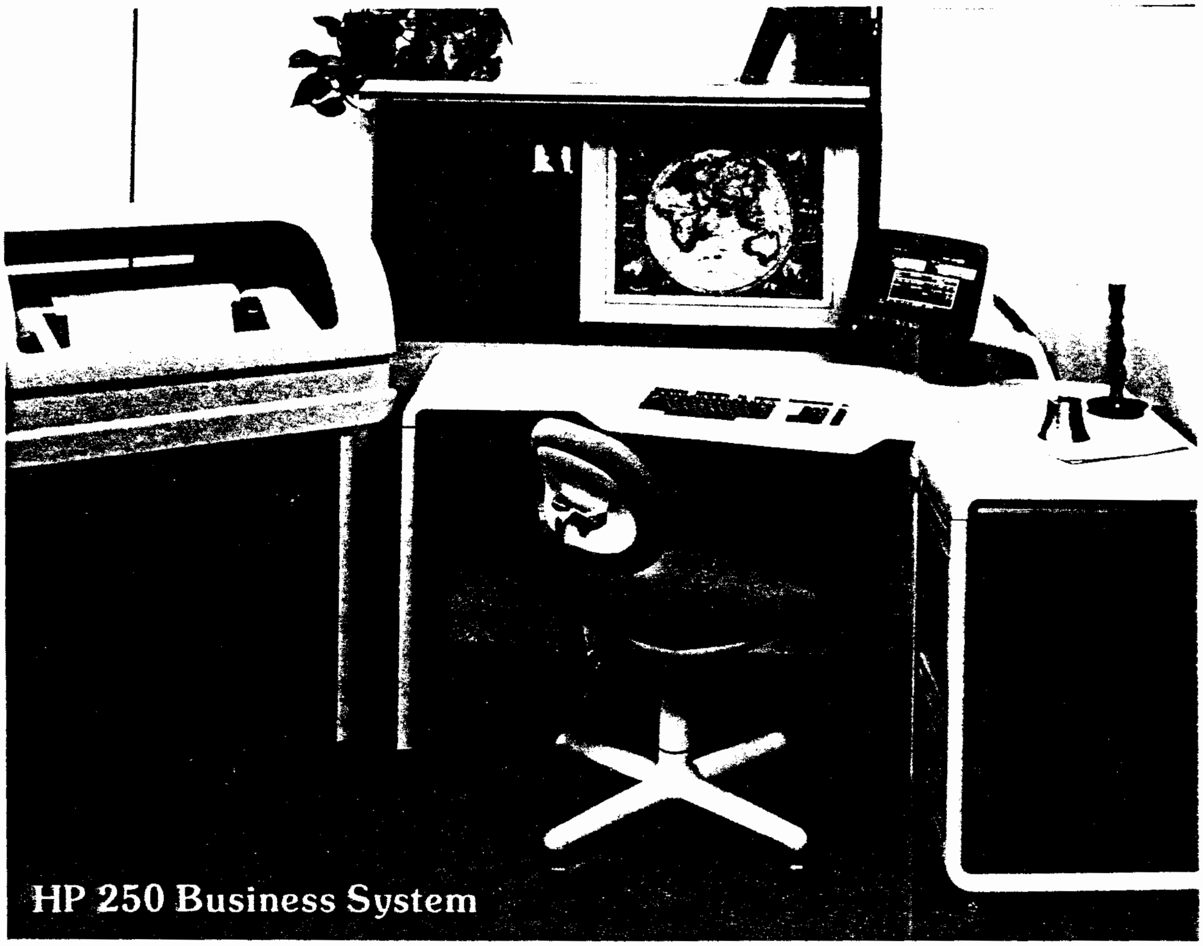
REPORT WRITER/250
Programming Manual

Manual Part No. 45251-90022
Microfiche No. 45251-99022



HP 250 Business System

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revised date at the bottom of the page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

August 1978 ... **First Edition**
April 1979 ... **Second Edition**: Revised pages: 2-3, 2-6, 2-14, 2-15, 2-16, 3-1, 4-3, C-1
June 1979...updated pages for O.S.2.D: 2-17, 3-1, 3-6, 4-7, A-2, A-6

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Table of Contents

Chapter 1: Introduction

Chapter 2: Report Description Statements

Chapter 3: Report Execution Statements

Chapter 4: Functions

Chapter 6: Example Report Programs

Appendix A: Summary of Statements and Functions

CHAPTER 1

Introduction

The HP REPORT WRITER/250 System is a combination of statements and functions which aid the programmer in producing reports. Standard report features such as headings, page numbers, totals, averages and logical breaks can be programmed using Report Writer. The operations are broken into three distinct groups.

1. **Report Description Statements** – Described in Chapter 2. These statements appear in the report description section of a program. They describe the image of the report, including headings, breaks, trailing comments and page size.
2. **Report Execution Statements** – Described in Chapter 3, the statements appear anywhere within the program, although they are only executed when a report is active. They cause the report description statements to be evaluated and cause the report details to be printed.
3. **System Functions** – Described in Chapter 4, these functions are used to hold information about the report including totals, averages, the last break or detail executed, and the page and line numbers last written.

The Report Writer statements work together to produce a report. One statement will cause another statement to be executed which in turn may cause another to be executed. To understand the relationship between statements, you should read the entire manual. Later, when you understand Report Writer, you can use Appendix A for a quick reference to the syntax of individual statements.

Definitions

Some of the terminology used with Report Writer may be unfamiliar to you. Several terms are defined here for your understanding.

HEADER – A header is a description of a series of operations to perform at the time a new break level is begun. For example, when a new page is begun the header might print the report name at the top of the page.

TRAILER – A trailer is a description of a series of operations to perform at the end of the current break level after the break condition has been triggered. It is executed prior to the execution of the header routine for the new break level. For example, when a page break occurs, the trailer might print the page number at the bottom of the page before printing the heading for the new page.

BREAK – A break is caused by a change in the value of one of the variables. You define this variable and the change required to the Report Writer. A break indicates special action is to take place. For example, assume you specify 60 lines to a page. When the Report Writer is about to output the 61st line, a break will occur.

LEVEL – Level is the means of establishing a hierarchical order to the report breaks. The highest level number represents the most frequent breaks and the lowest level number represents the least frequent breaks. For example, in a payroll report the highest level break might be a department and the lowest level be a division. There are nine possible levels, one being the lowest and nine being the highest.

DETAIL LINE – A detail line is the lowest logical group of data in a report. For example, in an inventory report the detail line is the output associated with a particular item (i.e., part number, description, quantity, etc.). The detail line is the primary trigger for all report breaks.

BLOCK STATEMENTS – These statements follow a header or trailer statement. They may be thought of as a subroutine automatically invoked by a break condition. The end of the block is indicated by the next execution of a Report Writer header, trailer or end statement.

The PRINT USING statement is not a specific Report Writer statement. However, its syntax is similar to many of the output statements in Report Writer. It is therefore very important that you have a thorough understanding of PRINT USING and IMAGE as described in the output chapter in the BASIC Programming Manual.

Syntax

The statementsin this manual use the same syntax conventions as in the BASIC Programming Manual.

DOT MATRIX – All words and characters in dot matrix must appear as shown.

[ ] – All parameters in brackets are optional. If there are brackets within brackets, the parameter within the inner bracket may only be specified if the parameter in the outer bracket is specified.

{ } – One parameter must be selected from the parameters stacked within braces.

CHAPTER 2

Report Description Statements

All the statements in this chapter must be in a program section that begins with the REPORT HEADER statement and ends with the END REPORT DESCRIPTION statement. This block or group of statements may be anywhere within the program. If more than one report is to be written, several description blocks can be within the program.

During execution of the program, when the REPORT HEADER statement is read, the system looks for the END REPORT DESCRIPTION statment and skips execution to the statement following it. Therefore, a branching statement is not required before the report description section.

In Chapter 6, an example report program and resultant report are given. Many of the examples are taken from this report. Note that the example is on a fold-out page to allow for better referencing while you read.

The REPORT HEADER Statement

The REPORT HEADER statement has two purposes. The first is to indicate the beginning of the report description section. The second is to write a one-time heading on the first page of the report. The header is printed when the first DETAIL LINE, TRIGGER PAGE BREAK or TRIGGER BREAK statement is executed. (These statements are described in Chapter 3.) It is printed before the first PAGE HEADER.

The syntax of this statement is:

```
                                                    { line id      }
[label:]REPORT HEADER [WITH number LINES][USING{              }[; list]]
[block statements]                                  {image string}
```

The parameters for this statement are defined as follows:

label — This is the standard BASIC line label. This label is referred to in the BEGIN REPORT statement. If not used, the BEGIN REPORT statement must refer to the line number of the REPORT HEADER statement.

number — The number of lines required for the header. If not entered, the value of number defaults to 1.

line id — A line number or label referencing an IMAGE statement.

image string — A list of image specifiers describing the output format, and enclosed in quotes.

list — This may be a list of string, numeric or array variables, literals, constants or expressions to be printed according to the image referenced.

block statements — Statements may follow the REPORT HEADER statement. They will be evaluated and executed immediately after the HEADER statement.

Some examples of this statement follow.

```
60 Inv:  REPORT HEADER USING R_head
•
•
•
600 R_head: IMAGE 20X,"XYZ COMPANY INVENTORY",2/
```

The initial heading (XYZ COMPANY INVENTORY) is printed beginning at column 21. Two blank lines follow. The BEGIN REPORT statement (described in Chapter 3) may reference line 60 or label Inv.

```
20    REPORT HEADER
```

With no block statements, there is no initial heading. The BEGIN REPORT statement must reference line 20.

```
20 Inv: REPORT HEADER USING "20X,K,2/";"XYZ COMPANY
INVENTORY"
```

This example does exactly the same thing as the first example.

The PAGE HEADER Statement

The PAGE HEADER statement defines what is to be done at the top of each page. It is triggered by a page break condition. The syntax is:

```
                                        { line id      }
PAGE HEADER [WITH number LINES] [USING {               }[; list]]
                                        { image string }
[block statements]
```

The parameters are:

number — The number of lines required for the header. If not entered, the value of number defaults to 1. The number is evaluated during execution of the BEGIN REPORT statement. The number of lines for the PAGE HEADER and the PAGE TRAILER are used in conjunction with PAGE LENGTH to determine the effective page size.

line id — A line number or label referencing an IMAGE statement.

image string — A list of image specifiers describing the output format and enclosed in quotes.

list — This may be a list of string, numeric or array varibles, literals, constants or expressions to be printed according to the image referenced.

block statements — Statements may follow the PAGE HEADER statement. They will be evaluated and executed immediately after the PAGE HEADER statement.

An example of this statement follows.

```
130   PAGE HEADER USING P_head;Date$
140   PRINT USING P_2hd
•
•
•
620   P_head:IMAGE 60X,8A,2/,10X,"PART",9X,"QUANTITY",10X,"UNIT",/,8X,
              "NUMBER",8X,"ON HAND",9X,"PRICE",8X,"VALUE"
630   P_2hd: IMAGE 9X,"=====",8X,"=========",8X,"=====",8X,"===="
```

Since two program lines of image specifiers are needed to show the format, the PAGE HEADER statement refers to the first line (P_head) and the PRINT USING statement, which is the "block statement", refers to the second line (P_2hd).

The results of this example is shown in Chapter 6 "Example Report Program".

The HEADER Statement

The HEADER statement defines what is to be done as a heading routine for a specified break condition. Each HEADER statement is directly associated with a break condition. There may be only one active HEADER statement for each of the nine possible break levels.

```
                                        ⎧  line id     ⎫
HEADER level [WITH number LINES] [USING ⎨              ⎬[; list] ]
[block statements]                      ⎩ image string ⎭
```

The parameters are:

level — A numeric expression evaluating to an integer from 1 to 9. This integer associates the header to a break condition. If level is 0, the HEADER statement will be ignored.

number — The number of lines required for the header. If not entered, the value of number defaults to 1. The number is evaluated every time the HEADER statement is executed and can be dynamically changed.

line id — A line number or label referencing an IMAGE statement.

image string — A list of image specifiers describing the output format and enclosed in quotes.

list — This may be a list of string, numeric or array varibles, literals, constants or expressions to be printed according to the image referenced.

block statements — Statements may follow the HEADER statement. They will be evaluated and executed immediately after the HEADER statement.

Some examples of this statement follow.

```
170   HEADER 1
180        TOTALS ON Qty*Price
190        PRINT USING P_head1;Div$
•
•
•
```

The TOTALS ON statement is described later in this chapter.

```
220   HEADER 3 USING P_head3
230         TOTALS ON Qty*Price
•
•
•
710 P_head3:   IMAGE /
```

The REPORT TRAILER Statement

The REPORT TRAILER statement is used to print a one-time trailer just prior to report termination. It is invoked by execution of the END REPORT statement, and is executed after all TRAILERS but prior to the last PAGE TRAILER.

REPORT TRAILER [WITH number LINES][USING $\left\{\begin{matrix}\text{line id}\\ \text{image string}\end{matrix}\right\}$[;list]]
[block statements]

The parameters are:

number	The number of lines required for the trailer. If not entered, the value of number defaults to 1. If the report trailer requires more than one line, it is important that this parameter be used to ensure that the trailer be printed on one page. If a page break occurs in the middle of a trailer, an error will occur.
line id	A line number or label referencing an IMAGE statement.
image string	A list of image specifiers describing the output format and enclosed in quotes.
list	This may be a list of string, numeric or array varibles, literals, constants or expressions to be printed according to the image referenced.
block statements	Statements may follow the REPORT TRAILER statement. They will be evaluated and executed immediately after the TRAILER statement.

An example of this statement follows:

```
160  REPORT TRAILER WITH 5 LINES USING R_trail;TOTAL(0,1),TOTAL(0,1)/NUMBREAK(1)
170     PRINT USING R_2tr;AVG(0,1)
:
:
650  R_trail:  IMAGE 2/,22X,"TOTAL COMPANY",10X,DCDDDCDDDPDD,/,22X,"AVG PER "
               "DIVISION",7X,DCDDDCDDDPDD
656  R_2tr:    IMAGE 22X,"AVG PER ITEM",11X,DDDCDDDPDD
```

The TOTAL, NUMBREAK, and AVG functions are described in Chapter 4.

The PAGE TRAILER Statement

The PAGE TRAILER statement defines the course of action to be taken at the bottom of each page. It is triggered by a page break condition.

PAGE TRAILER [WITH number LINES] [USING {line id | image string} [; list]]
[block statements]

The parameters for this statement are defined as follows:

number — The number of lines required for the trailer. If not entered, the value of number defaults to 1. If the page trailer requires more than one line, it is important that this parameter be used to ensure correct page alignment. The number is evaluated during execution of the BEGIN REPORT statement. The number of lines for the PAGE HEADER and the PAGE TRAILER are used in conjunction with PAGE LENGTH to determine the effective page size.

line id — A line number or label referencing an IMAGE statement.

image string — A list of image specifiers describing the output format and enclosed in quotes.

list — This may be a list of string, numeric or array varibles, literals, constants or expressions to be printed according to the image referenced.

block statements — Statements may follow the PAGE TRAILER statement. They will be evaluated and executed immediately after the PAGE TRAILER statement.

An example of this statement follows.

```
150   PAGE TRAILER WITH 2 LINES USING P_trail;NUMPAGE
 •
 •
 •
650   P_trail: IMAGE 60X,"PAGE",X,2D
```

This page trailer only requires one line but an extra blank line will follow because two lines are reserved by the WITH 2 LINES parameter. The NUMPAGE function is described in Chapter 4.

The TRAILER Statement

The TRAILER statement defines what is to be done as a follow up operation for a specified break condition. Each TRAILER statement is directly associated with a break condition. There may be only one active TRAILER statement for each of the nine possible break levels.

TRAILER level [WITH number LINES] [USING $\left\{ \begin{array}{c} \text{line id} \\ \text{image string} \end{array} \right\}$ [; list]]
[block statements]

The parameters are:

level — A numeric expression evaluating to an integer from 0 to 9. This integer associates the trailer to a break level.

number — The number of lines required for the trailer. If not entered, the value of number defaults to 1. If the trailer requires more than one line, it is important that this parameter be used to ensure that a page break does not occur in the middle of the trailer. If a page break occurs in the middle of a trailer (because the maximum number of lines per page has been printed), an error will result. The number is evaluated every time the TRAILER statement is executed and can be dynamically changed.

line id — A line number or label referencing an IMAGE statement.

image string — A list of image specifiers describing the output format and enclosed in quotes.

list — This may be a list of string, numeric or array varibles, literals, constants or expressions to be printed according to the image referenced.

block statements — Statements may follow the TRAILER statement. They will be evaluated and executed immediately after the TRAILER statement.

Some examples of this statement follow.

```
200   TRAILER 1 USING P_trail1;OLDCV$(1),TOTAL(1,1)
•
•
•
690   P_trail1: IMAGE "TOTAL",X,2A,X,"DIVISION",26X,DDDCDDDCDDDPDD
```

The OLDCV$ and TOTAL functions are described in Chapter 4. This trailer only requires one line, so the WITH...LINES parameter is not entered.

```
240   TRAILER 3 WITH 2 LINES USING P_trail3;OLDCV(3),TOTAL(3,1)
•
•
•
730   P_trail3: IMAGE /,"TOTAL DEPT",X,2A,29X.DDDCDDDCDDDPDD
```

This trailer requires two lines as stated in line 240. If it were not stated and a page break occurred after the first line was printed, an error would occur.

The BREAK WHEN Statement

The BREAK WHEN statement establishes the criteria for determining the level break condition. This break, in turn, will invoke the break condition for any higher numbered levels. While active, a break condition will trigger execution of the appropriate header/trailer statement blocks. There may only be one active BREAK WHEN statement for each of the nine possible break levels.

BREAK level WHEN control CHANGES [BY increment]

The parameters are:

level — A numeric expression evaluating to an integer from 0 to 9. This break level associates the BREAK WHEN statement to header/trailer statement.If level is 0, the BREAK WHEN statement will be ignored.

control — A numeric or string variable or expression evaluated during execution of the DETAIL LINE statement which is used to trigger the break condition.

A specific amount of space is reserved for a string expression control. If the string expression has a current length of greater then zero at execution of the BEGIN REPORT statement, this length is used. Otherwise, a default length of 18 will be used. For string variable controls, the dimensioned length will always be used. If that length is exceeded during the execution of the Report Writer, an error will occur.

increment — A numeric expression evaluated at the execution of the BEGIN REPORT statement which establishes the incremental change necessary in control to trigger the break condition. The increment parameter may only be used for a numeric control. If not present, any change will trigger the break condition. The value of increment is rounded to the nearest integer (i.e., .01 becomes 0 which will cause an error; 1.6 becomes 2 and 2.1 becomes 2).

The break limit is set when the control variable is first given a value. The value of the increment parameter is multiplied by an integer such that it is just larger (or just smaller if increment is negative) than the value of the control variable. For example, if increment =10 and the control variable =27, then increment is multiplied by 3 for a break limit of 30. If increment is −10 and control is 5, then the break limit is 0.

Once the break limit is set, it does not change until after a break occurs. (A break occurs either because the control variable changes past the increment, or because a TRIGGER BREAK statement was executed.) The break limit changes by a multiple of the increment value so that it is just larger (or smaller) than the value of the control variable.

Examples of this statement follow.

```
100   BREAK 1 WHEN Div$ CHANGES
110   BREAK 3 WHEN Dept$ CHANGES
•
•
•
460 Div$=C$[1,2]
470 Dept$=C$[3,4]
```

Lines 460 and 470 are not in the description section.

```
200 BREAK 2 WHEN Dim CHANGES BY 10
```

If the value of Dim is initially 4, a break will occur when the value of Dim is equal to or greater than 10.

```
300 BREAK 4 WHEN Sam CHANGES BY 2
```

If the value of Sam is initially 5 then changes to 1, no break will occur. When the value changes to 6 or greater, a break will occur.

```
400 BREAK 5 WHEN Alpha CHANGES BY -1
```

If the initial value of Alpha is 3 then the value changes to 2 or less, a break will occur.

The PAGE LENGTH Statement

The PAGE LENGTH statement sets the vertical size of the page. The number of blank lines to appear at the top or bottom of the page may optionally be established. To arrive at effective or usable page size, subtract the total number of blank lines plus the number of lines required for the page header and page trailer from the lines per page. The result must be greater than three. All expressions are evaluated at the time of the BEGIN REPORT statement's execution.

```
PAGE LENGTH lines per page [, blank lines top , blank lines bottom]
```

The parameters are:

lines per page — The number of lines per page. If not entered, it defaults to 66 lines with two blank lines at the top and bottom of the page. If lines per page evaluates to zero, no blanks are printed at the top or bottom of a page, a page heading is printed when the first detail line is executed, a page trailer is printed with the END REPORT, the user is responsible for invoking all page breaks by using the TRIGGER PAGE BREAK statement and the NUMLINE function will accumulate the number of lines printed up to 32767.

blank lines top — The number of blank lines to be output at the top of every page. The default is 2. The maximum is 255.

blank lines bottom — The number of blank lines to be output at the bottom of every page. The default is 2. The maximum is 255.

The LEFT MARGIN Statement

The LEFT MARGIN statement may be used to horizontally shift a report on a page. It establishes the leftmost column of a line which may be used for printing. This statement only applies when output is going to a printer. For reports going to a CRT display, the left margin will always be 1.

`LEFT MARGIN` column

The parameter is:

column — A numeric expression which evaluates to an integer from 1 to the current printer width less one (or 132, whichever is less). It defines the leftmost column from which to reference all image execution. The value of column −1 will be added to the length of each printed line. If LEFT MARGIN is not present, column defaults to 1.

The PAUSE AFTER Statement

The PAUSE AFTER statement temporarily pauses the execution of the report, allowing either the printing of reports on individual pages or viewing on the display. To resume execution of the report, you must press the ⇧ key.

PAUSE AFTER number PAGES

The parameter is:

number A numeric expression which evaluates to an integer between 0 and 32767. If evaluated to be zero, the PAUSE AFTER will have no effect.

The statement PAUSE AFTER 1 PAGES causes one page to print followed by a pause, the next page to print followed by a pause, etc.

The SUPPRESS PRINT FOR Statement

The SUPPRESS PRINT FOR statement provides a means of inhibiting print for a specified number of pages at the beginning of a report. Its primary purpose is to provide for restart in case of power or mechanical printer failures. Note that it is still necessary to rerun the report from its beginning so that totals may be accumulated correctly even though printout will not appear for the specified number of pages.

The SUPPRESS PRINT FOR statement performs its execution by altering the select code for the standard printer as set in the PRINTER IS statement. Use of the PRINTER IS statement while a report is active will cause an error 270 to occur.

SUPPRESS PRINT FOR number PAGES

The parameter is:

number A numeric expression evaluating to a positive integer. If set to 0, the statement is ignored.

The SUPPRESS PRINT AT Statement

The SUPPRESS PRINT AT statement allows reports to be produced at summary levels. Headers and trailers for levels lower than the SUPPRESS PRINT AT level are executed. Those with equal or higher levels are not. Except for the printout reduction, the report is produced exactly as if all details were being printed (i.e., the detail line must still be executed). Only one SUPPRESS PRINT AT statement may appear in a report description.

`SUPPRESS PRINT AT` level

The parameter is:

level — A numeric expression evaluating to an integer from 1 to 9. Only headers and trailers with a lower level will be executed.

An example of this statement follows.

```
220 SUPPRESS PRINT AT 4
```

The headers and trailers with levels 1, 2 and 3 are printed. No detail lines are printed. Headers and trailers with levels 4 through 9 are not printed. Page headers and page trailers are not affected. Example 2 in Chapter 6 shows a report with the SUPPRESS PRINT AT statement used.

The PRINT DETAIL IF Statement

The PRINT DETAIL IF statement allows printing conditions for detail lines to be specified without affecting the totaling functions.

`PRINT DETAIL IF` conditional exp

The parameter is:

conditional exp — An expression which will evaluate to zero if false. Otherwise, it will be assumed to be true. It is evaluated at every execution of the DETAIL LINE statement and if zero, the printout for that line will be suppressed. The line's data, however, will be included in all totaling functions.

If the DETAIL LINE statement requires more than 180 characters (including non-printing characters) to be defined, use a DETAIL LINE 0 to continue the statement. This will ensure that a PRINT DETAIL IF statement will execute correctly.

Some examples of this statement follow.

```
70 PRINT DETAIL IF Amt>200
```

When the DETAIL LINE is encountered, the varible Amt is evaluated. If Amt is greater than 200, the detail line is printed.

```
90 PRINT DETAIL IF Security<10
```

If the variable Security is equal or greater than 10, the detail line is not printed.

The GRAND TOTALS ON Statement

The GRAND TOTALS ON statement provides a means of having the Report Writer do automatic totaling for the entire report. The GRAND TOTALS ON statement may only appear once, directly following the REPORT HEADER statement. Once executed, the GRAND TOTALS ON statement allows two special functions to be used: TOTAL and AVG (described in Chapter 4). All totals are zero at the beginning of the report execution and are accessible at any time while the report is active. Totals are incremented during the execution of a DETAIL LINE 1-9 after all breaks are serviced but before control is passed to the USING part of the statement.

GRAND TOTALS ON exp$_1$[, exp$_2$...]

The parameter is:

exp Any valid number variable or expression.

An example of this statement follows.

```
60 Inv: REPORT HEADER
70      GRAND TOTALS ON Qty,Qty*Price
```

Each time a DETAIL LINE statement (with a number of 1 through 9) is encountered the values of Qty and Qty*Price are added to the totals kept by the GRAND TOTALS ON statement.

The TOTALS ON Statement

The TOTALS ON statement provides a means of having the Report Writer do automatic totaling. The TOTALS ON statement may only appear within a header statement block and additionally must immediately follow the header statement. Only one TOTALS ON statement may be present in a header statement block. Once executed, the TOTALS ON statement allows two special functions to be used: TOTAL and AVG (described in Chapter 4). Totals are incremented during the execution of a DETAIL LINE (1-9) statement after all breaks are serviced but before control is passed to the USING part of the statement. Totals are zeroed before control is passed to their associated HEADER but they remain available and unchanged in all TRAILERS when a level break occurs.

TOTALS ON exp_1[, exp_2...]

The parameter is:

exp   Any valid numeric variable or expression.

An example of this statement follows.

```
170  HEADER 1
180     TOTALS ON Qty*Price
•
•
•
220 HEADER 3
230     TOTALS ON Qty*Price,Qty
```

The TOTALS ON statement keeps a running total of Qty*Price beginning when HEADER 1 is first executed and resetting each time thereafter at each execution of HEADER 1. The statement in line 230 keeps the same total and a running total of Qty but is governed by HEADER 3.

The REPORT EXIT Statement

The REPORT EXIT statement defines what action is to be taken when a report is prematurely stopped. It is triggered by the execution of a STOP REPORT statement in the local program. After the REPORT EXIT section is completed, blank lines are printed to ensure that a complete page is ejected.

REPORT EXIT (exec flag) [WITH number LINES][USING $\left\{\begin{matrix}\text{line id}\\\text{image string}\end{matrix}\right\}$[; list]]
[block statements]

The parameters are:

exec flag
An integer expression which is evaluated after the STOP REPORT is executed. If it evaluates to zero, the REPORT EXIT will not be executed. If it evaluates to any non-zero value, the REPORT EXIT will be performed.

number
The number of lines required for the exit routine. If not entered, the value of number defaults to 1. If the routine requires more than one line, it is important that this parameter be used to ensure correct page alignment.

line id
A line number or label referencing an IMAGE statement.

image string
A list of image specifiers describing the output format and enclosed in quotes.

list
This may be a list of string, numeric or array variables, literals, constants or expressions to be printed according to the image referenced.

block statements
Statements may follow the REPORT EXIT statement. They will be evaluated and executed immediately after the REPORT EXIT statement.

An example of this statement follows:

```
100     REPORT EXIT (NUMLINES(0)>0) WITH 2 LINES USING"/,20X,K"
;" *** USER TERMINATED REPORT ***"
110     END REPORT DESCRIPTION
•
•
•
200     ON KEY #8 "EXIT REPORT" GOTO Rexit
•
•
•
300 Rexit:  OFF KEY #8
310         STOP REPORT
320         GOTO Eoj
```

The END REPORT DESCRIPTION Statement

The END REPORT DESCRIPTION statement's purpose is to terminate the report description section begun by a REPORT HEADER statement. It is required for all reports.

The syntax for this statement is:

```
END REPORT DESCRIPTION
```

CHAPTER 3

Report Execution Statements

The execution statements, beginning with BEGIN REPORT and ending with END REPORT, activate the report. Execution statements, with the exception of STOP REPORT, may only be executed in the program that initiated the current report by executing a BEGIN REPORT statement.

In Chapter 6 an example report program and resultant report are given. Many of the examples are taken from this report. Note that the example is on a fold out page to allow for better referencing while you read.

The BEGIN REPORT Statement

The BEGIN REPORT statement initiates execution. When executed, the Report Writer scans the report description section referenced by this statement and evaluates the non-dynamic report options in the section. If no errors are detected, all Report Writer system variables and controls are established. Only the variables which can change during the report execution are evaluated later (such as PRINT DETAIL IF condition, or header and trailer WITH number LINES parameters). Only one report may be active at a time.

BEGIN REPORT line id

The parameter is:

line id The line identifier (line number or line label) referencing a REPORT HEADER statement.

The DETAIL LINE Statement

The DETAIL LINE statement is the foundation around which the Report Writer runs. When the DETAIL LINE statement is executed, all break conditions are tested and triggered if appropriate before any output associated with the DETAIL LINE is printed. In addition, this statement causes all totals to be incremented. Upon the first execution of the DETAIL LINE statement, the Report Writer triggers the report header, page header and all header statements in ascending level-number sequence.

$$\texttt{DETAIL LINE}\ \text{line}\ [\texttt{WITH}\ \text{number}\ \texttt{LINES}][\texttt{USING}\left\{\begin{matrix}\text{line id}\\ \text{image string}\end{matrix}\right\}[\texttt{;}\ \text{list}]]$$

The parameters are:

line — A numeric expression evaluating to an integer between 0 and 9. If greater than zero, totals are incremented, Report Writer counters are incremented and a check for break conditions is made. If equal to zero, the above items are not done. If a DETAIL LINE statement will not fit on two program lines, a second DETAIL LINE statement can be used by setting the line parameter equal to one (or greater) in the first statement and equal to 0 in the second statement.

number — The number of lines required for output. If not entered, the value defaults to 1. If more than one line is required, it is important to enter the number so that a page break does not occur which would cause an error.

line id — A line number or label referencing an IMAGE statement.

image string — A string that contains an image format.

list — A list of numeric, string or array variables, constants, literals or expressions to be printed according to the image referenced.

Examples of this statement follow.

```
520 DETAIL LINE 1 USING D_line;Part$,Qty,Price,Qty*Price
•
•
•
770 D_line: IMAGE 9X,8A,8X,DCDDD,5X,DDCDDDPDD,3X,DDDCDDDPDD
```

This example causes the values of Part$, Qty, Price and Qty*Price to be printed in the format shown.

```
100 DETAIL LINE 1
110 IF A=1 THEN GOTO X
120 IF A=2 THEN GOTO Y
130 IF A=3 THEN GOTO Z
•
•
•
200 X: DETAIL LINE 0 USING D1;A,B,C,D
•
•
•
300 Y: DETAIL LINE 0 USING D2;A,B,C,D
•
•
•
400 Z: DETAIL LINE 0 USING D3;A,B,C,D
```

In this example, all break conditions are checked and totals incremented at line 100, but no detail is output. The value of A determines the image used for the detail line. Line 200, 300, or 400 is used to print the line. When it is printed, totals are not incremented nor are break conditions checked.

The TRIGGER BREAK Statement

The TRIGGER BREAK statement provides a means of forcing a break condition that cannot be described with a BREAK WHEN statement. The break condition is treated in the same manner as if the control in the BREAK WHEN statement had invoked the break condition. The TRIGGER BREAK statement may not be executed while a level or page break is active.

TRIGGER BREAK level

The parameter is:

level A numeric expression evaluating to an integer from 1 to 9. This number associates the TRIGGER BREAK to BREAK WHEN, header and/or trailer statements of the same level. All trailer and header statements with greater or equal levels are triggered. Refer to Chapter 5, Execution Hierarchy, for the order each statement is triggered.

The TRIGGER PAGE BREAK Statement

The TRIGGER PAGE BREAK statement allows a page break condition to be forced under circumstances other than the end of page. This statement initiates an immediate break to a new page. Page trailers and page headers are printed. The TRIGGER PAGE BREAK statement may not be executed if a page break is already active.

```
TRIGGER PAGE BREAK
```

The NUMPAGE= Statement

The NUMPAGE= statement allows the value of the Report Writer page counter to be changed during the execution of the report. The page counter is normally incremented by Report Writer just prior to the printing of a page header.

```
NUMPAGE= number
```

The parameter is:

number   A numeric expression evaluating to an integer value between 0 and 32767.

The END REPORT Statement

The END REPORT statement terminates the active report. It triggers all trailer statements in descending level number sequence, the report trailer and lastly the page trailer.

```
END REPORT
```

The STOP REPORT Statement

The STOP REPORT statement terminates the active report. The REPORT EXIT statement is executed if the following three conditions are true: 1) the STOP REPORT was executed from the program (not from the keyboard), 2) STOP REPORT is executed in the same program environment that initiated the current report (not a subprogram or function) and 3) the REPORT EXIT execution flag evaluated to a non-zero value. In all other cases, STOP REPORT immediately terminates any further printing.

The STOP REPORT statement can be executed even if a report is not active. The only time an error will be generated is while the REPORT EXIT section is active.

```
STOP REPORT
```

CHAPTER 4

Functions

The Report Writer keeps track of totals, page numbers, line numbers, break conditions and the number of detail and breaks executed. These values can be accessed through the Report Writer functions.

Report Writer functions may be accessed by any subprogram and/or function internal to the program that initiated the current report by executing a BEGIN REPORT statement.

In Chapter 6, an example report program and resultant report are given. Many of the examples are taken from this report. Note that the example is on a fold out page to allow for better referencing while you read.

The AVG Function

The AVG function returns the average for the specified expression in the TOTALS ON statement. The value returned is a cumulative average since the header statement block, containing the TOTALS ON statement, was last invoked by a break condition.

AVG (level, sequence)

The parameters are:

level — A numeric expression evaluating to an integer from 0 to 9. It associates the AVG function to a TOTALS ON statement in a header with the same level number. If level equals zero, the AVG function will reference the GRAND TOTALS ON statement.

sequence — A numeric expression evaluating to a positive integer. It corresponds to the sequential position of the desired expression in the TOTALS ON statement.

An example of this function follows.

```
70   GRAND TOTALS ON Qty*Price
•
•
•
265  REPORT TRAILER WITH 5 LINES USING R_trail;AVG(0,1)
```

The value returned is the grand total of Qty*Price divided by the number of detail lines (with number of one to nine) that have been executed.

The TOTAL Function

The TOTAL function returns the running total for the specified expression in a TOTALS ON statement. The value returned is the cumulative value since the header statement block, containing the TOTALS ON statement, was last invoked by a break condition.

`TOTAL (`level`,` sequence`)`

The parameters are:

level — A numeric expression evaluating to an integer from 0 to 9. It associates the TOTAL functions to a TOTALS ON statement in a header with the same level number. If level equals zero, the TOTAL function will reference the GRAND TOTALS ON statement.

sequence — A numeric expression evaluating to a positive integer. It corresponds to the sequential position of the desired expression in the TOTALS ON statement.

An example of this function follows.

```
220  HEADER 3
230    TOTALS ON Qty*Price
240  TRAILER 3 USING P_trail3;TOTAL(3,1)
```

The NUMDETAIL Function

The NUMDETAIL function returns the number of DETAIL LINE statements (with number between one and nine) executed since the header statement at the specified level was executed. The number is incremented during execution of a DETAIL LINE (1-9) statement after all breaks are serviced but before control is passed to the USING part of the statement. When a level break occurs, the number is zeroed before control is passed to the associated HEADER but remains available and unchanged in all TRAILERS.

```
NUMDETAIL (level)
```

The parameter is:

level — A numeric expression that evaluates to an integer from 0 to 9. It associates the NUMDETAIL with the header statement of the same level. If set to 0, the total number of detail lines (with number between one and nine) executed since the report became active is returned.

An example of this function follows.

```
60  HEADER 1
70    TOTALS ON Qty*Price
•
•
•
260  TRAILER 1 USING R_trail;TOTAL(1,1)/NUMDETAIL(1)
```

The NUMBREAK Function

The NUMBREAK function returns the number of times a break condition at the specified level has occured. The NUMBREAK counter is incremented when the break is detected which is before any header routine is activated.

NUMBREAK (**level**)

The parameter is:

level A numeric expression evaluating to an integer from 1 to 9. It associates the NUMBREAK function with the BREAK WHEN statement of the same level.

An example of this function follows.

```
290  REPORT TRAILER WITH 5 LINES USING R_trail;TOTAL(0,1),TOTAL(0,1)/NUMBREAK(1)
```

The OLDCV Function

The OLDCV function returns the value of the control variable as it was evaluated in the last break condition. (The control variable is the parameter "control" in the BREAK WHEN statement.) Its primary purpose is to get the correct value of the control variable in trailer routines. The value changes when a break condition occurs. The old value of the control variable is changed to the new break value after all TRAILERS have been processed and before any HEADERS are called.

```
OLDCV [$] (level)
```

The parameters are:

$ The $ indicates that the control variable is a string. Without a $, it is assumed the control variable is numeric.

level A numeric expression that evaluates to an integer from 1 to 9. It associates the OLDCV function with the BREAK WHEN statement of the same level containing the control variable.

An example of this function follows.

```
240   TRAILER 3 WITH 2 LINES USING P_trail3;OLDCV(3);TOTAL(3,1)
```

The NUMPAGE Function

The NUMPAGE function returns the current Report Writer page number. The Report Writer page counter is incremented just before the PAGE HEADER routine is called. If the REPORT HEADER contains a TRIGGER PAGE BREAK command, the page counter is incremented during the page break setup.

An example follows.

```
150 PAGE TRAILER USING P_trail;NUMPAGE
•
•
•
650 P_trail:  IMAGE 60X,"PAGE",2D
```

The NUMLINE function

The NUMLINE function returns the current Report Writer line count.

An example follows.

```
500 DETAIL LINE 1 USING D_line;NUMLINE,Part$,Qty
```

The LAST BREAK Function

The LAST BREAK function returns the current value of the last break condition level number detected. If the value is zero, the break was triggered by the Report Writer initialization. If the value is ten, the break was triggered by the Report Writer termination (END REPORT statement).

An example follows.

```
250  IF LAST BREAK=3 THEN GOTO 1000
```

The RWINFO Function

The general information function, RWINFO, provides a means of retrieving Report Writer information. If a report is not active, a −1 is returned.

RWINFO (integer)

Integer Value	Information Returned
1	Page size.*
2	Effective page = Page size (blank line top + blank lines bottom + lines in PAGE HEADER + lines in PAGE TRAILER).
3	Number of lines used in current page (same as NUMLINE).
4	Number of lines left in current page.*
5	Number of lines left in effective page.*
6	Page break cause flag: 0 = not caused by DETAIL LINE 1 = caused by DETAIL LINE.
7	Page count (same as NUMPAGE).
8	Number of pages left to suppress.
9	Number of logical pages produced.
10	Same as LAST BREAK.
11	Current LEFT MARGIN.
12	Current HEADER/TRAILER level if in a break condition.

* Will return a zero if pagination is turned off (PAGE LENGTH = 0).

CHAPTER 5

Execution Hierarchy

Three statements, BEGIN REPORT, END REPORT and DETAIL LINE, control the execution of the Report Writer. These statements invoke break conditions which in turn trigger special actions.

The Report Writer has a specific hierarchical order in which it executes the break conditions:

1. Page breaks always have the highest priority. Page trailers are usually processed before page headers. Page breaks are generally triggered by the internal line counter independent of any other break condition.
2. Trailers have the second highest priority. They are processed in descending sequence from the highest level to the current break level.
3. Headers have the next priority. They are processed in ascending sequence from the current break level to the highest level.
4. A detail line has the lowest priority. It is processed after all break conditions have been serviced.

This hierarchy is shown in the following table.

Break Execution Hierarchy

1st Detail Line	Detail Line Break	End Report
Report Header	Trailer 9	Trailer 9
Page Header	⋮	⋮
Header 1	Trailer n	Trailer 1
⋮	Header n	Report Trailer
Header 9	⋮	Page Trailer
	Header 9	
	n=current break level	

When the first DETAIL LINE statement is executed, the statements in column one are also executed (before the detail line is printed). When following DETAIL LINE statements (with a line not equal to zero) are executed and cause a break to occur, the statements in column two are executed. When the END REPORT statement is executed, the statements in column three are executed.

Between Trailer n and Header n, Report Writer does the following for all break levels triggered:

- Resets the value of the control variables.
- Sets the Total On counters to zero.
- Sets the NUMDETAIL counters to zero.
- Increments the break counters.

After Header 9 is executed, Report Writer does the following for Detail Lines with line greater than zero:

- Increments the detail line counter.
- Increments totals.
- Checks Print Suppression conditions (also done for line = 0).
- Checks for a Page Break condition (also done for line = 0).
- Prints the Detail Line (if no Print Suppression condition is valid) (also done for line = 0).

CHAPTER 6

Example Report Programs

Example 1

The following program is an example of how the Report Writer statements can be used to produce a report. This program accesses a file which is sorted first by division (Div$) and second by the department (Dept$).

```
10    !   This program access the file "INV" for data.
20    !   The data is output in a report.
30    !
40    !   Report Description Section
50    !
60  Inv:      REPORT HEADER USING R_head
70            GRAND TOTALS ON Qty*Price
80            PAGE LENGTH 66
100           BREAK 1 WHEN Div$ CHANGES
110           BREAK 3 WHEN Dept$ CHANGES
120   !
130           PAGE HEADER USING P_head;Date$
140                PRINT USING P_2hd
150           PAGE TRAILER WITH 2 LINES USING P_trail;NUMPAGE
160   !
170           HEADER 1
180             TOTALS ON Qty*Price
190             PRINT USING P_head1;Div$
200           TRAILER 1 USING P_trail1;OLDCV$(1),TOTAL(1,1)
210   !
220           HEADER 3 USING P_head3
230             TOTALS ON Qty*Price
240           TRAILER 3 WITH 2 LINES USING P_trail3;OLDCV$(3),TOTAL(3,1)
250   !
260           REPORT TRAILER WITH 5 LINES USING R_trail;TOTAL(0,1),TOTAL(0,1)/NUM
BREAK(1)
265               PRINT USING R_2tr;AVG(0,1)
270   !
280           END REPORT DESCRIPTION
290   !
300   !
310   !
320           PRINT "ENTER DATA AS MM/DD/YY"
330           INPUT Date$
340           PRINTER IS 0
350           ASSIGN #1 TO "INV,FILES"
360           READ #1,1;X
370   !
380   !
390   !
```

```
400  !        Report Execution Section
410  !
420  !
430           BEGIN REPORT Inv
440           FOR I=2 TO X
450               READ #1,I;C$
460               Div$=C$[1,2]          ! Set value for BREAK 1
470               Dept$=C$[3,4]         ! Set value for BREAK 3
480               Part$=C$[5,9]
490               Qty=VAL(C$[10,12])
500               Price=VAL(C$[13,17])
510  !
520               DETAIL LINE 1 USING D_line1;Part$,Qty,Price,Qty*Price
530  !
540           NEXT I
550           END REPORT
560           PRINTER IS 8
570  !
580  !        Line Image Section
590  !
600 R_head:     IMAGE 20X,"XYZ COMPANY INVENTORY",2/
610 !
620 P_head:     IMAGE 60X,8A,2/,10X,"PART",9X,"QUANTY",10X,"UNIT",/,9X,"NUMBER",
                 8X,"ON HAND",9X,"PRICE",8X,"VALUE",/
630 P_2hd:      IMAGE 9X,"======",8X,"========",8X,"=====",8X,"====="
640 !
650 P_trail:    IMAGE 60X,"PAGE",X,2D
660 !
670 P_head1:    IMAGE /,2A,2X,"DIVISION"
680 !
690 P_trail1:   IMAGE ,22X,"TOTAL",X,2A,X,"DIVISION",6X,DCDDDCDDDPDD,/47X,10("-")
700 !
710 P_head3:    IMAGE /
720 !
730 P_trail3:   IMAGE /,22X,"TOTAL DEPT ",2A,9X,DDCDDDCDDDPDD,/,46X,"----------"
740 !
750 R_trail:    IMAGE 2/,22X,"TOTAL COMPANY"10X,DCDDDCDDDPDD,/22X,"AVG PER",
                  " DIVISION",7X,DCDDDCDDDPDD
755 R_2tr:      IMAGE 22X,"AVG PER ITEM",11X,DCDDDCDDDPDD
760 !
770 D_line1:    IMAGE 9X,8A,8X,DCDDD,5X,DDCDDDPDD,3X,DDDCDDDPDD
780 !
790  END
```

```
                    XYZ COMPANY INVENTORY


                                                              4/25/78

          PART              QUANTY          UNIT
         NUMBER             ON HAND         PRICE         VALUE

         ======             ========        =====         =====

AA  DIVISION


         A-123               15         41.15        617.25
         K-573              125         10.90      1,362.50
         B-115              982            75        736.50
         B-125               99         37.50      3,712.50

                       TOTAL DEPT  1               6,428.75
                                               ------------


         A-111              782          1.99      1,556.18
         D-286              906          5.28      4,783.68
         N-742               94         28.67      2,694.98
         A-524              120            44         52.80

                       TOTAL DEPT  2               9,087.64
                                               ------------


         K-419              668          9.03      6,32.04

                       TOTAL DEPT  3               6,032.04
                                               ------------
                       TOTAL AA DIVISION          21,548.43
                                                 ----------

BB  DIVISION

         F-395               50         78.75      3,937.50
         C-974              225            32         72.00
         J-156               12        108.05      1,296.60
         K-238               41         97.87      4,012.67

                       TOTAL DEPT  1               9,318.77
                                               ------------
                       TOTAL BB DIVISION           9,318.77
                                                 ----------


                       TOTAL COMPANY              30,867.20
                       AVG PER DIVISION           15,433.60
                       AVG PER ITEM                2,374.40


                                                              PAGE  1
```

Example 2

When the statement SUPPRESS PRINT AT 3 is added to the report description section of the previous example, the following is the resultant output.

```
                    XYZ COMPANY INVENTORY

                                                            4/25/78

          PART          QUANTY          UNIT
         NUMBER         ON HAND         PRICE        VALUE

         ======         ========        =====        =====

AA  DIVISION
                      TOTAL AA DIVISION         21,548.43
                                               ----------

BB  DIVISION
                      TOTAL BB DIVISION          9,318.77
                                               ----------

                      TOTAL COMPANY             30,867.20
                      AVG PER DIVISION          15,433.60
                      AVG PER ITEM               2,374.40

                                                            PAGE  1
```

Example 3

This example is a subprogram which uses data from an IMAGE/250 data base. The statements which access the data base are described in the IMAGE/250 Programming Manual. The sort statement is described in the SORT/250 Programming Manual. However, the Report Writer portions of the program can be understood without knowledge of IMAGE/250 or SORT/250.

The breaks are set on product and region. Product must have a lower break level than region since product has less frequent breaks. These breaks are shown in lines 1430 and 1440. The file which has the data must be sorted first by product then by region. This is done in line 1240.

The report description section sets up the headers, trailers and totals. The header (B in the listing and report) for the product looks up the product description and prints the product number and description every time the product changes. The trailer (C) is the total number of orders, the total amount and the average price.

The header for the region (D) lists the region every time the product or region changes. The trailer (E) is the total number of orders (the number of detail lines printed) and the total dollar amount sold.

The report header (F) is the name of the report which is printed on top of the first page. The report trailer (G) lists the grand totals: the number of orders (the number of detail lines), the amount and the average price printed on the last report page.

To have a total printed in the trailer, the TOTALS ON (or GRAND TOTALS ON) statement must be used in the header. Line 1710, the report trailer, is directly connected to line 1350, the report header.

The detail line, line 1900, prints the order number, customer, city, date and price.

The page header (H) gives the date and report name then the column headings on every page. The page trailer gives the page.

The page length, margin, level and page suppression is set up in I of the listing. These values are passed to the subprogram through the COM statements.

Set Up Data Base and Spooling

```
    1010 !          RP301 - Report Writer 250 demo - produces bvci
    cle by region rpt
    1030  COM Base$[8],Pselect,Pass$[8],Buff$[200],Lst$[2],Clr$[
    4],Dat$[8]
    1040  COM INTEGER Cur_seg,Menu_no,Curovly$[16]
    1050 !
    1060 COM I$[160],INTEGER S(0:9),Restart,Spool,Code,Msg$[80],
    K$(1:8)
    1070 !
    1080 COM #1,Sort(1:4),Options,Level,Left,Value
    1090 !
    1100 DIM Name$[30]
    1110 INTEGER Order_date,Product
    1120 !
    1130 !
    1140            ON ERROR GOTO R98_error
    1150            LOAD SUB "RWUTIL";7,9      !Rwhalt,Error,FNCrt
    1160            ON HALT CALL Rwhalt
    1170 !
    1180            CURSOR (1,19)
    1190            LDISP "One moment while data is being sorted."
    1200            IN DATA SET "CUSTOMER" USE SKP 1,Name$,SKP 1,C
    ity$,SKP 3,Order_date,SKP 1,Region$,Product
    1210            IN DATA SET "OPTION" USE Order$,Option$,Option
    _price
    1220            ASSIGN "WORKF" TO #1
    1230            WORKFILE IS #1;THREAD IS "CUSTOMER","ORDER","O
    PTION"
    1240            SORT BY Product,Region$,Order$,Option$
    1250 !
    1260            PRINTER IS Pselect
    1270            IF NOT Spool THEN R05
    1280               PRINTER IS "SPOOL"
    1290               CURSOR (1,15)
    1300               LDISP " ";
    1310               CURSOR (25,10)
    1320               LDISP "*** REPORT IS BEING SPOOLED ***"
    1330 !
  { 1340 R05:       REPORT HEADER
F { 1350               GRAND TOTALS ON Option_price
  { 1360               PRINT SPA(27),"HP 250 REPORT WRITER DEMO"
    1370 !
  { 1380            PAGE LENGTH 66-45*(Pselect=8),2*(Pselect<>8),1
  { +3*(Pselect<>8)
I { 1390            LEFT MARGIN Left
  { 1400            SUPPRESS PRINT AT Level
  { 1410            SUPPRESS PRINT FOR Restart PAGES
    1420 !
A { 1430            BREAK 3 WHEN Product CHANGES
  { 1440            BREAK 6 WHEN Region$ CHANGES
    1450 !
```

cont.

Report Description

```
  1460          PAGE HEADER WITH 5 LINES USING Ph1;Dat$
  1470             PRINT USING Ph2
  1480             PRINT USING Ph3
  1490             PRINT USING Ph4
  1500 !
H 1510          PAGE TRAILER WITH 2 LINES USING Pt1;Last$,VAL$
  (NUMPAGE)
  1520             IF (Pselect=8) AND NOT Spool THEN ON FNCrt(
  Last_flag,NUMPAGE,Restart,5) GOTO R20,R90_exit
  1530             IF NOT Spool THEN R20
  1540                CURSOR (34,11)
  1550                DISP "CURRENT PAGE ";VAL$(NUMPAGE)
  1560 !
  1570 !
  1580          HEADER 3 WITH 7 LINES
  1590             TOTALS ON Option_price
B 1600             DBGET (Base$,"PRODUCT",7,S(*),Lst$,Buff$,Pr
  oduct)
  1610             IF S(0) THEN R95_dberror
  1620             PRINT USING Hd3;Product,Buff$[3;30]
  1630 !
D 1640          HEADER 6 WITH 4 LINES USING Hd6;Region$
  1650             TOTALS ON Option_price
  1660 !
C 1670          TRAILER 3 WITH 5 LINES USING Tr3;OLDCV(3),NUMD
  ETAIL(3),TOTAL(3,1),AVG(3,1)
  1680 !
E 1690          TRAILER 6 WITH 4 LINES USING Tr6;OLDCV$(6),NUM
  DETAIL(6),TOTAL(6,1)
  1700 !
  1710          REPORT TRAILER WITH 5 LINES USING Rt1;NUMDETAI
G L(0),TOTAL(0,1),AVG(0,1)
  1720             Last$="LAST"
  1730             Last_flag=1
  1740 !
  1750 R20:     END REPORT DESCRIPTION
  1760 !
  1770          ON KEY #8:"EXIT" GOTO R90_exit
  1780          ON KEY #16 GOTO R90_exit
  1790          IF NOT Spool AND (Pselect=8) THEN DISP "  ";
  1800 !
```

Report Execution

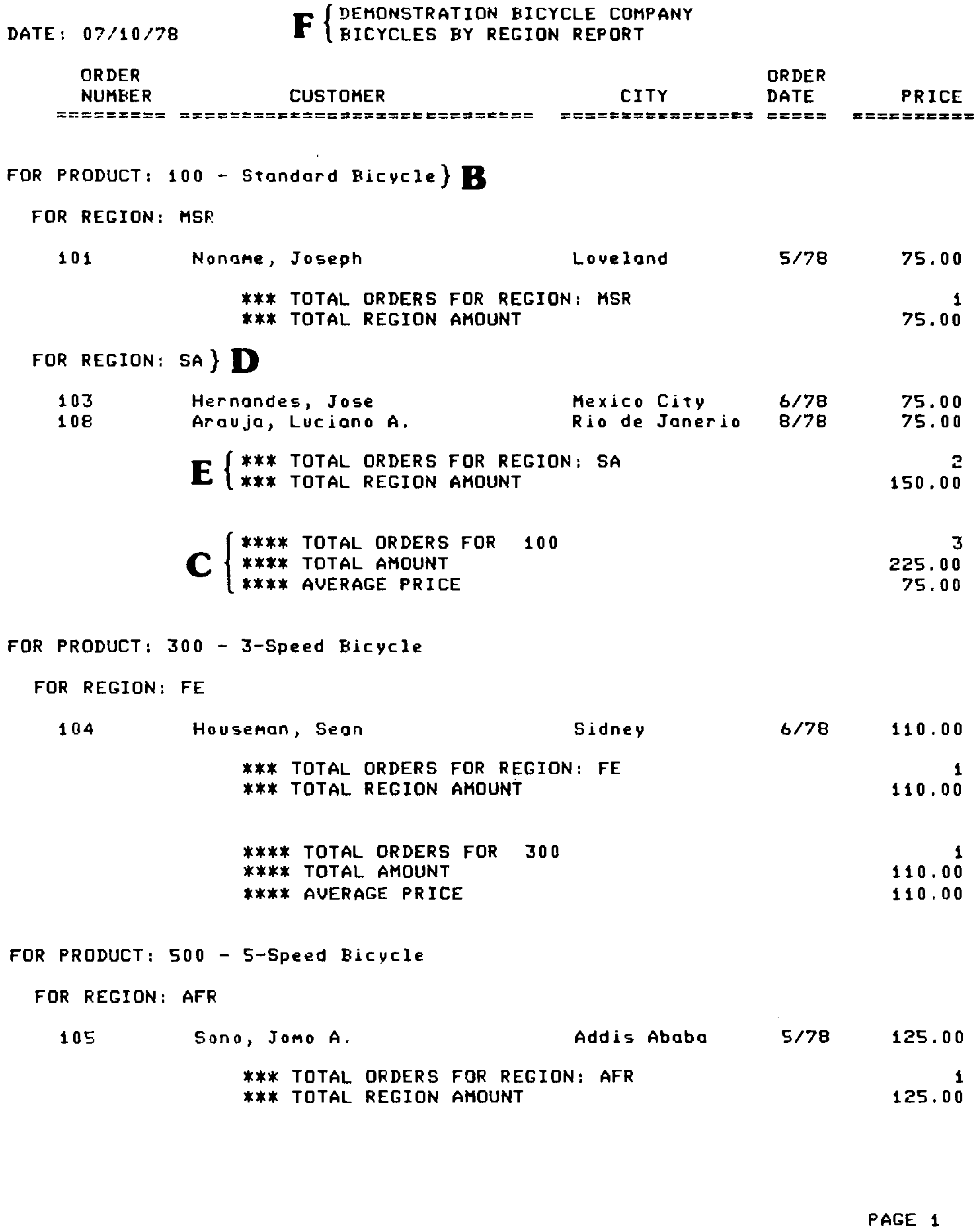
```
  1810          BEGIN REPORT R05
  1820          FOR I=1 TO WFLEN(1)
  1830             READ #1,I;Cnptr,Orptr,Opptr
  1840             IF Cnptr=Lcnptr THEN R40
  1850             Lcnptr=Cnptr
  1860             DBGET (Base$,"CUSTOMER",4,S(*),Lst$,Buff$,C
  nptr)
  1870             IF S(0) THEN R95_dberror
  1880             DBGET (Base$,"OPTION",4,S(*),Lst$,Buff$,Opp
  tr)
  1890             IF S(0) THEN R95_dberror
  1900             DETAIL LINE 1 USING Dl1;Order$,Name$,City$,
  VAL$(Order_date MOD 100)&"/"&VAL$(INT(Order_date/100)),Optio
  n_price
  1910 R40:        NEXT I
  1920          IF NUMDETAIL(0) THEN END REPORT
  1930 !
```

Subprogram Exit

```
1940 R90_exit:!
1950            ASSIGN * TO #1
1960            STOP REPORT
1970            LOAD "RM00"
1980 !
1990 R95_dberror:!
2000            LOAD "SALES",Dberror
2010 !
2020 R98_error:!
2030            OFF ERROR
2040            OFF KEY #
2050            CALL Rwerror(ERRM$,Base$,S(*))
2060            PAUSE
2070            STOP
2080 !
```

Image Section

```
2090 !          ***** PRINT USING IMAGE STATEMENTS *****
2100 !
2110 Ph1:       IMAGE "DATE: ",21A,"BICYCLES BY REGION REPORT"
,/
2120 !
2130 Ph2:       IMAGE 6X,"ORDER",51X,"ORDER"
2140 !
2150 Ph3:       IMAGE 6X,"NUMBER",11X,"CUSTOMER",19X,"CITY",8X
,"DATE",7X,"PRICE"
2160 !
2170 Ph4:       IMAGE 4X,"=========",X,"======================
=======",2X,"================",X,"=====",2X,"==========",/
2180 !
2190 Pt1:       IMAGE /,65X,5A,"PAGE ",3A
2200 !
2210 Hd3:       IMAGE /,"FOR PRODUCT: ",K," - ",K,/
2220 !
2230 Hd6:       IMAGE "  FOR REGION: ",K,/
2240 !
2250 Tr3:       IMAGE /,19X,"**** TOTAL ORDERS FOR ",4D,28X,DD
DDD,/,19X,"**** TOTAL AMOUNT",31X,DDDDCDDD.DD,/,19X,"**** AV
ERAGE PRICE",30X,DDDDCDDD.DD,/
2260 !
2270 Tr6:       IMAGE /,19X,"*** TOTAL ORDERS FOR REGION: ",25
A,DDDDD,/,19X,"*** TOTAL REGION AMOUNT",25X,DDDDCDDD.DD,/
2280 !
2290 Rt1:       IMAGE 2/,19X,"***** GRAND TOTAL OF ORDERS",25X
,7D,/,19X,"***** GRAND AMOUNT",30X,DDDDCDDD.DD,/,19X,"*****
GRAND AVERAGE PRICE",23X,DDDDCDDD.DD
2300 !
2310 Dl1:       IMAGE 4X,11A,31A,17A,6A,DDCDDD.DD
```



```
DATE: 07/10/78          F{DEMONSTRATION BICYCLE COMPANY
                         {BICYCLES BY REGION REPORT

      ORDER                                                      ORDER
      NUMBER            CUSTOMER                     CITY        DATE        PRICE
    ========= ============================ =============== ===== ==========


FOR PRODUCT: 100 - Standard Bicycle} B

  FOR REGION: MSR

    101        Noname, Joseph               Loveland        5/78        75.00

                   *** TOTAL ORDERS FOR REGION: MSR                        1
                   *** TOTAL REGION AMOUNT                             75.00

  FOR REGION: SA} D

    103        Hernandes, Jose              Mexico City     6/78        75.00
    108        Araujo, Luciano A.           Rio de Janerio  8/78        75.00

                E{ *** TOTAL ORDERS FOR REGION: SA                         2
                 { *** TOTAL REGION AMOUNT                            150.00


                 { **** TOTAL ORDERS FOR  100                              3
                C{ **** TOTAL AMOUNT                                  225.00
                 { **** AVERAGE PRICE                                  75.00


FOR PRODUCT: 300 - 3-Speed Bicycle

  FOR REGION: FE

    104        Houseman, Sean               Sidney          6/78       110.00

                   *** TOTAL ORDERS FOR REGION: FE                         1
                   *** TOTAL REGION AMOUNT                            110.00


                   **** TOTAL ORDERS FOR  300                              1
                   **** TOTAL AMOUNT                                  110.00
                   **** AVERAGE PRICE                                 110.00


FOR PRODUCT: 500 - 5-Speed Bicycle

  FOR REGION: AFR

    105        Sono, Jomo A.                Addis Ababa     5/78       125.00

                   *** TOTAL ORDERS FOR REGION: AFR                        1
                   *** TOTAL REGION AMOUNT                            125.00



                                                                    PAGE 1
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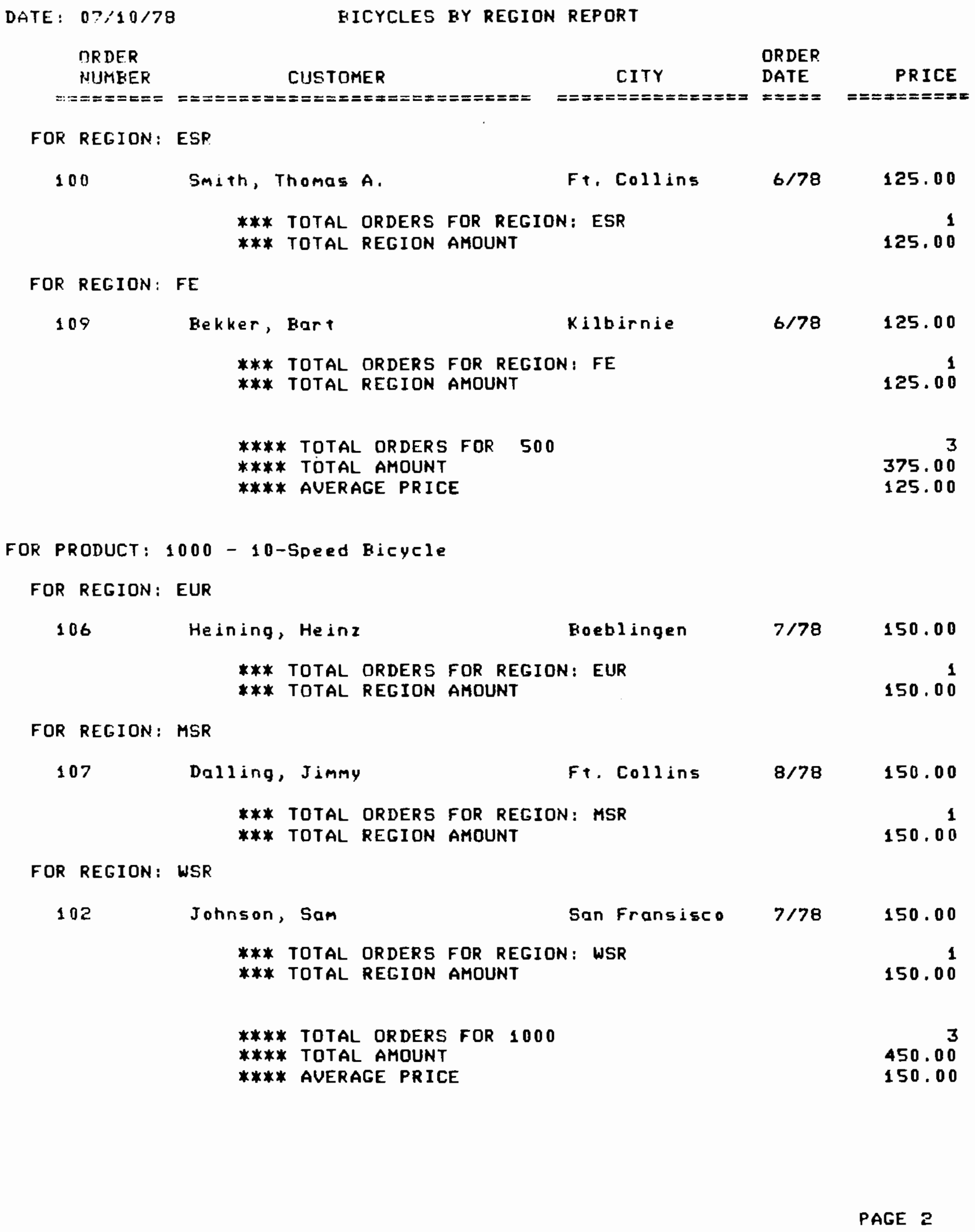

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DATE: 07/10/78              BICYCLES BY REGION REPORT

      ORDER                                                      ORDER
      NUMBER           CUSTOMER                      CITY        DATE        PRICE
    ========= =========================== =============== =====  =========

    FOR REGION: ESR

      100        Smith, Thomas A.             Ft. Collins     6/78      125.00

                   *** TOTAL ORDERS FOR REGION: ESR                          1
                   *** TOTAL REGION AMOUNT                              125.00

    FOR REGION: FE

      109        Bekker, Bart                 Kilbirnie       6/78      125.00

                   *** TOTAL ORDERS FOR REGION: FE                           1
                   *** TOTAL REGION AMOUNT                              125.00


                   **** TOTAL ORDERS FOR  500                                3
                   **** TOTAL AMOUNT                                    375.00
                   **** AVERAGE PRICE                                   125.00


FOR PRODUCT: 1000 - 10-Speed Bicycle

    FOR REGION: EUR

      106        Heining, Heinz               Boeblingen      7/78      150.00

                   *** TOTAL ORDERS FOR REGION: EUR                          1
                   *** TOTAL REGION AMOUNT                              150.00

    FOR REGION: MSR

      107        Dalling, Jimmy               Ft. Collins     8/78      150.00

                   *** TOTAL ORDERS FOR REGION: MSR                          1
                   *** TOTAL REGION AMOUNT                              150.00

    FOR REGION: WSR

      102        Johnson, Sam                 San Fransisco   7/78      150.00

                   *** TOTAL ORDERS FOR REGION: WSR                          1
                   *** TOTAL REGION AMOUNT                              150.00


                   **** TOTAL ORDERS FOR 1000                                3
                   **** TOTAL AMOUNT                                    450.00
                   **** AVERAGE PRICE                                   150.00



                                                                   PAGE 2
```

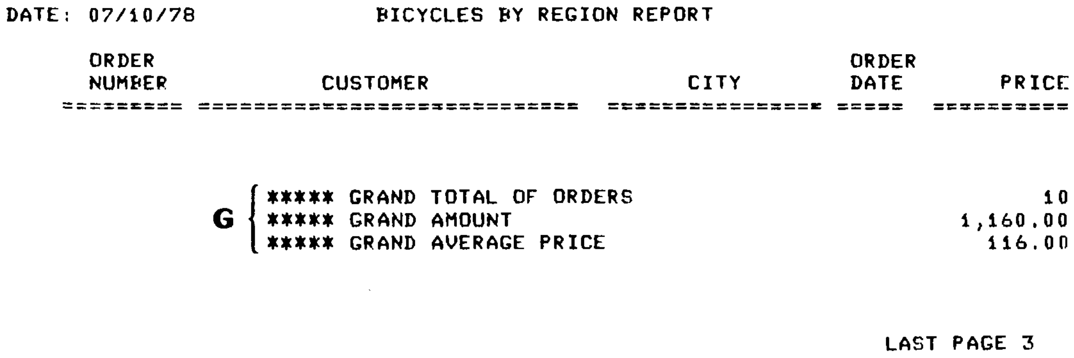

```
DATE: 07/10/78            BICYCLES BY REGION REPORT

       ORDER                                                 ORDER
       NUMBER        CUSTOMER                    CITY        DATE       PRICE
    ========= ============================ ================ =====  ==========


                  ***** GRAND TOTAL OF ORDERS                                10
              G { ***** GRAND AMOUNT                                   1,160.00
                  ***** GRAND AVERAGE PRICE                              116.00


                                                                LAST PAGE 3
```

APPENDIX A

Summary of Statements and Functions

Description Statements

BREAK level WHEN control CHANGES [BY increment]

The BREAK statement establishes the criteria for determining the level break condition.

END REPORT DESCRIPTION

The END REPORT DESCRIPTION statement must be used to end the description section.

GRAND TOTALS ON exp_1[, exp_2...]

The GRAND TOTALS ON statement provides automatic totaling for the entire report.

HEADER level [WITH number LINES][USING $\left\{\begin{array}{c}\text{line id}\\ \text{image string}\end{array}\right\}$[;list]]
[block statements]

The HEADER statement defines what is to be done as a heading when the specified level break occurs. The USING parameters are the same as in a PRINT USING statement.

LEFT MARGIN column

The LEFT MARGIN statement sets the column in which each line of the report will begin.

PAGE HEADER [WITH number LINES][USING $\left\{\begin{array}{c}\text{line id}\\ \text{image string}\end{array}\right\}$ [;list]]
[block statements]

The PAGE HEADER statement defines what is to be done at the top of every page. The USING parameters are the same as in a PRINT USING statement.

PAGE LENGTH lines per page [; blank top ; blank bottom]

The PAGE LENGTH statement specifies the number of lines there are on the page. The number of blank lines to be printed at the top and bottom of the page may also be specified.

PAGE TRAILER [WITH number LINES][USING $\left\{\begin{matrix}\text{line id}\\\text{image string}\end{matrix}\right\}$ [; list]]
[block statements]

The PAGE TRAILER statement defines what is to be done at the bottom of each page. If more than one line is used, that number should be specified. The USING parameter are the same as in a PRINT USING statement.

PAUSE AFTER number PAGES

The PAUSE AFTER statement causes a pause to occur after the specified number of pages has been output. The ⇧ key is pressed to resume output.

PRINT DETAIL IF condition expression

The PRINT DETAIL IF statement causes exceptional detail lines only to be printed without affecting the totaling functions.

REPORT EXIT (exec flag) [WITH number LINES] [USING $\left\{\begin{matrix}\text{line id}\\\text{image string}\end{matrix}\right\}$ [; list]]
[block statements]

The REPORT EXIT statement defines what action is to be taken when the report is prematurely stopped.

[label :] REPORT HEADER [WITH number LINES][USING $\left\{\begin{matrix}\text{line id}\\\text{image string}\end{matrix}\right\}$[; list]]
[block statements]

The REPORT HEADER statement begins the description section. It specifies what is to be done at the beginning of the report. The USING parameters are the same as in a PRINT USING statement.

REPORT TRAILER [WITH number LINES][USING $\left\{\begin{array}{c}\text{line id}\\ \text{image string}\end{array}\right\}$ [; list]]
[block statements]

The REPORT TRAILER statement defines what is to be done at the end of the report. If more than one line is required, that number should be specified. The USING parameters are the same as in a PRINT USING statement.

SUPPRESS PRINT AT level

The SUPPRESS PRINT AT statement specifies the level of headers and trailers that will be printed. Those with equal or higher levels will not be printed.

SUPPRESS PRINT FOR number PAGES

The SUPPRESS PRINT FOR statement causes the first specified number of pages not to be printed.

TOTALS ON exp_1[; exp_2...]

The TOTALS ON statement provides automatic totaling for a break level. It immediately follows a header statement.

TRAILER level [WITH number LINES][USING $\left\{\begin{array}{c}\text{line id}\\ \text{image string}\end{array}\right\}$ [; list]]
[block statements]

The TRAILER statement defines what is to be done as a trailer for the specified break level. If more than one line is required, that number should be specified. The USING parameters are the same as in a PRINT USING statement.

Execution Statements

BEGIN REPORT line id

The BEGIN REPORT statement initiates execution of a report, the description section of which is referenced by the line id.

DETAIL LINE detail [WITH number LINES][USING $\left\{\begin{matrix}\text{line id}\\ \text{image string}\end{matrix}\right\}$ [;list]]

The DETAIL LINE statement causes all break conditions to be tested, totals to be incremented, and data to be printed. If more than one line is required for data output, that number should be specified. The USING parameters are the same as in a PRINT USING statement.

END REPORT

The END REPORT statement causes final trailers to be executed and terminates the Report Writer.

NUMPAGE= expression

The NUMPAGE= statement causes the page counter to take the specified value.

STOP REPORT

The STOP REPORT statement immediately terminates an active report. No trailing statements are printed.

TRIGGER BREAK level

The TRIGGER BREAK statement forces a break condition at the specified level.

TRIGGER PAGE BREAK

The TRIGGER PAGE BREAK statement forces a page to break.

Functions

AVG (level, sequence)

The AVG function returns the average for the specified expression in a TOTALS ON statement. The level of the TOTALS ON statement and the sequential position of the expression are specified.

NUMBREAK (level)

The NUMBREAK function returns the number of times the specified level break condition has occurred.

NUMDETAIL (level)

The NUMDETAIL function returns the number of DETAIL LINE statements that have been executed since the specified level header was last executed.

OLDCV[$] (level)

The OLDCV function returns the value of the control variable as it was in the last level break condition. If the control variable is a string, the $ is appended to OLDCV.

TOTAL (level, sequence)

The TOTAL function returns the running total for the specified expression in a TOTALS ON statement. The level of the TOTALS ON and the sequential position of the expression are specified.

LAST BREAK

The LAST BREAK function returns the value of the last break condition level number detected.

NUMLINE

The NUMLINE function returns the current line number to which output will go.

NUMPAGE

The NUMPAGE function returns the current page number to which output will go.

RWINFO (integer)

The RWINFO function returns Report Writer information.

APPENDIX B

Error Messages

250 The BEGIN REPORT statement does not reference a report header. You should check the line id specified in the parameter and the line id of the line containing the REPORT HEADER statement.

251 A BEGIN REPORT statement was encountered when the Report Writer was already active. The BEGIN REPORT statement must be outside the execution loop.

252 An END REPORT DESCRIPTION statement is missing as a terminator to the description section. This error may occur when the BEGIN REPORT is executed. If the description section precedes the execution section, the Report Writer reads the header statement then skips over any statements until the END REPORT DESCRIPTION statement. If it is missing, this error will occur. you should check the program listing carefully. Every REPORT HEADER statement must have a corresponding END REPORT DESCRIPTION statement.

253 A duplicate description section statement has been encountered. You should check that the level number of each header, trailer or break statement is not duplicated. All other description statements can only be used once in a description section.

254 The number of blank lines in the PAGE LENGTH statement is invalid. This number must be a non-negative integer and may not exceed page length minus 1.

255 Expression in a statement evaluates to an unacceptable value. The acceptable values for each expression can be found in the appropriate chapter.

256 A GRAND TOTALS ON or TOTALS ON is improperly positioned in the description section. These statements must immediately follow the header statement. Only one totals statement is allowed per header.

257 A. A Report Writer operation was requested while a report was not active.
B. An END REPORT statement was not executed before a subprogram terminated.

258 Effective page size is less than three lines. Effective page size is the number of blank lines plus the number of lines required for the page header and page trailer subtracted from the page length.

259 Invalid execution of a description section statement. This may be caused by a description section statement not being within the description section, or by the program branching into the description section.

260 Insufficient space for printed output within the current printer page. Most likely caused because the WITH number LINES parameter was too small for a header, trailer, or detail line.

261 Left margin specified is less than one or greater than the current printer width −1, or is greater than 132.

262 A character string in BREAK WHEN control variable has a length greater than was found at the execution of a BEGIN REPORT. Refer to BREAK WHEN in Chapter 2 for a description of the control variable and its length.

263 A DETAIL LINE statement may not appear within the report description section.

264 The level parameter is out of range for a Report Writer statement. Level must be from zero to nine.

265 TOTALS ON or GRAND TOTALS ON statement is not active for the level requested. A TOTAL or AVG function refers to a level which has no GRAND TOTALS ON or TOTALS ON statement.

266 The sequence parameter is out of range for the GRAND TOTALS ON or TOTALS ON statement at the level requested.

267 The WITH number LINES parameter in a header, trailer, or detail line is greater than the effective page size or is negative.

268 The OLDCV function references a level which has no corresponding break level.

269 The OLDCV function does not match the data types for the control variable in a BREAK WHEN statement at the level requested. You should check that the level specified is correct and check the data types of the control variable.

270 The PRINTER IS statement may not be executed while the Report Writer is active.

271 Report Writer statement may not be used recursively.

APPENDIX C

Memory Requirements

A program which uses Report Writer statements requires a minimum of 220 bytes of User Memory. Additional memory is required for each of the following statements.

Each Statement:	Uses This Number of Bytes:
TOTALS ON	10+(8*number of expressions)
BREAK WHEN	
numeric control variable	28
string control variable	10+(DIM length or 18 if default-rounded up to an even number)
PRINT DETAIL IF	8

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