 00007

. DISPLAY
00007   Bleu cheese             1           1.96

. SKIP -1
RECORD: 00001

. DISPLAY
00001   Beans                   5           0.75

. NOTE REGULAR USE COMMAND DOES NOT INCLUDE INDEX FILE

. USE SHOPLIST

. LIST
00001   Beans                   5           0.75
00002   Bread loaves            2           1.06
00003   T-Bone steak            4           4.33
00004   Paper plates            1           0.94
00005   Plastic forks           5           0.42
00006   Lettuce                 2           0.53
00007   Bleu cheese             1           1.96
00008   Milk                    2           1.30
00009   Charcoal                2           0.75

. NOTE ALTERNATE FORM OF USE COMMAND RECALLS INDEX FILE

. USE SHOPLIST INDEX SHOPINDX
```

```
. LIST
00001   Beans                      5          0.75
00007   Bleu cheese                1          1.96
00002   Bread loaves               2          1.06
00009   Charcoal                   2          0.75
00006   Lettuce                    2          0.53
00008   Milk                       2          1.30
00004   Paper plates               1          0.94
00005   Plastic forks              5          0.42
00003   T-Bone steak               4          4.33

. USE BOOKS
. DISP STRU

STRUCTURE FOR FILE:   BOOKS.DBF
NUMBER OF RECORDS:  00010
DATE OF LAST UPDATE: 10/18/82
PRIMARY USE DATABASE
FLD          NAME            TYPE       WIDTH        DEC
001          TITLE            C          025
002          AUTHOR           C          015
003          CAT:NUM          C          006
004          ARR:DTE          C          008
** TOTAL **                             00055

. INDEX ON AUTHOR + CAT:NUM TO BOOKS
00010 RECORDS INDEXED

. LIST
00001   Flying High               Bird, I. M.         IMB001    02/29/04
00005   Nesting Procedures        Bird, I. M.         IMB002    09/25/06
00002   Diving                    Fish, U. R.         URF001    12/30/23
00008   Nursing                   Knight and Gale     KG001     08/04/44
00010   Vacationing in Europe     Knight and Gale     KG002     06/24/42
00004   101 Ways to Tie a Knot    Lynch, I.           IL001     04/01/00
00003   How to Survive a Crash    Lynch, M.           ML001     01/01/30
00007   Even Primes               Sladek, L           LS001     12/01/73
00009   Even More Primes          Sladek, L           LS002     04/24/73
00006   Thinking Big              Tim, Tiny           TT001     05/07/42
```

example of descending sort

```
. LIST
00001   MOW LAWN                   5
00002   WALK DOG                   9
00003   WALK CAT                   1
00004   WATER GRASS                7
00005   PAINT TRIM                 4
00006   INSTALL SPRINKLERS         6
```

```
. INDEX ON — PRIORITY TO SCHEDULE
00006 RECORDS INDEXED

. LIST
00002  WALK DOG              9
00004  WATER GRASS           7
00006  INSTALL SPRINKLERS    6
00001  MOW LAWN              5
00005  PAINT TRIM            4
00003  WALK CAT              1
```

INPUT

INPUT ["<cstring>"] TO <memvar>

This construct permits the entry of expression values into memory variables, and can be used within command files as a means for the user to enter data at the command file's bidding. <memvar> is created, if necessary, and the expression is stored into <memvar>. If <cstring> is present, it is displayed on the screen as a prompt message before the input is accepted.

The type of the <memvar> is determined from the type of data that is entered. If a delimited character string is entered, the <memvar> will be of character type. If a numeric expression is entered, <memvar> will be of numeric type. If a T or Y (for True or Yes) is entered, <memvar> will be a logical variable with the value TRUE; if an F or N (for False or No) is entered, <memvar> will be a logical variable with the value FALSE. The function TYPE may be used to explicitly determine the type of the entry.

Either single or double quote marks may be used to delimit the prompt string, however, both the beginning and ending marks must be the same.

INPUT should be used to enter numeric and logical data only. The ACCEPT command is a more convenient way to enter character strings.

Examples:

```
. INPUT TO X
:3
 3

. INPUT TO Z
:23/17.000+X
 4.352

. INPUT 'PROMPT USER FOR INPUT' TO Q
PROMPT USER FOR INPUT: 12345
 12345

. INPUT 'ENTER T IF EVERTHING IS OKAY' TO LOG
ENTER T IF EVERYTHING IS OKAY:  T
.T.

. INPUT "ENTER A CHAR STRING" TO CHAR
ENTER A CHAR STRING:  'CHAR STRING MUST BE QUOTE DELIMITED'
CHAR STRING MUST BE QUOTE DELIMITED
```

```
. DISP MEMO
X              (N)             3
Z              (N)             4.352
Q              (N)             12345
LOG            (L)             .T.
CHAR           (C)             CHAR STRING MUST BE QUOTE DELIMITED
** TOTAL **                    05 VARIABLES USED        00054 BYTES USED

. INPUT 'ENTER ANY LOGICAL' TO LOG2
ENTER ANY LOGICAL  :y
.T.
```

INSERT

INSERT [BEFORE] [BLANK]

This command allows records to be INSERTed into the middle of a database. Only one record at a time may be inserted into the database with the INSERT command.

The BEFORE phrase is used to cause insertion before the record currently pointed at, otherwise the new record will be placed just after the current record. Unless the BLANK phrase is used, the user will be prompted for input values as with the APPEND and CREATE commands. If the BLANK phrase is specified, then an empty record is inserted.

If the CARRY is SET ON then the information in the previous record is carried over to the new record.

If a SET FORMAT TO <file> is in effect, then INSERT will use the @-commands from the format file to form the full-screen and allow complete control of the screen and the data that will be appended. Otherwise, INSERT displays all fields in tabular form.

INSERTs into a large non-indexed database take a long time to complete and should be avoided unless necessary. INSERTs into an indexed file, no matter what size, are identical to APPENDs.

Examples:

```
. USE SHOPLIST

. LIST
00001  BEANS #303 CAN          5        0.69
00002  BREAD LOAVES            2        0.89
00003  T-BONE STEAK            4        3.59
00004  LETTUCE                 2        0.49
00005  MILK (1/2 GAL)          2        1.19
00006  CHARCOAL, 5# BAGS       2        0.69

. GOTO RECORD 4

. INSERT

RECORD 00005

ITEM:    BLEU CHEESE
NO:      1
COST:    1.79
```

```
. LIST
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAK            4       3.59
00004   LETTUCE                 2       0.49
00005   BLEU CHEESE             1       1.79
00006   MILK (1/2 GAL)          2       1.19
00007   CHARCOAL, 5# BAGS       2       0.69

. GOTO RECORD 4

. INSERT BEFORE

RECORD 00004

ITEM:       PAPER PLATES
NO:         1
COST:       .79

. LIST1
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAK            4       3.59
00004   PAPER PLATES            1       0.79
00005   LETTUCE                 2       0.49
00006   BLEU CHEESE             1       1.79
00007   MILK (1/2 GAL)          2       1.19
00008   CHARCOAL, 5# BAGS       2       0.69

. 4

. DISPLAY
00004   PAPER PLATES            1       0.79

. INSERT BLANK

. LIST
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAK            4       3.59
00004   PAPER PLATES            1       0.79
00005
00006   LETTUCE                 2       0.49
00007   BLEU CHEESE             1       1.79
00008   MILK (1/2 GAL)          2       1.19
00009   CHARCOAL, 5# BAGS       2       0.69
```

```
. 5

. REPLACE ITEM WITH 'PLASTIC FORKS' AND NO WITH 5 AND COST WITH .39

00001 REPLACEMENT(S)

. LIST
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAKS           4       3.59
00004   PAPER PLATES            1       0.79
00005   PLASTIC FORKS           5       0.39
00006   LETTUCE                 2       0.49
00007   BLEU CHEESE             1       1.79
00008   MILK (1/2 GAL)          2       1.19
00009   CHARCOAL, 5# BAGS       2       0.69
```

JOIN

JOIN TO < file> FOR < expression> [FIELDS < field list>]

This is one of the most powerful commands in dBASE. It allows two databases to be JOINed together to form a third database whenever some criterion is met.

The two databases used are the primary and secondary USE files. First the SELECT PRIMARY command is issued. Then the JOIN command is issued. JOIN then positions dBASE to the first record of the primary USE file and evaluates the FOR expression for each record in the secondary USE file. Each time that the expression yields a TRUE result, a record is added to the new database. When the end of the secondary USE file is reached, the primary USE file is advanced one record, the secondary USE file is 'rewound' and the process continues until the primary USE file is exhausted.

If the FIELDS phrase is omitted then the output database will be comprised of all the fields in the primary USE file's structure and as many of the secondary USE file's fields as will fit before exceeding the 32 field limit of dBASE.

If the FIELDS phrase is supplied, then those fields, and only those fields, that are in the field list will be placed in the output database.

This command takes a lot of time to complete if the contributing databases are large. And if the joining criterion is too loose, causing many joinings per primary record, then there is the potential for causing a JOIN that dBASE cannot complete. For example, suppose that the primary and secondary USE files each contain 1000 records, and that the expression is always true, a million records should be output by the JOIN into a database whose size would exceed the dBASE maximum of 65,535 records.

Example:

```
. USE INVENTRY

. DISPLAY STRUCTURE

STRUCTURE FOR FILE:   INVENTRY.DBF
NUMBER OF RECORDS:  00008
DATE OF LAST UPDATE: 12/14/82
PRIMARY USE DATABASE
FLD          NAME          TYPE          WIDTH          DEC
001          ITEM          C               020
002          COST          N               010          002
003          PART:NO       C               005
004          ON:HAND       N               005
** TOTAL **                                 00041
```

```
. LIST
00001   TIME STITCH              9.99      24776     1
00002   WIDGET                   1.67      31415    18
00003   GADGET, LARGE           16.33      92653     7
00004   TANK, SHERMAN       134999.00      89793     3
00005   SINK, KITCHEN           34.72      21828    77
00006   TROMBONES              198.37      76767    76
00007   RINGS, GOLDEN          200.00      70296     5
00008   #9 COAL                 22.00      11528    16

. SELECT SECONDARY

. USE ORDERS

. DISPLAY STRUCTURE
STRUCTURE FOR FILE:   ORDERS.DBF
NUMBER OF RECORDS:  00008
DATE OF LAST UPDATE:  12/21/82
PRIMARY USE DATABASE
FLD          NAME          TYPE    WIDTH     DEC
001          CUSTOMER       C       020
002          PART:NO        C       005
003          AMOUNT         N       005
** TOTAL **                        00031

. LIST
00001   SWARTZ, JOE         31415      13
00002   SWARTZ, JOE         76767      13
00003   HARRIS, ARNOLD      11528      44
00004   ADAMS, JEAN         89793      12
00005   MACK, JAY           31415       3
00006   TERRY, HANS         76767       5
00007   JUAN, DON           21828       5
00008   SALT, CLARA         70296       9

. SELECT PRIMARY

JOIN TO ANNOTATE FOR PART:NO=S.PART:NO;
FIELD CUSTOMER, ITEM, AMOUNT, COST
```

use the inventory file to add names to the orders

```
. USE ANNOTATE
```

```
. DISPLAY STRUCTURE

STRUCTURE FOR FILE:      ANNOTATE.DBF
NUMBER OF RECORDS:       00008
DATE OF LAST UPDATE:     12/21/82
PRIMARY USE DATABASE
FLD        NAME            TYPE     WIDTH     DEC
001        CUSTOMER         C        020
002        ITEM             C        020
003        AMOUNT           N        005
004        COST             N        010      002
** TOTAL **                         00056

. LIST
00001   SWARTZ, JOE      WIDGET            13        1.67
00002   MACK, JAY        WIDGET             3        1.67
00003   ADAMS, JEAN      TANK, SHERMAN     12   134999.00
00004   JUAN, DON        SINK, KITCHEN      5       34.72
00005   SWARTZ, JOE      TROMBONES         13      198.37
00006   TERRY, HANS      TROMBONES          5      198.37
00007   SALT, CLARA      RINGS, GOLDEN      9      200.00
00008   HARRIS, ARNOLD   #9 COAL           44       22.00

. USE INVENTRY
```

(join customer names with part numbers with insuffícent inventory to satisfy orders so that the customers can be notified, for instance)

```
. JOIN TO BACKORDR FOR PART:NO=S.PART:NO.AND.ON:HAND<AMOUNT;
FIELD CUSTOMER,ITEM

. USE BACKORDR

. LIST
00001   ADAMS, JEAN      TANK, SHERMAN
00002   SALT, CLARA      RINGS, GOLDEN
00003   HARRIS, ARNOLD   #9 COAL
```

LIST

a. LIST [< scope >] [FOR < exp >] [< exp list >] [OFF]
[WHILE < exp >] [FIELDS < field list >]
b. LIST STRUCTURE
c. LIST MEMORY
d. LIST FILES [ON < disk drive >] [LIKE < skeleton >]
e. LIST STATUS

LIST is the same as DISPLAY, except the scope defaults to ALL records and WAIT does not wait for a go-ahead after 15 record groups. Notice however that LIST STRUCTURE, LIST FILES and LIST MEMORY commands work exactly as the DISPLAY command.

With DELETED SET ON, LIST will show only non-deleted records.

LOCATE

LOCATE [< scope >] [FOR < exp >]
[CONTINUE]

This command causes a search of database records in the USE file for the first record whose data fields allow the < exp > to be TRUE. When the expression is satisfied, the following message is displayed:

RECORD n

The CONTINUE command may be used to continue the search. Other dBASE commands may be issued between the LOCATE and the CONTINUE. This does, however, limit the number of the characters in the FOR < exp > to 128 instead of 254. See CONTINUE.

If the expression cannot be found, the message END OF FILE is displayed, and the database is left positioned at the last record in the file. If the NEXT clause (see scope, section 9.1) is used in this command and the expression cannot be found within the scope of the NEXT, the message END OF LOCATE is displayed, and the database is left positioned at the last record scanned.

Note: a LOCATE will work faster on a file that is USEd without an INDEX file.

Examples:

```
. USE SHOPLIST

. LIST1
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAK            4       3.59
00004   PAPER PLATES            1       0.79
00005   PLASTIC FORKS           5       0.39
00006   LETTUCE                 2       0.49
00007   BLEU CHEESE             1       1.79
00008   MILK (1/2 GAL)          2       1.19
00009   CHARCOAL, 5# BAGS       2       0.69

. LOCATE FOR COST>.70

RECORD:  00002

. CONTINUE
RECORD:  00003
```

```
. DISP ITEM
T-BONE STEAKS
. CONTINUE
RECORD:  00004

. CONTINUE
RECORD:  00007

. CONTINUE
RECORD:  00008

. CONTINUE
END OF FILE
```

LOOP

LOOP

This command is used within the body of a DO WHILE to skip the commands following the LOOP, and still allow the reappraisal and possible reexecution of the body of the DO WHILE. LOOP is used to shorten DO WHILE loops which, if large, can be time consuming or may contain commands which are to be skipped at times. LOOP acts much as an ENDDO command, it will backup to the DO WHILE that matches it in nesting depth.

Use of loops in a DO WHILE is not always a good programming practice. The following example was done a second time, the second follows the first, without use of the LOOP capability.

Example 1:

```
STORE 1 TO INDEX
DO WHILE INDEX < 10
    STORE INDEX+1 TO INDEX
    IF ITEM='      '
        SKIP
        LOOP
    ENDIF
    DO PROCESS
ENDDO
```

Anytime that ITEM is equal to blanks then skip to the next record and go back to the DO WHILE

Example 2:

```
STORE 1 TO INDEX
DO WHILE INDEX < 10
    STORE INDEX + 1 TO INDEX
    IF ITEM = '      '
        SKIP
    ELSE
        DO PROCESS
    ENDIF
ENDDO
```

MODIFY

a. MODIFY STRUCTURE
b. MODIFY COMMAND [< file>]

Form a. of this command allows the user to modify the structure of a dBASE file. Any changes are permitted. Fields can be added, deleted, or have their parameters (e.g. name, type, length, number of decimals) changed.

MODIFY acts upon the database currently in USE. The existing structure is displayed on the screen, changes are made directly on the screen in the same way as full-screen editing is done with two exceptions: CTL-N inserts a blank line wherever the cursor is, CTL-T deletes the line that the cursor is on. The other control keys behave as described in section 9.

Note: The MODIFY STRUCTURE command deletes ALL data records that were in the USE file prior to the MODIFY. In order to modify a structure and keep its data, first COPY the structure to a work file, USE the work file, make the modifications, and finally APPEND the old data to the work file. The original database and the work file may be RENAMEd if it is necessary to restore their original names. See the example below.

Form b. of this command allows minor full-screen editing of command files (or anything else). If the <command file> is omitted then the user is prompted for it. If the file doesn't exist, it is created. After a command file has been edited, MODIFY COMMAND will rename type of the old copy to .BAK and save the new copy with the type .CMD.

When in MODIFY COMMAND, the CTL-N and CTL-T editing functions work as described in a previous paragraph. CTL-Q will abort all changes to the command file, CTL-W will write the changes back to the disk and to the rename that was described above.

There are some significant restrictions to this form of the command: 1) lines can only be 77 or fewer characters long (including the carriage return/line feed pair); 2) TAB characters are converted to single spaces; 3) the cursor can only be backed up in a file about 4000 bytes; 4) there is no search or block move capability as are in some text editors.

Full-screen cursor controls are the same for MODIFY COMMAND *except* for the following commands:

ctl-N inserts a blank line wherever the cursor is;
ctl-T deletes the line the cursor is on and moves up the lower lines;
ctl-W writes the changes made to the file back on the disk and exits MODIFY COMMAND (ctl-o for SuperBrain);
ctl-Q aborts any changes made to the command file;
ctl-R scrolls one line down; and
ctl-C scrolls one page up.

Example:

```
. NOTE — AN EXAMPLE OF HOW TO MODIFY A STRUCTURE WITHOUT
. NOTE — LOSING THE INFORMATION IN THE FILE
. USE INVNTRY
. COPY TO WORK
. USE WORK
. MODIFY STRUCTURE
. APPEND FROM INVNTRY
. DELETE FILE INVNTRY
. USE
. RENAME WORK TO INVNTRY
```

NOTE

a. NOTE [<any characters>]
b. * [<any characters>]

This command allows comments to be placed into a command file. Unlike the REMARK command, the content of this command is not echoed onto the output device.

Example:

NOTE — last modification : 4 july 1976

* — last modification spelled doom's day

PACK

PACK

This command purges all records marked for deletion by the DELETE command. Once the PACK command has been issued, nothing can bring back deleted records.

If the file being PACKed is indexed, and the indexed files are in use, then the PACK will adjust the index files at the same time it adjusts the USE file.

An alternate method to the PACK is to COPY the old file to a new file. DELETEd records will not be copied. Then the old file may be deleted (or saved as a back-up) and the new file renamed.

PACK will not reduce amount of disk space reserved for that file by CP/M. To recover the space, use a COPY TO <file name> and then delete the source file. This is a limitation of the CP/M operating system not of dBASE II.

Examples:

```
. USE B:SHOPSAVE

. LIST
00001   BEANS            5        0.75
00002   BREAD LOAVES     2        0.97
00003   T-BONE           4        3.94
00004   PAPER PLATES     1        0.86
00005   PLASTIC FORKS    5        0.42
00006   LETTUCE          2        0.53
00007   BLEU CHEESE      1        1.96
00008   MILK             2        1.30
00009   CHARCOAL         2        0.75

. DELETE RECORD 8
00001 DELETION(S)

. LIST
00001   BEANS            5        0.75
00002   BREAD LOAVES     2        0.97
00003   T-BONE           4        3.94
00004   PAPER PLATES     1        0.86
00005   PLASTIC FORKS    5        0.42
00006   LETTUCE          2        0.53
00007   BLEU CHEESE      1        1.96
00008  *MILK             2        1.30
00009   CHARCOAL         2        0.75
```


```
. PACK
PACK COMPLETE, 00008 RECORDS COPIED

. LIST
00001   BEANS           5       0.75
00002   BREAD LOAVES    2       0.97
00003   T-BONE          4       3.94
00004   PAPER PLATES    1       0.86
00005   PLASTIC FORKS   5       0.42
00006   LETTUCE         2       0.53
00007   BLEU CHEESE     1       1.96
00008   CHARCOAL        2       0.75
```

A PACK need not always be done, for example, suppose some records must be deleted but it is necessary for them to remain in the database. These records will not be COPY'd, APPENDed, or SORTed, but they may be COUNTed. It becomes important to know whether or not the record being processed is deleted or not. The following example is a partial command file that would skip over a record that has been deleted and continue processing with the next record.

```
DO WHILE .NOT. EOF
   LOCATE FOR NATURE = "TLM"
   IF .NOT. *

      commands

   ENDIF
   CONTINUE
ENDDO
```

This operation might be avoided entirely by using the SET DELETED ON command.

QUIT

QUIT [TO < com file list>]

This command closes all database files, command files, and alternate files and returns control to the operating system. The message *** END RUN dBASE *** is displayed.

If the TO phrase is included, then all the programs in the < com file list> will be executed in sequence by CP/M. This feature lets you go out of dBASE and chain to other pieces of software.

There is no limit to the number of programs or CP/M commands which can be executed as long as the 254 character limit for any command is not exceeded. dBASE can be reentered at the end of the string of commands. However, it is not required; CP/M will be given control when the string of commands is finished executing. MP/M does not allow this implementation.

Example:

```
. QUIT TO 'DIR B: ', 'PIP PRN:=ALTERNAT.TXT ', 'DBASE CMDFILE'
```

In this example, dBASE is exited, a directory of the B-drive is done, PIP is then called to copy a file to the print device, and dBASE is reentered with a command file (CMDFILE.CMD) taking control immediately.

READ

READ [NOUPDATE]

This command enters the full-screen mode for editing and/or data entry of variables identified for and displayed by an "@" command with a GET phrase. The cursor can be moved to any of the GET variables. Changes made to those variables on the screen are entered into the appropriate database fields or memory variables.

If the SET FORMAT TO <format file> command has been issued, then READ will cause all of the "@" commands in the format file to be executed, thus formatting the screen, allowing editing of all GET variables. Notice that this technique is a tailorable substitute for the EDIT command when in the interactive mode.

When in the SET FORMAT TO SCREEN mode, an ERASE command is used to clear the screen. A series of "@" commands may then be issued to format the screen. Then a READ command would be given which would allow editing.

If a second or later series of "@" commands is issued after a READ command, then READ will place the cursor on the first GET variable following the last READ. In this way, the screen format and the specific variables edited can be based on decisions made by the user in response to prior READ commands.

Variables to be used with the "@" commands and edited using the READ command must be either in the USE file as field names or must be character string memory variables. Memory variables must be predefined before the "@" command is issued. If necessary, store as many blanks as you want the maximum length of the memory variable to be in order to initialize the memory variable (e.g. STORE ' ' to MEMVAR).

See section 8 for cursor control and data entry instructions.

The SET SCREEN ON command must be in effect (this is the default condition if full-screen operations were enabled when dBASE II was installed).

The NOUPDATE option can be used to avoid index updating. dBASE checks for altered index keys after READ commands and updates index files as needed. If multiple indexes are used, this process can take time. If it is known that no keys are altered by the READ command (e.g. only memory variables or non-key fields are READ) then the index update process can be skipped by use of the NOUPDATE phrase.

Example:

```
.
.
.
STORE '   ' TO PTYPE
STORE '                    ' TO ACCT
ERASE
@ 5,0 SAY 'Enter a C for cash payment'
@ 6,0 SAY '      or a D for deferred payment'
@ 8,10 GET PTYPE
READ
IF PTYPE='D'
   @ 10,10 SAY 'Enter acct no.' GET ACCT PICTURE '999-99-9999'
   READ
ENDIF
.
.
.
```

In this command file fragment, the screen is cleared and the first two "@" commands are put up. The cursor will be between two colons that mark the screen location of the variable PTYPE. Since the first STORE set the size of PTYPE at 1 character, any entry by the user will fill PTYPE and exit the first READ command.

If a "D" was entered by the dBASE operator, then the "@" command that asks for an account number will be done. Notice that ACCT was defined long enough in the STORE to include the two dashes that the PICTURE phrase in the "@" will enter.

```
USE CHECKS
SET FORMAT TO SCREEN
ACCEPT "Option" TO CHOICE
IF CHOICE$'Aa'
   ERASE
   DO WHILE NUMBER # 0
      APPEND BLANK
      @ 5,0  SAY "Enter next Number" ;
             GET NUMBER PICTURE '99999'
      @ 6,0  SAY "Enter Recipient";
             GET RECIPIENT PICTURE 'XXXXXXXXXXXXXXXXXXXXXXX'
      @ 7,0  SAY "Enter Amount";
             GET AMOUNT PICTURE '9999999999'
      @ 8,5  SAY "Is it back yet?" ;
             GET HOME
      @ 8,30 SAY "Are you paying out?";
             GET OUTGOING
      READ
   ENDDO
ENDIF
```

In the last example, a file was used and altered directly, the choice being left up to the operator on whether or not to add new records to the database in question.

Refer to the "@" command for more details.

RECALL

RECALL [< scope >] [FOR < exp >]
[WHILE < exp >]

This command removes the mark-for-deletion from the records that were marked by the DELETE command.

Examples:

```
. USE DUPE3

. LIST
00001    NEUMAN, ALFRED E.                1357
00002    RODGERS, ROY                     2468
00003    CASSIDY, BUTCH                   3344
00004    CHANG, LEE                       6743
00005    POST, WILEY                      1011
00006    LANCASTER, WILLIAM J             6623

. 3

. DELETE NEXT 3
00003 DELETION(S)

. LIST
00001    NEUMAN, ALFRED E.                1357
00002    RODGERS, ROY                     2468
00003   *CASSIDY, BUTCH                   3344
00004   *CHANG, LEE                       6743
00005   *POST, WILEY                      1011
00006    LANCASTER, WILLIAM J             6623

. RECALL RECORD 4
00001 RECALL(S)

. LIST
00001    NEUMAN, ALFRED E.                1357
00002    RODGERS, ROY                     2468
00003   *CASSIDY, BUTCH                   3344
00004    CHANG, LEE                       6743
00005   *POST, WILEY                      1011
00006    LANCASTER, WILLIAM J             6623

. RECALL ALL
00002 RECALL(S)
```

. LIST

00001	NEUMAN, ALFRED E.	1357
00002	RODGERS, ROY	2468
00003	CASSIDY, BUTCH	3344
00004	CHANG, LEE	6743
00005	POST, WILEY	1011
00006	LANCASTER, WILLIAM J	6623

REINDEX

REINDEX

This command behaves exactly as the INDEX on <exp> to <index file name> command EXCEPT that the key expression and TO file need not be entered. REINDEX uses the keys from the index files currently in use and completely rebuilds the files.

```
. USE BOOKS INDEX AUTHORS

. REINDEX
```

RELEASE

RELEASE [< memvar list>]
[ALL]
[ALL LIKE < skeleton>]
[ALL EXCEPT < skeleton>]

This command releases all or selected memory variables and makes the space that they consumed available for new memory variables. If ALL is specified, then all memory variables will be deleted.

The < skeleton> is similar to < skeleton> in DISPLAY FILES. Question marks mask any character, asterisks match any subsequent characters.

E.g. RELEASE ALL LIKE MEM??X would release memory variables MEMABX, MEMFFX, and MEMRRX but not MEMAB, MEMABY, or MAMABX.

RELEASE ALL EXCEPT MEM* would release MAM, MAMABX, and ME but would not release MEM, MEMXXXXX, or MEMABX.

REMARK

REMARK [any characters]

This command allows the display of any characters. The contents of this command are displayed on the output device when this command is encountered.

Examples:

```
. REMARK ****** REMARK TEST ********
****** REMARK TEST ********
```

RENAME

RENAME < original file name> TO < new file name>

This command allows the changing of the name of a file in the CP/M directory. If no file type (the up to 3 characters following a file name) is given then dBASE assumes that a database's name is being used and assigns the type .DBF to the named files. See section 4 for more detail concerning dBASE use of file types.

Example:

. RENAME INVENMAC TO INVENOLD

. RENAME D:REPORT.FRM TO REPORT.BAK

. RENAME TYPELESS. TO TYPED.TYP

REPLACE

REPLACE [< scope >] < field > WITH < exp > [,< field > WITH < exp >]
[FOR < exp >] [NOUPDATE]
[WHILE < exp >]

This command is used to replace the contents of specified data fields of the file in USE with some new data. This command is contrasted with the STORE command in that REPLACE changes only field variables, while the STORE command changes only memory variables.

If < scope > is not supplied in the command then REPLACE acts only on the current record.

If a REPLACE is done on an index key and the index is in USE, then the index file will be adjusted by deleting the old index entry and re-entering the new entry in its proper place. Un-USEd index files will not be affected. When a REPLACE is done on an index key, the altered record will "shift places" in the file, the new "next record" will not be the same as the old "next record." The key should not be REPLACEd with a NEXT n as the < scope >.

The NOUPDATE option can be used to avoid index updating. dBASE checks for altered index keys after REPLACE commands and updates index files as needed. If multiple indexes are used, this process can take time. If it is known that no keys are altered by the REPLACE command (e.g. only memory variables or non-key fields are REPLACE) then the index update process can be skipped by use of the NOUPDATE phrase.

Note: If you are using PRIMARY and SECONDARY databases, you can REPLACE a field *only* in the currently SELECTED database.

Examples:

```
. USE SHOPLIST

. NOTE INFLATION CAUSES 10% PRICE INCREASE

. LIST
00001   BEANS #303 CAN          5       0.69
00002   BREAD LOAVES            2       0.89
00003   T-BONE STEAKS           4       3.59
00004   PAPER PLATES            1       0.79
00005   PLASTIC FORKS           5       0.39
00006   LETTUCE                 2       0.49
00007   BLEU CHEESE             1       1.79
00008   MILK (1/2 GAL)          2       1.19
00009   CHARCOAL, 5# BAGS       2       0.69

. REPLACE ALL COST WITH COST *1.1
00009 REPLACEMENT(S)
```

```
. LIST
00001   BEANS #303 CAN          5       0.75
00002   BREAD LOAVES            2       0.97
00003   T-BONE STEAKS           4       3.94
00004   PAPER PLATES            1       0.86
00005   PLASTIC FORKS           5       0.42
00006   LETTUCE                 2       0.53
00007   BLEU CHEESE             1       1.96
00008   MILK (1/2 GAL)          2       1.30
00009   CHARCOAL, 5# BAGS       2       0.75

. USE B:SHOPLIST

. COPY TO B:SHOPWORK
00009 RECORDS COPIED

. LIST
00001   BEANS                   5       0.75
00002   BREAD LOAVES            2       0.97
00003   T-BONE                  4       3.94
00004   PAPER PLATES            1       0.86
00005   PLASTIC FORKS           5       0.42
00006   LETTUCE                 2       0.53
00007   BLEU CHEESE             1       1.96
00008   MILK                    2       1.30
00009   CHARCOAL                2       0.75

. GOTO TOP

. REPLACE NEXT 5 COST WITH COST *1.1 FOR COST> .75
00003 REPLACEMENT(S)

. LIST
00001   BEANS                   5       0.75
00002   BREAD LOAVES            2       1.06
00003   T-BONE                  4       4.33
00004   PAPER PLATES            1       0.94
00005   PLASTIC FORKS           5       0.42
00006   LETTUCE                 2       0.53
00007   BLEU CHEESE             1       1.96
00008   MILK                    2       1.30
00009   CHARCOAL                2       0.75

. USE CHECKS

. DISP STRU
```

```
STRUCTURE FOR FILE     CHECKS.DBF
NUMBER OF RECORDS:  00016
DATE OF LAST UPDATE: 10/18/82
PRIMARY USE DATABASE
FLD          NAME            TYPE       WIDTH      DEC
001        NUMBER             N          005
002        RECIPIENT          C          020
003        AMOUNT             N          010        002
004        HOME               L          001
005        OUTGOING           L          001
** TOTAL **                             00038

. LIST
00001            1 Phone Company             104.89 .F. .T.
00002            2 Gas Company                 4.15 .F. .T.
00003            3 Electricity               250.30 .F. .T.
00004            4 Grocery Store            1034.45 .F. .T.
00005          134 Me, salary                561.77 .T. .F.
00006            6 Bank (sc)                   4.00 .T. .T.
00007            7 Doctor Doolittle          100.00 .T. .T.
00008            8 Pirates                   100.00 .F. .T.
00009            9 Car Repair Man            500.01 .F. .T.
00010           10 Me                        561.77 .T. .F.
00011           11 Tupperware                 50.02 .F. .T.
00012           12 Me                        561.77 .T. .F.
00013           13 Me                        750.03 .T. .F.
00014          234 Peter Rabbit               14.00 .F. .T.
00015          237 Golden Goose              650.00 .F. .T.
00016           30 Me                        561.77 .T. .F.

. 11

. REPLACE HOME WITH F
00001 REPLACEMENT(S)

. DISPLAY
00011           11 Tupperware                 50.02 .F. .T.
```

REPORT

REPORT [FORM<form file>] [<scope>] [TO PRINT] [PLAIN] [FOR <exp>]
[WHILE <exp>]

REPORT is used to prepare reports (either on the screen or on paper) by displaying data from the file in USE in a defined manner. Reports may have titled columns, totaled numeric fields, and displayed expressions involving data fields, memory variables, and constants.

The FOR phrase allows only that information which meets the conditions of the <exp> to be reported; the TO PRINT phrase sends the report to the printer as well as the screen; and the <scope> of the report defaults to ALL unless otherwise specified.

The first time the REPORT command is used (for a new report) a FORM file is built. dBASE prompts the user for specifications of the report format and automatically generates the FORM file. Subsequent reports can use the FORM file to avoid respecification of the report format. If the FORM phrase of the command is omitted the user will be prompted for the name of the form file.

The following example of a form file has almost all the options specified. The user may control the number of spaces to indent the lines in the body of the report with the 'M' option (default is 8 spaces); the number of lines per page is changed with the 'L' option (default is 57 lines); and the location of the page heading is controlled with the 'W' option (the page width, default is 80 characters) since it is only used for centering the page heading.

The REPORT command will process a maximum of 24 fields.

```
. REPORT FORM SHOPFORM
ENTER OPTIONS, M=LEFT MARGIN, L=LINES/PAGE, W=PAGE WIDTH M=5,W=65
PAGE HEADING? (Y/N) Y
ENTER PAGE HEADING: Shopping List for Picnic
DOUBLE SPACE REPORT? (Y/N) N
ARE TOTALS REQUIRED? (Y/N) Y
SUBTOTALS IN REPORT? (Y/N) N
COL       WIDTH,CONTENTS
001       23,ITEM+'...'
ENTER HEADING: Item;====
002       10,NO
ENTER HEADING: >Number;======
ARE TOTALS REQUIRED? (Y/N) Y
003       10,COST
ENTER HEADING: >Cost/Item;=========
ARE TOTALS REQUIRED? (Y/N) N
004       10,NO*COST
ENTER HEADING: >Cost;====
ARE TOTALS REQUIRED? (Y/N) Y
005       (cr)
```

REPORT asks for the width of the field to be printed and the contents of the field. The width asked for here has no relationship to the actual width of the field to be printed out, for instance, in the first column above, ITEM is in a column that is 23 characters wide, in the data base ITEM is actually only 20 characters wide. One should also note that the string '. . .' is being concatenated to the contents of the field ITEM. This accounts for the extra 3 characters in the report. This also means that if the report column is less in length than the field that should go into it, dBASE will wrap the field to fit. An 80 character field would generate 2 lines if it were put into a 50 character column.

The contents of the columns may be fields from a database, a memory variable, literals, or expressions. Note that in column 1 in the form on the previous page, there is a concatenated string. Each record in the database in use will have *only as far as the report is concerned (the database will remain unchanged)* three periods concatenated to the end of the string. Column 4 contains the product of NO and COST. Column 4 has no field equivalent to it in the database. (The fields are, left to right, named ITEM, NO, and COST).

```
. LIST
00001  BEANS           5     0.75
00002  BREAD LOAVES    2     1.06
00003  T-BONE          4     4.33
00004  PAPER PLATES    1     0.94
00005  PLASTIC FORKS   5     0.42
00006  LETTUCE         2     0.53
00007  BLEU CHEESE     1     1.96
00008  MILK            2     1.30
00009  CHARCOAL        2     0.75
```

Returning to the FORM file (the questions on what should go into the report), note that there are some special characters used in the headings. For page headings, column headings, and character strings, a semicolon (;) will break the heading or string at the semicolon and resume the display on the next line. If a heading or string is too long to fit within the number of spaces allowed for it, it will be broken at the last blank (if possible) and resumed on the next line. The other significant characters are "<," and ">." In column headings, if the title is preceded with a "<" then the title will be left-justified in the column. Likewise a ">" will right-justify the title.

Other options in REPORT include totalling, subtotalling, and summary reports. In summary reports, detail records are not displayed, just totals and subtotals. Totalling and subtotalling are done only on fields that are numeric in nature. See the report examples.

Finally, a carriage return will end the report form and begin displaying the report. A copy will be printed on the printer if the TO PRINT phrase was included in the initial command.

Other dBASE commands that affect the operation of report are the "SET EJECT OFF," "SET HEADING TO" and "SET DATE TO" commands. Before REPORT prints out its information, it does a page eject. This capability may be suppressed with the SET EJECT OFF command. The SET HEADING TO command allows an additional heading to be added

to the report at run time. This command has an effect for the duration of one session. (The heading must be set each time a new dBASE run is initiated.) The same is for the SET DATE TO command. The date of the report may be changed or omitted by use of this command. See the SET command for more information.

There comes a time, when this capability is no longer adequate, special forms must be used, more flexibility is desired with the report format, retrieving the data from the database requires more complex methods than REPORT will handle, etc. The "@" and the SET FORMAT TO PRINT commands will give the user more power over the form of the report. See the "@" command for more information and examples.

Example 1:

```
. USE SHOPLIST

. REPORT FORM SHOPFORM


PAGE NO. 00001

                      Shopping List for Picnic

       Item                    Number        Cost/Item        Cost

BEANS              . . .          5            0.75           3.75
BREAD LOAVES       . . .          2            1.06           2.12
T-BONE             . . .          4            4.33          17.32
PAPER PLATES       . . .          1            0.94           0.94
PLASTIC FORKS      . . .          5            0.42           2.10
LETTUCE            . . .          2            0.53           1.06
BLEU CHEESE        . . .          1            1.96           1.96
MILK               . . .          2            1.30           2.60
CHARCOAL           . . .          2            0.75           1.50
** TOTAL **
                                 24                          33.35

. SET HEADING TO 4 July 1976

. REPORT FORM SHOPFORM


PAGE NO. 00001                4 July 1976

                      Shopping List for Picnic

       Item                    Number        Cost/Item        Cost

BEANS              . . .          5            0.75           3.75
BREAD LOAVES       . . .          2            1.06           2.12
T-BONE             . . .          4            4.33          17.32
PAPER PLATES       . . .          1            0.94           0.94
PLASTIC FORKS      . . .          5            0.42           2.10
LETTUCE            . . .          2            0.53           1.06
BLEU CHEESE        . . .          1            1.96           1.96
MILK               . . .          2            1.30           2.60
CHARCOAL           . . .          2            0.75           1.50
** TOTAL **
                                 24                          33.35
```

Example 2:

This example shows use of the subtotalling capabilities of dBASE. When the report form is created the subtotalling is done on the field PART:NO. This could be done if it was necessary to know not only who the part was ordered by but also how many of each part must be made (or bought).

```
. USE ORDERS INDEX ORDERS

. LIST
00003   HARRIS, ARNOLD              11528          44
00013   ANDERSON, JAMES REGI        11528          16
00007   JUAN, DON                   21828           5
00001   SWARTZ, JOE                 31415          13
00005   MACK, JAY                   31415           3
00009   BARNETT, WALT               31415           6
00008   SALT, CLARA                 70296           9
00002   SWARTZ, JOE                 76767          13
00006   TERRY, HANS                 76767           5
00010   NICHOLS, BILL               76767          17
00004   ADAMS, JEAN                 89793          12
00011   MURRAY, CAROL               89793           4
00012   WARD, CHARLES A.            92653          15

. REPORT
ENTER REPORT FORM NAME: ORDERS
ENTER OPTIONS, M=LEFT MARGIN, L=LINES/PAGE, W=PAGE WIDTH W=65
PAGE HEADING? (Y/N) Y
ENTER PAGE HEADING: ORDERS LISTED BY PART NUMBER
DOUBLE SPACE REPORT? (Y/N) N
ARE TOTALS REQUIRED? (Y/N) Y
SUBTOTALS IN REPORT? (Y/N) Y
ENTER SUBTOTALS FIELD: PART:NO
SUMMARY REPORT ONLY? (Y/N) N
EJECT PAGE AFTER SUBTOTALS? (Y/N) N
ENTER SUBTOTAL HEADING: Orders for part number
COL       WIDTH,CONTENTS
001         20,CUSTOMER
ENTER HEADING: < CUSTOMER NAME
002         10,AMOUNT
ENTER HEADING: > QUANTITY ORDERED
ARE TOTALS REQUIRED? (Y/N) Y
003
```

PAGE NO. 00001

ORDERS LISTED BY PART NUMBER

CUSTOMER NAME	QUANTITY ORDERED
Orders for part number 11528	
HARRIS, ARNOLD	44
ANDERSON, JAMES REGI	16
** SUBTOTAL **	60
*Orders for part number 21828	
JUAN, DON	5
**SUBTOTAL **	5
*Orders for part number 31415	
SWARTZ, JOE	13
MACK, JAY	3
BARNETT, WALT	6
** SUBTOTAL **	22
*Orders for part number 70296	
SALT, CLARA	9
** SUBTOTAL **	9
*Orders for part number 76767	
SWARTZ, JOE	13
TERRY, HANS	5
NICHOLS, BILL	17
** SUBTOTAL **	35
*Orders for part number 89793	
ADAMS, JEAN	12
MURRAY, CAROL	4
** SUBTOTAL **	16

```
*Orders for part number 92653
WARD, CHARLES A.                                    15
** SUBTOTAL **
                                                    15

** TOTAL **
                                                   162
```

Example 3:

Suppose some of your colleagues and yourself started playing cards for points to see who would buy lunch for everyone on the next holiday. In the interest of Fair Play, you decide to keep a running total on the score. All sorts of information could be dug out of the database (like who could lose his shirt if he weren't careful). The following database could be an example of such a game.

```
. DISP STRU

STRUCTURE FOR FILE:   CARDS.DBF
NUMBER OF RECORDS:    00016
DATE OF LAST UPDATE:  09/17/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH        DEC
001          DATE          C             008
002          LISA          N             003
003          ANNA          N             003
004          WAYNE         N             003
** TOTAL **                               00018
```

```
. REPORT
ENTER REPORT FORM NAME: CARDS
ENTER OPTIONS, M=LEFT MARGIN, L=LINES/PAGE, W=PAGE WIDTH W=40
PAGE HEADING? (Y/N) Y
ENTER PAGE HEADING: Hearts Scores
DOUBLE SPACE REPORT? (Y/N) N
ARE TOTALS REQUIRED? (Y/N) Y
SUBTOTALS IN REPORT? (Y/N) N
COL        WIDTH,CONTENTS
001        10,DATE
ENTER HEADING: Date of;Game
002        6,Lisa
ENTER HEADING: Score;Lisa
ARE TOTALS REQUIRED? (Y/N) Y
003        6,ANNA
ENTER HEADING: Score;Anna
ARE TOTAL REQUIRED? (Y/N) Y
004        6,WAYNE
ENTER HEADING: Score;Wayne
ARE TOTALS REQUIRED? (Y/N) Y
005        5,LISA+ANNA+WAYNE
ENTER HEADING: Game;Total
ARE TOTALS REQUIRED? (Y/N) Y
006        (cr)
```

(Note — the last column in the report form is a totalling of the scores in each of the records, that is, the sum of Lisa's, Wayne's and Anna's scores. It is not necessary for the column in the report to exist in the database before it may be used, the field "LISA+ANNA+WAYNE" does not exist in the database "CARDS." This would be an example of how an expression may be placed in a report.)

PAGE NO. 00001

Hearts Scores

Date of Game	Score Lisa	Score Anna	Score Wayne	Game Total
05/26/82	29	75	53	157
05/27/82	45	48	63	156
05/28/82	50	56	74	180
05/29/82	86	24	72	182
06/05/82	43	12	75	130
06/12/82	42	9	27	78
06/26/82	84	35	63	182
07/06/82	33	71	26	130
08/19/82	37	55	38	130
09/15/82	19	57	54	130
09/16/82	15	7	108	130
09/17/82	59	13	58	130
** TOTAL **	542	462	711	1715

A report may also cover just a few of the records in a file. Such as:

. GOTO RECORD 7

. REPORT NEXT 4 FORM CARDS

PAGE NO. 00001

Hearts Scores

Date of Game	Score Lisa	Score Anna	Score Wayne	Game Total
07/07/82	40	63	27	130
07/09/82	55	41	60	156
07/13/82	40	63	54	157
07/23/82	38	69	23	130
** TOTAL **	173	236	164	573

A report may also ask for information which would meet certain criteria. Such as:

. REPORT FORM CARDS FOR WAYNE < 50

PAGE NO. 00001

Hearts Scores

Date of Game	Score Lisa	Score Anna	Score Wayne	Game Total
06/12/82	42	9	27	78
07/06/82	33	71	26	130
07/07/82	40	63	27	130
07/23/82	38	69	23	130
08/19/82	37	55	38	130
** TOTAL **	190	267	141	598

. REPORT FORM NEXT WHILE CUSTOMER > ="M"

PAGE NO. 00001
12/13/82

CUSTOMER	PART	AMOUNT
MACK, JAY	31415	3
MURRAY, CAROL	89793	4
NICHOLS, BILL	76767	17
SALT, CLARA	70296	9
SWARTZ, JOE	31415	13
SWARTZ, JOE	76767	13
TERRY, HANS	76767	5
WARD, CHARLES A.	92653	15

PLAIN is an extension of the command REPORT. This allows for a dBASE report to be created in such a manner that it may be inserted into a report generated by a wordprocessor.

The clause PLAIN causes page numbers and the date at the top of each page in the report to be suppressed. Page headings are inserted into the dBASE report only at the beginning of the report. If it is desired to suppress the page ejects between reports then the SET EJECT OFF must still be used.

Examples:

. USE TRACE INDEX DOC

. NOTE POSITION THE DATABASE AT THE FIRST RECORD FOR THE REPORT

. 304

```
. REPORT FORM TABLES PLAIN WHILE DOC = "3-280-T"
ENTER OPTIONS, M=LEFT MARGIN, L=LINES/PAGE, W=PAGE WIDTH
PAGE HEADING? (Y/N) Y
ENTER PAGE HEADING: TABLES
DOUBLE SPACE REPORT? (Y/N) N
ARE TOTALS REQUIRED? (Y/N) N
COL       WIDTH,CONTENTS
001       20,$(DOC,7,17)
ENTER HEADING: TABLE
002       40,DESCR
ENTER HEADING: REQUIREMENT
003       (cr)
```

TABLES

TABLE	REQUIREMENT
Table 1	GLL Telemetry Modes
Table 2	Allowable combinations of R/T and Record Formats
Table 2.3.2	Bus User Codes
Table 3	GLL Bit rate allocation
Table 4	Header Format
Table 5	Format Identification
Table 6	Commutation Map Identifier Assignment
Table 7	S/C Clock Progression
Table A2.2.1	Eng data layout
Table A2.2.2	Fixed-Area Structure/Position Identifiers
Table A2.2.3	Variable Area Pocket Structure/Position Identifier
Table A2.2.4	CDS Fixed area Measurement Sampling Time
Table A2.2.8	Engr Measurements

RESET

RESET [<drive>]

The RESET command is used to reset the CP/M bit map after a diskette has been swapped. Normally, if a diskette is swapped, CP/M will not allow writes to take place until after a warm or soft boot has taken place.

If <drive> is not specified, then the entire system will be reset. Unfortunately, neither dBASE nor the operating system can determine which diskettes you may have swapped and I/O errors may result if a disk that has open files is replaced. If <drive> is specified, dBASE checks to see whether any of its files are open on that drive and will prevent I/O errors. The <drive>-less form should therefore not be used and is maintained for compatibility reasons only. Do not swap and RESET the drive which contains the dBASE system command files.

Issuing a RESET command when no disk swap has taken place has no effect.

RESTORE

RESTORE FROM <file> [ADDITIVE]

This command reads a file of memory variables. The file must be built using the SAVE TO <file> command. All memory variables which were defined previous to the RESTORE command are deleted by this command.

If the ADDITIVE phrase is included, then memory variables already defined are not released, and as many variables as will fit are added from the FROM file.

Examples:

```
. DISPLAY MEMORY
ONE             (N)          1.0000
ALFABET         (C)         ABCDEFGHIJKL
CHARS           (C)         ABCDEFGHIJKL NEW STUFF
** TOTAL **                  03 VARIABLES USED      00042 BYTES USED

. SAVE TO MEMFILE

. RELEASE ALL

. DISPLAY MEMORY
** TOTAL **                  00 VARIABLES USED      00000 BYTES USED

. RESTORE FROM MEMFILE

. DISPLAY MEMORY
ONE             (N)          1.0000
ALFABET         (C)         ABCDEFGHIJKL
CHARS           (C)         ABCDEFGHIJKL NEW STUFF
** TOTAL **                  03 VARIABLES USED      00042 BYTES USED
```

RETURN

RETURN

This command is used inside a command file to return control to the command file which called it (or to the keyboard if the user called the command file directly). Encountering an end of file on a command file is equivalent to a RETURN command.

Command files usually have a RETURN command as their last executable line, and may be used to protect lines of text or programmer notes from processing.

SAVE

SAVE TO <file> [ALL LIKE <skeleton>]

This command stores all currently defined memory variables to a file. These memory variables may be restored by the RESTORE command.

The <skeleton> is similar to <skeleton> in DISPLAY FILES. Question marks mask any character, asterisks match any subsequent characters.

E.g. SAVE TO <file> ALL LIKE MEM??X would save memory variables MEMABX, MEMFFX, and MEMRRX but not MEMAB, MEMABY, or MAMABX.

Examples:

```
. DISPLAY MEMORY
ONE             (N)          1.0000
ALFABET         (C)         ABCDEFGHIJKL
CHARS           (C)         ABCDEFGHIJKL NEW STUFF
** TOTAL **                  03 VARIABLES USED      00042 BYTES USED

. SAVE TO MEMFILE

. RELEASE ALL

. DISPLAY MEMORY
** TOTAL **                  00 VARIABLES USED      00000 BYTES USED

. RESTORE FROM MEMFILE

. DISPLAY MEMORY
ONE             (N)          1.0000
ALFABET         (C)         ABCDEFGHIJKL
CHARS           (C)         ABCDEFGHIJKL NEW STUFF
** TOTAL **                  03 VARIABLES USED      00042 BYTES USED
```

SELECT

SELECT [PRIMARY]
[SECONDARY]

This command causes dBASE to select one of the two possible database areas for future operations. This permits the dBASE user to do operations on two databases at a time, such as using the data from one database to update the data in another database, or comparing the data in two databases, or any of a number of other multi-database operations.

When dBASE is initiated, the PRIMARY area is active. PRIMARY will stay active until a SELECT SECONDARY instruction is given. The secondary area will then be active until a SELECT PRIMARY command is encountered. A different database may be USE'd in each of the areas. This permits the (nearly) concurrent usage of two databases at once. There is no effect if a SELECT SECONDARY is entered when the secondary area is already selected or vice versa with the primary area.

When both database areas have databases in USE, field variables can be extracted from either area. That is to say, any expression can use variables from either database region. If the field names in both regions are the same for a desired variable, then the variable can be prefixed with a "P." or "S." to denote which database it is to come from.

dBASE commands that cause movement of the database (i.e. GOTO, SKIP, REPORT, SORT, COPY, LIST, DISPLAY and others) affect only the currently selected database. The SET LINKAGE ON command will allow all sequential commands (those that have a <scope> parameter) to perform positioning on both the secondary and the primary databases. (See the SET command.) The REPLACE command will only affect variables in the currently selected database. The DISPLAY STRUCTURE command will display the structure of the currently selected database only.

Examples:

```
. USE SHOPLIST

. LIST
00001  Beans          5   0.75
00002  Bread loaves   2   1.06
00003  T-Bone steak   4   4.33
00004  Paper plates   1   0.94
00005  Plastic forks  5   0.42
00006  Lettuce        2   0.53
00007  Bleu cheese    1   1.96
00008  Milk           2   1.30
00009  Charcoal       2   0.75

. NOTE NOW OPEN ANOTHER DATABASE IN THE SECONDARY AREA
```

```
. SELECT SECONDARY

. USE SHOPCOST

. LIST
00001                   800104                  31.38
00002                   800111                  45.69
00003                   800118                  51.18
00004                   800124                  48.19
00005                   800201                  55.82
00006                   800209                  12.04
00007                   800229                  12.04

. SELECT PRIMARY

. SUM COST
 12.04

. SELECT SECONDARY

. APPEND

RECORD 00008

DATE          : 800303
AMOUNT        : 12.04

RECORD 00009

DATE          : (cr)

. SUM AMOUNT
 268.38

. NOTE EITHER DATABASE'S VARIABLES CAN BE ACCESSED

. DISP OFF COST,AMOUNT,ITEM,DATE

      0.75          12.04          Charcoal          800303

. NOTE THE SAME DATABASE CAN BE USED IN BOTH AREAS

. USE SHOPLIST

. NOTE BUT ONE MUST BE CAREFUL SINCE THE VARIABLE NAMES ARE IDENTICAL

. NOTE IN BOTH DATABASES
```

SET

a. SET < parm1 > [ON]
[OFF]
b. SET < parm2 > TO < opt >

This command changes the configuration of dBASE. SET has two forms. Form a allows those parameters that are "toggles" to be set on or off; form b allows those parameters that need one of the different strings described below to have its default reset.

Form a parameters and defaults:

Note: The default values are underlined.

< parm5 >	ACTION	MEANING
1. ECHO	ON	All commands which come from a command file are echoed on the screen.
	OFF	There is no echo.
2. STEP	ON	dBASE halts after the completion of each command and waits for the user to decide either to go to the next command, quit (escape) from the command file, or enter a command from the keyboard. (STEP is used for debugging command files).
	OFF	Normal operations are resumed.
3. TALK	ON	The results from commands are displayed on the screen.
	OFF	There is no display shown.
4. PRINT	ON	Output is echoed to printer.
	OFF	The echo is turned off.
5. CONSOLE	ON	Output is echoed to the screen.
	OFF	Output to the screen is turned off.
6. ALTERNATE	ON	Output is echoed to a disk file.
	OFF	The echo to the file is turned off.
7. SCREEN	ON	Full-screen operations are turned on for APPEND, INSERT, EDIT, and CREATE
	OFF	Full-screen operations are turned off.

8. LINKAGE	ON	All sequential commands (LIST, REPORT, SUM, i.e. those that allow a <scope>) will increment the PRIMARY and SECONDARY record pointers simultaneously, but does not force them to be equal.
	OFF	Makes PRIMARY and SECONDARY database pointers independent.
9. COLON	ON	Bounds GET data items with colons in @ commands.
	OFF	Removes colons.
10. BELL	ON	Bell rings whenever illegal data is entered or data field boundaries are crossed.
	OFF	Bell is turned off.
11. ESCAPE	ON	An escape character (1B Hex) aborts execution of command files.
	OFF	Escape key will not interrupt processing.
12. EXACT	ON	Requires that character strings match completely (except for trailing blanks) in expressions and the FIND command.
	OFF	Matches will be made on the basis of the length of the second string, e.g. "ABCDEF" = "ABC"is true.
13. INTENSITY	ON	Full-screen operations will use dual intensity screen characters (normal and inverse video on some terminals).
	OFF	Dual intensity will not be used.
14. DEBUG	ON	Output from the ECHO and STEP commands will be sent to the printer so that full-screen commands may be checked out without the screen becoming cluttered.
	OFF	No extra output on the printer.
15. CARRY	ON	Data from the previous record will be carried-over when APPENDing records in the full-screen mode.
	OFF	No carrying will be done.
16. CONFIRM	ON	dBASE will not skip to next field in full-screen editing until a control key (like return) is typed.
	OFF	dBASE will skip to next field any time too many characters are entered.

17. EJECT	ON	REPORT command will eject a page before beginning a new report.
	OFF	The page eject will be suppressed.
18. RAW	ON	Spaces are left off.
	OFF	Places spaces between fields when the DISPLAY and LIST commands are used without the fields list.
19. DELETED	ON	Records marked for deletion cannot be located with the FIND commands nor processed by any command that allows the NEXT phrase (e.g. LIST, LOCATE, COUNT, etc.)
	OFF	Records marked for deletion can be LOCATEd and DISPLAYed (but not COPYed or APPENDed).

Form b parameters and their formats:

1. SET HEADING TO <string>

This form of the SET command saves the <string> internally and prints the string as part of the report header line. The <string> can be up to 60 characters long. (See REPORT for an example.)

2. SET FORMAT TO [SCREEN]
   [PRINT]
   [<format file>]

The first two forms of this SET parameter determine where the output of "@" commands will go. The last form determines where @ commands are READ from. (See the "@" and READ commands.)

3. SET DEFAULT TO <drive>

This SET command makes the specified disk drive into the default drive. dBASE will assume that inexplicit file names are on this disk drive. This allows command files to be written in such a way (conveniently) that referenced files may be on any drive in the system. This can also be done with &-macros for further generality in disk drive assignment. In the interactive mode of dBASE, this SET command permits implicit file names.

When a default drive has been set, ALL inexplicit file names are set to the dBASE default. This includes form files, command files, memory files, format files, index files, text files as well as database files.

The parameter <drive> may or may not have the colon (:) attached, that is, both "B" and "B:" are acceptable forms of specifying which drive is wanted.

Note: This SET command does not affect the CP/M default drive in any way. The dBASE initial default drive is the same as the CP/M default drive, the SET DEFAULT redefines dBASE's internal default only while within dBASE.

Example:

```
. SET DEFAULT TO B:

. USE DATEVSYR          (dBASE will access the 'B' drive for this
                         database and all subsequent data and
                         command files.)
```

4. SET ALTERNATE TO [<file>]

This form of the SET ALTERNATE command is part of a two step process to write everything that is normally written onto the screen, onto a disk file as well. This includes output that dBASE generates as well as all inputs typed onto the console. This form identifies and opens the receiving disk file. If the <file> existed on the disk prior to this command, it will be overwritten. A subsequent SET ALTERNATE ON begins the echo process.

Example:

```
SET ALTERNATE TO B:PRINTFLE
SET ALTERNATE ON
  .
  .
  .
any commands
  .
  .
  .
SET ALTERNATE TO anyfile
```

Everything which appears on the screen or printer will be copied onto (in this example) B:PRINTFLE.TXT, which can be word processed, printed, or saved.

5. SET DATE TO mm/dd/yy

The format may be yy/mm/dd, dd/mm/yy, etc; m, d, or y may be any numeral. The system date can be set or reset at any time with this command. It however does not perform date/calendar validation like the date request when dBASE is first started.

```
SET DATE TO 12,10,76
```

6. SET INDEX TO <index file> [, <index file>, ... <index file>]

SET INDEX TO identifies and sets up as many as seven index files to be used for future operations. If an index file is currently in USE when this command is issued then the old index file is closed and the new one established.

Note: when the new index is set up, the database is left positioned where it was, but the index does not point anywhere. A FIND command or GOTO must be issued to set the index pointer before any commands that have a NEXT clause are issued.

The first index file named is considered as the Master Index. All FINDs use only this index and the database will be in the Master Index order (when skipping).

A SET INDEX TO command (with no index files) will release all indexes and the database will be a sequential file.

7. SET MARGIN TO n

This form of the SET command allows the user to control the left margin when a report is printed. All lines to be printed will be offset by n spaces. The n parameter must be a literal number in the range 1 to 254.

SKIP

SKIP [+<exp>]
[−<exp>]

This command causes the current record pointer to be advanced or backed up relative to its current location.

Example.

```
. USE INVNTRY1

. LIST
00001   136928   13   1673   ADJ. WRENCH      7.13   189    9   0   9.98
00002   221679    9   1673   SM. HAND SAW     5.17   173    4   1   7.98
00003   234561    0     96   PLASTIC ROD      2.18    27  112  53   4.75
00004   556178    2    873   ADJ. PULLEY     22.19   117    3   0  28.50
00005   723756   73     27   ELECT. BOX      19.56   354    6   1  29.66
00006   745336   13     27   FUSE BLOCK      12.65    63    7   2  15.95
00007   812763    2   1673   GLOBE            5.88   112    5   2   7.49
00008   876512    2    873   WIRE MESH        3.18    45    7   3   4.25
00009   915332    2   1673   FILE             1.32    97    7   3   1.98
00010   973328    0     27   CAN COVER        0.73    21   17   5   0.99

. 5

. SKIP −2
RECORD:  00003

. SKIP
RECORD:  00004

. SKIP 3
RECORD:  00007
```

SORT

SORT ON <field> TO <file> [ASCENDING]
[DESCENDING]

This command allows the user to sort data files to another file which is different from the original file. The file in USE is sorted on one of the data fields and may be sorted into ascending or descending order. Notice that the USE file remains in USE and is unaltered, and that deleted records are ignored.

While the SORT command allows only one key, a database may be sorted on several keys by cascading sorts: sort on the most minor key first and progress toward the major key. dBASE will only disturb the order of records when necessary. The collating sequence for character fields is the ASCII code. ASCENDING is assumed if neither ASCENDING or DESCENDING is specified.

The sort uses the ASCII collating sequence. This means that the string 'SMITH' is "smaller" than 'Smith' (the expression " 'SMITH' < 'Smith' " would be TRUE).

The INDEX command is contrasted with the SORT command in this way: INDEX, when done, performs nearly all of SORTs duties. Also, INDEX generally allows greater freedom and greater speed than SORT.

Note that SORT performs a physical rewrite of the datafile, so you should have at least as much disk capacity available as the file currently occupies.

```
. USE SHOPLIST

. LIST
00001   BEANS #303 CAN          5       0.75
00002   BREAD LOAVES            2       0.97
00003   T-BONE STEAKS           4       3.94
00004   PAPER PLATES            1       0.86
00005   PLASTIC FORKS           5       0.42
00006   LETTUCE                 2       0.53
00007   BLEU CHEESE             1       1.96
00008   MILK (1/2 GAL)          2       1.30
00009   CHARCOAL, 5# BAGS       2       0.75

. SORT ON ITEM TO SORTFILE
SORT COMPLETE

. USE SORTFILE
```

```
. LIST
00001   BEANS #303 CAN          5       0.75
00002   BLEU CHEESE             1       1.96
00003   BREAD LOAVES            2       0.97
00004   CHARCOAL, 5# BAGS       2       0.75
00005   LETTUCE                 2       0.53
00006   MILK (1/2 GAL)          2       1.30
00007   PAPER PLATES            1       0.86
00008   PLASTIC FORKS           5       0.42
00009   T-BONE STEAKS           4       3.94
```

STORE

STORE <exp> TO <memvar>

This command computes the value of an expression and stores the value into a memory variable. If the memory variable did not exist before this command was issued then dBASE will create the memory variable automatically.

Note that STORE will alter only memory variables. Use the REPLACE command to change database field variables.

```
. RELEASE ALL

. STORE 1 TO ONE

 1

. STORE 'ABCDEFGHIJKL' TO ALFABET
ABCDEFGHIJKL

. STORE ALFABET+'  NEW STUFF' TO CHARS
ABCDEFGHIJKL NEW STUFF

. STORE ONE*1.0000 TO ONE
 1.0000

. DISPLAY MEMORY

EOF          (L)        .T.
ONE          (N)         1.0000
ALFABET      (C)        ABCDEFGHIJKL
CHARS        (C)        ABCDEFGHIJKL NEW STUFF
** TOTAL **              04 VARIABLES USED          00042 BYTES USED
```

SUM

SUM < field> [< field>][TO < memvar list>] [< scope>] [FOR < exp>]
[WHILE < exp>]

The SUM command adds numeric expressions involving the USE file according to the < scope> and FOR clauses. Up to 5 expressions may be simultaneously summed. If the TO clause is present, the sums are also stored into memory variables (memory variables will be created if they didn't exist prior to the issuance of the SUM command). The default scope of SUM is *all* non-deleted records.

```
. USE SHOPLIST

. LIST
00001   BEANS #303 CAN          5       0.75
00002   BREAD LOAVES            2       0.97
00003   T-BONE STEAKS           4       3.94
00004   PAPER PLATES            1       0.86
00005   PLASTIC FORKS           5       0.42
00006   LETTUCE                 2       0.53
00007   BLEU CHEESE             1       1.96
00008   MILK (1/2 GAL)          2       1.30
00009   CHARCOAL, 5# BAGS       2       0.75

. SUM COST
11.48

. SUM COST FOR NO=1
2.82

. SUM COST, NO
11.48 24

. SUM COST TO MSUM
11.48

. ? MSUM
11.48

. DISPLAY MEMORY

MSUM            (N)             11.48
** TOTAL **                     01 VARIABLES USED       00006 BYTES USED

. ? MSUM*1.10
12.6280

. SUM NO*COST,NO,COST,COST/NO
31.53                   24                      11.48                   5.81
```

TEXT

TEXT

All lines following the TEXT command are copied directly to the screen or printer, according to the SET status. Macros are not expanded but continued lines are combined. The copy continues until an ENDTEXT command is encountered.

The TEXT command is a convenient way of incorporating blocks of text into command files without the need of multiple @ SAY or ? commands.

Example:

```
TEXT
    Anything that appears within the TEXT / ENDTEXT bounds is copied to the output
    without being processed by the dBASE command interpreter. The only exception is
    input lines continued with a semicolon.
ENDTEXT
```

TOTAL

TOTAL ON <key> TO <database> [FIELDS <list>] [FOR <exp>]
[WHILE <exp>]

The TOTAL command is similar to the subtotal capability in the REPORT command except that the subtotals are placed into a database instead of printed. This allows condensation of data by eliminating detail and summarizing.

Note: The USE database must be either presorted by the key or indexed on the key.

If the TO database was defined (if it existed and had a structure), then its structure will be left intact and used to decide which fields will be totalled arithmetically.

If the TO database did not exist prior to this TOTAL command, then the structure from the USE database will be copied to the TO file.

This command is most selective when the TO database exists and the FIELD phrase is included in the command. In this case, only the numeric fields in the FIELDS are totalled. In any other configuration of this command, all numeric fields are totalled.

TOTAL can also be used to remove duplicate records from a database since a non-numeric field in the FIELDS list is not totalled (naturally) and is not flagged as an error.

Example:

```
. USE ORDERS INDEX ORDERS

. DISP STRU
STRUCTURE FOR FILE:   ORDERS.DBF
NUMBER OF RECORDS:  00008
DATE OF LAST UPDATE: 12/14/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH      DEC
001          CUSTOMER      C             020
002          PART:NO       C             005
003          AMOUNT        N             005
** TOTAL **                              00031

. LIST
00003   HARRIS, ARNOLD          11528          44
00007   JUAN, DON               21828           5
00001   SWARTZ, JOE             31415          13
00005   MACK, JAY               31415           3
00008   SALT, CLARA             70296           9
00002   SWARTZ, JOE             76767          13
00006   TERRY, HANS             76767           5
00004   ADAMS, JEAN             89793          12
```

(Imagine that the warehouse needs to know how many of each item to bring out. By totaling on the quantity as long as the part numbers are the same, a database is generated that contains part numbers and the number needed.)

(The database CALLS has already been defined.)

```
. TOTAL ON PART:NO TO CALLS
00006 RECORDS COPIED

. USE CALLS

. DISP STRU
STRUCTURE FOR FILE:   CALLS.DBF
NUMBER OF RECORDS:  00006
DATE OF LAST UPDATE: 12/21/82
PRIMARY USE DATABASE
FLD          NAME          TYPE       WIDTH      DEC
001          PART:NO          C         005
002          AMOUNT           N         005
** TOTAL **                             00011

. LIST
00001        11528          44
00002        21828           5
00003        31415          16        (Note: two orders totaled)
00004        70296           9
00005        76767          18        (Note: two other orders totaled)
00006        89793          12
```

UPDATE

```
UPDATE FROM <database> ON <key> [ADD <field list>] [RANDOM]
                      [REPLACE [          <field list>          ] ]
                                [<field> WITH <from-field>]
```

The UPDATE command revises the USE file by using data from a second database to modify the USE database. Updated items can be either summed or replaced in entirety. A record is updated if a match occurs when a specified key field in the USE database is compared to a key field in the FROM database. These fields are supplied with the ON phrase.

If the RANDOM phrase is used, then <key> is assumed to be a *single* field in the FROM <file> that can match indexes in the USE database (the USE database must be indexed). Records in the FROM file can be in any order. As each record is read from the FROM file, an internal FIND is done to find the record in the USE database.

If the RANDOM option is not used, then the USE database must be either pre-sorted by the key or indexed on the key. The FROM database must be pre-sorted by the key. Both databases are 'rewound' and a record is read. If the keys match, the add or replace action takes place as directed. If the key in the USE file is smaller (in sort sequence) than the key in the FROM database, then no action takes place, and the record is skipped and left unchanged. Similarly, if the FROM key is smaller, no updates happen and that record is skipped.

Example:

```
. USE INVUPDAT

. DISPLAY STRUCTURE
STRUCTURE FOR FILE:     INVUPDAT.DBF
NUMBER OF RECORDS:      00003
DATE OF LAST UPDATE:    12/18/82
PRIMARY USE DATABASE
FLD           NAME           TYPE        WIDTH        DEC
001         PART:NO           C           005
002         ON:HAND           N           005
003         COST              N           010          002
** TOTAL **                               00021

. LIST
00001          21828           77                 35.88
00002          70296            0                250.00
00003          89793            2             134999.00
```

(Notice that the database is sorted on the "key" PART:NO.)

```
. USE INVENTRY INDEX INVENTRY

. DISPLAY STRUCTURE
STRUCTURE FOR FILE:   INVENTRY.DBF
NUMBER OF RECORDS:  00008
DATE OF LAST UPDATE: 12/18/82
PRIMARY USE DATABASE
FLD          NAME          TYPE        WIDTH        DEC
001          ITEM          C           020
002          COST          N           010          002
003          PART:NO       C           005
004          ON:HAND       N           005
** TOTAL **                             00041

. DISP ALL
00008  #9 COAL             22.00        11528         16
00005  SINK, KITCHEN       34.72        21828         77
00001  TIME STITCH          9.99        24776          1
00002  WIDGET               1.67        31415         18
00007  RINGS, GOLDEN      200.00        70296          5
00006  TROMBONES          198.37        76767         76
00004  TANK, SHERMAN   134999.00        89793          5
00003  GADGET, LARGE       16.33        92653          7
```

(Again notice that the database is indexed on the "key" PART:NO.)

```
. UPDATE ON PART:NO FROM INVUPDAT ADD ON:HAND REPLACE COST

. LIST
00008  #9 COAL             22.00        11528         16
00005  SINK, KITCHEN       35.88        21828        154
00001  TIME STITCH          9.99        24776          1
00002  WIDGET               1.67        31415         18
00007  RINGS, GOLDEN      250.00        70296          5
00006  TROMBONES          198.37        76767         76
00004  TANK, SHERMAN   134999.00        89793          7
00003  GADGET, LARGE       16.33        92653          7
```

(Note—the two new Sherman tanks were added to the database and the cost of the golden rings and the kitchen sinks were replaced with the new prices.)

USE

USE [<database file>]
USE <database file> INDEX <index file> [, <index file>, ... <index file>]

Example:

. USE DATABASE INDEX NAME,CITY,PART:NO,SALESMAN

The USE command specifies which (pre-existing) database file is to be the file in USE. If there was a USE file prior to this command, the old file is closed. If a filename is not specified in the command, then the previous USE file is closed.

The second form of USE is to specify a database for operation and an associated index file (which was previously created by the INDEX command) and permits subsequent index operations such as FIND and indexed sequential file access.

Up to seven index files may be USEd with any one database at the same time. The first index file named is considered as the Master Index. All FINDs use only this index and the database will be in the Master Index order (when skipping). All of the named index files will be automatically updated anytime their keys are modified (by APPEND, EDIT, REPLACE, READ, or BROWSE commands).

Examples:

. USE EXAMPLE

. USE TRACE INDEX TRACE

WAIT

WAIT [TO < memvar>]

This command causes dBASE to cease operations until any character is entered from the keyboard, the message WAITING is displayed on the screen. If the TO clause is specified, then the single keystroke that releases dBASE from the wait-state will be entered into the memory variable.

The TO option is most useful when only a single character is required to direct the action of a command file process e.g. menu selections. Notice that a carriage return is not necessary to "send" the character as in the ACCEPT and INPUT commands.

If any non-printable character (i.e. RETURN, LINE FEED, or any other control character) is typed as the response to a WAIT TO command, the value of the memory variable is set to a blank.

Example:

```
. RELEASE ALL

. WAIT TO ACTION
WAITING 1

. DISP MEMO
ACTION          (C)          1
** TOTAL **                   01 VARIABLES USED        00002 BYTES USED
```

APPENDIX A LIST OF COMMANDS

```
? <exp> [,<exp>]
@ <coordinates> [SAY <exp> [USING '<picture>']]
                [GET <variable> [PICTURE '<picture>']]
ACCEPT ["<cstring>"] TO <memvar>
APPEND [FROM <file> [SDF] [DELIMITED] [FOR <exp>]] or [BLANK]
BROWSE [FIELDS <field list>]
CANCEL
CHANGE FIELD <list> [<scope>] [FOR <exp>]
CLEAR [GETS]
CONTINUE
COPY TO  <file> [<scope>] [FIELD <list>] [FOR <exp>] [SDF]
         [DELIMITED [WITH <delimiter>]] or [STRUCTURE]
COUNT [<scope>] [FOR <exp>] [TO <memvar>]
CREATE [<filename>]
DELETE [<scope>] [FOR <exp>]
DELETE FILE <file>
DISPLAY [<scope>] [FOR <exp>] [<exp list>] [OFF] [FIELDS <field list>]
DISPLAY STRUCTURE
DISPLAY MEMORY
DISPLAY FILES [ON <disk drive>] [LIKE <skeleton>]
DO <file>
DO WHILE <exp>
EDIT
EJECT
ELSE
ENDDO
ENDIF
ENDTEXT
ERASE
FIND <key>
GO or GOTO [RECORD], or [TOP], or [BOTTOM], <n>
HELP [command]
IF <exp>
INDEX
INDEX ON <char string expression> TO <index file name>
INPUT ["<cstring>"]TO <memvar>
INSERT [BEFORE] [BLANK]
JOIN TO <file> FOR <expression> [FIELDS <field list>]
LIST
LOCATE [<scope>] [FOR <exp>]
LOOP
MODIFY STRUCTURE
MODIFY COMMAND <command file>
NOTE or *
PACK
```

QUIT [TO <list of CP/M level commands or .COM files>]
READ [NO UPDATE]
RECALL [<scope>] [FOR <exp>]
REINDEX
RELEASE [<memvar list>] [ALL [LIKE <skeleton>]]
REMARK
RENAME <current file name> TO <new file name>
REPLACE [<scope>] <field> WITH <exp> [AND <field> WITH <exp>]
REPORT [<scope>] [FORM <form file>] [TO PRINT] [FOR <exp>]
RESET
RESTORE FROM <memfile> [ADDITIVE]
RETURN
SAVE TO <file> [ALL LIKE <skeleton>]
SELECT [PRIMARY or SECONDARY]
SET <parm> [ON] [OFF]
SET ALTERNATE TO <file>
SET DEFAULT TO <drive>
SET DATE TO <string>
SET FORMAT TO <format file name>
SET HEADING TO <string>
SET INDEX TO <index file list>
SET MARGIN TO <n>
SKIP <+/-> [<n>]
SORT ON <field> TO <file> [ASCENDING], or [DESCENDING]
STORE <exp> TO <memvar>
SUM <field> [<scope>] [TO <memvar list>] [FOR <exp>]
TEXT
TOTAL TO <file> ON <key variable> [FIELDS <field list>]
UPDATE FROM <file> ON <key variable> [ADD <field list>] [REPLACE <field list>]
USE <file> [INDEX <index file name>]
WAIT [TO <memvar>]

FUNCTIONS:

@(<string1>,<string2>)	AT function
*	deleted record function
#	record number function
!(<char string>)	upper case function
$(<char string>,<start>,<length>)	substring function
CHR(<numeric expression>)	numeric to ASCII
DATE( )	system date function
EOF	end-of-file function
FILE(<file>)	existence function
INT(<numeric expression>)	integer function
LEN(<char string>)	length function
RANK(<string>)	ASCII value function
STR(<numeric expression>,<width>[,<decimals>])	string function
VAL(<char string>)	value function
TRIM(<char string>)	trims strings
TYPE(<exp>)	supplies data type

APPENDIX B LIMITATIONS AND CONSTRAINTS

number of fields per record	32 max
number of characters per record	1000 max
number of records per database	65535 max
number of characters per character string	254 max
accuracy of numeric fields	10 digits
largest number	1.8×10^{63} approx
smallest number	1.0×10^{-63} approx
number of memory variables	64 max
number of characters per command line	254 max
number of expressions in SUM command	5 max
number of characters in REPORT header	254 max
number of characters in index key	99 max
number of pending GETS	64 max
number of files open at one time	16 max

APPENDIX C ERROR MESSAGES

BAD DECIMAL WIDTH FIELD
Redefine Decimal.

BAD FILE NAME
Syntax error in filename.

BAD NAME FIELD
Redefine Name.

BAD TYPE FIELD
Must be C, N, or L.

BAD WIDTH FIELD
Redefine size of data field.

CANNOT INSERT — THERE ARE NO RECORDS IN DATABASE FILE
Use the APPEND command instead.

CANNOT OPEN FILE
Internal error, contact dealer for support.

COMMAND FILE CANNOT BE FOUND
Check spelling.

DATA ITEM NOT FOUND

DATABASE IN USE IS NOT INDEXED
FIND is only permitted on indexed databases.

DIRECTORY IS FULL
The CP/M disk directory cannot hold anymore files.

DISK IS FULL
No space left on disk.

END OF FILE FOUND UNEXPECTEDLY
The database in USE is not in the correct format. If all records are correct and present, then PACK and re-INDEX the database.

"FIELD" PHRASE NOT FOUND
Rewrite command line.

FILE ALREADY EXISTS

FILE DOES NOT EXIST

FILE IS CURRENTLY OPEN
Type a USE or CLEAR command to close the file.

FORMAT FILE CANNOT BE OPENED

FORMAT FILE HAS NOT BEEN SET
SET the appropriate format file.

ILLEGAL DATA TYPE

ILLEGAL GOTO VALUE
Must be > 0 and < 65535

ILLEGAL VARIABLE NAME
Only alphanumerics and colons are allowed invariable and field names.

INDEX DOES NOT MATCH DATABASE
dBASE cannot match the key with the database. Try another index file.

INDEX FILE CANNOT BE OPENED
Check spelling or INDEX the database.

JOIN ATTEMPTED TO GENERATE MORE THAN 65,534 RECORDS
The FOR clause allows too many joined output records, make it more stringent.

KEYS ARE NOT THE SAME LENGTH

MACRO IS NOT A CHARACTER STRING
&macros must be character strings.

MORE THAN 5 FIELDS TO SUM
Sum is limited to 5 fields.

NESTING LIMIT VIOLATION EXCEEDED

NO EXPRESSION TO SUM

NO "FOR" PHRASE
Rewrite command with correct syntax.

NO "FROM" PHRASE
Rewrite command with correct syntax.

NO FIND
More a diagnostic type message than an error message. dBASE couldn't find the key. Record # has been set to 0.

NON-NUMERIC EXPRESSION

NONEXISTENT FILE

"ON" PHRASE NOT FOUND
Rewrite command with correct syntax.

OUT OF MEMORY FOR MEMORY VARIABLES
Reduce the number or size of memory variables.

RECORD LENGTH EXCEEDS MAXIMUM SIZE (OF 1000)
Reduce size of some fields or create a second database on a common key.

RECORD NOT IN INDEX
Index file was not updated after a record was added. Reindex.

RECORD OUT OF RANGE
Record number greater than number of records in database. The Record doesn't exist.

SORTER INTERNAL ERROR, NOTIFY SCDP
Internal error, contact dealer for support.

SOURCE AND DESTINATION DATA TYPES ARE DIFFERENT
Check that both datatypes are numeric or both character

*** SYNTAX ERROR ***

SYNTAX ERROR IN FORMAT SPECIFICATION

SYNTAX ERROR, RE-ENTER

"TO" PHRASE NOT FOUND
Rewrite command with correct syntax.

TOO MANY CHARACTERS
Shorten the command line.

TOO MANY FILES ARE OPEN
There is a maximum of 16 files allowed to be open at one time.

TOO MANY MEMORY VARIABLES
There is a maximum of 64 memory variables.

TOO MANY RETURNS ENCOUNTERED
Probably an error in the structure of a command file.

"WITH" PHRASE NOT FOUND
Rewrite command with correct syntax.

UNASSIGNED FILE NUMBER
Internal error, contact dealer for support.

*** UNKNOWN COMMAND
Check spelling.

VARIABLE CANNOT BE FOUND
Need to create the variable, or check the spelling.

INDEX

This index was designed so that the user can find the desired information with a minimum of effort. Most items are indexed under several headings. The **boldface** page numbers are the best entry points for any topic. These **boldface** numbers point to the most comprehensive coverage for any subject matter.

— G —

– S –

– T –