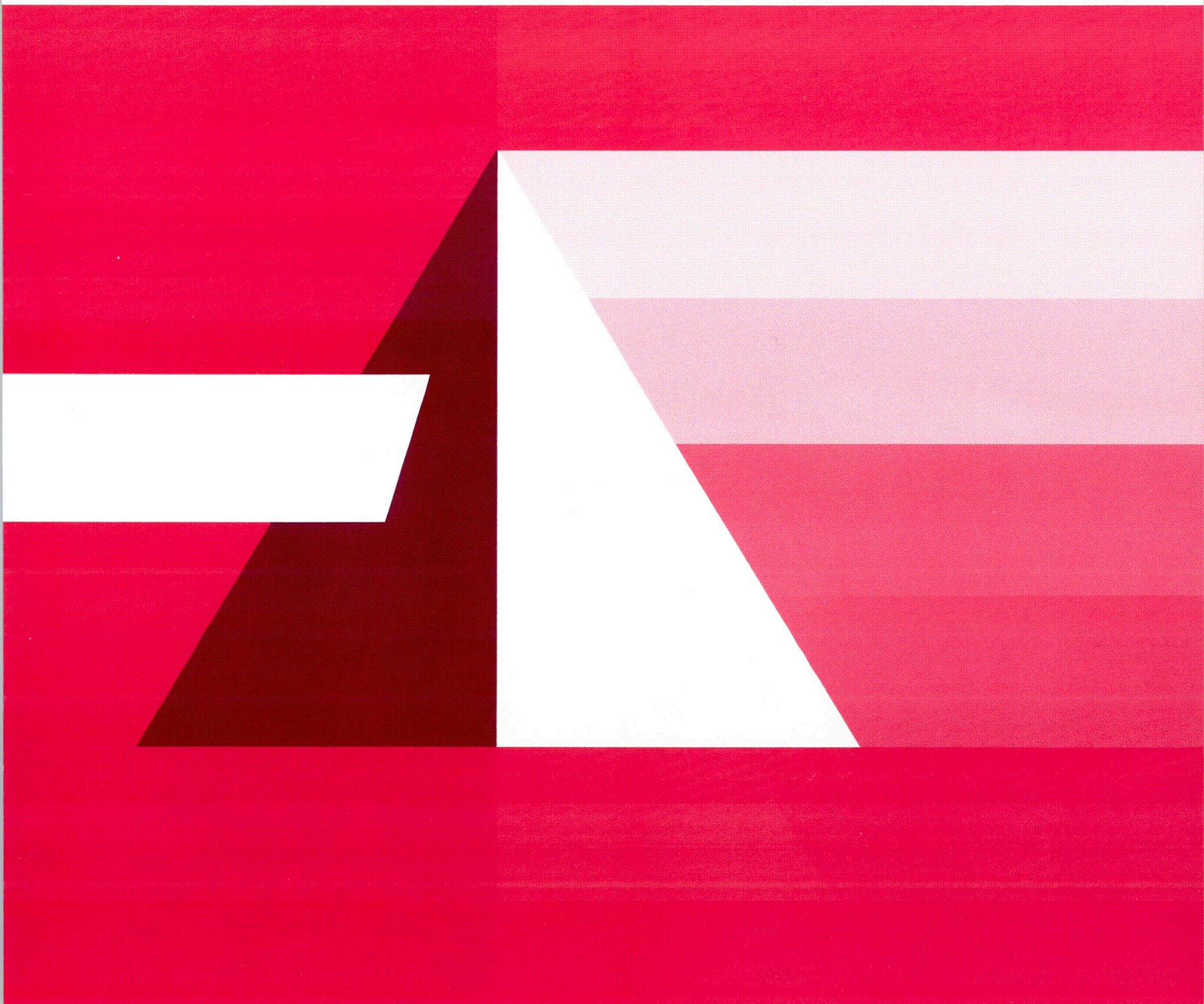
HP 3000 Computer Systems

HEWLETT PACKARD

Report/3000 User's Guide



HP 3000 Computer System

REPORT/3000

User's Guide

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PREFACE

This guide describes the use of HP Report/3000, a command driven, nonprocedural report writer used with HP Dictionary/3000; it can also be used as a standalone product. The initial sections are tutorial; the last section is in a reference format. Some familiarity with the HP 3000 computer system is assumed. Otherwise, you should consider completing the self-paced course HP 3000: A Guided Tour (part number 22835-93001). See the following manuals and courses for related material:

Reference Manuals

Part Number	Title
30000-90009	MPE Commands Reference Manual
30000-90079	KSAM/3000 Reference Manual
32215-90003	IMAGE/3000 Reference Manual
32244-90001	Dictionary/3000 Reference Manual
32246-90001	HP Inform/3000 User's Guide
32247-90001	Transact/3000 Reference Manual

Self-Paced Courses

Part Number	Title
22842A	Programming in Transact/3000
22843A	Using Dictionary/3000

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This section discusses:

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Manual Design

MANUAL OBJECTIVES

This manual is designed to instruct you in the use of Report/3000. Specifically, it contains the instructions necessary for you to design, write, compile, and generate a report.

FOR WHOM IS THIS MANUAL WRITTEN?

This manual is intended for data base administrators, those familiar with programming techniques, and nontechnical users (those who may run existing reports and write, compile, and run simple reports).

The Nontechnical User of Report/3000

Sections 2 through 7 will give you, in nontechnical language, the instructions you need to produce a simple report. When you feel comfortable with the language and procedures, you can polish your new skills by mastering other features of Report/3000 explained in Section 8.

The Experienced User

If you are familiar with report generating products or Report/3000, but you need help occasionally, this manual may be used as a reference manual. Section 8 presents the definitions and syntax of all the Report/3000 statements in alphabetic order.

WHAT IS REPORT/3000?

Report/3000 is a product that allows you to generate reports, both simple and elaborate. In addition to data listings, the report may contain, among other things, summary information, headings, and calculations.

Data definitions specified in a Report/3000 program come from two sources: Dictionary/3000 and/or user-supplied specifications. You can rely on Dictionary/3000 definitions or you can define and access data using the Report/3000 DEFINE and ACCESS statements.

Report/3000 is a high-level report writing language, report compiler, and report producer.

As you read through this manual you will discover how versatile Report/3000 can be. Once you have mastered the skill of writing a Report/3000 program, you will become more creative in designing reports that display exactly what you want.

MANUAL DESIGN

This manual is divided into sections; each section is designed to give you the skills you need to become more proficient in using Report/3000.

Section 1	– an overview of this manual and of Report/3000.
Section 2	– provides a brief discussion of how to develop, compile, and run a report using Report.
Sections 3-7	– guide you through the development of a report. First you will be shown how to develop a simple report using Report statements. As you proceed through these you will be shown how to make reports more and more elaborate and succinct. To test your skills, practice exercises are included periodically.
Section 8	– lists report specifications and the definitions and syntax of all Report statements.
Appendix A	– Error Messages
Appendix B	– Punctuation Usage
Appendix C	– Glossary
Appendix D	– Schema for ORDMGT Data Base
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Appendix F	– Quick Reference Guide

DEVELOPING A REPORT

SECTION
II

This section includes:

How to Develop a Report
Writing the Report
Compiling the Report
Running the Report

HOW TO DEVELOP A REPORT USING REPORT/3000

Here's the way to develop a report using Report/3000. Follow these steps:

1. decide what you want to appear in your report and rough out the design on paper,
2. use EDIT/3000, Text and Document Processor/3000 (TDP/3000), or any standard editor to write the Report program,
3. compile the statements using the Report compiler, and
4. generate the report using the Report processor.

DECIDING WHAT YOU WANT IN YOUR REPORT AND ROUGHING OUT A DESIGN

You wouldn't be writing a report if you didn't have a good idea of the information you want to display and how you want it formatted. For example, you may want to show a simple listing of product numbers and the quantity of each product sold. In this case, the report you want to generate will contain values for the following items:

```
PRODUCT-NUMBER          QUANTITY
```

With Report, however, you can display far more than a simple list of figures. Suppose that in addition to the data shown above you want your report to show the total quantity of products sold in January and February. Now the report looks something like this:

```
PRODUCT-NUMBER                QUANTITY

    -----                       ----
    -----                       ----
    -----                       ----

TOTAL QUANTITY FOR JANUARY AND FEBRUARY: _____
```

Suppose you want to take your analysis a step further by showing the total sales generated by each product and the biggest sale during the two-month period. The report now looks something like this:

```
PRODUCT-NUMBER      QUANTITY          SALES VALUE

    -----               ----              ------
    -----               ----              ------
    -----               ----              ------

TOTAL QUANTITY FOR JANUARY AND FEBRUARY: _____
MAXIMUM SALE: _____
```

As you can see, the report has become more elaborate. Report gives you the flexibility to produce any or all of these reports. The important thing is to think about what you want your report to show, and rough out the design of the report before you write the Report program.

WRITING THE REPORT/3000 PROGRAM

Once you decide how you want your report to look and what information you want to display, you are ready to write the Report program. A Report program consists of one or more Report statements, which specify the content and format of a report. Report statements are discussed in the next section.

Report programs are written using EDIT/3000, TDP/3000, or any standard editor. If you are not familiar with the use of a text editing subsystem, refer to the appropriate user manual.

COMPILING THE REPORT/3000 PROGRAM

After you write the program, you are ready to compile it. Compiling is the process of translating English-like words into computer-executable code. Programs are compiled using the Report compiler as follows:

```
:RUN REPCOMP.PUB.SYS
```

The following prompts appear in succession:

```
SOURCE FILE>

LIST FILE>

CONTROL>
```

SOURCE FILE refers to the file name of your editor file containing the Report statements. Don't confuse the SOURCE FILE name with the report name (as given in the REPORT statement) or the report title (as given in the REPORT TITLE statement). You will learn more about these in the next section. For now, remember that SOURCE FILE> is prompting you for the name of your editor file.

LIST FILE prompts you for where you want the compiled program listing to be sent. One of the following options may be selected:

1. carriage return	– directs your listing of the compiled program to your terminal ($STDLIST).
2. type in LP	– directs your listing to the line printer.
3. type in a file name	– directs your listing of the compiled program to the named disc file.
4. type in *file-name	– directs your listing to a file referenced in a file equation.
5. type in NULL	– no listing is produced.

The CONTROL prompt allows you to generate other listings in addition to the compiled program. One or more of the following options may be entered:

1. LIST – directs the compiler to generate a listing of the source file as it is compiled. The compiled report is sent to the line printer or the terminal depending on what you entered on the LIST FILE line. (default value)

2. CODE – directs the compiler to create a binary code file for the report. (default value)

3. DICT – directs the compiler to access the data dictionary for data element definitions and access methods. (default value)

4. ERRS – directs the compiler to display errors on the line printer or the terminal (depending on what you entered on the LIST FILE line) even if the compiler listing is directed to another device. (default value)

5. DEFN – directs the compiler to list data element definitions at the end of the report program. The listing is sent to the line printer or the terminal (depending on what you entered on the LIST FILE line) at the end of the report listing.

NOTE: If any of the CONTROL> options are preceded by the word "NO", the effect will be the reverse of that listed above.

Example

Suppose you write a Report program and name the editor file ACCNT. You want the report program to be displayed on the terminal, and you want the compiler to create a binary code file, generate a listing of the report on the terminal, show the errors in the compiled report, and use the data dictionary for data element definitions and access methods.

Requirements:

1. list compilation at the terminal
2. create binary code file
3. list source file
4. use data dictionary definitions and access methods
5. show errors

Compile Commands:

`:RUN REPCOMP.PUB.SYS`	1. run compiler
`SOURCE FILE> ACCNT`	2. editor file ACCNT contains report statements
`LIST FILE> <carriage return>`	3. list compiled source file on terminal
`CONTROL> <carriage return>`	4. select defaults: create binary code file list source file use data dictionary show errors

Pressing the carriage return key satisfies the last four requirements. Why? Because the default values for CONTROL LINE> are LIST, CODE, DICT, and ERRS.

Practice Exercise

Assume you have just written the statements for a report. Using the information given below, write the commands required to compile the report program and send it to the line printer, create a binary code file, generate a listing of the report statements, and list the errors.

Report Information:

Editor file name: REPO3
Compiler program file name: REPCOMP

(compile command): _____

SOURCE FILE>_____

LIST FILE>_____

CONTROL>_____

Check your answer with the one given on the next page.

Answer to Practice Exercise

(compile command)

```
:RUN REPCOMP.PUB.SYS

SOURCE FILE> REPO3

LIST FILE> LP

CONTROL> <carriage return>
```

The entry made in response to the MPE command prompt (:) takes the the following form:

```
:RUN REPCOMP.PUB.SYS
```

The editor file name (SOURCE FILE) is REPO3. Typing LP in response to the prompt for LIST FILE> causes the report statements to be listed on the line printer, and the carriage return in response to the prompt for CONTROL> results in the creation of a binary code file, a listing of the source file, a listing of any errors in the program, and the use of data dictionary definitions and access methods.

Some errors, called fatal errors, prevent the compilation of the program. If the program does not compile, a message appears indicating that the compilation is terminated. If the program compiles, a message appears indicating that no compilation errors are present.

SOME COMPILER OPTIONS

Some options are available that allow you to control the compiler listing of your Report program. You can include any of the following options anywhere in the program:

1. !PAGE – directs the compiler to skip to the top of the next page on the listing.
2. !NOLIST – directs the compiler to suppress the listing of the source statements.
3. !LIST – directs the compiler to list all source statements that follow this option.
4. !INCLUDE (file-name) – directs the compiler to read the Report statements in the named editor file at this point in the program; file-name can be qualified with a group and account. Up to 16 files may be nested.

When you respond to the prompts issued by the Report compiler, Report views your terminal as a file from which it reads the responses; the formal name Report uses for this file is REPIN. The default for REPIN is the MPE file $STDINX, which is explained in the MPE Commands reference manual. If you want Report to get your responses from some other file, you must have a file equation that tells Report the name of your file, and you must put your responses in this file in the same order that Report issues the prompts. For example, if you wanted to put your responses in a file named RESPOND you would enter the following file equation before entering the Report compiler command:

```
:FILE REPIN=RESPOND
```

In this case, when you compile the report Report knows to read file RESPOND for responses to its prompts. (If this file is an EDIT/3000 file, it must be unnumbered.)

Similarly, when Report sends prompts or a compiler listing to your terminal it uses the formal file name REPOUT for the terminal (known to MPE as $STDLIST). If you do not want prompts or your listing at the terminal, you can enter a file equation as in the following example:

```
:FILE REPOUT=MYFILE
```

In this case, anything that would normally appear at the terminal goes to a file we've named MYFILE.

REPLIST is the Report formal-file-designator for the MPE file $STDLIST if the line printer is the destination of your compiled listing; this also can be changed with a file equation.

When Report is compiling your program, it uses a preparation code file named REPCODE. In case of a very large program, the default maximum size of 1023 records may not be large enough (you will receive the message BINARY FILE FULL during compilation). To correct this problem you can increase the maximum size of REPCODE by using the MPE FILE command. For example, to increase the size to 2000 records you would enter the following:

```
:FILE REPCODE;DISC=2000
```

RUNNING THE REPORT

After you compile the report you are ready to run it. To run the report, enter:

```
:RUN REPORT.PUB.SYS
```

The following will appear on the terminal:

```
REPORT NAME>
```

Fill in the name of the report as it is listed in the REPORT statement. Do not use the editor file name.

Example

Suppose the name of the report as it is listed in the report program is REPRT1.

To run the report enter the following:

```
:RUN REPORT.PUB.SYS

REPORT NAME> REPRT1
```

PROMPTS YOU MAY ENCOUNTER

When you run a report, you could receive one or more of the prompts discussed on this page.

Selection Values

Report issues the following prompt if the report program contains a SELECT statement but no selection values:

```
PROVIDE SELECTION VALUE(S) FOR THE FOLLOWING DATA ITEM(S):
```

You will learn more about the SELECT statement in Sections 6 and 8. For now, remember that to run some reports you may have to enter selection values.

Passwords

The security of some data bases is preserved through passwords. If you are working with such a data base, you will be prompted for the password before the report is generated.

Generating the Report on the Terminal or Printer

You may also encounter the following prompt:

```
REPORT TO TERMINAL OR PRINTER (T/P)>
```

Entering a T or a carriage return sends the report to the terminal, and a P sends it to the line printer.

NOTE: You can avoid this interaction by including an OPTION statement in your report program. For more information, see the description of the OPTION statement in Section 8.

SOME PROCESSING OPTIONS

When you respond to prompts issued by the Report processor, REPIN is the formal file name for your terminal ($STDINX). You can equate REPIN to some other file if you want the processor to get your input from a file other than your terminal. For example, the following file equation tells Report to read file MYINPUT:

```
:FILE REPIN=MYINPUT
```

You must enter the file equation before you enter the processor command.

File REPOUT is used for prompts and report output. It defaults to your terminal ($STDLIST). You can equate REPOUT to another file if you do not want prompts or your report output to appear at your terminal.

If you have a SORT statement in your program, Report uses a file named REPSORT. The default size of this file is 10,000 records divided into 30 extents (an extent is a way of grouping records). You can change the size of this file by using the MPE FILE command. If you wanted to decrease the size of REPSORT to 5000 records, you would enter the following:

```
:FILE REPSORT;DISC=5000
```

REPLIST is the Report formal-file-designator for the MPE file $STDLIST if the line printer is the destination of your report output; this also can be changed with a file equation.

BUILDING A SIMPLE REPORT

SECTION III

In this section you will learn about statements, verbs, verb assignments and how to build a simple report using the following Report statements:

REPORT
REPORT TITLE
DETAIL
REPORT SUMMARY

REPORT/3000 STATEMENTS, VERBS, AND VERB ASSIGNMENTS

A Report/3000 program is made up of one or more Report/3000 statements. Report is a nonprocedural language, which means that the Report statements may be written in any order. Statements may also be written in upper or lower case letters. The program below is an example of a simple program containing four statements: a REPORT, a REPORT TITLE, a DETAIL, and a REPORT SUMMARY statement. The line numbers shown are the editor line numbers.

```
1     REPORT FIRST;
2     REPORT TITLE "CUSTOMER ACCOUNT DATA";
3     DETAIL ACCOUNT: PROD-NO: QUANTITY;
4     REPORT SUMMARY "END OF REPORT";
```

Each statement contains a verb and a verb assignment.

REPORT/3000 VERBS

A verb, which always comes first in a statement, is a word (or words) that describes a category of actions. In the program above, the Report verbs are:

```
REPORT
REPORT TITLE
DETAIL
REPORT SUMMARY
```

VERB ASSIGNMENTS

A verb assignment defines the specific action to be performed by the verb. For example, in the statement below:

```
SELECT DATE >810430 AND DATE <810601;
```

the word SELECT is a verb. It directs Report to perform an action, namely, to select. In this case, Report selects all dates between 810430 (April 30, 1981) and 810601 (June 1, 1981).

Let's look at another example:

```
SORT ACCOUNT;
```

SORT is the verb. It directs Report to sort what appears in the verb assignment: ACCOUNT.

Verb assignments may be broken down into the following categories:

report name
report specifications (specs)
option list
element name(s)
element, selection criteria
file, element list
element definitions

A complete list of Report statements (verbs and their associated verb assignments) is shown in Table 3-1. Although Report program statements may be written in any order, a preestablished order, such as the one given here, makes program revision and correction easier.

Report/3000 Statement: verb	verb assignment
REPORT	report name
DISPLAY	report spec
OPTION	option list
PAGE HEADING	report spec
PAGE FOOTING	report spec
DEFINE(ITEM)	element definitions
REPORT TITLE	report spec
SORT(n)	element name(s)
GROUP(n) TITLE	report spec
DETAIL	report spec
GROUP(n) SUMMARY	report spec
REPORT SUMMARY	report spec
SELECT	element 1, selection criteria
ACCESS	file 1, element list

Table 3-1. Report/3000 Verbs and Verb Assignments

Each of these Report statements is listed and discussed in Section 8 of this manual.

A WORD ABOUT PUNCTUATION

As with any programming language, punctuation is important. Appendix B contains a complete discussion of punctuation and practice exercises to check your understanding of punctuation usage. It is recommended that you read the explanation on punctuation usage before you go on.

BUILDING A REPORT

In this and subsequent sections you will learn how to write reports using Report statements. The data base on which the reports in this section are based is for a fictitious company that makes bicycles. This section presents a very simple report. In the sections that follow, the simple report developed in this section will be altered from a simple listing of data into a report which contains more detailed and pertinent information.

A SIMPLE REPORT/3000 PROGRAM

Look at the program below.

```
1     REPORT ORDER;
2     REPORT TITLE "CUSTOMER ORDERS";
3     DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY: UNIT-COST;
4     REPORT SUMMARY "END OF REPORT";
```

Figure 3-1. Simple Report/3000 Program

Before you look at the report generated by this program, rough out on paper what you think the report will look like. You know from line 2, for example, that the report title is CUSTOMER ORDERS. But do you think the title will be centered or left-justified?

Likewise, line 4 indicates that the report summary will contain the words END OF REPORT. Where do you think the summary will appear in the report?

Finally, line 3 indicates that the following data elements will be displayed:

```
ACCOUNT
PROD-NO
DESCRIPTION
QUANTITY
UNIT-COST
```

Now compare the report you outlined on paper to the actual report shown on the next page. The report was displayed on the terminal because carriage return was pressed in response to the REPORT TO TERMINAL OR PRINTER (T/P) prompt. Twenty-two lines appear on the screen, and then you are asked if you want the display to continue. Pressing carriage return or "Y" continues the display; entering "N" ends the display.

```
CUSTOMER ORDERS
ACCOUNT     PROD-NO  DESCRIPTION                          QUANTITY UNIT-COST
-------------------------------------------------------------------------
4158560684 26881H/M SANTA FE MEN'S 26 INCH                      5     7795
4158670329 26881H/M SANTA FE MEN'S 26 INCH                     35     7795
4158518001 26881H/M SANTA FE MEN'S 26 INCH                     42     7795
4159235116 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 1    13814
4153230642 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                22    13814
4087338229 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 2    13814
4159647066 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                42    13814
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                26    13814
4087390777 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                25    13814
4159410900 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                28    13814
4152591283 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                43    13814
4157250464 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                20    13814
4087326094 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                34    13814
4158560684 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                28    13814
4158670329 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                45    13814
4158518001 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 7    13814
4087338229 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 2    13814
4159647066 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                42    13814
4153668739 7272TH/M BOYS CITATION 27 INCH 10 SPEED             41     9598
4087328644 7272TH/M BOYS CITATION 27 INCH 10 SPEED             22     9598

CONTINUE (Y/N) > N
```

Figure 3-2. Simple Report

Does this report look the way you thought it would? Notice that the report title is left-justified and that there is no line between the report title and the data element headings. (There are no blank lines at all.) Also notice that the data element names listed in the DETAIL statement are the same as the headings in the report and are listed in the same order. We ended the report after the first display. If we had continued the display and had seen the entire report, the words END OF REPORT would have appeared left-justified at the end as the result of the REPORT SUMMARY statement. The program is reproduced below so you can compare the Report statements with the report itself.

```
1    REPORT ORDER;
2    REPORT TITLE "CUSTOMER ORDERS";
3    DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY: UNIT-COST;
4    REPORT SUMMARY "END OF REPORT";
```

Later in this section the report will be altered by:

- centering the report title
- adding blank lines
- expressing dollars and cents

The verb and verb assignment for each program statement are shown below:

Verb	Verb Assignment
REPORT	ORDER;
REPORT TITLE	"CUSTOMER ORDERS";
DETAIL	ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY: UNIT-COST;
REPORT SUMMARY	"END OF REPORT";

THE REPORT STATEMENT

The REPORT statement assigns a name to the Report program (in contrast to the REPORT TITLE statement which assigns a name to the report itself). The REPORT statement must be the first statement in the program and is the only required statement of a program.

The program name must be six alphanumeric characters or less. When the program is compiled, it is saved in a file designated by the program name prefixed with the letters IR. The compiled report ORDER will be saved in a file named IRORDER, for example.

CENTERING THE REPORT TITLE

To center the report title, you have to add the format specification (spec) COL=n (where n is a column number) to the REPORT TITLE statement. The column number depends on the length of the title and the length of the line. In this case, the format spec COL=27 is used to center the title. The entire statement would look like this:

```
REPORT TITLE "CUSTOMER ORDERS", COL=27;
```

When the report is run, the first character of the title will be in column 27, and it will look like the following:

```
MON, MAR  8, 1982,  9:01 AM                                        PAGE 1

                              CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                          QUANTITY UNIT-COST
-------------------------------------------------------------------------
4158560684 26881H/M SANTA FE MEN'S 26 INCH                      5     7795
4158670329 26881H/M SANTA FE MEN'S 26 INCH                     35     7795
4158518001 26881H/M SANTA FE MEN'S 26 INCH                     42     7795
4159235116 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 1    13814
4153230642 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                22    13814
4087338229 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 2    13814
4159647066 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                42    13814
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                26    13814
4087390777 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                25    13814
4159410900 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                28    13814
4152591283 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                43    13814
4157250464 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                20    13814
4087326094 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                34    13814
4158560684 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                28    13814
4158670329 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                45    13814
4158518001 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 7    13814
4082453550 0684CU/M BOY'S DREAM MACHINE 10 SPEED                3     7998
4082453550 26961H/M 12 SPEED LEGRANGE BOY'S                     4    10598
4087338229 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 2    13814
4159647066 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                42    13814
      .
      .
      .
END OF REPORT
```

Figure 3-3. Simple Report With Centered Title

This time the report was produced on the line printer. The date, time, and page number are printed on the top of each page. The three dots shown near the end of the report indicate that the actual report is longer; the complete listing is not shown here.

INSERTING BLANK LINES

Suppose you want to add a blank line between the report title and the first line of detail information. There are two ways to introduce blank lines: by using the format spec LINE=n where n is the number of lines to space, or by using a null string. Both methods will be explained.

Inserting Lines Using A Null String

```
2     REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
3     DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY: UNIT-COST;
```

The REPORT TITLE statement above contains a null string. A null string is double quotation marks (" ") with no data in between. The format spec " ", LINE=2 directs Report to skip to the second line below the last printed line and print the information between the quotation marks. Since no information is between the quotation marks, the effect is to double-space between the report title and the detail line. When these two format specs are added to the program shown in Figure 3-1, the report looks like this:

```
MON, MAR  8, 1982,  9:11 AM                                        PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                        QUANTITY UNIT-COST
-------------------------------------------------------------------------
4158560684 26881H/M SANTA FE MEN'S 26 INCH                    5     7795
4158670329 26881H/M SANTA FE MEN'S 26 INCH                   35     7795
4158518001 26881H/M SANTA FE MEN'S 26 INCH                   42     7795
4159235116 26701H/F 26 INCH GIRL'S 3 SPEED BIKE               1    13814
4153230642 26701H/F 26 INCH GIRL'S 3 SPEED BIKE              22    13814
     .
     .
     .
END OF REPORT
```

Figure 3-4. Introducing a Blank Line Using a Null String

Inserting Lines Using the Format Spec LINE=n

```
2     REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
3     DETAIL ACCOUNT, LINE=2: PROD-NO: DESCRIPTION:
4            QUANTITY: UNIT-COST;
```

The format spec LINE=2 in the DETAIL statement above adds a blank line each time the value for the data element ACCOUNT changes. With the addition of this format spec to the program shown in Figure 3-1, the report now looks like this:

```
MON, MAR  8, 1982,  9:15 AM                                    PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                    QUANTITY UNIT-COST
-------------------------------------------------------------------------

4158560684 26881H/M SANTA FE MEN'S 26 INCH                5     7795

4158670329 26881H/M SANTA FE MEN'S 26 INCH               35     7795

4158518001 26881H/M SANTA FE MEN'S 26 INCH               42     7795

4159235116 26701H/F 26 INCH GIRL'S 3 SPEED BIKE           1    13814

4153230642 26701H/F 26 INCH GIRL'S 3 SPEED BIKE           22    13814
     .
     .
     .
END OF REPORT
```

Figure 3-5. Introducing a Blank Line Using LINE=n

DOLLARS AND CENTS

In this report, the information displayed in the UNIT-COST column represents dollars and cents; that is, the value 7795 represents $77.95. Although it is easy to figure out the values, the information would be more informative if it were presented using the standard notation for dollars and cents. This may be done by using what is known as an edit mask.

An edit mask is a format spec used to modify the way data is presented without changing the data itself. The edit mask used to express data in dollars and cents is shown below:

```
EDIT="$$$,$$$.^^"
```

This edit mask specifies that for every value of UNIT-COST, a decimal point should be added two positions from the right, a comma should be placed every third position to the left of the decimal point, and the entire value should be preceded by a dollar sign. Notice that the edit mask is enclosed in quotation marks.

For more information on edit masks, refer to format specifications in Section 8.

The Report statement that produces the desired result is:

```
3     DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
4            UNIT-COST, EDIT="$$$,$$$.^^";
```

When this statement is executed, the values in the UNIT-COST column looks like those shown in the report below:

```
MON, MAR  8, 1982,  9:22 AM                                    PAGE 1


                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                        QUANTITY UNIT-COST
-------------------------------------------------------------------------
4158560684 26881H/M SANTA FE MEN'S 26 INCH                    5     $77.95
4158670329 26881H/M SANTA FE MEN'S 26 INCH                   35     $77.95
4158518001 26881H/M SANTA FE MEN'S 26 INCH                   42     $77.95
4159235116 26701H/F 26 INCH GIRL'S 3 SPEED BIKE               1    $138.14
4153230642 26701H/F 26 INCH GIRL'S 3 SPEED BIKE              22    $138.14
   .
   .
   .
END OF REPORT
```

Figure 3-6. Simple Report With Edit Mask

Much more informative, don't you think?

NOTE: If Dictionary/3000 and the Report/3000 program contain an edit mask for the same data element, the Report program edit mask overrides the Dictionary edit mask.

In this section, the simple program that produces the report shown in Figure 3-1 has been altered in three ways by:

- centering the title
- adding a line between the title and the detail line
- using an edit mask to express dollars and cents

The modified program and the resulting report are shown in Figure 3-7.

```
MON, MAR  8, 1982,  9:37 AM                                        PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                          QUANTITY UNIT-COST
-------------------------------------------------------------------------
4158560684 26881H/M SANTA FE MEN'S 26 INCH                      5     $77.95
4158670329 26881H/M SANTA FE MEN'S 26 INCH                     35     $77.95
4158518001 26881H/M SANTA FE MEN'S 26 INCH                     42     $77.95
4159235116 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 1    $138.14
4153230642 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                22    $138.14
4087338229 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 2    $138.14
4159647066 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                42    $138.14
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                26    $138.14
4087390777 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                25    $138.14
4159410900 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                28    $138.14
4152591283 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                43    $138.14
4157250464 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                20    $138.14
4087326094 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                34    $138.14
4158560684 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                28    $138.14
4158670329 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                45    $138.14
4158518001 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 7    $138.14
4082453550 0684CU/M BOY'S DREAM MACHINE 10 SPEED                3     $79.98
4082453550 26961H/M 12 SPEED LEGRANGE BOY'S                     4    $105.98
4087338229 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                 2    $138.14
4159647066 26701H/F 26 INCH GIRL'S 3 SPEED BIKE                42    $138.14
      .
      .
      .
END OF REPORT


      1     REPORT ORDER;
      2     REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
      3     DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
      4            UNIT-COST, EDIT="$$$,$$$.^^";
      5     REPORT SUMMARY "END OF REPORT";
```

Figure 3-7. Simple Report With Centered Title, Blank Lines, and Edit Mask

ADDING COMMENTS TO YOUR PROGRAM

Comments may be added to your program using the following symbols: << >>. Comments are used in programs to provide additional information or brief explanations about the statement to which they apply.

Lines 1 and 5 in the program below contain comments.

```
1     REPORT ORDER;  <<this is the report program name>>
2     REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
3     DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
4            UNIT-COST, EDIT="$$$,$$$.^^";
5     REPORT SUMMARY "END OF REPORT"; <<last statement in report>>
```

Practice Exercise 1

Look at the report shown below. In the space indicated, fill in the Report statements that are used to produce the report. The report file name is PRICES. (Please note that no data has been included in this report — only dashed lines.)

```
REPORT ON PRODUCTS AND PRICE
PROD-NO          PRICE
-----------------------------
-------          -----
-------          -----
-------          -----
-------          -----
-------          -----
-------          -----
CURRENT PRICE LIST -- UPDATED 08/01/82
```

Report statements:

1. _____

2. _____

3. _____

4. _____

The answer to this practice exercise follows Practice Exercise 2.

Practice Exercise 2

In the report shown below, circle the information generated by the REPORT TITLE and the DETAIL statements.

```
                    SUMMARY OF ACCOUNTS

ACCOUNT NAME        PRODUCT              PURCHASE DATE
-------------------------------------------------------
George Anderson     2889                 81/04/01
                    3993                 81/05/30
                    4567                 81/05/30

END OF ACCOUNT FOR: George Anderson


Helga Horbe         3448                 81/04/03
                    4567                 81/04/21
                    4666                 81/04/22

END OF ACCOUNT FOR: Helga Horbe

                    END OF REPORT
```

For the answers to these practice exercises, look at the next page.

Answer to Practice Exercise 1

The Report statements required to produce the report in Practice Exercise 1 are:

1. REPORT PRICES;
2. REPORT TITLE "REPORT ON PRODUCTS AND PRICE";
3. DETAIL PROD-NO: PRICE;
4. REPORT SUMMARY "CURRENT PRICE LIST — UPDATED 08/01/82";

Compare your answer with this one. If you are unsure of the purpose of each statement or the punctuation, refer to Section 8 and Appendix B.

Answer to Practice Exercise 2

```
                    SUMMARY OF ACCOUNTS

ACCOUNT NAME        PRODUCT                 PURCHASE DATE
-------------------------------------------------------
George Anderson     2889                    81/04/01
                    3993                    81/05/30
                    4567                    81/05/30

END OF ACCOUNT FOR: George Anderson

Helga Horbe         3448                    81/04/03
                    4567                    81/04/21
                    4666                    81/04/22

END OF ACCOUNT FOR: Helga Horbe

                    END OF REPORT
```

BUILDING A REPORT USING THE SORT STATEMENT

SECTION IV

In this section you will learn how to alter a simple report with a SORT statement.

SORTING VALUES IN YOUR REPORT

Figure 4-1 shows a report and the Report program that generated it.

```
MON, MAR  8, 1982,  9:53 AM                                        PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                        QUANTITY UNIT-COST
-------------------------------------------------------------------------
4082452705 26821H/F GIRL'S 26 INCH 10 SPEED                  18     $68.89
4082452705 0684CU/M BOY'S DREAM MACHINE 10 SPEED              6     $79.98
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE              26    $138.14
4082452705 0684CU/M BOY'S DREAM MACHINE 10 SPEED              6     $79.98
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE              26    $138.14
4082452705 26821H/F GIRL'S 26 INCH 10 SPEED                  18     $68.89
      .
      .
      .
4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED              3     $79.98
4082453350 26961H/M 12 SPEED LEGRANDE BOY'S                   4    $105.98
4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED              3     $79.98
4082453350 26961H/M 12 SPEED LEGRANDE BOY'S                   4    $105.98
4082453350 26961H/M 12 SPEED LEGRANDE BOY'S                   4    $105.98
4082453350 26821H/F GIRL'S 26 INCH 10 SPEED                  42     $68.89
      .
      .
      .
END OF REPORT


     1   REPORT ORDER;
     2   REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
     3   SORT ACCOUNT;
     4   DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
     5          UNIT-COST, EDIT="$$$,$$$.^^";
     6   REPORT SUMMARY "END OF REPORT";
```

Figure 4-1. Sorted Report and Corresponding Report/3000 Program

Compare the report shown in Figure 3-2 with the one shown in Figure 4-1. The report shown in Figure 3-2 contains only one reference to account number 4082452705. The data base upon which this report is based is large, however, and if all of the records were shown in the simple report, many more references to account number 4082452705 would appear. When the data is sorted by account number as it is in Figure 4-1, this fact becomes evident. The report in Figure 4-1 shows that the account numbers are sorted in ascending order and that the next account number is 4082453350.

ASCENDING AND DESCENDING ORDER

Unless you specify otherwise, data elements are always sorted in ascending order. If you wish to sort data elements values in descending order, you may do so by using the option DES. For example, to change the SORT statement in Figure 4-1 so that the values are sorted in descending rather than ascending order, you would rewrite the statement to:

```
SORT  ACCOUNT (DES) ;
```

Because data elements are automatically sorted in ascending order, there is no need for you to specify the option ASC. However, you may include it for documentation purposes.

SORTING MORE THAN ONE DATA ELEMENT

Report/3000 allows you to sort more than one data element at a time. However, to do so you have to assign a priority to each data element. Priorities are established using sort priority numbers. If a SORT statement contains only one data element, no sort priority number is required. If, however, the SORT statement contains two or more data elements, you must supply a sort priority number.

The number in parentheses following the word SORT is a sort priority number. It determines the order in which data elements are to be sorted. For example, in the SORT statement:

```
SORT(1) ACCOUNT: QUANTITY;
```

we have assigned a sort priority number of 1 to the data element ACCOUNT. Records are first sorted by ACCOUNT; records with equal values for ACCOUNT are then sorted by QUANTITY. When two or more data elements are listed in a SORT statement, only the first data element has an explicit sort priority number; all others have implied sort priority numbers. In the example, the data element ACCOUNT has an explicit sort priority number of 1 and the data element QUANTITY has an implied sort priority number of 2. If more data elements were included, the implied sort priority number would increase by one for each successive data element.

A sort priority number is a relative value — it merely establishes a starting point from which all other data elements are numbered. For example, if the SORT statements below appeared in two separate programs, the data elements would be sorted in exactly the same order:

```
SORT(1) LAST-NAME: ACCOUNT: QUANTITY;

SORT(4) LAST-NAME: ACCOUNT: QUANTITY;
```

In each case, records are first sorted by LAST-NAME. Equal values of LAST-NAME are then sorted by ACCOUNT. Finally, equal values of ACCOUNT are sorted by QUANTITY. In the first SORT statement, implied sort priority numbers for ACCOUNT and QUANTITY are 2 and 3, respectively. In the second SORT statement, the implied sort priority numbers for ACCOUNT and QUANTITY are 5 and 6, respectively.

For more information about sort priority numbers, refer to the SORT statement in Section 8.

Suppose the report shown in Figure 4-1 was sorted first by ACCOUNT and second by PROD-NO. The resulting report and its corresponding program are shown in Figure 4-2.

```
MON, MAR  8, 1982, 10:03 AM                                        PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                          QUANTITY UNIT-COST
-------------------------------------------------------------------------
4082452705 0684CU/M BOY'S DREAM MACHINE 10 SPEED              6     $79.98
4082452705 0684CU/M BOY'S DREAM MACHINE 10 SPEED              6     $79.98
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE              26    $138.14
4082452705 26701H/F 26 INCH GIRL'S 3 SPEED BIKE              26    $138.14
4082452705 26821H/F GIRL'S 26 INCH 10 SPEED                  18     $68.89
4082452705 26821H/F GIRL'S 26 INCH 10 SPEED                  18     $68.89
      .
      .
      .
4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED              3     $79.98
4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED              3     $79.98
4082453350 26821H/F GIRL'S 26 INCH 10 SPEED                  42     $68.89
4082453350 26961H/M 12 SPEED LEGRANDE BOY'S                   4    $105.98
4082453350 26961H/M 12 SPEED LEGRANDE BOY'S                   4    $105.98
4082453350 26961H/M 12 SPEED LEGRANDE BOY'S                   4    $105.98
      .
      .
      .
END OF REPORT
```

```
1   REPORT ORDER;
2   REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
3   SORT(1) ACCOUNT: PROD-NO;
4   DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
5          UNIT-COST, EDIT="$$$,$$$.^^";
6   REPORT SUMMARY "END OF REPORT";
```

Figure 4-2. Report Sorted on Two Data Elements

Notice that both ACCOUNT and PROD-NO are sorted in ascending order. The records are first sorted by ACCOUNT; whenever the account numbers are the same, the records are sorted by PROD-NO.

Practice Exercise

1. Using the information that follows, write a Report program that produces the program shown below. For this exercise, assume that you want to sort the data element LAST-NAME in ascending order.

   Report name: NEWACC (for new accounts)

```
New Accounts
LAST-NAME       ACCOUNT-NO     PROD-NO      DESCRIPTION
-------------------------------------------------------
--------        ----------     -------      -----------
--------        ----------     -------      -----------
--------        ----------     -------      -----------
--------        ----------     -------      -----------
--------        ----------     -------      -----------
New Accounts -- First Company Report
```

2. Using the report shown above, write a SORT statement that will sort the information in descending order by ACCOUNT-NO.

   _____

3. What is the implied sort priority number of the data element ZIP in the following SORT statement?

```
SORT(3) LAST-NAME: FIRST-NAME: CITY: ZIP;
```

Look at the next page for the answer to this practice exercise.

Answers to Practice Exercise

1. The following Report program generates the report shown.

```
1     REPORT NEWACC;
2     REPORT TITLE "New Accounts";
3     SORT LAST-NAME;
4     DETAIL LAST-NAME: ACCOUNT-NO: PROD-NO: DESCRIPTION;
5     REPORT SUMMARY "New Accounts -- First Company Report";
```

2. The SORT statement that sorts the information in descending order by ACCOUNT-NO is:

```
SORT ACCOUNT-NO(DES);
```

3. The implied sort priority number for the data element ZIP is 6. The explicit sort priority number for LAST-NAME is 3 and the implied sort priority numbers for the remaining data elements are 4, 5, and 6, respectively.

The next section discusses the GROUP statement.

BUILDING A REPORT USING A GROUP STATEMENT

SECTION V

In this section you will see what effect the GROUP statement has on the format of a report. You will learn that the GROUP statement is used to group data and to add title and summary information before and after grouped data.

THE GROUP STATEMENT

Look at the report and the corresponding Report program shown in Figure 5-1. The only difference between the report in Figures 4-2 and 5-1 is the addition of a GROUP TITLE and a GROUP SUMMARY statement.

```
MON, MAR  8, 1982, 10:09 AM                                    PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                      QUANTITY UNIT-COST
-------------------------------------------------------------------------
DATA AVAILABLE FOR ACCOUNT NBR:
4082452705 0684CU/M BOY'S DREAM MACHINE 10 SPEED            6     $79.98
           0684CU/M BOY'S DREAM MACHINE 10 SPEED            6     $79.98
           26701H/F 26 INCH GIRL'S 3 SPEED BIKE            26    $138.14
           26701H/F 26 INCH GIRL'S 3 SPEED BIKE            26    $138.14
           26821H/F GIRL'S 26 INCH 10 SPEED                18     $68.89
           26821H/F GIRL'S 26 INCH 10 SPEED                18     $68.89
TOTAL QUANTITY IS:                                        100
DATA AVAILABLE FOR ACCOUNT NBR:
4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED            3     $79.98
           0684CU/M BOY'S DREAM MACHINE 10 SPEED            3     $79.98
           26821H/F GIRL'S 26 INCH 10 SPEED                42     $68.89
           26961H/M 12 SPEED LEGRANDE BOY'S                 4    $105.98
           26961H/M 12 SPEED LEGRANDE BOY'S                 4    $105.98
           26961H/M 12 SPEED LEGRANDE BOY'S                 4    $105.98
TOTAL QUANTITY IS:                                         64
        .
        .
        .
END OF REPORT

     1   REPORT ORDER;
     2   REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
     3   SORT(1) ACCOUNT: PROD-NO;
     4   GROUP(1) TITLE "DATA AVAILABLE FOR ACCOUNT NBR:";
     5   DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
     6          UNIT-COST, EDIT="$$$,$$$.^^";
     7   GROUP(1) SUMMARY "TOTAL QUANTITY IS:":
     8            TOTAL(QUANTITY), ALIGN;
     9   REPORT SUMMARY "END OF REPORT";
```

Figure 5-1. Report Showing Effects of GROUP Statement

GROUP STATEMENTS VS. SORT STATEMENTS

Programs that contain a GROUP statement (GROUP TITLE or GROUP SUMMARY) must also contain a SORT statement. SORT and GROUP statements are linked by a sort priority number. In the SORT and GROUP statements below, the number 1 in the GROUP statement refers to the data element in the SORT statement with the sort priority number of 1. In this case, the data element with the sort priority number of 1 is ACCOUNT. Each time the value of ACCOUNT changes, the group title appears.

```
SORT(1) ACCOUNT: PROD-NO;
GROUP(1) TITLE "DATA AVAILABLE FOR ACCOUNT NBR:";
```

Notice in Figure 5-1 that a GROUP statement has the effect of deleting all redundant values for the grouped data. For example, the account number 4082452705 is displayed only once. By comparison, when the GROUP statement is omitted, as it is in Figure 4-2, the account number is repeated.

THE GROUP TITLE STATEMENT

The GROUP TITLE statement for the report shown in Figure 5-1 directs Report to add the title "DATA AVAILABLE FOR ACCOUNT NBR:" each time the value for ACCOUNT changes. No blank lines appear between the group title and the first line of data element values because none are specified. Later in this section, however, the program will be altered to add blank lines.

THE GROUP SUMMARY STATEMENT

The GROUP SUMMARY statement is used to display written summaries or, as is often true, computational data. For example, you might want to add up the total sales for an account and put the result at the end of the group information for that account. Report provides a way to display computational data for a data element — by using arithmetic functions. In the report shown in Figure 5-1, the arithmetic function TOTAL is used to add up the values for the data element QUANTITY. Report provides five arithmetic functions. The function and action performed by each are as follows:

Arithmetic Function	Action
TOTAL	adds up the values for a data element
COUNT	adds up the number of occurrences of a data element
MAXIMUM	displays the maximum value of a data element
MINIMUM	displays the minimum value of a data element
AVERAGE	computes the average value of a data element

Arithmetic functions are further explained in Section 8.

ADDING UP AND DISPLAYING RESULTS IN A GROUP SUMMARY

The arithmetic function TOTAL is used to add up the values of a data element and display the result. The GROUP SUMMARY statement shown below specifies that the text "TOTAL QUANTITY IS:" will appear below the last line of group values and will be followed by a total for the data element QUANTITY.

```
7    GROUP(1) SUMMARY "TOTAL QUANTITY IS:":
8             TOTAL(QUANTITY), ALIGN;
```

The total value will be positioned immediately below the QUANTITY column because we added the format spec ALIGN.

This is a good place to point out that the REPORT SUMMARY statement can, in addition to displaying text, be used with the arithmetic functions to display computational data.

INSERTING BLANK LINES BEFORE AND AFTER THE GROUP TITLE AND GROUP SUMMARY

Notice that there are no blank lines between one group summary and the next group title. Blank lines may be added by using the format spec LINE=n or the null string (" ", LINE=n). A discussion of the use of these two methods is given in Section 3. When the program shown below is run, the report in Figure 5-3 results.

```
 1   REPORT ORDER;
 2   REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
 3   SORT(1) ACCOUNT: PROD-NO;
 4   GROUP(1) TITLE "DATA AVAILABLE FOR ACCOUNT NBR:", LINE=2:
 5            " ", LINE=2;
 6   DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
 7          UNIT-COST, EDIT="$$$,$$$.^^";
 8   GROUP(1) SUMMARY "TOTAL QUANTITY IS:", LINE=2:
 9            TOTAL(QUANTITY), ALIGN;
10   REPORT SUMMARY "END OF REPORT";
```

Figure 5-2. Report/3000 Program With Spacing Added

```
MON, MAR  8, 1982, 10:27 AM                                    PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                    QUANTITY UNIT-COST
-------------------------------------------------------------------------

DATA AVAILABLE FOR ACCOUNT NBR:

4082452705 0684CU/M BOY'S DREAM MACHINE 10 SPEED          6     $79.98
           0684CU/M BOY'S DREAM MACHINE 10 SPEED          6     $79.98
           26701H/F 26 INCH GIRL'S 3 SPEED BIKE          26    $138.14
           26701H/F 26 INCH GIRL'S 3 SPEED BIKE          26    $138.14
           26821H/F GIRL'S 26 INCH 10 SPEED              18     $68.89
           26821H/F GIRL'S 26 INCH 10 SPEED              18     $68.89
           26821H/F GIRL'S 26 INCH 10 SPEED              18     $68.89
           26881H/F SANTA FE LADIES 26 INCH              34     $74.59
           .
           .
           .
           7272TH/F GIRLS CITATION 27 INCH 10 SPEED      44     $92.89

TOTAL QUANTITY IS:                                      560

DATA AVAILABLE FOR ACCOUNT NBR:

4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED          3     $79.98
           0684CU/M BOY'S DREAM MACHINE 10 SPEED          3     $79.98
           26821H/F GIRL'S 26 INCH 10 SPEED              42     $68.89
           26821H/F GIRL'S 26 INCH 10 SPEED              42     $68.89
           26821H/F GIRL'S 26 INCH 10 SPEED              42     $68.89
           26961H/M 12 SPEED LEGRANDE BOY'S               4    $105.98
           26961H/M 12 SPEED LEGRANDE BOY'S               4    $105.98
           26961H/M 12 SPEED LEGRANDE BOY'S               4    $105.98
           .
           .
           .
           6482TH/F GIRL'S 26 INCH 12 SPEED RACER        32     $88.87

TOTAL QUANTITY IS:                                      304
           .
           .
           .
END OF REPORT
```

Figure 5-3. Report Using GROUP Statement and Other Format Specs

MULTIPLE GROUP STATEMENTS

You can have more than one GROUP TITLE or GROUP SUMMARY statement in a report program. For example, the program in Figure 5-4 has two GROUP SUMMARY statements.

```
 1    REPORT MULTI;
 2    REPORT TITLE "MONTHLY ACCOUNT SUMMARY", COL=18: " ", LINE;
 3    DETAIL ACCOUNT: PURCH-NO: PROD-NO: QUANTITY: PRICE,
 4           EDIT="$,$$$.^^": TOTAL, EDIT="$$$,$$$.^^";
 5    SORT(1) ACCOUNT: PURCH-NO;
 6    GROUP(1) SUMMARY "********   ACCOUNT TOTAL:": TOTAL(TOTAL),
 7           EDIT="$,$$$,$$$.^^", ALIGN: " ", LINE;
 8    GROUP(2) SUMMARY "TOTAL QUANTITY:", COL=12, LINE=2:
 9           TOTAL(QUANTITY), ALIGN: " ", LINE;
10    REPORT SUMMARY "********   GRAND TOTAL:", LINE=2: TOTAL(TOTAL),
11           EDIT="$$$,$$$,$$$.^^", ALIGN;
```

Figure 5-4. Report/3000 Program With Two GROUP Statements

An obvious difference between this program and previous examples is the sort priority number of 2 in the GROUP statement in line 8. The 2 links this GROUP statement to the data element with the same sort priority number, which is PURCH-NO. The resulting report is shown in Figure 5-5.

Records are first sorted by ACCOUNT; records with equal values for ACCOUNT are sorted by PURCH-NO. The summary information in the first GROUP statement is displayed when the value for ACCOUNT changes, and the summary information in the second GROUP statement is displayed each time time value for PURCH-NO changes.

```
WED, MAR 17, 1982, 10:56 AM                                    PAGE 1

                    MONTHLY ACCOUNT SUMMARY

ACCOUNT      PURCH-NO PROD-NO   QUANTITY PRICE     TOTAL
-------------------------------------------------------------------
4082452705        106 26701H/F        26  $193.40  $5,028.40
                      26881H/F        34  $197.23  $6,705.82
                      26821H/F        18  $196.32  $3,533.76

             TOTAL QUANTITY:          78

                  123 6676TH/M        10   $99.97    $999.70
                      7272TH/F        44  $207.63  $9,135.72

             TOTAL QUANTITY:          54

                  125 0684CU/M         6   $99.97    $599.82

             TOTAL QUANTITY:           6

                  452 27981H/M        46  $129.97  $5,978.62
                      26961H/M        32  $129.84  $4,154.88

             TOTAL QUANTITY:          78

********     ACCOUNT TOTAL:                       $36,136.72

4082453350        192 0684CU/M         3   $99.97    $299.91

             TOTAL QUANTITY:           3

                  194 26821H/F        42  $196.32  $8,245.44
                      7272TH/F         4  $207.63    $830.52
                      6482TH/F        32  $281.76  $9,016.32

             TOTAL QUANTITY:         110

********     ACCOUNT TOTAL:                       $18,092.28

4082576855        333 6676TH/F         8  $171.12  $1,368.96
       .
       .
       .
********     GRAND TOTAL:                      $1,230,978.46
```

Figure 5-5. Report Using Two GROUP Statements

Practice Exercise 1

Using the report requirements that follow, write a program that generates the report shown below. This simple report is designed to show the number of accounts in each state. Have your program add blank lines in the places shown.

Report name: STACCT (for state accounts)

```
Accounts in Each State

STATE        ACCOUNT-NO
-----------------------

This data applies to:

-----        ----------
             ----------
             ----------
             ----------

State Summary--Total Accounts: ---
             .
             .
             .
END OF REPORT
```

The answer to this practice exercise is shown on the next page.

Answer to Practice Exercise 1

Here's what you should have written:

```
1     REPORT STACCT;
2     REPORT TITLE "Accounts in Each State": " ", LINE=2;
3     SORT(1) STATE: ACCOUNT-NO;
4     GROUP(1) TITLE "This data applies to:", LINE=2: " ", LINE=2;
5     DETAIL STATE: ACCOUNT-NO;
6     GROUP(1) SUMMARY "State Summary--Total Accounts:", LINE=2:
7              COUNT(ACCOUNT-NO);
8     REPORT SUMMARY "END OF REPORT";
```

The GROUP SUMMARY statement displays the text "State Summary — Total Accounts:" and makes an arithmetic count of the number of accounts in the group (COUNT(ACCOUNT-NO)). Refer to Section 8 for more information about the arithmetic function COUNT. The format spec LINE=2 and the null string (" ", LINE=2) add a blank line before and after the group title and summary.

The last item that will appear on this report is defined in the REPORT SUMMARY statement. The summary contains the line END OF REPORT.

Practice Exercise 2

1. Suppose the SORT and GROUP SUMMARY statements shown below appear in the same program. Group summary information will be displayed each time the value of which data element changes?

```
SORT(13) ACCOUNT: CITY: LAST-NAME: PROD-NO: QUANTITY;
GROUP (14) SUMMARY "TOTAL ACCOUNTS ARE:": COUNT(ACCOUNTS), COL=24;
```

2. What is the difference between a GROUP statement and a SORT statement?

_____

_____

_____

3. What is common to both SORT and GROUP statements?

_____

4. Look at the report shown below and answer the question that follows it.

```
          CUSTOMER INFORMATION

LAST-NAME      PROD-NO     QUANTITY
--------------------------------
Jones          32390.01          50
               46677.12          30
               58859.22          30
MAXIMUM VALUE IS:                50

Nabor          32390.01          35
               46677.12          35
               58859.22          40
MAXIMUM VALUE IS:                40
```

Which of the following GROUP SUMMARY statements produce the results shown above?

(a)
```
GROUP(1) SUMMARY "CUSTOMER INFORMATION";
```

(b)
```
GROUP(1) SUMMARY "MAXIMUM VALUE IS:":
          MAXIMUM(QUANTITY), ALIGN;
```

(c)
```
GROUP(1) SUMMARY "MAXIMUM VALUE IS:":
          TOTAL(QUANTITY), ALIGN;
```

The answers to this practice exercise are on the next page.

Answer to Practice Exercise 2

1. CITY — Because the sort priority number for the data element ACCOUNT is 13 the implied sort priority number for the data element CITY is 14. The GROUP sort priority number 14 corresponds to the data element CITY.

2. GROUP statements are used to subdivide information according to specific element values or logical information breaks. When the value changes, subtotals or other information may be displayed. SORT statements are used to define the order in which is sorted.

3. sort priority numbers

4. The answer is "b". The "1" indicates that group title and group summary information should appear each time the data element LAST-NAME changes. Before a new customer name appears, summary information appears. In this report, the text MAXIMUM VALUE IS: is displayed below the last data element value and should be aligned in the QUANTITY column.

BUILDING A REPORT USING A SELECT STATEMENT

SECTION VI

In this section you will learn how to limit the information presented in a report by using the SELECT statement.

THE SELECT STATEMENT

Let's take the report program shown in Figure 5-2 and add a SELECT statement. Because Report is a nonprocedural language, the SELECT statement can be added anywhere in the program.

```
 1   REPORT ORDER;
 2   REPORT TITLE "CUSTOMER ORDERS", COL=27: " ", LINE=2;
 3   SORT(1) ACCOUNT: PROD-NO;
 4   GROUP(1) TITLE "DATA AVAILABLE FOR ACCOUNT NBR:", LINE=2:
 5            " ", LINE=2;
 6   DETAIL ACCOUNT: PROD-NO: DESCRIPTION: QUANTITY:
 7          UNIT-COST, EDIT="$$$,$$$.^^";
 8   GROUP(1) SUMMARY "TOTAL QUANTITY IS:", LINE=2:
 9            TOTAL(QUANTITY), ALIGN;
10   REPORT SUMMARY "END OF REPORT";
11   SELECT PROD-NO ="0684CU/M" AND ACCOUNT >4082452705 AND
12          ACCOUNT <4087326094;
```

Figure 6-1. Report/3000 Program With SELECT Statement

The SELECT statement in Figure 6-1 restricts the amount of data that is presented in the report to a single product number: 0684CU/M. It also limits the account numbers shown to those greater than 4082452705 and less than 4087326094. The report generated by this program is shown in Figure 6-2.

```
MON MAR  8, 1982, 10:45 AM                                    PAGE 1

                          CUSTOMER ORDERS

ACCOUNT     PROD-NO  DESCRIPTION                      QUANTITY UNIT-COST
-------------------------------------------------------------------------

DATA AVAILABLE FOR ACCOUNT NBR:

4082453350 0684CU/M BOY'S DREAM MACHINE 10 SPEED            3     $79.98
           0684CU/M BOY'S DREAM MACHINE 10 SPEED            3     $79.98

TOTAL QUANTITY IS:                                          6
END OF REPORT
```

Figure 6-2. Report With SELECT Statement

The values "=" and ">" are called relations. A complete list of Report relations is shown below:

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

Report also allows you to select using a generic string. For more information refer to Section 8.

A data element in a SELECT statement need not be one of the data elements printed in the report, as in the following example:

```
REPORT . . . ;
DETAIL PROD-NO: ACCOUNT: QUANTITY;
SELECT PURCH-DATE >811231 AND PURCH-DATE <830101;
```

Within the selected range of purchase dates, the PROD-NO, ACCOUNT, and QUANTITY will be displayed.

NOTE: Be careful. When you use relations (=, <>, <, <=, >, >=) each must be preceded by the name of a data element.

valid:

```
SELECT ACCOUNT >4082452705 AND ACCOUNT <4087326094;
```

invalid:

```
SELECT ACCOUNT >4082452705 AND <4087326094;
```

FILLING IN SELECTION VALUES AT RUN TIME

The program shown in Figure 6-1 includes selection values, or as they are often called, selection criteria. Specifying selection criteria in the report program is most useful for production-type programs. For more ad hoc reports, you can omit the selection criteria from the SELECT statement. Then when you run the report, you are prompted for the selection criteria.

Suppose for example, that the selection criteria were omitted from the SELECT statement in Figure 6-1. The SELECT statement as it presently appears, and as it would appear without selection criteria, is shown below.

with selection criteria:

```
11    SELECT PROD-NO ="0684CU/M" AND ACCOUNT >4082452705 AND
12           ACCOUNT <4087326094;
```

without selection criteria:

```
11    SELECT PROD-NO AND ACCOUNT;
```

When you run the program that does not contain selection criteria, the following prompt appears:

```
PROVIDE SELECTION VALUE(S) FOR THE FOLLOWING DATA ITEM(S):

PROD-NO>

ACCOUNT>
```

You may enter the selection criteria each time the prompt (>) appears. Here's what your entry would look like:

```
PROD-NO> 0684CU/M

ACCOUNT> 4082452705 TO 4087326094
```

Notice that the selection criteria entered at the terminal differ from those in the Report program. They are simple, more closely approximate the English language, and are designed to make the job of running a report easier for the nonprogrammer. For a more complete explanation of selection criteria entered at run time, refer to the SELECT statement in Section 8.

If you do not enter selection criteria in response to the prompt, Report ignores the SELECT statement.

Practice Exercise 1

1. Which of the following SELECT statements limits the number of purchase orders shown in a report to numbers higher than 15000 and lower than 20000?

   (a) `SELECT PURCH-ORD >15000 AND <20000;`
   (b) `SELECT PURCH-ORD >15000 AND PURCH-ORD <20000;`
   (c) `SELECT PURCH-ORD >15000 AND PURCH-ORD <20000`
   (d) `SORT PURCH-ORD >15000 AND <20000;`

2. Using the data element PROD-NO (for product number), write a SELECT statement that will identify all product numbers greater than 47272.

Answers to Practice Exercise 1

1. The SELECT statement that limits the number of purchase orders shown in a report to numbers higher than 15000 and lower than 20000 is:

```
(b)  SELECT PURCH-ORD >15000 AND PURCH-ORD <20000;
```

(a) is incorrect because the data element name is omitted before the relation "less than" (<).

(c) is incorrect because a semicolon (;) does not appear at the end of the statement.

(d) is a SORT statement not a SELECT statement.

2. The SELECT statement that will identify all product numbers greater than 47272 is:

```
SELECT PROD-NO >47272;
```

Practice Exercise 2

Using the information below, write the Report program that produces the report shown.

Report name: QRT2

Data elements:
PROD-NO
PRICE
PURCH-DATE

Purpose of report: To determine the total price of products purchased during March, 1981. (The report should be "sorted" and "grouped" by PROD-NO.)

```
                    March Sales

PROD-NO                                   PRICE
----------------------------------------------
------                                    ------
                                          ------
                                          ------
                                          ------
                                          ------
                          TOTAL           ------

------                                    ------
                                          ------
                                          ------
                          TOTAL           ------

                    GRAND TOTAL           ------
```

The answer to this practice exercise is given on the next page.

Answer to Practice Exercise 2

```
1     REPORT QRT2;
2     REPORT TITLE "March Sales", COL=16: " ", LINE=3;
3     SORT PROD-NO;
4     DETAIL PROD-NO: PRICE, COL=36;
5     GROUP(1) SUMMARY "TOTAL", COL=24: TOTAL(PRICE), ALIGN:
6              " ", LINE=2;
7     REPORT SUMMARY "GRAND TOTAL", COL=16, LINE=2:
8                    TOTAL(PRICE), ALIGN;
9     SELECT PURCH-DATE >810228 AND PURCH-DATE <810401;
```

Remember that your report statements, other than the REPORT statement that must be first, may be in any order.

The reports presented so far have been simple and were designed to show you the effect of certain Report/3000 statements on the report format and contents. Section 7 presents a report that will demonstrate some of the other features of Report/3000.

GETTING FANCY

SECTION VII

This section presents some of the other features of Report/3000 that will give your reports a professional appearance.

USING FORMATTING TRICKS

The Report program shown in Figure 7-1 includes numerous format specs that you can use to make a report more elaborate as you master Report/3000.

```
 1      REPORT FANCY;
 2      DISPLAY "THIS REPORT CONTAINS UP-TO-DATE INFORMATION ON "
 3              "CUSTOMER ORDERS RECEIVED":
 4              "DURING THE FIRST TWO QUARTERS OF THE FISCAL YEAR "
 5              "BEGINNING",LINE=1:
 6              "JANUARY 1, 1981 AND ENDING JUNE 30, 1981.",LINE=1;
 7      OPTION OUTPUT=LP, NOHEAD;
 8      PAGE HEADING "CUSTOMER ORDERS, JUNE, 1981", COL=40;
 9      PAGE FOOTING "ORDER PROCESSING REPORT NO. 38", COL=40;
10      REPORT TITLE "CUSTOMER ORDERS--JANUARY-JUNE, 1981", COL=18, LINE=4;
11      SORT(1) LAST-NAME: PROD-NO;
12      GROUP(1) TITLE "NAME:", LINE=3: FIRST-NAME: LAST-NAME, JOIN=2:
13                     "ACCOUNT #", LINE=1: ACCOUNT:
14                     "ADDRESS:", LINE=1: STREET-ADDR:
15                     CITY, LINE=1, COL=10: STATE, JOIN=2: ZIP, JOIN=2:
16      "PRODUCT       DESCRIPTION                          QUANTITY   TOTAL SALES",
17         LINE=2:
18      "-------------------------------------------------------------------",
19      LINE=1: " ", LINE=2;
20      DETAIL PROD-NO: DESCRIPTION: QUANTITY: TOTAL, EDIT="$$$,$$$.^^";
21      GROUP(1) SUMMARY "TOTAL SALES FOR THIS ACCOUNT IS:", LINE=2:
22                       TOTAL(TOTAL), EDIT="$$$,$$$.^^";
23      REPORT SUMMARY "GRAND TOTAL OF ALL SALES:", LINE=3:
24                     TOTAL(TOTAL), EDIT="$$$$,$$$.^^";
25      SELECT PURCH-DATE >810101 AND PURCH-DATE <810630;
```

Figure 7-1. Elaborate Report/3000 Program

We'll look at some of the statements shown above and see what effect they have on the report itself.

THE DISPLAY STATEMENT

The DISPLAY statement is used to show the person running the report a sign-on message providing information or instructions about the report. The message is displayed on the terminal before any element selection prompts appear.

The report program in Figure 7-1 contains a DISPLAY statement. The message enclosed in quotes is displayed on three separate lines beginning at the left edge of the terminal screen; to vary the format of the message, you can include format specs other than LINE, which is used here. The message will look like this on the terminal screen:

```
THIS REPORT CONTAINS UP-TO-DATE INFORMATION ON CUSTOMER ORDERS RECEIVED
DURING THE FIRST TWO QUARTERS OF THE FISCAL YEAR BEGINNING
JANUARY 1, 1981 AND ENDING JUNE 30, 1981.
```

Notice that when a literal string extends beyond one line in the program you need to include a blank at the end of the first line or the beginning of the continuation line so that the words don't run together. If, for example, we forgot the blank at the end of line 2 in Figure 7-1 the first line of the message would look like this:

```
THIS REPORT CONTAINS UP-TO-DATE INFORMATION ONCUSTOMER ORDERS RECEIVED
```

When the Report program in figure 7-1 is run, the report on the following page is produced.

```
MON, MAR  8, 1982, 11:34 AM                                    PAGE 1

                                          CUSTOMER ORDERS, JUNE, 1981

                CUSTOMER ORDERS--JANUARY-JUNE, 1981

NAME: MICHAEL  ALLAN
ACCOUNT # 4153288842
ADDRESS: LAGUNITA COURT
         SUNNYVALE  CA  94086

PRODUCT       DESCRIPTION                      QUANTITY  TOTAL SALES
-------------------------------------------------------------------

0684CU/F GIRL'S DREAM MACHINE 10 SPEED             35    $6,449.80
26701H/M 26 INCH MEN'S 3 SPEED BIKE                16    $1,439.52
27981H/F GIRL'S 27 INCH 15 SPEED THE WI            18    $3,735.72
6476TH/F GIRL'S 26 INCH RACER 10 SPEED             44   $12,346.40
6476TH/M BOYS 26 INCH RACER 10 SPEED               26    $2,599.22

TOTAL SALES FOR THIS ACCOUNT IS: $26,570.66

NAME: JAY  ALLEMAN
ACCOUNT # 4153216352
ADDRESS: 2220 WAVERLEY
         PALO ALTO  CA  94305

PRODUCT       DESCRIPTION                      QUANTITY  TOTAL SALES
-------------------------------------------------------------------

0684CU/M BOY'S DREAM MACHINE 10 SPEED              48    $4,798.56
26821H/M BOY'S 26 INCH 10 SPEED                    25    $2,249.25
26961H/F 12 SPEED LEGRANDE GIRL'S                  35    $7,000.35
26961H/M 12 SPEED LEGRANDE BOY'S                   32    $4,154.88
6482TH/F GIRL'S 26 INCH 12 SPEED RACER              4    $1,127.04
6482TH/M MEN'S 26 INCH 12 SPEED RACER              43    $4,932.96
7272TH/F GIRLS CITATION 27 INCH 10 SPEE            29    $6,021.27
7274TH/F FEM'S 27 INCH 10 SPEED DELUXE             33    $6,791.40

TOTAL SALES FOR THIS ACCOUNT IS: $37,075.71

         .
         .
         .

GRAND TOTAL OF ALL SALES: $432,889.45

                                          ORDER PROCESSING REPORT NO.  38
```

Figure 7-2. Fancy Report

GROUP TITLES OF MORE THAN ONE LINE

As Figure 7-2 shows, group information can sometimes be presented on more than one line. For example, the following GROUP TITLE statement displays four lines of information.

```
12      GROUP(1) TITLE "NAME:", LINE=3: FIRST-NAME: LAST-NAME, JOIN=2:
13                     "ACCOUNT #", LINE=1: ACCOUNT:
14                     "ADDRESS", LINE=1: STREET-ADDR:
15                     CITY, LINE=1, COL=10: STATE, JOIN=2: ZIP, JOIN=2;
```

Let's examine this statement. Notice that each line contains the format spec LINE=n, where n is the number of lines to skip. In line 11, the format spec LINE=3 causes the GROUP TITLE "NAME" to appear three lines below the information that precedes it. After the word NAME appears, the data element values FIRST-NAME and LAST-NAME are displayed.

In line 13, the format spec LINE=1 (or simply LINE) causes the word ACCOUNT and the value for the data element ACCOUNT to appear one line below the NAME. Likewise, in lines 14 and 15, the format spec LINE=1 (or LINE) causes the information to appear one line below ACCOUNT. When this statement is run, the group title information will look like that shown below:

```
NAME: MICHAEL  ALLAN
ACCOUNT # 4153288842
ADDRESS: LAGUNITA COURT
         SUNNYVALE  CA  94086
```

REPOSITIONING DETAIL HEADINGS

The OPTION statement shown in Figure 7-1 specifies that no headings are to be displayed for any of the data elements. Preventing the automatic display of headings gives you the freedom to enter headings and position the headings wherever you like. In the report shown in Figure 7-1, headings are generated by the GROUP TITLE statement whereas headings are normally generated by the DETAIL statement. Headings generated by the DETAIL statement appear above group information, like this:

```
PRODUCT       DESCRIPTION                          QUANTITY   TOTAL SALES
-------------------------------------------------------------------------

NAME: MICHAEL  ALLAN
ACCOUNT # 4153288842
ADDRESS LAGUNITA COURT
        SUNNYVALE  CA  94086
```

To reposition the headings so they appear below the group information, the automatic entry of headings must be suppressed, and the headings must be added to the GROUP TITLE statement.

The program segment below shows how this is done. Line 7 includes the option list item, NOHEAD. This spec disables the automatic addition of headings. It allows you to add headings wherever you like. Lines 16 through 19 specify that headings are added not as separate element names, but as a single line of text. In this case the line of text is followed by a dashed line and one blank line:

```
 7   OPTION OUTPUT=LP, NOHEAD;
             .
             .
             .
16   "PRODUCT       DESCRIPTION                          QUANTITY  TOTAL SALES",
17      LINE=2:
18   "-------------------------------------------------------------------------",
19   LINE=1: "", LINE=2;
```

CLOSING THE GAP BETWEEN VALUES USING JOIN=n

Report relies on Dictionary to provide information on how much space to allow for a data element value. For example, in the data base used in this guide, Dictionary allocates 14 spaces for the data element CITY. The space allocated for each data element is called the data element's display field. Thus, the data element CITY has a display field of 14 spaces. This means that the entries for SUNNYVALE and PALO ALTO are allocated 14 spaces whether the city's name contains 14 letters or not.

Suppose these two cities are displayed in a report along with the data element STATE. The report would look like this:

```
SUNNYVALE       CA
   .
   .
   .
BOISE           ID
```

To close the gap between the city and state, the format spec JOIN=n is used where n specifies the number of spaces to leave between joined elements. Lines 12 and 15 of the GROUP TITLE statement shown below include the format spec JOIN=2.

```
12      GROUP(1) TITLE "NAME:", LINE=3: FIRST-NAME: LAST-NAME, JOIN=2:
13                     "ACCOUNT #", LINE=1: ACCOUNT:
14                     "ADDRESS:", LINE=1: STREET-ADDR:
15                     CITY, LINE=1, COL=10: STATE, JOIN=2: ZIP, JOIN=2;
```

In line 12, the data elements FIRST-NAME and LAST-NAME are separated by two spaces. Likewise, in line 15, the data elements CITY and STATE, and STATE and ZIP are separated by two spaces.

Using the format spec JOIN=2, the group title looks like this:

```
NAME: MICHAEL  ALLAN
ACCOUNT # 4153288842
ADDRESS: LAGUNITA COURT
         SUNNYVALE  CA  94086
```

If the format spec JOIN=2 were NOT used, the group title would look like this:

```
NAME: MICHAEL              ALLAN
ACCOUNT # 4153288842
ADDRESS: LAGUNITA COURT
         SUNNYVALE          CA 94086
```

NOTE: Report automatically adds one space between data element display fields.

Before you go on to the next section, compare the Report program in Figure 7-1 with the report shown in Figure 7-2. See if you can determine which Report statement produces which result.

STATEMENT INDEX

SECTION VIII

This section is designed to be used for reference during and after your mastery of the Report/3000 concepts presented in previous sections of this guide. The section includes:

- Notations used
- Report specifications
  - Arithmetic functions
  - Format specifications
- Report/3000 statements (in alphabetic order)

NOTATIONS USED IN THIS SECTION

The report specifications and the Report statements are described in terms of a reference format, where certain conventions are observed.

Each entry includes:

- the proper syntax
- an explanation of each part of the syntax
- examples

In syntax:

UPPERCASE words are Report/3000 keywords, which cannot be abbreviated or omitted;

lowercase words represent names that you must supply;

[ ] mean that anything inside the brackets is optional;

{ } mean that you must include one of the words stacked inside the braces;

. . . mean that you can repeat that portion of the statement any number of times.

Punctuation that appears in syntax is required. Each Report statement must end with a semicolon, and report specifications are separated from each other by colons. However, the different options in the OPTION statement are separated by commas. Punctuation is discussed in detail in Appendix B.

REPORT SPECIFICATIONS

Report/3000 statements consist of verbs and verb assignments, which define the action to be performed by the verb. The verb assignment in several Report statements is called a report specification (spec). A report spec indicates:

1. what information is to be included in the report, and

2. where and how this information is to be printed on the page or displayed on the terminal screen.

The first part of a report spec is thus called a content spec, and the second part is called a format spec. Content specs are separated from format specs by commas. A Report statement with a report spec would like this:

```
verb content-spec,format-spec;
```

A content spec can be one of the following:

- a character string enclosed in quotes
- a data element name
- an arithmetic function

Appendix E shows valid combinations of Report verbs and report specs.

Arithmetic Functions

An arithmetic function is a special type of content spec. It affects what appears in a report by performing an arithmetic operation on a specific data element and including the result of the operation in the report.

You can use an arithmetic function to report a running value in each detail line or to report an accumulated value after a group of detail lines. If you use a function in a detail line, its value can be reset to zero when the data element value changes (called a break point) by including the element's sort priority number along with the element name. For information about sort priority numbers, refer to the SORT statement later in this section.

The arithmetic functions are described on the following pages.

AVERAGE

Used to obtain the average value of a data element.

SYNTAX

```
AVERAGE(element-name[,break-number])
```

PARAMETERS

element-name — The name of a data element that is defined in the data dictionary or a DEFINE statement.

break-number — A sort priority number; if included when the function is used in a detail line, the function value is reset to zero when the value of the data element having the above sort priority number changes.

EXAMPLES

```
DETAIL PROD-NO: UNIT-COST: AVERAGE(UNIT-COST);
```

The average value of UNIT-COST is displayed on each detail line.

```
PROD-NO   UNIT-COST
------------------------------
7272TH/M     95.98        95.98
6676TH/F    131.63       113.81
0684CU/F     76.89       101.50
```

AVERAGE in a GROUP statement displays the average value for a group of detail lines.

```
GROUP(1) SUMMARY "AVERAGE": AVERAGE(UNIT-COST);
```

```
PROD-NO    UNIT-COST
--------------------
0684CU/F       76.89
               79.98
              138.14
AVERAGE         98.34
```

COUNT

Used to keep track of the number of times a data element occurs.

SYNTAX

```
COUNT(element-name[,break-number])
```

PARAMETERS

element-name — The name of a data element that is defined in the data dictionary or a DEFINE statement.

break-number — A sort priority number; if included when the function is used in a detail line, the function value is reset to zero when the value of the data element having the above sort priority number changes.

EXAMPLES

```
DETAIL PROD-NO: ACCOUNT: BACKORDERFLG:
       COUNT(BACKORDERFLG);
```

Each detail line of this report includes a running count of the number of occurrences of BACKORDERFLG.

```
PROD-NO   ACCOUNT     BACKORDERFLG
-------------------------------------------
7272TH/M 4153668739 N                      1
6676TH/F 4087328644 N                      2
0684CU/F 4158560309 N                      3
```

COUNT

When the COUNT function is in a GROUP statement, the number of occurrences of BACKORDERFLG is displayed only at a break point.

```
GROUP(1) SUMMARY "BACKORDER": COUNT(BACKORDERFLG);
```

```
PROD-NO   ACCOUNT     BACKORDERFLG
---------------------------------
0684CU/F 4153668739 N
         4087328644 N
         4158560309 N
BACKORDERFLG        3
```

Text discussion: Section 5

MAXIMUM

Used to find the largest value of a data element.

SYNTAX

```
MAXIMUM(element-name[,break-number])
```

PARAMETERS

element-name — The name of a data element that is defined in the data dictionary or a DEFINE statement.

break-number — A sort priority number; if included when the function is used in a detail line, the function value is reset to zero when the value of the data element having the above sort priority number changes.

EXAMPLES

```
DETAIL PROD-NO: QUANTITY: MAXIMUM(QUANTITY);
```

The maximum value of QUANTITY found so far is displayed on each detail line.

```
PROD-NO   QUANTITY
--------------------------
7272TH/M        41       41
6676TH/F        35       41
0684CU/F        77       77
```

MAXIMUM in a GROUP statement displays the maximum value for a group of detail lines.

```
GROUP(1) SUMMARY "MAX": MAXIMUM(QUANTITY);
```

```
PROD-NO   QUANTITY
------------------
0684CU/F        12
                 5
                22
                15
MAX          22
```

MINIMUM

Used to find the smallest value of a data element.

SYNTAX

```
MINIMUM(element-name[,break-number])
```

PARAMETERS

element-name — The name of a data element that is defined in the data dictionary or a DEFINE statement.

break-number — A sort priority number; if included when the function is used in a detail line, the function value is reset to zero when the value of the data element having the above sort priority number changes.

EXAMPLES

```
DETAIL PROD-NO: QUANTITY: MINIMUM(QUANTITY);
```

The minimum value of QUANTITY found so far is displayed on each detail line.

```
PROD-NO   QUANTITY
------------------------
7272TH/M        12     12
6676TH/F        20     12
0684CU/F         7      7
```

MINIMUM in a GROUP statement displays the minimum value for a group of detail lines.

```
GROUP(1) SUMMARY "MIN": MINIMUM(QUANTITY);

PROD-NO   QUANTITY
------------------
0684CU/F        12
                20
                 7
                15
MIN           7
```

Used to find the sum of the values of a data element.

SYNTAX

```
TOTAL(element-name[,break-number])
```

PARAMETERS

element-name — The name of a data element that is defined in the data dictionary or a DEFINE statement.

break-number — A sort priority number; if included when the function is used in a detail line, the function value is reset to zero when the value of the data element having the above sort priority number changes.

EXAMPLES

```
DETAIL PROD-NO: ACCOUNT: UNIT-COST: TOTAL(UNIT-COST,1);
SORT PROD-NO;
GROUP(1) SUMMARY "PRODUCT END";
```

A running total of UNIT-COST is displayed. TOTAL is set to 0 when the break on PROD-NO occurs.

```
PROD-NO   ACCOUNT     UNIT-COST
-----------------------------------------
0684CU/F 4153668739     98.95        98.95
         4087328644    124.45       223.40
         4158560309     76.89       300.29
PRODUCT END

7272TH/M 4158560309     75.50        75.50
         4153646741     88.45       163.95
         4153716339    140.45       304.40
PRODUCT END

6676TH/F 4158510665    200.00       200.00
         4153668739    267.99       467.99
PRODUCT END
```

TOTAL

The TOTAL function in a GROUP statement causes the SALES total to be displayed only at a break point.

```
GROUP(1) SUMMARY "TOTAL": TOTAL(UNIT-COST);

PROD-NO   ACCOUNT     UNIT-COST
-----------------------------
0684CU/F 4153668739     98.95
         4087328644    124.45
         4158560309     76.89
TOTAL     300.29

7272TH/M 4158560309     75.50
         4153646741     88.45
         4153716339    140.45
TOTAL     304.40
```

Text discussion: Section 5

Format Specs

A format spec is the part of a report spec that tells where and how the report information is to be printed on the page or displayed on the terminal screen. If you do not include any of the options described in this section in your report program, Report uses defaults:

- each line of the report begins at the left margin
- there are no blank lines
- a data element's display field is as long as its size attribute in the Dictionary or a DEFINE statement
- there is one space between display fields
- character strings are left-justified in the display field
- numbers are right-justified in the display field

The format specs you can use to vary the layout and appearance of your report are described on the following pages.

ALIGN

Used with an arithmetic function in a GROUP SUMMARY or REPORT SUMMARY statement to line up the function result beneath the data element the function is acting on. ALIGN is ignored in a DETAIL statement.

SYNTAX

ALIGN

EXAMPLE

```
GROUP(1) SUMMARY "TOTAL": TOTAL(QUANTITY),ALIGN;
```

When you run the report that includes this GROUP statement, the total of QUANTITY is lined up under the QUANTITY column.

```
PROD-NO   QUANTITY
------------------
6676TH/F        12
                 5
                41
                22
TOTAL           80
```

Text discussion: Section 5

Used to specify a carriage control code that causes a printer carriage action when you print the report.

SYNTAX

```
CCTL = number
```

PARAMETERS

number — A decimal number code as listed in table 8-1.

Table 8-1. Carriage Control Codes

DECIMAL CODE	CARRIAGE ACTION
32	Single space (with or without automatic page eject).
43	No space, return (next printing at column 1). Not valid on 2607.
45	Triple space (without automatic page eject).
48	Double space (without automatic page eject).
49	Page eject (form feed). Selects VFC Channel 1.
2nn (nn is any number from 0 through 63)	Space nn lines (no automatic page eject). 200 not valid for 2607.
192-199	Select VFC Channel 1-8 (2607).
192-203	Select VFC Channel 1-12 (2613, 2617, 2618, 2619).
192-207	Select VFC Channel 1-16 (2608).

Table 8-1. Carriage Control Codes (continued)

	NOTE Channel assignments shown below are the HP standard defaults.
192	Skip to top of form (page eject).
193	Skip to bottom of form.
194	Single spacing with automatic page eject.
195	Skip to next odd line with automatic page eject.
196	Skip to next third line with automatic page eject.
197	Skip to next 1/2 page.
198	Skip to next 1/4 page.
199	Skip to next 1/6 page.
200	Skip to bottom of form.
201	User option (2613/17/18/19), skip to one line before bottom of form (2608).
202	User option (2613/17/18/19), skip to one line before top of form (2608).
203	User option (2613/17/18/19), skip to top of form (2608).
204	Skip to next seventh line with automatic page eject.
205	Skip to next sixth line with automatic page eject.
206	Skip to next fifth line with automatic page eject.
207	Skip to next fourth line with automatic page eject.
208	No space, no return (next printing physically follows this).

Table 8-1. Carriage Control Codes (continued)

256 or 64	Sets post-space movement option; this first prints, then spaces. If previous option was pre-space movement, the the driver outputs a line with a skip to VFC Channel 3 to clear the buffer.
257 or 65	Sets pre-space movement option (first spaces, then prints).
258 or 66	Sets single-space option, with automatic page eject (60 lines per page).
259 or 67	Sets single-space option, without auomatic page eject (66 lines per page).
513	Enables CONTIGUOUS WRITE (Privileged Mode Capability only).
1025	Disables CONTIGUOUS WRITE (Privileged Mode Capability only).
	NOTE Page eject code 49 is suppressed if the current request transfer count of 0, and the previous request ended with a page eject.

EXAMPLE

```
DETAIL ACCOUNT: PROD-NO: PURCH-DATE;
SORT ACCOUNT;
GROUP(1) SUMMARY "END OF ACCOUNT DATA",CCTL=198;
```

When these three statements appear in a Report program, there will be a quarter of a page between each group of data (if you print the report, not display it on the terminal).

```
ACCOUNT     PROD-NO   PURCH-DATE
-------------------------------
4082576855 7272TH/M 01/27/82
           6676TH/F 01/26/82
           6776TH/F 02/25/82
END OF ACCOUNT DATA




4083677981 6482TH/F 08/08/81
END OF ACCOUNT DATA




4087338229 6476TH/M 04/26/81
           6476TH/M 10/12/81
END OF ACCOUNT DATA
```

Used to display a data element starting in a specific column of your report. If you do not specify any horizontal positioning, the data element size as defined in the data dictionary or a DEFINE statement is used to space your report items across the page with one space between each element.

SYNTAX

```
COL=number
```

PARAMETERS

number — A number from 1 to 299 but not more than the line width you define in the OPTION statement; the left-most column is 1.

EXAMPLE

```
DETAIL PROD-NO,COL=12: QUANTITY,COL=25;
```

This DETAIL statement moves the report information to the right — PROD-NO now begins in column 12 and QUANTITY begins in column 25.

```
            PROD-NO        QUANTITY
--------------------------------
            7272TH/M             41
            6676TH/F             35
            0684CU/F             43
```

Text discussion: Section 3

EDIT

Used to make report items more readable by inserting characters such as dollar signs and decimal points or suppressing the display of leading zeros; overrides any edits specified in the data dictionary.

SYNTAX

```
EDIT = "edit-mask"
```

PARAMETERS

edit-mask — A character string, which you must enclose in quotes, made up of insertion and place-holding characters as follows:

Character	Effect
^	A character from the source data element is displayed in the place of each caret.
Z	Leading zeros are suppressed.
$	Leading zeros are suppressed; the right-most leading zero is replaced with a $.
*	Asterisks are displayed in the place of leading zeros.
.	The decimal point implied in the data dictionary or in a DEFINE statement is displayed in the position where this one appears (a DEFINE attribute takes precedence over the dictionary attribute).
!	A decimal point is displayed in the position specified by the exclamation point; the decimal point implied in the data dictionary is overridden.

–	Used as the last character of the edit mask, a negative data element is displayed with a trailing negative sign.
CR	Used as the last characters of the edit mask, a negative data element is displayed with a trailing CR.
DR	Used as the last characters of the edit mask, a negative data element is displayed with a trailing DR.

All other characters (like commas and slashes) are inserted on a character for character basis.

EXAMPLES

Data Element Value	Edit Mask	Displayed Item
1234	$$,$$$.^^	$12.34
123456	$$,$$$.^^	$1,234.56
123456	***,**$.^^	*$1,234.56
000009	ZZZZ.^^	.09
-123456	$$,$$$.^^CR	$1,234.56CR
071681	^^/^^/^^	07/16/81
123	$$,$$$.^^-	$1.23-
02345	ZZZ!ZZ	23.45

In the last example, assume that the data dictionary definition of this element implies that the decimal point is after the right-most digit, the 5. The exclamation point allows you to override this and display a decimal point between the 3 and the 4.

```
DETAIL PROD-NO: QUANTITY: UNIT-COST,EDIT="$,$$$,$$$.^^":
       PURCH-DATE,EDIT="^^/^^/^^";
```

The two edit masks in this DETAIL statement make the report more readable.

```
PROD-NO   QUANTITY UNIT-COST PURCH-DATE
---------------------------------------
7272TH/M        41    $89.95 02/16/82
26701H/M        20    $71.95 02/24/82
27981H/F         7   $250.00 02/28/82
```

NOTE: If you specify an edit mask incorrectly (not enough characters in the edit mask for the data element value, misplace the decimal point), the field is filled with number signs (#) when you run the report.

Text discussion: Section 3

Used to display a heading other than the heading text from the data dictionary or the data element name, which is displayed when there is no heading text.

SYNTAX

```
HEAD="character-string"
```

PARAMETERS

character-string	A string that you must enclose in quotes; can be up to 30 characters.

EXAMPLE

```
DETAIL PROD-NO,HEAD="PRODUCT NUMBER":
       QUANTITY,HEAD="COUNT";
```

The data element names are replaced with PRODUCT NUMBER and COUNT.

```
PRODUCT NUMBER COUNT
---------------------
7272TH/M          41
26701H/M          20
27981H/F           7
```

JOIN

Used to specify the number of spaces between report items. The spaces are inserted after the last displayed character of the previous report item. Default positioning of data element size is used if JOIN is not specified.

SYNTAX

```
JOIN[=number]
```

PARAMETERS

number — A number from 0 to 299; the default is 1.

EXAMPLE

```
DETAIL LAST-NAME, HEAD="CUSTOMER": FIRST-NAME,
       JOIN, NOHEAD: STREET-ADDR, HEAD="ADDRESS";
```

Instead of the 20 spaces allocated for LAST-NAME in the data dictionary, LAST-NAME and FIRST-NAME are concatenated with only one space in between. The NOHEAD option (described later in this section) suppresses the FIRST-NAME head.

```
CUSTOMER            ADDRESS
---------------------------------------
ANDREWS JOHN        1200 N. OAK DR.
ANDERSON CAROLYN    3841 Z ST.
BELL ALLEN          P.O. BOX 398
BUTLER GEORGE       6667 LINCOLN LN.
```

Text discussion: Section 7

Used to left-justify report items (default for character strings).

SYNTAX

LEFT

EXAMPLE

```
DETAIL PROD-NO: QUANTITY,LEFT;
```

Both PROD-NO and QUANTITY are left-justified; PROD-NO is automatically left-justified because it is a character string, but the format spec must be included to left-justify QUANTITY, which is a numeric string.

```
PROD-NO   QUANTITY
------------------
7272TH/M 12
6676TH/F 205
0684CU/F 7
```

LINE

Used to display report items on a new line, skip multiple lines, or overstrike lines (if your printer has this capability).

SYNTAX

```
LINE[=number]
```

PARAMETERS

number — A number from 0 to 99 but not more than the number of lines per page you define in the OPTION statement. The default is 1.

EXAMPLE

```
DETAIL LAST-NAME: ACCOUNT,LINE;
```

This DETAIL statement displays the account number on the line below the customer's name.

```
LAST-NAME
ACCOUNT
------------------
MAHAFFIE
4153716339
LEMOS
4153693553
KOHLER
4153281086
```

Text discussion: Section 3

Used to make the size of a report item different from the size of the data element as specified in the data dictionary or a DEFINE statement.

SYNTAX

```
LNG = number
```

PARAMETERS

number — A number from 1 to 299; the report item will be "number" characters long starting with the left-most character of the data element.

EXAMPLE

```
DETAIL PROD-NO; QUANTITY; DESCRIPTION,LNG=20;
```

The data element DESCRIPTION is defined as 30 characters, but you only want to see 20 characters in the report.

```
PROD-NO   QUANTITY  DESCRIPTION
----------------------------------------
6676TH/F        12  12 SPEED LEGRANDE GI
0684CU/F        20  FEM'S 27 INCH 10 SPE
26701H/M         7  GIRL'S 26 INCH 12 SP
```

NEED

Used to keep logical blocks of information together on one page.

SYNTAX

NEED = number

PARAMETERS

number — A number between 1 and 99; when there are fewer than "number" lines left on the page, display of the report item starts on a new page.

EXAMPLE

```
GROUP(1) TITLE "NAME:",LINE=3: FIRST-NAME,NEED=8:
         LAST-NAME,JOIN=2: "ACCOUNT #",LINE:
         ACCOUNT: "ADDRESS:",LINE: STREET-ADDR:
         CITY;LINE,COL=10: STATE,JOIN=2: ZIP,JOIN=2;
```

This group title requires a number of lines to keep each customer's data together. When there are fewer than eight lines left on the page, a new page is started.

NOCRLF

Used to suppress a carriage return/line feed for the current line.

SYNTAX

NOCRLF

EXAMPLE

```
DETAIL PROD-NO: QUANTITY,NOCRLF;
```

This DETAIL statement results in no carriage return after QUANTITY is displayed.

```
PROD-NO   QUANTITY
------------------
0684CU/M         49    26701H/F          1    7272TH/M          7
```

NOHEAD

Used to suppress report item headings.

SYNTAX

NOHEAD

EXAMPLE

```
DETAIL PROD-NO,NOHEAD: QUANTITY,NOHEAD;
```

This report has no report item headings.

```
0684CU/F      43
26701H/F       1
26821H/F       3
```

NOSIGN

Used to indicate that a numeric data element should always be positive; a negative value would be invalid data. If a negative value is found, the report field is filled with negative signs.

SYNTAX

NOSIGN

EXAMPLE

```
DETAIL PROD-NO: QUANTITY,NOSIGN;
```

QUANTITY should never be negative.

```
PROD-NO   QUANTITY
------------------
0684CU/F        12
26701H/F --------
26881H/M         7
```

PAGE

Used to start the display of a report item on a new page or to skip one or more pages.

SYNTAX

```
PAGE[=number]
```

PARAMETERS

number — The number of pages to space before printing resumes; can be from 1 to 99 (default is 1).

EXAMPLE

```
GROUP(1) SUMMARY "MONTHLY TOTALS",PAGE;
```

The totals are displayed on a new page.

```
                                PAGE 1

    PROD-NO   QUANTITY
    ------------------
    26881H/F         12

                                PAGE 2

        PROD-NO   QUANTITY
        ------------------
        MONTHLY TOTALS
           .
           .
           .
```

Used to right-justify a data element in a report field; used with character strings as right-justified is the default for numeric strings.

SYNTAX

RIGHT

EXAMPLE

```
DETAIL LAST-NAME: CITY,RIGHT;
```

The CITY character string in this report is right-justified.

```
LAST-NAME                CITY
-------------------------------------
MAHAFFIE                      SAN JOSE
LEMOS                      REDWOOD CITY
KOHLER                   MOUNTAIN VIEW
LARA                          SUNNYVALE
```

ROW

Used to display a report item on the specified line (differs from the LINE option in that LINE is in relation to the current line, and ROW is in relation to the first line of the page).

SYNTAX

```
ROW=number
```

PARAMETERS

number — A number from 1 to 99 but not more than the number of lines per page you define in the OPTION statement. If the report is already further down the page than the row you specify, the display continues on the next line.

EXAMPLE

```
REPORT TITLE "MONTHLY SALES REPORT",ROW=4;
```

The report title appears on the fourth line of the page.

```
1
2
3
4       MONTHLY SALES REPORT
5          .
6          .
7          .
```

SPACE

Used to pad the beginning of a report item with spaces.

SYNTAX

```
SPACE[=number]
```

PARAMETERS

number — A number from 0 to 299 but not more than the line width you define in the OPTION statement; the default is 1.

EXAMPLE

```
DETAIL PROD-NO,SPACE=5: QUANTITY,SPACE=12;
```

This DETAIL statement inserts fives spaces before PROD-NO and 12 spaces before QUANTITY.

```
     PROD-NO                    QUANTITY
-----------------------------------------
     7272TH/M                         12
     6676TH/F                         20
     26701H/M                          7
```

TRUNCATE

Used to allow a report item to be truncated if it will not fit on the line.

SYNTAX

TRUNCATE

EXAMPLE

```
DETAIL ACCOUNT: LAST-NAME: STREET-ADDR:
       PROD-NO: QUANTITY: DESCRIPTION,TRUNCATE;
```

The product description is truncated if it does not fit on the line.

```
. . .  STREET-ADDR       PROD-NO  QUANTITY  DESCRIPTION
       ---------------------------------------------
       1200 MAIN ST.     0684CU/F        12  12 SPEED LEG
       3841 3RD. AVE.    6476TH/F        20  FEM'S 27 INC
       P.O. BOX 01       26881H/M         5  GIRL'S 26 IN
```

Used to fill the display field of a numeric data element with leading zeros.

SYNTAX

ZERO[E]S

EXAMPLE

```
DETAIL PROD-NO: QUANTITY,ZEROS;
```

The QUANTITY field is filled with leading zeros.

```
PROD-NO   QUANTITY
------------------
7272TH/M  0000012
0684CU/F  0000220
6676TH/F  0000007
```

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REPORT STATEMENTS

The Report statements that are available for specifying the content of your reports are described in alphabetic order on the following pages.

ACCESS

Used to tell Report/3000 the files to access to retrieve the data elements that you want in a report, to list these elements, and to specify the access method to be used. All data elements to be retrieved must be defined in the data dictionary or in a DEFINE statement.

Normally, Report gets access information from the data dictionary, relieving you of the necessity of using the ACCESS statement. When there is more than one access path available, Report chooses the first one it finds. Use the ACCESS statement if you do not want Report to use this first path.

ACCESS is also used when Report cannot retrieve data elements, which occurs under the following conditions:

the dictionary is not available;

the required paths are not defined in the dictionary;

the retrieval path spans across more than four data sets in a data base;

SYNTAX

```
ACCESS  file1[,LIST=(element-list1)]
            [:file2,{KEY  }=element-name1[([file3][,element-name2])]
                    {CHAIN}
                    {MATCH}
            [,LIST=(element-list2)]]...;
```

PARAMETERS

file1	The name of the first file you want Report to access; can be an IMAGE data set, KSAM file, or MPE file (see the appropriate reference manual for data set access and file information).
element-list1	A list of data elements (separated by commas) that you want retrieved from file1.
file2	The next file that you want accessed via a key, chain, or match; can be an IMAGE data set, KSAM file, or MPE file.
KEY	If file2 is a data set, element-name1 is used as a search item for a calculated access (IMAGE mode 7) to this data set, which must be a master. If file2 is a KSAM file created with the DUP option, this type of access retrieves only one record when there are multiple records with the same key value.
CHAIN	If file2 is a data set, element-name1 is used to specify the chain head for a chained read (IMAGE mode 5) of this data set, which must be a detail. If file2 is a KSAM file, element-name1 must be a key for the file. If the KSAM file was created with the DUP option, this type of access retrieves all records with the same key value. If file2 is an MPE file, the chain is reinterpreted as a serial read matching on element-name1.
MATCH	Element-name1 is used as a match element for a serial read of file2, which can be any type of data set or file.
element-name1	The name of the key, chain, or match data element; it must be in a file in the retrieval path, and this file must have already been read (that is, appeared previously in the ACCESS statement).

file3	The name of the file that contains element-name1; the default is file1.
element-name2	An alias (another name for) element-name1 that is used in file2.
element-list2	A list of data elements (separated by commas) that you want retrieved from file2.
NOTE:	Any file that is a data base set must be named as follows: set-name(base-name)

EXAMPLES

```
ACCESS  CUSTOMER (ORDMGT) , LIST= (ACCOUNT, LAST-NAME,
        STREET-ADDR) :  SALES (ORDMGT) , CHAIN=ACCOUNT,
        LIST= (PROD-NO, PURCH-DATE) ;
```

This statement first accesses the master data set CUSTOMER, retrieves the elements ACCOUNT, LAST-NAME, and STREET-ADDR, and chains to the detail data set SALES in the same data base, where the elements PROD-NO and PURCH-DATE are retrieved. The chain item ACCOUNT resides in both data sets.

```
ACCESS  SALES (ORDMGT) , LIST= (PROD-NO, ACCOUNT, PURCH-NO) :
        ORDREC, KEY=PROD-NO (PRODNUM) , LIST= (QUANT, COST) ;
```

The detail data set SALES is accessed, and three elements (PROD-NO, ACCOUNT, and PURCH-NO) are retrieved. The next file in the path is the KSAM file ORDREC, which is accessed by key; the key element PROD-NO is known by a different name (PRODNUM) in ORDREC than in the data set. The elements QUANT and COST are retrieved from ORDREC.

```
ACCESS  INVENTO, LIST= (INV-NO, UNIT-COST) :
        PRODFILE, MATCH=INV-NO, LIST= (DESC, ORD-DAT,
        ON-ORD) ;
```

There are two files in this path (INVENTO and PRODFILE), which are linked by the match item INV-NO.

DEFINE

Used to include in a report data elements that are not defined in the data dictionary (used in conjunction with the ACCESS statement in this case).

DEFINE is also used to modify the attributes of data elements that are defined in the data dictionary. The modification is in effect only for the current report; the actual dictionary attributes are not changed.

SYNTAX

```
DEFINE(ITEM) item-spec[: item-spec]...;
```

PARAMETERS

item-spec — Specifies the data element name and attributes as follows:

```
element-name1 [[count]
              type(size[,dec][,storage])]
              [=parent-name(position)]
              [,ALIAS=(element-alias)]
              [,HEAD="heading-text"]
              [,ENTRY="entry-text"]
              [,EDIT="edit-mask"]
              [,INIT=value]
              [,COMPUTE=arithmetic-expression]
```

element-name1 — The name of a data element that is in a data base or file, or a temporary data element to be used only for the current report; the name can be from 1 to 20 characters beginning with a letter.

count — The number of sub-elements if the data element is compound; the default is 1.

type — A data type designator where

U = An ASCII character string containing no lowercase alphabetic characters.

X = An unrestricted ASCII character string (can be uppercase and/or lowercase).

9 = An ASCII character string containing numeric characters.

Z = A zoned decimal format number.

P = A packed decimal number.

I = A signed binary integer in 2's complement form. (for Image-use I(8) on variable to correspond to I(2) in Database

J = The same as I but only numbers conforming to COBOL COMPUTATIONAL data specifications are allowed.

K = An absolute binary quantity.

R = A floating point number (commercial notation).

E = A floating point number (scientific notation).

NOTE: To indicate that a data element should always be positive, you can follow a numeric type designator with a positive sign.

size — An integer value that is the total number of characters (number of digits plus decimal point, if any) needed to report the largest element value. A character position for any numeric sign is assumed and is not included in the size count.

dec	The number of digits to the right of the decimal point.
storage	The byte length for the element; overrides the length calculated from the type, size, and decimal attributes.
parent-name	The name of an element defined in the data dictionary or in a separate DEFINE statement; the parent element is superior in a hierarchal structure to the element currently being defined (called the child element).
position	The starting byte position of the child element (the element being defined) within the parent element; the first byte position is 1, and the default is 1.
ALIAS	The element being defined is known by a different name in the file from which it is being retrieved (as specified in the ACCESS statement).
element-alias	The other name by which the element being defined is known.
HEAD	The data element name is not to be used as a report heading.
heading-text	A text string that is used as a report heading; can be up to 30 characters.
ENTRY	A message is to be displayed as a selection prompt for input for the person running the report.
entry-text	A text string that is used as a selection prompt; can be up to 30 characters.

EDIT — The data element is to be edited to make it more readable in a report.

edit-mask — A string of insertion and place-holding characters for editing report output (for more information, refer to the EDIT format spec discussed previously in this section).

INIT — The data element is to be set to some initial value.

value — A numeric constant or a character string (enclosed in quotes) that the data element is set to initially.

COMPUTE — An arithmetic operation is to be performed on the data element.

arithmetic-expression — A series of variables separated by arithmetic operators. The defined element is automatically initialized to 0, and computations are carried out before the element is sorted or displayed in a report. Valid variables are data element names, which must be enclosed in parentheses, or numeric constants. The arithmetic operators and their meanings are:

+	add
–	subtract
*	multiply
/	divide; give the quotient
//	divide; give the remainder

Arithmetic operations are performed in the following order:

1. Division giving the remainder
2. Division giving the quotient
3. Multiplication
4. Subtraction
5. Addition

You can vary the order of operations by using brackets to group operations.

EXAMPLES

```
DEFINE(ITEM)  ZIP X(5,0,6);
```

This element is defined in the data dictionary as 6 bytes long (recall that the dictionary is an IMAGE data base where type X must be an even number of bytes). In the report you want to see only the five characters of the zip code.

```
DEFINE(ITEM)  YEAR X(2)  = DATE(1);
DEFINE(ITEM)  MONTH X(2)  = DATE(3);
DEFINE(ITEM)  DAY X(2)  = DATE(5);
```

These three statements take the parent element DATE, defined in the dictionary as X(6), and redefine it as three separate elements for a report. Note that the DATE byte positions must be specified so Report knows where to get the characters for the new elements.

```
DEFINE(ITEM)  PRODUCT X(8),  ALIAS=(PROD-NO);
```

The item PRODUCT is known as PROD-NO in the file named in the ACCESS statement that accompanies this DEFINE statement.

```
DEFINE(ITEM)  TOTCOST P(12),  COMPUTE=(QUANTITY)*
              (UNIT-COST),  HEAD="TOTAL COST",
              EDIT="$$$,$$$,$$$.^^";
```

A temporary data element is computed as the product of two other data elements (QUANTITY and UNIT-COST), given a heading to be used in the report, and edited to make the output more readable.

```
DEFINE(ITEM)  RESULT P(12),COMPUTE=
              [(QUANT)+10]*[(ORDER)/2];
```

This statement performs computations; the operations within the brackets are performed first, first, then the multiplication is done.

DETAIL

Used to specify the data elements you want included in the body of a report. The data elements must be defined in the data dictionary or a DEFINE statement.

SYNTAX

```
DETAIL report-spec[: report-spec]. . .;
```

PARAMETERS

report-spec

Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

EXAMPLE

```
DETAIL LAST-NAME, COL=10: PROD-NO: PRICE,
     COL=50;
```

In this example, three data elements will be displayed: LAST-NAME, PROD-NO, and PRICE. These data element names are content specs; COL=10 and COL=50 are format specs. LAST-NAME will be positioned in column 10, and PRICE will be positioned in column 50. Because the data element PROD-NO has no format spec associated with it, it will be positioned automatically.

Text discussion: Section 3

DISPLAY

Used to generate a display on the terminal before any selection value prompts are shown. This statement can be used to provide information or instructions to the person running a report.

SYNTAX

```
DISPLAY report-spec[: report-spec]. . .;
```

PARAMETERS

report-spec

Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

content-spec[,format-spec];

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

content-spec[,format-spec][: content-spec

[,format-spec]]...;

A complete explanation of report specs is given at the beginning of this section.

EXAMPLES

```
DISPLAY "THIS REPORT IS CLASSIFIED",LINE=4,COL=25;
```

This message appears on the fourth line of the terminal display beginning in character position 25.

```
DISPLAY "This report was originally designed by "
        "Jerry Morgan.": "Please refer all questions "
        "to him.",LINE;
```

This statement is made up of two report specs separated by a colon. The message is displayed on two lines because the second report spec contains the format spec LINE.

Text discussion: Section 7

GROUP SUMMARY

Used to display summary information following a group break point.

SYNTAX

```
GROUP(n) SUMMARY report-spec[: report-spec]. . .;
```

PARAMETERS

(n) The sort priority number, which corresponds to a data element listed in a SORT statement. Each time the value of the data element changes, GROUP summary information is displayed. For more information about sort priority numbers, refer to the SORT statement later in this section.

report-spec Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

NOTE: You can use GROUP(n) without SUMMARY to avoid the repeated printing of the same element value; only the first occurrence of the value is printed and no title or summary information is printed.

GROUP SUMMARY

EXAMPLE

Suppose the following statements appear in a Report program:

```
SORT(1) ACCOUNT: PROD-NO: QUANTITY;
GROUP(1) SUMMARY "TOTAL OF QUANTITY IS:":
                 TOTAL(QUANTITY), ALIGN;
```

The GROUP statement is linked to the SORT statement by a sort priority number. In this case the sort priority number is 1. Before a new account appears in the report, the group summary information (as defined in the GROUP SUMMARY statement) will appear. When the above statements are combined with the required program statements, the results look like the report shown below.

```
ACCOUNT       PROD-NO      QUANTITY
-----------------------------------
----          -----           -----
              -----           -----
              -----           -----
TOTAL OF QUANTITY IS:         -----
----          -----           -----
              -----           -----
              -----           -----
TOTAL OF QUANTITY IS:         -----
```

Text discussion: Section 5

GROUP TITLE

Used to display title information before a group break point.

SYNTAX

```
GROUP(n) TITLE report-spec[: report-spec]...;
```

PARAMETERS

(n) The sort priority number, which corresponds to a data element listed in a SORT statement. Each time the value of the data element changes, GROUP title information is displayed. For more information about sort priority numbers, refer to the SORT statement later in this section.

report-spec Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

NOTE: You can use GROUP(n) without TITLE to avoid the repeated printing of the same element value; only the first occurrence of the value is printed and no title or summary information is printed.

GROUP TITLE

EXAMPLE

Suppose the following statements appear in a Report program:

```
SORT(5) ACCOUNT: PROD-NO: QUANTITY: TOTAL;
GROUP(5) TITLE "CUSTOMER ACCOUNT BREAKDOWN";
```

When the report that contains these two statements is run, each time the ACCOUNT value changes the GROUP TITLE "CUSTOMER ACCOUNT BREAKDOWN" is displayed. The sort priority number in the GROUP TITLE statement corresponds to the data element ACCOUNT in the SORT statement. If the sort priority number were 6, then each time the value of the data element PROD-NO changed the GROUP TITLE information would appear.

Text discussion: Section 5

Used to control operational parameters.

SYNTAX

```
OPTION [option-list];
```

PARAMETERS

option-list — Consists of one or more of the following options separated by commas:

OUTPUT={LP} / {TERM} — Used to direct the report to the line printer (if the LP option is used), or to the terminal (if the TERM option is used). If this option is omitted, Report prompts you at execution time with the message:

```
REPORT TO TERMINAL OR PRINTER (T/P)>
```

Entering T or a carriage return displays the report at the terminal; entering P sends it to the line printer.

NOBANNER — Specifies that the banner line (date and page) for line printer output is to be suppressed.

NOHEAD — Specifies that no report item headings are to be displayed; otherwise, data element names or heading texts from the data dictionary are displayed.

SUPPRESS — Specifies that multiple blank lines are to be suppressed. For example, a multiline description. might have only one line of text; only one blank line is introduced when the report is run.

NODUPLICATE — Specifies that duplicate records are to be suppressed in the report.

WIDTH=n — Specifies that if the report is listed on a terminal, each line displayed may contain no more than n characters.

Default value=79 characters.

OPTION

DEPTH=n

Specifies that each display on the terminal may contain no more than n lines.

Default value=22 lines.

PWIDTH=n

Specifies that when the report is printed on a line printer, each line may contain no more than n characters.

Default value=132 characters.

PDEPTH=n

Specifies that when the report is printed on a line printer, it may contain no more than n lines per page.

Default value=58 lines (or 60 if the NOBANNER option is specified).

EXAMPLES

```
OPTION OUTPUT=TERM;
```

Using this option displays the report on the terminal.

```
OPTION OUTPUT=LP, SUPPRESS, PWIDTH=128;
```

Using the above options, the report is sent to the line printer, only one blank line appears wherever two or more consecutive blank lines are generated, and each line of the report may contain no more than 128 characters.

```
OPTION  NOHEAD, DEPTH=20;
```

This OPTION statement does not display data element headings, but allows 20 lines for each terminal display of the report. Because no value is included for OUTPUT, you will be asked when you run the report whether you want it printed on the line printer or displayed on the terminal.

PAGE FOOTING

Used to generate information at the bottom of each page of a report.

SYNTAX

```
PAGE FOOTING report-spec[: report-spec]...;
```

PARAMETERS

report-spec

Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

EXAMPLE

```
PAGE FOOTING "CASE STUDY: STATISTICAL ANALYSIS",
             COL=35;
```

The text in quotation marks will appear at the bottom of each page of the report beginning in column 35.

PAGE HEADING

Used to generate information at the top of each page of a report.

SYNTAX

```
PAGE HEADING report-spec[: report-spec]...;
```

PARAMETERS

report-spec

Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

EXAMPLE

```
PAGE HEADING "STATUS REPORT FOR PROJECT ATHENA",
             COL=35;
```

The text in quotation marks will appear at the top of each page of the report beginning in column 35.

Used to establish a name for the report program. This statement must be the first statement of any report program and is the only required statement. Do not confuse the REPORT statement with the REPORT TITLE statement. The REPORT statement specifies the name of the Report/3000 program. After the editor file is compiled, the name in the REPORT statement is the name you give at execution time in response to the REPORT NAME> prompt. The REPORT TITLE statement specifies the title that will appear at the beginning of the report.

SYNTAX

```
REPORT report-name;
```

PARAMETERS

report-name	Any name consisting of from one to six alphanumeric characters; enter this name when the REPORT NAME> prompt appears.

EXAMPLES

```
REPORT REPO1;

REPORT 3QRTS;

REPORT PROFIT;
```

Text discussion: Section 3

REPORT SUMMARY

Used to generate information at the end of a report.

SYNTAX

```
REPORT SUMMARY report-spec[: report-spec]...;
```

PARAMETERS

report-spec

Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

EXAMPLE

```
REPORT SUMMARY "GRAND TOTAL OF ALL SALES":
                TOTAL(SALES), ALIGN;
```

At the end of the report, the text delimited by quotation marks will be printed, followed by a total value for the data element SALES. The format spec ALIGN positions the total below the column of values for SALES.

Text discussion: Section 3

REPORT TITLE

Used to generate information at the beginning of a report.

SYNTAX

```
REPORT TITLE report-spec[: report-spec]...;
```

PARAMETERS

report-spec

Includes a content spec (what is to be presented in the report) and may include, at your option, a format spec (where and how the information is to appear on the terminal or printed page). If no format spec is included, Report relies on default positioning.
The syntax for a report spec is:

```
content-spec[,format-spec];
```

Two or more report specs are separated by colons.
The syntax for a multiple report spec is:

```
content-spec[,format-spec][: content-spec
  [,format-spec]]...;
```

A complete explanation of report specs is given at the beginning of this section.

REPORT TITLE

EXAMPLE

```
REPORT TITLE "THE BUTAH COMPANY", COL=33:
             "MANUFACTURING DIVISION", LINE=1,
             COL=31:
             "BACKORDER SUMMARY", LINE=1,
             COL=33:
```

When this REPORT TITLE statement is executed, the text in quotes will be centered at the beginning of the report (assuming the margins are set at 1 and 80):

THE BUTAH COMPANY
MANUFACTURING DIVISION
BACKORDER SUMMARY

Text discussion: Section 3

Used to limit the data in a report; only elements that meet the selection values you specify are included in the report. You can include the selection values in the SELECT statement in the report program, or you can put just the element name in the SELECT statement — Report/3000 then asks you to enter selection values when you run the report by displaying this prompt:

PROVIDE SELECTION VALUE(S) FOR THE FOLLOWING DATA ITEM(S):

SYNTAX

```
SELECT element-name1 [selection-criteria] [connector
                     element-name2 [selection-criteria]]...;
```

PARAMETERS

element-name — The name of a data element to be selected; must be defined in the data dictionary or a DEFINE statement.

selection-criteria — An expression made up of a relation and a value; data elements with corresponding values that satisfy the relationship are selected. The syntax for selection-criteria depends on whether the values are (1) included in a SELECT statement or (2) entered from the terminal at run time.

1. When values are included in a SELECT statement, the syntax for selection-criteria is:

   relation value

relation — An operator that expresses a relationship between the data element and the value. The operators and their meanings are:

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

value

A numeric constant, a character string, or a generic string; you must enclose strings in quotes.

A generic string is a string of characters with a caret (^) at the beginning or end or embedded in the string. The caret has the following meanings:

At the end of a string (ABC^) — all data values beginning with the string are to be included in the report.

At the beginning of a string (^ABC) — all data values ending with the string are to be included in the report.

Two carets at the end of a string (ABC^^) — all data values containing the string anywhere are to be included in the report.

Embedded between characters in a string (A^^B^C) — all data values that match wherever characters appear in the string are to be included in the report.

connector

The Boolean connection between one value and another. The connectors and their meanings are:

AND — The selected field must contain both the value preceding AND and the value following AND.

OR — The selected field must contain one or both of the values preceding and following OR.

2. When values are entered from the terminal at run time, the syntax for selection-criteria is:

$$\left\{ \begin{array}{l} \text{[relation] value} \\ \text{value TO value} \end{array} \right\} \left[\text{connector} \left\{ \begin{array}{l} \text{[relation] value} \\ \text{value TO value} \end{array} \right\} \right] \ldots$$

relation

An operator that expresses a relationship between the data element and the value. The operators and their meanings are:

NE	not equal
LT	less than
LE	less than or equal
GT	greater than
GE	greater than or equal

The default is equal.

value

A numeric constant, a character string, or a generic string; any string with embedded blanks must be enclosed in quotes.

A generic string is a string of characters with a caret (^) at the beginning or end or embedded in the string. The caret has the following meanings:

At the end of a string (ABC^) — all data values beginning with the string are to be included in the report.

At the beginning of a string (^ABC) — all data values ending with the string are to be included in the report.

Two carets at the end of a string (ABC^^) — all data values containing the string anywhere are to be included in the report.

Embedded between characters in a string (A^^B^C) — all data values that match wherever characters appear in the string are to be included in the report.

connector

The Boolean connection between one value and another. The connectors and their meanings are:

AND — The selected field must contain both the value preceding and the value following this connector.

OR — The selected field must contain one or both of the values.

If you follow a connector with a carriage return, Report prompts you to enter additional values by displaying (CONTINUATION LINE)>. If you then enter another carriage return rather than values, the connector is ignored.

EXAMPLES

The first examples show SELECT statements that include the selection criteria.

```
SELECT PROD-NO = "0684CU/F";
```

This statement produces a report that contains information only on products numbered 0684CU/F Note that this character string value is enclosed in quotes.

```
SELECT PROD-NO = "0684CU/F" AND QUANTITY <= 10;
```

This statement directs Report to include in the report only products numbered 0684CU/F where there are 10 or fewer in stock. BOTH CONDITIONS MUST BE MET. The numeric constant 10 does not have to be enclosed in quotes.

```
SELECT PROD-NO = "0684CU/F" OR PROD-NO = "26821H/M";
```

As a result of this statement, the report includes information on more than one product. Records meeting either condition are selected.

```
SELECT ACCOUNT >= "415^";
```

All ACCOUNT elements that begin with 415 or greater are included in the report.

```
SELECT PROD-NO = "068^^^/F" AND SHIP-DATE >= 801020;
```

The report includes all PROD-NO elements beginning with 068 and ending with F that were shipped on or after the 20th. of October, 1980.

The following examples show SELECT statements with element names but no values; selection criteria are entered when the report is run. In each case, the following prompt is displayed:

```
PROVIDE SELECTION VALUE(S) FOR THE FOLLOWING DATA ITEM(S):
```

Then a data element name or entry text associated with the element in the data dictionary is displayed.

```
SELECT PROD-NO;
```

Report prompts for the element value.

```
PROD-NO> 0684CU/F
```

Entering this single product number produces a report that contains information only on products numbered 0684CU/F. This character string value does not have to be enclosed in quotes.

```
SELECT PROD-NO AND ACCOUNT;
```

After the prompt, an element value is entered.

```
PROD-NO> 0684CU/F TO <cr>
(CONTINUATION LINE)> 0699MH/F
ACCOUNT> GE 408^
```

All products numbered 0684CU/F to and including 0699MH/F associated with accounts beginning with 408 or greater are selected. The TO followed by a carriage return results in the continuation line message. BOTH the PROD-NO and ACCOUNT criteria must be met for records to be selected.

```
SELECT LAST-NAME;
```

In this example, the person running the report is to select values of the data element LAST-NAME. In the data dictionary, LAST-NAME has entry text defined that is displayed as a prompt instead of the element name.

```
ENTER CUSTOMER'S NAME> "SALLY GOODMAN"
```

The information about this customer is selected for the report. The name is enclosed in quotes because of the embedded blank.

```
SELECT ACCOUNT;
```

A range of values is entered in response to the prompt.

```
ACCOUNT> 408^ TO 415^
```

Account numbers beginning with 408 to (and including) account numbers beginning with 415 are selected for the report.

```
SELECT ACCOUNT = 41976855 AND PROD-NO AND QUANTITY;
```

This example shows mixed use of selection criteria: the account number value to be selected is included in the report program; at run time, prompts for PROD-NO and QUANTITY values to be selected are displayed. This provides an extra level of filtering based on values as only records with the account number 41976855 are made available at run time.

Text discussion: Section 6

SORT

Used to indicate which data elements in the DETAIL statement are to be sorted, in what priority they are to be sorted, and in what order (ascending or descending).

SYNTAX

```
SORT(n) element-name1 [(ASC)] [: element-name2 [(ASC)] ]...;
                      [(DES)]                  [(DES)]
```

PARAMETERS

(n) The sort priority number, which can be from 1 to 99. This number determines the priority in which the data elements are sorted. The first data element in a SORT statement has a sort priority number of n, the second element has n+1, the third n+2, and so on. The sort priority number is relative. It merely specifies a starting point from which all other data elements in the statement are numbered. Each sort priority number must be unique, however.

Records are first sorted according to the data element with the lowest sort priority number; records with equal values for this data element are then sorted according to the data element with the next lowest sort priority number, and so on.

If a break is to occur when the value of a data element changes, the n in a GROUP(n) SUMMARY or GROUP(n) TITLE statement must correspond to the element's sort priority number.

If there are multiple SORT statements in a report program, Report first looks for the lowest n, then n+1, and so on.

element-name — A data element defined in the data dictionary or a DEFINE statement.

(ASC) — The data element is to be sorted in ascending order (standard alphabetic and numeric order). This is the default but can be included for documentation purposes.

(DES) — The data element is to be sorted in descending order (reverse alphabetic and numeric order).

EXAMPLES

```
SORT(1) ACCOUNT: PRODUCT-NO: PRICE;
```

Records are first sorted according to the values of ACCOUNT; records with equal values for ACCOUNT are sorted according to PRODUCT-NO; records with equal values for both ACCOUNT and PRODUCT-NO are sorted according to PRICE. Because the sort priority number is a relative value, the following SORT statement sorts records in the same order as the first example:

```
SORT(5) ACCOUNT: PRODUCT-NO: PRICE;
```

The difference between these two statements is the implied priority given each data element that follows the first data element.

In the first example, the implied priority of PRODUCT-NO is 2, and the implied priority of PRICE is 3. In the second example, the implied priority of PRODUCT-NO is 6, and the implied priority of PRICE is 7.

The sort priority number becomes important when a report program contains more than one SORT statement. For example, look at the SORT statements below:

```
SORT(7) ACCOUNT: PRODUCT-NO: PRICE;
SORT(3) LAST-NAME: PURCH-ORD-NO;
```

These statements could be part of the same report program. Report looks for the lowest n. Remember that each sort priority number must be unique.

To break the above report on ACCOUNT, the GROUP statement would look like this:

```
GROUP(7) SUMMARY "END OF ACCOUNT";
```

The sort priority number is the same (7) for the ACCOUNT element and the GROUP statement.

```
SORT(1) ACCOUNT(DES): PROD-NO: QUANTITY;
```

In this example, the data element ACCOUNT will be sorted in descending order, while the data elements PROD-NO and QUANTITY will be sorted in ascending order.

Text discussion: Section 4

ERROR MESSAGES

APPENDIX

A

This appendix contains a listing of the error messages that can be issued by the Report compiler and processor.

COMPILER ERROR MESSAGES

The Report/3000 compiler issues various error messages that appear wherever you direct your compiler listing. These messages are listed in Table A-1 and take the following form:

```
***ERROR***          ^ (number) message
```

where "number" is the number from the first column of the table and "message" is the message text. The caret (^) is positioned under the place in the Report statement where the compiler detected the error.

Table A-1. Compiler Error Messages

NO.	MESSAGE	EXPLANATION AND/OR ACTION
–1	INVALID TERMINATOR	The compiler has detected an unexpected field termination character; one of the characters displayed between the brackets is expected (a blank could be one the expected characters).
4	INVALID VERB	Correct the verb.
5	INVALID ITEM TYPE	The specified item type is not valid; valid item types are U, X, 9, Z, P, I, J, K, R, and E.
8	EXPECTING A NUMERIC FIELD	The compiler expected a numeric field and has detected a null or non-numeric field.
11	UNEXPECTED EOF IN TEXT FILE	The compiler has detected an end-of-file within a Report program statement; check that each statement is terminated with a semicolon and each character string with a quotation mark.
13	FATAL ERROR: COMPILATION TERMINATED	The compiler has detected an error from which it cannot recover; see the previous error message on the compiler listing.
14	INVALID OPTION	Correct the option field.
15	EXPECTING ITEM NAME	The compiler expected a data element name and has encountered an invalid or null field.
16	ITEM NAME LONGER THAN 16 CHARACTERS	Correct the name of the data element (Report allows 20 characters but 16 is the maximum IMAGE allows).
17	SET NAME LONGER THAN 16 CHARACTERS	Correct the name of the data set (Report allows 20 characters but 16 is the maximum IMAGE allows).
18	INVALID REPORT NAME	The REPORT statement syntax is incorrect.
24	INVALID NUMBER	The identified numeric field contains an invalid number; check the associated statement and option specifications.
25	MISSING TEXT	The compiler expected a field between the identified terminator and the previous one.

NO.	MESSAGE	EXPLANATION AND/OR ACTION
29	UNEXPECTED TEXT BETWEEN DELIMITERS	The compiler expected two consecutive delimiters; the text between them is ignored.
30	SYNTAX ERROR	The compiler has detected a general syntax error. Check the syntax for the associated Report statement.
32	DECIMAL COUNT MUST BE LESS THAN TOTAL	The decimal place count is larger than the number of digits declared in the data element definition.
33	EXPECTING A CHARACTER STRING	The compiler expected a character string within quotation marks at this point in the program.
37	STORAGE BYTE COUNT TOO SMALL	The storage length specified in a DEFINE(ITEM) statement is less than the value calculated internally for the element. The specified storage length is ignored.
39	DATA TYPE LENGTH NOT SUPPORTED	The storage length specified in a DEFINE(ITEM) statement is greater than the maximum size allowed for this data type. The specified storage length is ignored.
45	EXPECTING A SET NAME	The compiler expected the name of a data set and has encountered an invalid or null field.
46	MULTIPLE OPTION DEFINITION	The same option has been used more than once in the statement; the indicated option is ignored.
47	MULTIPLE ITEM DEFINITION	The indicated element has already been defined. This definition is ignored.
55	NON-PRINTING CHARACTER IN TEXT FILE IGNORED	The compiler has detected a non-printing character at the indicated position. The character is ignored.
57	FORMAT STATEMENT TOO LONG	A format specification is too long; reduce the number of options
58	CONFLICTING OPTION IGNORED	The indicated option cannot be specified because a conflicting option has already been specified. This option is ignored.

NO.	MESSAGE	EXPLANATION AND/OR ACTION
61	LITERAL STRING TOO LONG	A character string exceeds 256 characters. Shorten the string or split it into several strings.
62	ITEM REFERENCED TO ITSELF	A sub-item or data base synonym definition references itself. The definition is ignored.
67	SORT ERROR DURING LABEL CROSS-REFERENCE	An error occurred during the sort operation. The report is produced unsorted.
68	SORT ERROR DURING DATA ITEM DEFINITIONS	An error occurred during the sort operation. The report is produced unsorted.
72	INTERNAL ERROR - PLEASE REPORT THIS ERROR	The compiler has detected an error in its internal program control labels. Contact a Systems Engineer.
79	SOURCE FILE READ ERROR	Examine the file display for a possible system problem.
81	EXPECTING AN OPTION FIELD	An option was expected in the indicated position but none was found; check the statement syntax.
82	TOO MANY FILES	The maximum number of files allowed in an ACCESS statement has been exceeded (maximum is 50).
83	EXPECTING A SET NAME	The name of a data base set is expected at the indicated point in the statement.
84	MULTIPLE SET DEFINITION	The indicated data set has already been defined.
85	UNDEFINED SET OR FILE NAME	A data set or file that has not been defined has been referenced.
86	MULTIPLE GROUP/SORT LEVEL STATEMENT	A duplicate sort priority number has been detected in a GROUP or SORT statement.
87	MULTIPLE SELECT STATEMENT	There can be only one SELECT statement in a Report program.
88	EXCEEDED MAXIMUM GROUP SORT LEVEL	The sort priority number must be less than 99.

NO.	MESSAGE	EXPLANATION AND/OR ACTION
89	MULTIPLE ACCESS STATEMENT	There can be only one ACCESS statement in a Report program.
90	INVALID CONTROL OPTION IGNORED	The OPTION statement contains an invalid parameter, which is ignored.
92	CODE FILE WRITE ERROR	Examine the file display and correct the program.
99	LOGIC LEVELS DO NOT MATCH	The number of open parentheses and close parentheses in the selection criteria do not match.
100	DATA DICTIONARY REQUIRED BUT NOT AVAILABLE	The compiler requires information from the dictionary, which it cannot open. Make the dictionary data base available.
101	MULTIPLE FORMAT STATEMENT	A format spec within a REPORT, PAGE, or GROUP statement is a duplicate.
102	TOO MANY ITEMS IN FILE LIST	More than 128 items have been used in a file list in the ACCESS statement.
103	COMPUTATION LEVELS DO NOT MATCH	The number of open parentheses and close parentheses in an arithmetic expression do not match.
104	MULTIPLE DISPLAY STATEMENTS	There can be only one DISPLAY statement in a Report program.
105	NO ITEMS IN REPORT	There are no report items in any of the Report statements so no output can be produced.
106	NO ACCESS FILE	The compiler cannot find an access file for the indicated report items. The dictionary does not contain correct or complete information.
107	BASE TABLE FULL	Too many data bases are required for the report.
108	FILE TABLE FULL	Too many data sets or files are required for the report.
109	ITEM TABLE FULL	Too many data elements are required for the report.

NO.	MESSAGE	EXPLANATION AND/OR ACTION
110	FILE-ITEM TABLE FULL	More data element to file relationships exist in the dictionary than can be processed (maximum is 256).
111	DATA DICTIONARY: DATA BASE ERROR: error-message	A dictionary data base error has occurred. See error-message for appropriate action.
112	DATA DICTIONARY: CANNOT FIND BASE: base-name	Dictionary information is missing for the indicated data base.
113	DATA DICTIONARY: CANNOT FIND FILE: file-name	Dictionary information is missing for the indicated data set or file.
114	DATA DICTIONARY: CANNOT FIND ITEM: item-name	Dictionary information is missing for the indicated data element.
115	DATA DICTIONARY: NO KEY FOR FILE: file-name	Dictionary information does not contain a key item for the indicated data set or KSAM file.
116	DATA DICTIONARY: NO TYPE FOR FILE: file-name	Dictionary information does not contain a type attribute for the indicated file.
117	CANNOT OPEN INCLUDE FILE	A file named in an !INCLUDE statement cannot be opened. Compilation continues using the current source file.
118	TOO MANY INCLUDE FILES	More than five INCLUDE files have been nested.
119	INCOMPATIBLE INCLUDE FILE	An INCLUDE file is not an editor ASCII file of record length 80 characters.
121	ALIAS TABLE IS FULL	Too many element alias names have been defined for the indicated element.

MESSAGE	EXPLANATION AND/OR ACTION
FOLLOWING ITEM(S) ARE NOT IN ANY DATA SET OR FILE:	The indicated data elements cannot be found in any file in the dictionary.
FOLLOWING FILE(S) CANNOT BE RELATED TO FILE(S):	The indicated groups of files cannot be related according to linkage information in the dictionary.

RUN-TIME MESSAGES

The Report/3000 processor issues various messages, which provide information or indicate errors. Additionally, various subsystem errors can occur when you run a report. The messages issued by Report are listed in Table A-2; for subsystem (IMAGE, KSAM, MPE) errors, consult the appropriate reference manual.

INFORMATION MESSAGES

Information messages indicate processor conditions that are not errors; they take the following form:

*INFO: message (error-info)

where "message" is the message text and "error-info" is as described below.

ERROR MESSAGES

Error messages take the following form:

*ERROR: error-message (error-info)

where "error-message" is the message text and "error-info" is as described below.

ERROR-INFO

The error-info portion of processor messages contains up to five of the following fields:

(type number [,code-location [,parm(n)] [,file-name]])

The meaning of these fields is described on the next page.

"Type" is one of the following:

USER	the error is the result of an invalid response by the person running the report and can usually be corrected when a different response is entered.
PROG	the error is the result of an error in the Report program and can usually be corrected by the program writer.
SYSTEM	the error is due to constraints of the system the report is running on and can be corrected by the system operator.
TRAP	the error is the result of an internal error in the processor; report any such errors to a Systems Engineer.
IMAGE	the error is an IMAGE data base error.
KSAM	the error is a KSAM error or a file system error that occurred while operating on a KSAM file.
MPEF	the error is a file system error.

"Number" is from the first column of the error message table.

"Code-location" is the place in the program where the error occurred.

"Parm(n)" is the field number at which the error occurred.

"File-name" is the data set or file involved in the error.

Table A-2. Run-time Error Messages

USER ERRORS

NO.	MESSAGE	EXPLANATION AND/OR ACTION
1	ENTRY NOT NUMERIC	The data element is defined as type integer, floating point, or numeric ASCII; a non-numeric character has been detected in the data entry field.
2	INPUT FIELD LONGER THAN n	The length of the data entry exceeds the size defined for the associated data element.
4	NUMERIC INTEGER PART LONGER THAN n	The integer part of a decimal number exceeds the length defined for the associated data element.
5	NUMERIC DECIMAL PART LONGER THAN n	The decimal part of a decimal number exceeds the length defined for the associated data element.
9	INVALID MODE	The mode used in opening the data base must be numeric.
10	INVALID REPORT NAME	The report name in the REPORT statement must be 1 to 6 characters.
11	REPORT FILE NOT FOUND	The report file could not be opened because it does not exist or an MPE security violation occurred.
16	ATTEMPT TO ASSIGN NEGATIVE VALUE TO ITEM: item-name	The processor has detected an attempt to assign a negative value to a data element defined as positive.
17	INVALID ARITHMETIC FIELD FOR ITEM: item-name	The processor is attempting to execute an arithmetic operation using a data element defined as character, zoned, or packed decimal (type X, U, Z, or P) and has detected an invalid data storage format for the element.
18	ENTRY CANNOT BE NEGATIVE	The indicated data element has been defined as always positive.

NO.	MESSAGE	EXPLANATION AND/OR ACTION
19	INVALID LOGICAL CONNECTOR	The valid connectors are: and, or, to.
20	INVALID PRECEDING RELATIONAL OPERATOR	The valid relational operators are: =, <>, <=, >=, <, >.
21	UNDELIMITED TEXT STRING	A character string must be terminated by a quotation mark.
22	INVALID PASSWORD FOR DATA BASE: base-name	An invalid password has been entered in response to the prompt for data base password.

PROGRAMMER ERRORS

NO.	MESSAGE	EXPLANATION AND/OR ACTION
3	UNDEFINED DATA ITEM: item-name	The processor is unable to resolve the definition of the indicated data element.
12	UNDEFINED DATA ITEM REFERENCED: item-name	A reference has been made to an undefined data element.
18	ARITHMETIC CONVERSION FOR ITEM: item-name	Internal error; report to Systems Engineer.
41	INCOMPATIBLE CODE FILE	The Report program must be compiled with a compatible version of Report/3000.
46	DECIMAL DIVIDE BY ZERO	The processor has detected a divide by zero in a packed decimal computation.
47	DECIMAL OVERFLOW	The processor has detected an overflow in a packed decimal computation.
48	EXTENDED PRECISION DIVIDE BY ZERO	The processor has detected a divide by zero in a double precision floating point computation.
49	EXTENDED PRECISION UNDERFLOW	The processor has detected an underflow in a double precision floating point computation.
50	EXTENDED PRECISION OVERFLOW	The processor has detected an overflow in a double precision floating point computation.
51	INTEGER OVERFLOW	The processor has detected an overflow in an integer arithmetic operation.
52	FLOATING POINT OVERFLOW	The processor has detected an overflow in a single precision floating point operation.
53	FLOATING POINT UNDERFLOW	The processor has detected an underflow in a single precision floating point operation.
54	INTEGER DIVIDE BY ZERO	The processor has detected a divide by zero in an integer arithmetic computation.
55	FLOATING POINT DIVIDE BY ZERO	The processor has detected a divide by zero in an integer arithmetic computation.
65	PAGE OVERFLOW	A page heading, page footing or a combination of a heading and footing cannot be displayed on a page.

SYSTEM ERRORS

NO.	MESSAGE	EXPLANATION AND/OR ACTION
1	SORT INITIALIZATION	An error in the call to the system sort utility has occurred. The probable cause is insufficient dics space for the sort scratch file.
2	SORT FILE WRITE	An error on releasing a record to the system sort utility has occurred. If the cause is not apparent to the resident System Programmer, contact the Systems Engineer.
3	SORT OUTPUT	An error on requesting a record from the system sort utility has occurred. If the cause is not apparent to the resident System Programmer, contact the Systems Engineer.
4	SORT END	An error has occurred during the exit procedure from the system sort utility. If the cause is not apparent to the resident System Programmer, contact the Systems Engineer.
5	CANNOT OPEN PRINT FILE	The processor is unable to open the print file.
7	CODE FILE READ	The processor detected a read error while reading the code file.
8	DISC SPACE NOT AVAILABLE FOR SORT FILE	Scratch file space for the sort operation could not be created.
9	PRINT FILE ACCESS	The print device is unavailable. Check the FILE statement or call the system operator.
10	REPOUT FILE ACCESS	A write operation to the REPOUT file was unsuccessful (should only occur if REPOUT was equated to a system file or device).
12	CANNOT OPEN DATA BASE: base-name	The data base needed by Report cannot be opened; it does not exist or an incompatible open mode has been specified.

TRAPS

NO.	MESSAGE	EXPLANATION AND/OR ACTION
5	EMPTY CODE FILE	The processor detected an empty code file.
6	UNEXPECTED EOF IN CODE FILE	The processor encountered an unexpected end-of-file while reading the code file. Contact the Systems Engineer.
7	ARITHMETIC CONVERSION FOR TABLE LITERAL	A program constant cannot be converted to the binary equivalent as the current statement requires.
8	BROKEN WORKSPACE CHAIN	The processor has detected a break in the workspace link list. Contact the Systems Engineer.
9	ARITHMETIC TRAP	The processor has detected an arithmetic trap condition in its internal processing. Please report the error condition and the internal address (given as %n.%nnnnn) to the Systems Engineer.
10	OUT OF RANGE PCODE ADDRESS	The processor has detected a PCODE address out of the loaded range of transaction codes. Please report the error condition and the PCODE address (given as %n.%nnnnn) to the Systems Engineer.
11	DISPLAY FORMAT LEVEL OVERFLOW	The processor has detected an overflow in managing format levels. Contact the Systems Engineer.
12	DISPLAY FORMAT LEVEL UNDERFLOW	The processor has detected an underflow in managing format levels. Contact the Systems Engineer.

PUNCTUATION USAGE

APPENDIX

B

This appendix describes the use of punctuation in your Report programs.

PUNCTUATION USAGE IN DETAIL

Anyone who has written a program realizes the importance of punctuation. The job of report program writing and debugging is easier once you master the use of punctuation. This appendix is designed to help you learn punctuation usage quickly.

This appendix contains references to report specs, which are made up of content specs and format specs. A content spec defines what data is to be presented in the report; a format spec defines where and how the information is to appear on the page or terminal screen. Although these specs are explained in the examples where they are used, a more detailed explanation of report specs is given in Section 8.

Semicolon

; used to end a Report/3000 statement.

Example

```
DETAIL PROD-NO: DESCRIPTION: QUANTITY: TOTAL, HEAD="TOTAL SALES",
       SPACE=4, EDIT="$$$,$$$!^^";
```

Comma

, used to separate format specs from the content spec to which they apply. (Note: commas are also used with the OPTION statement to separate values in the option list.)

Example 1

```
DETAIL ACCOUNT, LINE=10, COL=20;
```

Because the format specs LINE=10 and COL=20 refer to the content spec ACCOUNT, they are separated from the content spec by commas.

Example 2

```
GROUP(1) SUMMARY "Concluding Remarks", COL=15, LINE=2;
```

Here the content spec is "Concluding Remarks". The format specs are COL=15 and LINE=2. Commas are used to separate the format specs from the content spec.

Colon

: used to separate multiple report specs within a Report/3000 statement.

Example 1

```
REPORT TITLE "This is the First Line of the Title":
             "This is the Second Line of the Title", LINE=2;
```

In this example, the first report spec contains only a content spec ("This is the First Line of the Title"). The second report spec contains both a content spec ("This is the Second Line of the Title") and a format spec (LINE=2). When the report is displayed using the statement above, the report title looks like this:

```
This is the First Line of the Title

This is the Second Line of the Title
```

The text of each line of the title appears at the left margin and the second line of the title is 2 lines below the first.

For a complete discussion of content and format specs, see Section 8.

Example 2

Look at the statement below and notice how the colon is used to separate report specs.

```
DETAIL ACCOUNT: PROD-NO: QUANTITY: TOTAL;
```

In this example, ACCOUNT, PROD-NO, QUANTITY, and TOTAL are all content specs. Because no format spec is listed, Report positions these elements automatically. When the program containing this statement is run, the report detail line looks like this:

```
ACCOUNT PROD-NO QUANTITY TOTAL
------------------------------
```

The data element ACCOUNT begins at the left margin.

Parentheses

( ) used to:

1. enclose a data element name when used with one of the following arithmetic functions: MAXIMUM, TOTAL, MINIMUM, AVERAGE, and COUNT;

2. enclose the SORT priority number, which is used in both the SORT and the GROUP statements;

3. specify in the SORT statement whether data element values should be sorted in ascending or descending order;

4. enclose size and storage attributes in the DEFINE statement;

5. enclose data element names in the COMPUTE attribute in the DEFINE statement;

6. enclose element lists in the ACCESS statement; and

7. separate a data base name from a data set name in the ACCESS statement.

Example 1

```
GROUP(1) SUMMARY TOTAL(QUANTITY), ALIGN;
```

In this example, the number "1" in the GROUP statement is the sort priority number, which corresponds to a data element in a SORT statement. This number must be enclosed in parentheses.

The arithmetic function TOTAL is a content spec. An arithmetic function is always associated with a data element name. The data element name must be enclosed in parentheses. When any of the following arithmetic functions are used, the data element used in conjunction with the function must be enclosed in parentheses. The five arithmetic functions are:

TOTAL(element name)
MAXIMUM(element name)
MINIMUM(element name)
AVERAGE(element name)
COUNT(element name)

Example 2

```
SORT TOTAL-SALES (DES) ;
```

The above SORT statement specifies that the values for the data element TOTAL-SALES are to be sorted in descending order. Parentheses are used to enclose the option DES.

Quotation Marks

" " used to delimit a literal string. Quotation marks are also used with the EDIT format spec.

Example 1

```
REPORT TITLE "QUARTERLY REPORT", COL=25;
```

When this statement is displayed, the report title "QUARTERLY REPORT" appears beginning in column 25.

Example 2

```
DETAIL ACCOUNT, HEAD="This goes in place of account";
```

The content spec ACCOUNT is followed by another content spec HEAD="This goes in place of account". The second content spec overrides the default date element name or heading text specified in the dictionary.

Example 3

```
DETAIL PROD-NO: PRICE, EDIT="$$.^^";
```

The DETAIL statement above, which causes the display of the data elements PROD-NO and PRICE, contains the format spec EDIT. The price will be displayed in the format shown by the EDIT specification (or edit mask). For more information about the edit mask, refer to Section 8.

Brackets

[ ] used in the DEFINE statement in computational expressions to vary the order of arithmetic operations.
Section 8 contains a detailed discussion of the DEFINE statement.

Now you can test your understanding of punctuation usage by answering the following practice exercise.

Practice Exercise

1. In the blank below, put the punctuation mark used to:

   a. separate Report/3000 statements.____

   b. separate content specs from format specs.____

   c. include a line of text in the report.____

   d. separate the items in the option-list in the OPTION statement.____

   e. identify a data element used with the arithmetic functions TOTAL, COUNT, MAXIMUM, MINIMUM, and AVERAGE.____

   f. separate content specs from content specs.____

2. Add the appropriate punctuation marks to the statements given below.

a. `REPORT STKREP`

b. `OPTION OUTPUT=TERM`

c. `DETAIL ACCOUNT-NO PROD-NO QUANTITY DATE`

d. `GROUP 2 TITLE customer is:`

e. `SORT 1 NAME PURCH-NO PRODUCT`

f. `GROUP 1 SUMMARY Maximum value per customer is MAXIMUM account`

g. `REPORT SUMMARY TOTAL QUANTITY`

h. `REPORT SUMMARY This was a good month, congratulations!`

i. `PAGE HEADING Dynamo Corp. -- Quarterly Report COL=40 LINE=2`

j. `SELECT QUANTITY < 25 OR QUANTITY > 99`

k. `OPTION OUTPUT=TERM WIDTH=50 DEPTH=22`

3. Add the appropriate punctuation to the Report/3000 statements given below.

a. REPORT QUART2

b. DISPLAY Welcome to the production department assembly records.

c. OPTION OUTPUT=LP PWIDTH=100 PDEPTH=50 SUPRESS

d. PAGE HEADING The WIDGET CO. COL=50

e. PAGE FOOTING Production Report No. 33 COL=50

f. REPORT TITLE Production and Backorder Data LINE=2 COL=25

g. SORT 4 ORDER-NO PROD-NO DATE-REQ QUANTITY

h. GROUP 5 TITLE Production Number Data

i. GROUP 6 TITLE Date Production Required

j. DETAIL ORDER-NO PROD-NO DATE-REQ QUANTITY

k. GROUP 6 SUMMARY TOTAL QUANTITY ALIGN

l. GROUP 5 SUMMARY Summary of Production Data

m. SELECT PROD-NO >905 OR DATE >810405

The answers to this practice exercise are shown on the next page.

Answers to Practice Exercise

1. a. separate Report/3000 statements ;

   b. separate content specs from format specifications ,

   c. include a line of text in the report " "

   d. separate the items in the option-list in the OPTION statement ,

   e. identify a data element used with the arithmetic functions TOTAL, COUNT, MAXIMUM, MINIMUM, and AVERAGE ( )

   f. separate content specs from content specs :

2. a. `REPORT STKREP;`

   b. `OPTION OUTPUT=TERM;`

   c. `DETAIL ACCOUNT-NO: PROD-NO: QUANTITY: DATE;`

   d. `GROUP(2) TITLE "customer is:";`

   e. `SORT(1) NAME: PURCH-NO: PRODUCT;`

   f. `GROUP(1) SUMMARY "Maximum value per customer is": MAXIMUM(ACCOUNT);`

   g. `REPORT SUMMARY TOTAL(QUANTITY);`

   h. `REPORT SUMMARY "This was a good month, congratulations!";`

   i. `PAGE HEADING "Dynamo Corp. -- Quarterly Report", COL=40, LINE=2;`

   j. `SELECT QUANTITY < 25 OR QUANTITY > 99;`

   k. `OPTION OUTPUT=TERM, WIDTH=50, DEPTH=22;`

3. a. REPORT QUART2;

   b. DISPLAY "Welcome to the production department assembly records.";

   c. OPTION OUTPUT=LP, PWIDTH=100, PDEPTH=50, SUPRESS;

   d. PAGE HEADING "The WIDGET CO.", COL=50;

   e. PAGE FOOTING "Production Report No. 33", COL=50;

   f. REPORT TITLE "Production and Backorder Data", LINE=2, COL=25;

   g. SORT(4) ORDER-NO: PROD-NO: DATE-REQ: QUANTITY;

   h. GROUP(5) TITLE "Production Number Data";

   i. GROUP(6) TITLE "Date Production Required";

   j. DETAIL ORDER-NO: PROD-NO: DATE-REQ: QUANTITY;

   k. GROUP(6) SUMMARY TOTAL(QUANTITY), ALIGN;

   l. GROUP(5) SUMMARY "Summary of Production Data";

   m. SELECT PROD-NO >905 OR DATE >810405;

GLOSSARY

APPENDIX
C

This glossary defines terms you need to be familiar with in order to use Report/3000.

Access —
The process of obtaining data from a data base or file for use in a report.

Account —
The basic unit in the HP 3000 accounting structure that provides file access security.

Alias —
In the DEFINE statement, another name by which the defined data element is known.

Arithmetic expression —
A series of variables and arithmetic operators used with the COMPUTE attribute of the DEFINE statement to provide computed variables for reports.

Arithmetic function —
A Report/3000 routine to perform basic computations: counting, totaling, averaging, and finding maximums or minimums.

Arithmetic operator —
A symbol that indicates a mathematical process to be performed.

Attribute —
A property of a data element in a DEFINE statement.

Break point —
A place in a report where the value of a specific data element changes; used to display GROUP TITLE and GROUP SUMMARY information.

Byte position —
The starting position of a child data element within a parent data element.

Chain —
The set of detail data set entries with the same search item value, which are linked together.

Child —
A data element that is subordinate to another data element in a hierarchal structure.

Compound data element —
A named group of identically defined, adjacent elements within the same data entry; each occurrence of the element is called a sub-element. Similar to a table in COBOL or an array in FORTRAN.

Connector —
A word specifying the logical (Boolean) relationship between two data elements in a SELECT statement.

Content specification —
The part of a report specification that defines the data to be included in a report.

Count —
A numeric value that is the number of sub-elements for a compound element. Also, an arithmetic function used to keep track of the number of occurrences of a data element.

Data base —
An organized collection of logically related data, which provides shared support of multiple applications.

Data base administrator —
The individual responsible for controlling the design, content, and use of a data base.

Data dictionary —
A central repository of information about the definition, structure, and usage of data in the data base.

Data set —
A collection of data entries where each entry contains values for the same data elements.

Declaration —
In a DEFINE statement, the set of attributes that characterizes a data element and includes the type, size, and number of decimal digits.

Edit mask —
A character string made up of insertion and place-holding characters that is used to edit data element values before display in a report.

Element —
The smallest accessible unit of data in a data base or file.

Entry text —
A character string used as a selection prompt for input when a report is run.

Extent —
An integral number of consecutively-located disc sectors; used by MPE to manage disc files.

File —
A collection of logically related records, usually of the same type.

Formal file designator —
The name by which Report/3000 recognizes a file; provides a way for commands and code outside Report to reference the file.

Format specification —
The part of a report specification that defines where and how report information is to appear on the page or terminal screen.

Formatting —
Arranging the report content on the page.

Generic string —
A type of character string consisting of characters and one or more carets (^), which can be at the beginning or end or within the string. The string is used to select element values for a report by matching values with the string pattern.

Group —
In the HP 3000 accounting structure, a subdivision of an account. Also, a Report/3000 statement used to display title or summary break point information.

Heading text —
A character string used as a report item heading.

Implied decimal point —
The assumed position of a decimal point, which does not occupy a storage position. It is denoted by the dec attribute in the data dictionary or a DEFINE statement.

Key —
A data element whose value is used to locate records; called a search item in IMAGE/3000.

Match —
A data element whose value is used to locate records through a serial read of a data base set or file.

Nonprocedural —
The type of software where you can write the program statements in any order — they do not have to appear in the order they are to be executed.

Numeric constant —
A numeric character or string of numeric characters whose value is implicit in the characters; contrast with Variable.

Parent —
A data element that is superior to other elements in a hierarchal structure.

Path —
The route used to link data base sets or files for retrieval of data elements to be used in a report.

Report specification —
The verb assignment in several Report statements; indicates what information is to be included in the report, and where and how this information is to appear on the terminal or printed page.

Retrieval —
The process of searching a data base or file to locate data elements for a report.

Selection criteria —
An expression used to restrict the data values to be displayed in a report.

Serial match —
A method of retrieving data elements from two files where a value is read from the first file, and then the second file is searched for the the same value.

Size —
A value that is the number of characters needed to display the display data element value; used in a DEFINE statement.

Sort priority number —
The number associated with a data element in a SORT statement that determines the order in which the element is sorted.

Source data element —
A data element as it exists in the data base or file; used in producing report output.

Storage —
The byte length for an element; used in a DEFINE statement.

Sub-element —
An occurrence of a compound data element. See Compound data element.

Type —
In a DEFINE statement, the element attribute that defines the storage format of the data.

Variable —
An element name that, in computations, assumes the current value of the element.

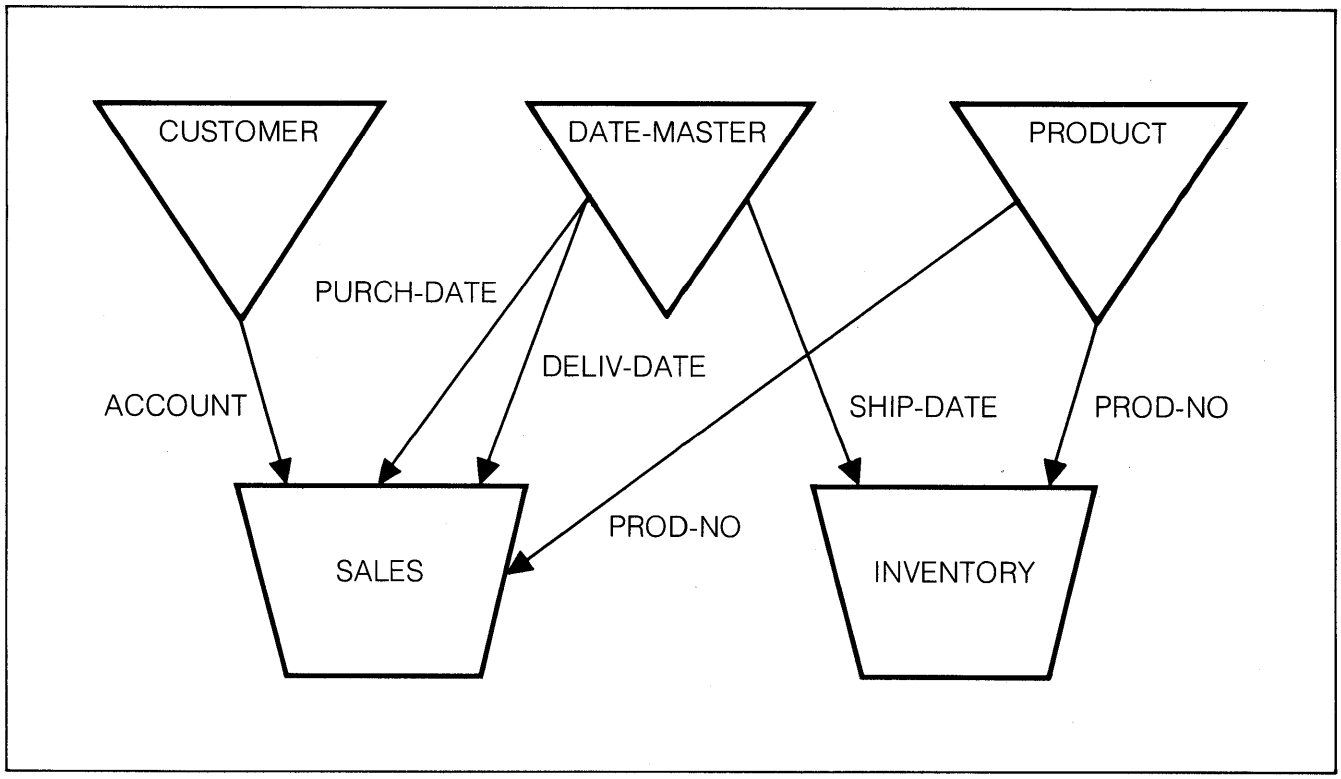
Verb assignment —
The action that a Report/3000 verb is to perform.

SCHEMA FOR ORDMGT DATA BASE

APPENDIX D

The ORDMGT data base, which is used for all the examples in this guide, is shown in this appendix, along with a list of the data elements in each data set.

ORDMGT consists of two manual master data sets (CUSTOMER, PRODUCT), an automatic master data set (DATE-MASTER), and two detail data sets (SALES, INVENTORY).



```
CUSTOMER, MANUAL                        DATE-MASTER, AUTOMATIC

  ACCOUNT (X10)       <<search item>>     DATE (X6)  <<search item>>
  LAST-NAME (U20)
  FIRST-NAME (U18)
  INITIAL (U2)                          PRODUCT, MANUAL
  STREET-ADDR (X22)
  CITY (X14)                              PROD-NO (U8)  <<search item>>
  STATE (X2)                                 DESCRIPTION (X30)
  ZIP (X10)
  CREDIT (X2)


SALES, DETAIL

  ACCOUNT (X10)     <<linked to CUSTOMER, sorted by PURCH-NO>>
  PROD-NO (U8)      <<linked to PRODUCT>>
  QUANTITY (P8)
  PRICE (P12)
  TOTAL (P12)
  PURCH-DATE (X6)   <<linked to DATE-MASTER>>
  DELIV-DATE (X6)   <<linked to DATE-MASTER>>
  PURCH-NO (U6)     <<sort item for ACCOUNT>>


INVENTORY, DETAIL

  PROD-NO (U8)      <<linked to PRODUCT>>
  BACKORDERFLG (U2)
  UNIT-COST (P8)
  SHIP-DATE (X6)    <<linked to DATE-MASTER>>
```

VERB AND REPORT SPEC OPTIONS

APPENDIX

E

Table E-1 shows valid combinations of Report verbs and report specs.

Table E-1. Valid Verb and Report Spec Options

	DETAIL	DISPLAY	GROUP SUMMARY	GROUP TITLE	PAGE FOOTING	PAGE HEADING	REPORT SUMMARY	REPORT TITLE
Character String	✓	✓	✓	✓	✓	✓	✓	✓
Data Element Name	✓		✓	✓				
Arithmetic Function	✓		✓				✓	
ALIGN			✓				✓	
CCTL	✓	✓	✓	✓		✓	✓	✓
COL	✓	✓	✓	✓	✓	✓	✓	✓
EDIT	✓		✓	✓			✓	
HEAD	✓							
JOIN	✓		✓	✓			✓	
LEFT	✓		✓	✓			✓	
LINE	✓	✓	✓	✓	✓	✓	✓	✓
LNG	✓		✓	✓			✓	
NEED	✓	✓	✓	✓			✓	✓
NOCRLF	✓	✓	✓	✓		✓	✓	✓
NOHEAD	✓							
NOSIGN	✓		✓	✓			✓	
PAGE	✓	✓	✓	✓		✓	✓	✓
RIGHT	✓		✓	✓			✓	
ROW	✓	✓	✓	✓		✓	✓	✓
SPACE	✓	✓	✓	✓	✓	✓	✓	✓
TRUNCATE	✓		✓	✓			✓	
ZERO[E]S	✓		✓	✓			✓	

QUICK REFERENCE GUIDE

APPENDIX
F

This appendix contains the syntax of all Report/3000 statements and report specs.

Report/3000 is a free-format language.

REPORT/3000 STATEMENTS

ACCESS — Specifies data retrieval paths.

```
ACCESS file1[,LIST=(element-list1)]:
        [:file2,{KEY   }=element-name1[([file3][,element-name2])]
                {CHAIN }
                {MATCH }
        [,LIST=(element-list2)]]...;
```

DEFINE — Defines new data elements.

```
DEFINE(ITEM) item-spec[: item-spec]...;

item-spec

        element-name1 [[count]
                       type(size[,dec][,storage])]
                       [=parent-name(position)]
                       [,ALIAS=(element-alias)]
                       [,HEAD="heading-text"]
                       [,ENTRY="entry-text"]
                       [,EDIT="edit-mask"]
                       [,INIT=value]
                       [,COMPUTE=arithmetic-expression]
```

DETAIL — Specifies data elements for the report body.

```
DETAIL report-spec[: report-spec]...;
```

DISPLAY — Displays a sign-on message.

```
DISPLAY report-spec[: report-spec]...;
```

GROUP SUMMARY — Displays information following a break point.

```
GROUP(n) SUMMARY report-spec[: report-spec]...;
```

GROUP TITLE — Displays information before a break point.

```
GROUP(n) TITLE report-spec[: report-spec]...;
```

OPTION — Controls operational parameters.

```
OPTION [OUTPUT={LP|TERM},NOBANNER, NOHEAD, SUPPRESS, NODUPLICATE,
        WIDTH=n, DEPTH=n, PWIDTH=n, PDEPTH=n];
```

PAGE FOOTING — Displays information at the bottom of a page.

```
PAGE FOOTING report-spec[: report-spec]...;
```

PAGE HEADING — Displays information at the top of a page.

```
PAGE HEADING report-spec[: report-spec]...;
```

REPORT — Specifies the name of the report program.

```
REPORT report-name;
```

REPORT SUMMARY — Displays information at the end of a report.

```
REPORT SUMMARY report-spec[: report-spec]...;
```

REPORT TITLE — Displays information at the beginning of a report.

```
REPORT TITLE report-spec[: report-spec]...;
```

SELECT — Limits data in a report.

```
SELECT element-name1 [selection-criteria] [connector]
        element-name2 [selection-criteria]]...;
```

SORT — Specifies data elements to be sorted.

SORT(n) element-name1[(ASC) / (DES)] [: element-name2[(ASC) / (DES)]]...;

REPORT SPECS

Report specs are made up of content specs (what is to be presented in the report) and format specs (where and how the information is to appear on the terminal or printed page).

```
content-spec[,format-spec][: content-spec
    [,format-spec]]...;
```

content-spec

A character string enclosed in quotes
A data element name
An arithmetic function:

AVERAGE(element-name[,break-number])
COUNT(element-name[,break-number])
MAXIMUM(element-name[,break-number])
MINIMUM(element-name[,break-number])
TOTAL(element-name[,break-number])

format-spec

ALIGN

CCTL = number

COL = number

EDIT = "edit-mask"

HEAD = "character-string"

JOIN[= number]

LEFT

LINE[= number]

LNG = number

NEED = number

NOCRLF

NOHEAD

NOSIGN

PAGE[= number]

RIGHT

ROW = number

SPACE[= number]

TRUNCATE

ZERO[E]S

INDEX

S

T

U

V

W

Z

Special characters

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HP 3000 Computer System
REPORT/3000
User's Guide

32245-90001 May 1982

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