CREATE

REPORT WRITER

REFERENCE MANUAL

R E L A T E^{TM}/3 0 0 0

Relational Data Base Management System

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INTRODUCTION

This manual describes CREATE, the report writer option available for RELATE™/3000—CRI's Relational Data Base Management System. The RELATE/3000 system is designed to provide data file manipulation capabilities to both technical and non-technical users. CREATE extends this capability, allowing users to quickly create meaningful output formats for data.

CREATE commands are similar in format to RELATE commands and are executed directly from the Command Interpreter or from a user's program through the Host Language Interface routines.

In order to most easily use CREATE, you should be familiar with the use of RELATE/3000.

CAPABILITIES AND FEATURES

CREATE allows the user to quickly create meaningful and attractive reports by using simple commands to define:

* page headings

* page footings

* column headings

* report heading

* report footing

* actions to be performed before or after a specified grouping of data

The major features include:

* The ability to use data directly from most KSAM and MPE, and all RELATE and IMAGE databases.

* The ability to transform and subset the data with the Command Interpreter before reporting.

* Automatic formatting and labeling so that simple reports are generated with very little effort.

* Significant control over the appearance of the data.

* Ability to obtain totals and subtotals of specified data.

* Execution of procedure files to generate reports periodically.

* English language error messages.

* No pre-compilation needed, so the commands can be entered and executed interactively.

* Simple definitions for placement and appearance of headings and footings.

* Report definitions can be stored in EDITOR files and easily modified as required.

SECTION 1

CONCEPTS

NOTATION

The following notation is used to define the syntax of the commands described in this manual:

CAPITALIZED BOLD WORDS   are the names of commands or subroutine names.

CAPITALIZED WORDS   are words that have specific meanings to CREATE. These are also referred to as keywords.

lower-case words   are words that are names or labels to be specified by the user.

[ ] (Square Brackets)   are used to indicate that the enclosed item is optional and may be omitted. The brackets may be nested such that if the inner items are used the outer items must be used.

| | (Vertical Bars)   between items indicate that one of the items **must** be chosen.

... (Ellipses)   indicate that the item immediately preceding may occur once or any number of times in succession.

Commands may be entered in any combination of upper and lower case characters. They are processed as if only upper case characters have been used, except for information placed in double quotes (" "), which is processed exactly as entered. Commands may be up to 1500 characters in length and span up to 100 lines. Each line of the command may have up to 250 characters.

All command names and keywords may be abbreviated to as few characters as are required to uniquely identify the word. When the system is used in batch mode or from the Host Language Interface routines, it is recommended that keywords be spelled out completely. This will ensure that ambiguities will not result because of new features added in subsequent releases of the software.

Punctuation and spacing are crucial when entering commands. Punctuation is performed by delimiters. Delimiters include a space (" "), comma (","), equal sign ("="), semicolon (";"), or left and right parentheses. Only the first space between items is important; extra spaces may be added to improve readability. Each command describes the punctuation required for proper operation. Generally, however keywords are delimited by spaces (or equal signs); lists (field names, user names etc.) are delimited by commas; and keyword sequences delimited by equal signs are separated with semicolons.

SPECIAL CHARACTERS

& (ampersand)

An ampersand entered as the last character on a line indicates that the input for the current line will continue on the next line. The prompt for the continuation line will then be an "&›". In this manner, up to 1500 characters and 100 lines can be used for a single command. If continuation lines are indented for readability, the spaces at the beginning of the line are counted towards the 1500-character limit.

\ (backslash)

A backslash can be used to separate multiple commands, or responses, on a single line. A maximum of 1500 characters may be entered in this way. When multiple responses are entered, and an error occurs, all unused information is ignored and prompting is returned to the terminal.

//

This terminates the current input stream. It is also used to exit the system. If a "//" is actually desired as data it must be enclosed in double quotes as shown.

Control-H

(or Backspace) Characters can be deleted by using either a Control-H or a Backspace. One character is deleted each time the Control-H or backspace is used. If a hard-copy terminal is being used, the carriage will advance one line and then backspace a single position for each character deleted. If a CRT is being used, the cursor will normally backspace one position per character deleted.

Control-Q

The Control-Q resumes output suspended by the Control-S.

Control-S

The Control-S suspends output to the terminal. Output may be resumed by entering a Control-Q.

Control-X

Use Control-X to delete an entire line. The system responds with three exclamation points, a carriage return, and a line feed. No prompt is printed by the system and data or commands may immediately be entered.

Control-Y

A Control-Y can be used to terminate lengthy printout or cancel the execution of a command. The text "‹Control-Y›" is printed when this key is used. If a procedure file is executing when the key is struck, the user will have the opportunity to continue with or terminate the procedure file.

Control-anything

Some users may wish to include control characters within quoted strings for carriage control or similar purposes. CREATE will allow this, but will also count control characters in determining the length of the quoted string. In some cases this may cause misalignment of the remainder of the string. This can sometimes be fixed by including spaces on the opposite end of the string from the control characters.

| (vertical bar)

A vertical bar can be used in an explicitly stated Field Heading. Wherever a single bar occurs, the heading will be split onto an additional line.

^ (caret)   A caret (displayed on some printers and terminals as an
             up-arrow) is used when specifying the output appearance of a
             field to show which positions will actually be occupied by data.

GLOSSARY

break level -- A number used with the BREAK keyword to define a control break.

column heading -- The heading that appears at the top of each column of data in the body of the report. Each field usually has its own column.

control break -- A field given a BREAK keyword in the FIELD command is known as a control field. When a record is read and the value of the control field is different from what it was in the last record, a control break is said to have occurred. See the CONTROL BREAKS section in Appendix E for more information.

data -- Information of any kind. People's names are data. Salaries are data.

default -- If the user does not specify a value, size, or number for something, CREATE automatically chooses a value, size, or number. This is the default.

field heading -- Same as column heading.

footspec -- A footing specification. Consists of one or more parameters defining the contents, the appearance, and the position on the page of one item in a footing. See the FOOTING SPECIFICATION section for more information.

group -- When several records in a file have the same value for one field, then the records form a group based on that field.

headeritem -- A specific item to be printed in a heading or footing. This may be text enclosed in quotes, a fieldname, or a summary. See the HEADER ITEM section for more information.

headspec -- A heading specification. Consists of one or more parameters defining the contents, the appearance, and the position on the page of one item in a heading. See the HEADING SPECIFICATION section for more information.

picture -- A description of how data will appear on a report. A picture is a string of characters enclosed in quotes (e.g., "$ ^^^.^^"). Carets denote the positions into which data will be placed. See the FORMAT SPECIFICATION section for more information.

summary -- $TOTAL, $AVERAGE, or $COUNT.

WHAT IS A REPORT?

A report is neatly formatted data. A report may be only one page long or continue onto several pages, depending on the quantity and format of the data.

CREATE allows nearly every aspect of a report to be defined by the user. Normally, however, CREATE makes assumptions concerning what a report should look like, so the user can generate a report with a minimum number of commands.

There are nine CREATE commands available to the user:

FIELDS — lists and describes the data that will appear in the body of the report;

REPORT HEADING — describes how the first page(s) of the report will look;

REPORT FOOTING — describes how the last page(s) of the report will look;

PAGE HEADING — describes what to print at the top of each new page;

PAGE FOOTING — describes what to print at the bottom of each new page;

GROUP HEADING — describes what to print before each new grouping of data;

GROUP FOOTING — describes what to print after each new grouping of data;

REPORT OPTIONS — changes the default spacing within the report;

LIST REPORT — lists previously entered report commands.

In order to generate a report, only the FIELDS command is required, listing the names of fields to be printed. CREATE will place the data in columns and provide headings for the columns with no further input from the user, although the user has the ability to redefine these. Beyond this, any one or more of the other commands may be used to enhance the report's appearance.

Only one of each command type will be used in a report (for GROUP commands, there may be as many GROUP HEADINGS and FOOTINGS as there are BREAK levels defined). If more than one command of the same type is entered, only the latest one will be used.

In addition, two RELATE commands also function in CREATE:

REDO — allows changes to previous CREATE commands.

NOTE — documents the report.

See the RELATE manual for information on how to use these commands.

COMMAND AND PARAMETER ORDER

CREATE uses a non-procedural language. This means that:

   a)   commands can be entered in any order.

   b)   parameters within any detailed specification may be in any order.

The user may enter the FIELDS command first and then the PAGE HEADING command, or vice-versa, and the resulting report will be the same in both cases.

Within each detailed specification (e.g., headspec, footspec, fieldspec, formatspec), the order of the parameters is unimportant. CREATE uses the parameters according to their definition and not according to their order. For example, "TAB" in the FIELD SPECIFICATION is defined as "the position in a line at which the field should begin printing." Therefore, CREATE doesn't care whether the TAB parameter is entered before or after the name of the field.

Another example, in the HEADING SPECIFICATION section, is the NEWLINE parameter. Its definition is "how many linefeeds to perform before printing the headeritem." Therefore, CREATE doesn't care whether NEWLINE is before or after the headeritem.

The only order that is important to CREATE is which specification comes first in a command, because that is how the order of printing is determined. For example, in the FIELDS=(fieldspec1), (fieldspec2), (fieldspec3) command, CREATE will first evaluate and print fieldspec1, then fieldspec2, then fieldspec3.

The most difficult aspect of generating a report is determining where the data will come from. Using CREATE, a report can be generated with any data that can be gathered into one file or path, using RELATE's OPEN FILE, SELECTion, or VIEW commands.

One file without SELECT

The simplest case is where all of the information needed for the report is located in a single file. The file can be of any type that RELATE can access: RELATE, MPE, KSAM, or IMAGE. In this case, you need only open the file and then enter CREATE using the REPORT command. If the order of the data will be important to your report, you will need to execute a SET INDEX command after opening the file.

One file using SELECT

In some cases, most of the data will be in one file but there will be some things that do not appear in any file. One example would be a file containing price-per-unit and quantity, but not total price. Another example would be a file containing city, state, and zip code in separate fields that you would like to have appear as one field (e.g., "COLUMBUS, OH 00000"). Fortunately, the SELECT command in RELATE has the capability to create these and many other fields for you. The first example would be solved by multiplying the two fields together; the second, with the $CONCAT function.

Most of the flexibility of CREATE depends on the data that is available to it. We suggest that you thoroughly familiarize yourself with the SELECT command and all its associated functions in order to take advantage of the powerful capabilities of CREATE.

Multiple files with single join

In many cases the information needed for a report is stored in more than one file. RELATE can easily join two or more files together with the SELECT command. CREATE automatically determines what file a fieldname belongs to, so no file qualifiers are needed (or allowed) on fieldnames in CREATE. The only case where this may present difficulty is when two files have fields with the same name but different contents. In this case, you will need to use the SELECT or MODIFY FIELD command to temporarily give unique names to the fields.

For example, you may have two files, one (BCUST) containing a customer billing address and another (SCUST) containing the customer shipping address. You may have thought ahead and called your field BADDRESS in the first file and SADDRESS in the second file. More likely, however, they are called ADDRESS in both files. In this case, you would use one of the following methods to temporarily rename the fields:

1. SELECT BADDRESS=BCUST.ADDRESS, SADDRESS=SCUST.ADDRESS

2. SET PATH BCUST
   MODIFY FIELD ADDRESS; NAME=BADDRESS
   SET PATH SCUST
   MODIFY FIELD ADDRESS; NAME=SADDRESS

Intrinsic to your ability to join files together for CREATE is your understanding of the WHERE clause on a SELECT command. The WHERE clause is simple to use but important. An inappropriate or absent WHERE clause could generate incorrect or duplicate data.

Multiple files with SELECT functions

As with a single file, combinations of data can also be obtained using the functions available in the SELECT command. Again, if the order of the data is important to your report, you must be certain that the system is looking at the data in the proper order. In a join operation, this is done with a BY clause on the SELECT command instead of the SET INDEX command which is used on a single file.

In any case, by using the SELECT command the data can be:

1) Consolidated through the use of aggregates.

2) Obtained from many related sources at one time.

3) Transformed through the use of expressions which can include trigonometric, logarithmic, date and character functions.

4) Subset to display only what is relevant.

EXAMPLES:

To produce a simple report on the contents of a single file, we need only to open the file. Note that originally the data is not sorted by CNO, the customer number. The SET INDEX command sets a previously defined sorting sequence by CNO. The report will then be sorted by CNO. First, use the SHOW command to see what fields are in the file and the PRINT command to see the contents of the file.

```
)OPEN FILE INVDET
)SHOW

FILE NAME              =INVDET.DOC81.RDB

                T
                Y  PRINT   INT
NAME            P  LEN    SIZE

CNO             R    6      2 W
INVNO           A    8      8 B
LINE            I    3      1 W
PART            A    8      8 B
DESC            A   15     16 B
PRICE           R    9.2    2 W
QTY_O           I    4      1 W
QTY_S           I    4      1 W
UM              A    2      2 B


PRINT LINE WIDTH = 73 CHARACTERS.
```

The fields contain the following information:

CNO	Customer number
INVNO	Invoice number
LINE	Line number on invoice
PART	Part number
DESC	Description of part
PRICE	Price per unit
QTY_O	Quantity (number of units) ordered
QTY_S	Quantity shipped
UM	Unit measurement

```
)PRINT CNO.INVNO.PART.PRICE.QTY_S

$LINE      CNO  INVNO      PART              PRICE  QTY_

      1  100200  5237      A98-425          34.50   100
      2  100200  5237      A57-620           8.25    30
      3  103400  5238      W09-145        1490.95    10
      4  103500  5239      A57-620           8.25    30
      5  103500  5239      A57-192           6.50    30
      6  103500  5239      A57-421          19.25    70
      7  103400  5240      W09-145X        795.00     4
      8  152700  5241      M93-446           6.47   200
      9  152700  5241      A87-011          40.25    40
     10  152700  5242      A87-103          40.25    20
     11  152700  5242      D00-301          22.15    40
     12  152700  5242      D45-642         310.50     5
     13  103400  5243      H03-492           6.23    35

13 LINES PRINTED.
)SET INDEX 1
INDEX #1 IS NOW THE CURRENT INDEX.
)PRINT CNO.INVNO.PART.PRICE.QTY_S

   CNO  INVNO      PART              PRICE  QTY_

100200  5237      A98-425          34.50   100
100200  5237      A57-620           8.25    30
103400  5238      W09-145        1490.95    10
103400  5240      W09-145X        795.00     4
103400  5243      H03-492           6.23    35
103500  5239      A57-620           8.25    30
103500  5239      A57-192           6.50    30
103500  5239      A57-421          19.25    70
152700  5241      M93-446           6.47   200
152700  5241      A87-011          40.25    40
152700  5242      A87-103          40.25    20
152700  5242      D00-301          22.15    40
152700  5242      D45-642         310.50     5

13 LINES PRINTED.
```

Now we will use the SELECT command to create some fields that do not already exist in the file. GTOT will equal PRICE multiplied by QTY_S and RTOT will be the running total of QTY_S. The BY clause will ensure that the data will again be in sorted order.

```
)SELECT @,GTOT=PRICE*QTY_S,RTOT=$RTOTAL(QTY_S) &
&)    BY CNO
)PRINT CNO,INVNO,PART,PRICE,QTY_S,GTOT,RTOT
```

CNO	INVNO	PART	PRICE	QTY_	GTOT	RTOT
100200	5237	A98-425	34.50	100	3450.00	100
100200	5237	A57-620	8.25	30	247.50	130
103400	5238	W09-145	1490.95	10	14909.50	140
103400	5240	W09-145X	795.00	4	3180.00	144
103400	5243	H03-492	6.23	35	218.05	179
103500	5239	A57-620	8.25	30	247.50	209
103500	5239	A57-192	6.50	30	195.00	239
103500	5239	A57-421	19.25	70	1347.50	309
152700	5241	M93-446	6.47	200	1294.00	509
152700	5241	A87-011	40.25	40	1610.00	549
152700	5242	A87-103	40.25	20	805.00	569
152700	5242	D00-301	22.15	40	886.00	609
152700	5242	D45-642	310.50	5	1552.50	614

```
13 LINES PRINTED
```

We will now do a simple join of two files. Both files have CNO and INVNO in them for reference between the files. Notice that the data will not be sorted because we do not include a BY clause on the SELECT command.

```
)SELECT
DE-SELECTED.   THE CURRENT PATH IS "INVDET".
)OPEN FILE INVMAS
```

Use the SHOW command to see what fields are in this file.

```
)SHOW
```

FILE NAME   =INVMAS.DOC81.RDB

NAME	T Y P	PRINT LEN	INT SIZE
CNO	R	6	2W
INVNO	A	8	8B
NAME	A	20	20B
ADDRESS	A	15	16B
CITY	A	10	10B
ST	A	2	2B
ZIP	A	6	6B
PO	A	5	6B
D_ORD	R	8	2W
D_INV	R	8	2W
REMARKS	A	30	30B
DISC	R	9.2	2W
FREIGHT	R	9.2	2W
SERVICE	R	9.2	2W
C_TAX	R	7.2	2W
S_TAX	R	7.2	2W
TERM_P	R	5.2	2W
TERM_D	I	3	1W

PRINT LINE WIDTH = 190 CHARACTERS.

```
)SELECT INVDET.@,INVMAS.@ &
&)    WHERE INVDET.CNO=INVMAS.CNO AND INVDET.INVNO=INVMAS.INVNO
)PRINT CNO,INVNO,PART,D_INV,PRICE,QTY_S
```

CNO	INVNO	PART	D_INV	PRICE	QTY_
100200	5237	A98-425	8/15/82	34.50	100
100200	5237	A57-620	8/15/82	8.25	30
103400	5238	W09-145	8/15/82	1490.95	10
103500	5239	A57-620	8/16/82	8.25	30
103500	5239	A57-192	8/16/82	6.50	30
103500	5239	A57-421	8/16/82	19.25	70
103400	5240	W09-145X	8/18/82	795.00	4
152700	5241	M93-446	8/18/82	6.47	200
152700	5241	A87-011	8/18/82	40.25	40
152700	5242	A87-103	8/18/82	40.25	20
152700	5242	D00-301	8/18/82	22.15	40
152700	5242	D45-642	8/18/82	310.50	5
103400	5243	H03-492	8/22/82	6.23	35

```
13 LINES PRINTED
```

We will now join these two files again, but this time we will sort them by CNO and INVNO (using the BY clause), recreate the GTOT field, and concatenate ADDRESS and STate together with a comma as a separator.

```
)SELECT
DE-SELECTED.  THE CURRENT PATH IS "INVMAS".
)SELECT INVDET.@,INVMAS.@,GTOT=INVDET.PRICE*INVDET.QTY_S,&
&)   LOC=$CONCAT(INVMAS.ADDRESS,", ",INVMAS.ST) &
&)   BY CNO,INVNO &
&)   WHERE INVMAS.CNO=INVDET.CNO AND INVMAS.INVNO=INVDET.INVNO
)PRINT CNO,LOC,INVNO,PART,GTOT
```

CNO	LOC	INVNO	PART	GTOT
100200	832 WILDWOOD DR, CO	5237	A98-425	3450.00
100200	832 WILDWOOD DR, CO	5237	A57-620	247.50
103400	PO BOX 827, WI	5238	W09-145	14909.50
103400	PO BOX 827, WI	5240	W09-145X	3180.00
103400	PO BOX 827, WI	5243	H03-492	218.05
103500	18A MAIN ST, TX	5239	A57-620	247.50
103500	18A MAIN ST, TX	5239	A57-192	195.00
103500	18A MAIN ST, TX	5239	A57-421	1347.50
152700	8282 W. MAIN, TX	5241	M93-446	1294.00
152700	8282 W. MAIN, TX	5241	A87-011	1610.00
152700	8282 W. MAIN, TX	5242	A87-103	805.00
152700	8282 W. MAIN, TX	5242	D00-301	886.00
152700	8282 W. MAIN, TX	5242	D45-642	1552.50

```
13 LINES PRINTED
```

When Does A Newpage Occur?

CREATE will not split a group heading, a group footing, or a single record of data between two pages. When there is not enough room left on a page for the next entity to be printed, CREATE automatically prints the page footing, outputs a formfeed, and prints the page heading.

If HEADDATA or FOOTDATA are specified in the REPORT OPTIONS command, CREATE will verify that there is enough room on the page for the requested number of records in addition to the heading or footing. If there isn't room, a formfeed occurs and the page heading and footing are printed before printing the heading or data.

CREATE always places the page footing at the lowest point possible on the page unless the LINE parameter is used to redefine its location.

If a formfeed occurs between control breaks, all suppressed fields will be printed on the first line of the new page.

A newpage can be requested by the user in REPORT and GROUP headings and footings with the NEWPAGE parameter.

Page Size

CREATE, by default, leaves 3 blank lines at the top and bottom of each page (except on CRTs, which have no blank lines at top and bottom). This can be changed with the $SPACE_B and $SPACE_T parameters in RELATE's TERMINAL command. (See the TERMINAL command in the RELATE Reference Manual).

By default, no spaces are left at either side of the page. This can be altered with the MARGIN keyword in the REPORT OPTIONS command.

The length of the page is determined by the RELATE default or by the $LINES parameter in RELATE's TERMINAL command.

The width of the page is determined by the default terminal width or by the $WIDTH parameter in RELATE's TERMINAL command. If the report is sent to the printer and $WIDTH has not been set, the width is assumed to be 132 characters.

Column Formats

CREATE, by default, assigns headings for the columns of data and spacing between the columns. See Appendix C, FIELD HEADINGS AND COLUMN WIDTH, for details on what is, and can be, done.

KEYWORDS

The following words are keywords (sometimes called reserved words) used by CREATE. The user should avoid giving fields names that duplicate these keywords. If fields are given these names, CREATE may assume that any references to these words indicate the field and not the keyword.

BREAK	NEWPAGE
DRAWLINE	NOHEADING
FIELDHEADS	NOFOOTING
FOOTDATA	NOPRINT
FORMAT	OPTIONAL
HEADDATA	OVERLINE
HEADING	POSITION
JUSTIFY	RESETPAGE
LINE	SUPPRESS
NEWLINE	TAB
	UNDERLINE

SECTION 2

C O M M A N D S

REPORT, GO and //

In order to access any of the CREATE commands, the user must first be using RELATE/3000. Once a file has been chosen to report on (see Selecting Data For the Report), the REPORT command can be entered in the following format:

[range] REPORT[:P][:I] [USING procfile[;SHOW]] [modifiers] [FOR condition]

range
: Optional. If used, only records in the specified range will be used in the report. See the RANGE section in the RELATE manual.

REPORT
: Required. Tells RELATE to enter CREATE and get ready to process report commands.

:P
: Optional. If used, the report will be generated on the printer (or whatever device RDBLIST is associated with. Several reports can be placed together into the same output spoolfile with the OPEN RDBLIST and CLOSE RDBLIST commands found in the RELATE manual).

  If RDBLIST is assigned to a disc file which has no carriage control, formfeeds will be indicated by the string "$$NEWPAGE$$" instead of by linefeeds.

:I
: Optional. If used and REPORT is running from a procedure file, commands will be read from the same procedure file. Otherwise, the user will be prompted for input at the terminal.

USING procfile
: Optional. If used, CREATE will read commands from the EDITOR file called "procfile."

SHOW
: Optional. Shows the commands as they execute.

modifiers
: Optional. Can be any one or more of the following separated by semicolons (";"):

  COPIES=copies
  : If specified, this keyword must be followed by an integer indicating how many times the report is to be printed.

  PAGES=range
  : If specified, this keyword must be followed by an integer indicating the physical page numbers of the report to be printed. This will not always correspond to the printed page number if a RESETPAGE is used.

  WAIT
  : If used, CREATE will pause at the bottom of each page and wait for RETURN to be pressed. This is most useful when the user needs to insert a new sheet of paper for each page.

FOR condition
: Optional. If used, only records satisfying the specified condition will be used in the report. See the EXPRESSION EVALUATION section of the RELATE manual for more information.

The CREATE prompt is a greater-than sign (">"). When this appears on the terminal, the system is waiting for a CREATE command. One command can be extended onto up to 100 lines and 1500 characters by typing "&" at the end of a line. The system will prompt "&>" to show that a continuation is expected. If a continuation line is indented for readability, the spaces at the beginning of the line are included in the 1500 character command limit.

At any point, part or all of a report may be entered from an editor file by enclosing the file's name in braces ({ }). If the user wishes to see the commands as they execute, ";SHOW" should be appended to the filename within the braces.

If an error occurs in a command, the system will print an error message and again prompt ">". The command will need to be reentered. See the REDO command in the RELATE manual for an easy way to do this.

The GO command is the system's signal that the report has been completely defined. CREATE will process all of the information it has been given and then ask the user to align the paper and press RETURN. The report will begin printing. If a procfile was used and GO was not included in the procfile, the system will return to an interactive prompt (">") after it has processed all of the commands in the file.

After the report is finished, the user is automatically returned to the RELATE main process. To generate another report, the above steps must be repeated. CREATE will remember all of its old command numbers, however, so the REDO can be used if desired to re-enter commands from a previous report. Use the LIST REPORT command to review the old commands.

When a "//" is entered in response to ">", the system halts processing of the report, clears any information it may have begun, and returns to the main RELATE process.

FIELDS[=(fieldspec)[,(fieldspec)[,...]]]

Defines the fields or text to be used in the body of the report. This command is the only one required to generate a report.

fieldspec   Optional. The specification describing a field or text to appear in the body of the report. Each fieldspec must contain either a fieldname or text enclosed in quotes. It may also include several parameters describing the appearance and positioning of the field and the field's heading. Multiple fieldspecs may be given. In order to generate a report, at least one fieldspec must be given.

If fieldspecs are not specified, this command clears any existing FIELDS.

Besides a fieldname or text, each fieldspec may contain keywords dealing with the field's:
        heading: HEADING=(headspec), NOHEADING
        print format: FORMAT=(formatspec), NOPRINT, OPTIONAL
        position on page: TAB=tab, LINE=line
        break level: BREAK=num, SUPPRESS=num
See the FIELD SPECIFICATION section for detailed information.

Fields will be printed in the order their fieldspecs are specified. Unless the print position of a field is stated explicitly with a TAB parameter, or the BETWEEN keyword is used in the REPORT OPTIONS command, two spaces will be left between columns of data.

If a PICTURE is not specified in the FORMAT specification the column width is the wider of the field heading or the print length. If a PICTURE is specified, the column width is the size of the PICTURE. More information on this subject is given in the FIELD HEADINGS AND COLUMN WIDTHS Appendix.

If a field appears more than once in a report and a summary of that field is requested, CREATE will assume that the first appearance of that field is the one to be summarized.

If text is given instead of a fieldname, FORMAT may not be specified. The default heading for text is NOHEADING.

EXAMPLES:

When a simple PRINT command is used, the headings for the fields default to the fieldname. In addition, if the field is not as wide as the fieldname, the heading is truncated.

```
)OPEN FILE INVDET
)PRINT CNO,INVNO,LINE,PART,DESC,QTY_S

$LINE        CNO INVNO   LIN PART      DESC            QTY_

     1  100200 5237      1 A98-425   8x11 PAPER       100
     2  100200 5237      2 A57-620   PRINTER RIBBONS   30
     3  103400 5238      1 W09-145   X24 TERMINAL      10
     4  103500 5239      1 A57-620   PRINTER RIBBONS   30
     5  103500 5239      2 A57-192   PRINTER RIBBONS   30
     6  103500 5239      3 A57-421   RIBBON CARTRIDG   70
     7  103400 5240      1 W09-145X  REBUILT TERMINA    4
     8  152700 5241      1 M93-446   PRINTOUT BINDER  200
     9  152700 5241      2 A87-011   15x11 PAPER       40
    10  152700 5242      1 A87-103   15x11 PAPER UNL   20
    11  152700 5242      2 D00-301   TAPE LABELS       40
    12  152700 5242      3 D45-642   MAG TAPE           5
    13  103400 5243      1 H03-492   RS-232 CONNECT    35

13 LINES PRINTED.
```

When CREATE is used, field headings can be stated explicitly. In addition, fieldnames are not truncated even if they are wider than the field (as in QTY_S and INVNO). However, if a PICTURE is given, headings will be truncated to fit the field width (as in LNUM and CUST NUMBER). Notice that the fieldname LINE is a KEYWORD in CREATE, so the SELECT command must be used to give it a new name.

```
)SELECT @,LNUM=LINE
)REPORT
>FIELDS=(CNO;FORMAT=(PICTURE="↑↑↑↑↑↑");HEADING=("CUST NUMBER")),&
&>      (INVNO;HEADING=("INVOICE")),&
&>      (LNUM;FORMAT=(PICTURE="↑")),&
&>      (PART),&
&>      (DESC;HEAD=("DESCRIPTION")),&
&>      (QTY_S)
>GO
```

CUST N	INVOICE	L	PART	DESCRIPTION	QTY_S
100200	5237	1	A98-425	8x11 PAPER	100
100200	5237	2	A57-620	PRINTER RIBBONS	30
103400	5238	1	W09-145	X24 TERMINAL	10
103500	5239	1	A57-620	PRINTER RIBBONS	30
103500	5239	2	A57-192	PRINTER RIBBONS	30
103500	5239	3	A57-421	RIBBON CARTRIDG	70
103400	5240	1	W09-145X	REBUILT TERMINA	4
152700	5241	1	M93-446	PRINTOUT BINDER	200
152700	5241	2	A87-011	15x11 PAPER	40
152700	5242	1	A87-103	15x11 PAPER UNL	20
152700	5242	2	D00-301	TAPE LABELS	40
152700	5242	3	D45-642	MAG TAPE	5
103400	5243	1	H03-492	RS-232 CONNECT	35

REPORT HEADING[=(headspec)[,(headspec)[,...]]]

Defines the information to be printed and actions to be taken at the beginning of the report.

headspec   Optional.   The specification for one item to appear in the heading. This specification might contain only text to be printed or the name of a field whose contents are to be printed, or it might contain several parameters describing the appearance and positioning of part of the heading.   Multiple headspecs may be given.

If no headspecs are given, this command clears any existing REPORT HEADING.

Each headspec may contain no more than one item to be printed:
        text, a fieldname, or FIELDHEADS
and zero or more keywords about the item's:
        print format: FORMAT=(formatspec)
        position on the page: NEWLINE, either POSITION=pos or TAB=tab, LINE=line
        page control: NEWPAGE, RESETPAGE
        lines to be printed: UNDERLINE, OVERLINE, DRAWLINE
See the HEADING SPECIFICATION section for detailed information.

If the last headspec in the REPORT HEADING specifies NEWPAGE and nothing else, a formfeed will occur (with no PAGE FOOTING), and the PAGE HEADING will be placed at the top of the following page.

In all other cases, the report will begin on the same page as the last headspec with no intervening PAGE HEADING.

PAGE HEADINGs and FOOTINGs will not occur before or during a REPORT HEADING.

REPORT HEADING

EXAMPLES:

Open the INVMAS file and print the contents. We want a list of all different customer names and addresses, so we use the SELECT command to choose only one line for each customer number.

```
)OPEN FILE INVMAS
)SET INDEX 1
INDEX #1 IS NOW THE CURRENT INDEX.
)PRINT CNO,NAME,ADDRESS

   CNO NAME                    ADDRESS

100200 AMERICAN POLYMERS       832 WILDWOOD DR
103400 NORTHLANDERS INC.       PO BOX 827
103400.NORTHLANDERS INC.       PO BOX 827
103400 NORTHLANDERS INC.       PO BOX 827
103500 SUTO TRAVEL ADVISORS 18A MAIN ST
152700 UNITED VIDEO CORP.      8282 W. MAIN
152700 UNITED VIDEO CORP.      8282 W. MAIN

7 LINES PRINTED.
)SELECT @ UNIQUE BY CNO
```

The default placement for any item in any heading is in the center of the page. We include the NEWPAGE at the end of this heading to move the report output onto the next page. If NEWPAGE was not included, the report would start on the same page just below the "PART NUMBER" line.

```
)TERMINAL $WIDTH=65
)REPORT
>REPORT HEADING=(NEWLINE=25;"BILLING ADDRESSES FOR 1982"),&
&>               (NEWLINE=2;"Peterson Equipment Company"),&
&>               (LINE=45;"REPORT NUMBER 10832-A";POS=LEFT),&
&>               ("c1982 P.E.C.";POS=RIGHT),&
&>               (NEWPAGE)
>FIELDS=(NAME),(ADDRESS),(CITY),(ST),(ZIP)
>GO
```

BILLING ADDRESSES FOR 1982

Peterson Equipment Company

REPORT NUMBER 10832-A   c1982 P.E.C.

REPORT HEADING

NAME	ADDRESS	CITY	ST	ZIP
AMERICAN POLYMERS	832 WILDWOOD DR	ASPEN	CO	80237
NORTHLANDERS INC.	PO BOX 827	GREEN BAY	WI	60444
SUTO TRAVEL ADVISORS	18A MAIN ST	DALLAS	TX	75230
UNITED VIDEO CORP.	8282 W. MAIN	GALVESTON	TX	74437

REPORT FOOTING[=(footspec)[,(footspec)[,...]]]

Defines the information to be printed and actions to be taken at the end of the report.

footspec   Optional.   The specification for one item to appear in the footing. This specification might contain only text to be printed, the name of a field whose contents are to be printed, or a summary to be calculated, or it might contain several parameters describing the appearance and positioning of part of the footing.

If no footspecs are given, this command clears any existing REPORT FOOTING.

Each footspec may contain no more than one item to be printed:
       text, a fieldname, or a summary function
and zero or more keywords about the item's:
       print format: FORMAT
       position on the page: NEWLINE, POSITION or TAB, LINE
       page control: NEWPAGE, RESETPAGE
       lines to be printed: UNDERLINE, OVERLINE, DRAWLINE
See the FOOTING SPECIFICATION section for detailed information.

If the first footspec in the REPORT FOOTING specifies NEWPAGE, then a page footing will be placed on the current page, and then the REPORT FOOTING will commence on the following page with no page heading.

If the first footspec in the REPORT FOOTING does not specify NEWPAGE, then the report footing will begin on the current page if there is room.   If there is not room, a PAGE FOOTING will be placed on the current page, a PAGE HEADING (without field headings) will be placed on the following page, and then the REPORT FOOTING will be processed.

PAGE HEADINGs and FOOTINGs will not occur during or after the REPORT FOOTING.

REPORT FOOTING

EXAMPLES:

We would like a list of the price per item, the quantity of items shipped, and the total amount owed to us. The price multiplied by quantity is not included in the file, so the SELECT command allows us to define this field.

```
)OPEN FILE INVDET
)SELECT *,GTOT=QTY_S*PRICE
```

The default placement for footing items is in the center of the page unless it is a summary, in which case it automatically aligns with its field.

```
)TERMINAL $WIDTH=65
)REPORT
>REPORT FOOTING=(NEWLINE=2;"TOTAL BILLING";TAB=20),&
&>                (&TOTAL(GTOT)),&
&>                (NEWLINE=2;"END OF REPORT")
>FIELDS=(PART),(DESC),(PRICE),(QTY_S),(GTOT)
>GO
```

PART	DESC	PRICE	QTY_S	GTOT
A98-425	8x11 PAPER	34.50	100	3450.00
A57-620	PRINTER RIBBONS	8.25	30	247.50
W09-145	X24 TERMINAL	1490.95	10	14909.50
A57-620	PRINTER RIBBONS	8.25	30	247.50
A57-192	PRINTER RIBBONS	6.50	30	195.00
A57-421	RIBBON CARTRIDG	19.25	70	1347.50
W09-145X	REBUILT TERMINA	795.00	4	3180.00
M93-446	PRINTOUT BINDER	6.47	200	1294.00
A87-011	15x11 PAPER	40.25	40	1610.00
A87-103	15x11 PAPER UNL	40.25	20	805.00
D00-301	TAPE LABELS	22.15	40	886.00
D45-642	MAG TAPE	310.50	5	1552.50
H03-492	RS-232 CONNECT	6.23	35	218.05

                 TOTAL BILLING   29942.55

                    END OF REPORT

PAGE HEADING[=(headspec)[,(headspec)[,...]]]

Defines the information that will be printed (or actions that will be performed) at the top of every page (see exceptions below).

headspec   Optional   The specification for one item to appear in the heading. This specification might contain only text to be printed, or the name of a field whose contents are printed, or it might contain several parameters describing the appearance and positioning of part of the heading.   Multiple headspecs may be given.

If no headspecs are given, this command clears any existing PAGE HEADING.

Each headspec may contain no more than one item to be printed:
         text, a fieldname, FIELDHEADS, or $PAGE
and zero or more keywords about the item's:
         print format: FORMAT=(formatspec)
         position on page: NEWLINE, either POSITION=pos or TAB=tab, LINE=line.
         lines to be printed: UNDERLINE, OVERLINE, DRAWLINE
See the HEADING SPECIFICATION section for detailed information.

Each page heading will begin on the first available line of the page.   By default, CREATE leaves 3 blank lines at the top of each page.   Therefore, the first available line is usually the fourth line of the page.   Further information on this can be found in the PAGE FORMAT section.

If a REPORT HEADING is specified, the PAGE HEADING may not occur on one or more of the initial pages of the report (see REPORT HEADING for details).

If a REPORT FOOTING is specified, the PAGE HEADING may not occur on one or more of the final pages of the report (see REPORT FOOTING for details).

PAGE HEADING

EXAMPLES:

)OPEN FILE INVMAS

The default placement for any heading item is the center of the page. The language is non-procedural, so the placement of parameters for any single item is unimportant. For example, if "TAB=58" is placed before "PAGE" instead of after it, the results will be exactly the same.

```
)TERMINAL $WIDTH=65
)REPORT
>PAGE HEADING=("Peterson Equipment Company";POS=LEFT),&
&>            ("PAGE";TAB=58),&
&>            ($PAGE;POS=RIGHT),&
&>            ("OUTSTANDING FREIGHT CHARGES";NEWLINE=2),&
&>            (NEWLINE=2)
>FIELDS=(CNO),(NAME),(INVNO),(FREIGHT)
>GO
```

PAGE HEADING

Peterson Equipment Company   PAGE   1

OUTSTANDING FREIGHT CHARGES

```
   CNO   NAME                    INVNO        FREIGHT

100200   AMERICAN POLYMERS       5237          445.30
103400   NORTHLANDERS INC.       5238            0.00
103500   SUTO TRAVEL ADVISORS    5239          227.83
103400   NORTHLANDERS INC.       5240          230.02
152700   UNITED VIDEO CORP.      5241           26.95
152700   UNITED VIDEO CORP.      5242           18.00
103400   NORTHLANDERS INC.       5243            8.20
```

PAGE FOOTING[=(footspec)[,(footspec)[,...]]]

Defines the information that will be printed (or actions that will be taken) at the bottom of every page in the report (see exceptions below).

footspec   Optional. The specification for one item to appear in the footing. This specification might contain only text to be printed, the name of a field whose contents are to be printed, or a summary to be calculated, or it might contain several parameters describing the appearance and positioning of part of the footing. Multiple footspecs may be given.

If footspecs are not specified, this command clears any existing PAGE FOOTING.

Each footspec may contain no more than one item to be printed:
    text, a fieldname, a summary function, or $PAGE
and zero or more keywords about the item's:
    print format: FORMAT=(formatspec)
    position on page: NEWLINE, either POSITION=pos or TAB=tab, LINE=line
    lines to be printed: UNDERLINE, OVERLINE, DRAWLINE
See the FOOTING SPECIFICATION section for detailed information.

The page footing will always end on the last available line of the page. By default, CREATE leaves 3 blank lines at the bottom of each page. Therefore, the last available line is usually the fourth line from the bottom. Further information on this can be found in the PAGE FORMAT section.

If a REPORT FOOTING is specified, the PAGE FOOTING may not occur on one or more of the last pages of the report (see REPORT FOOTING for details).

If a REPORT HEADING is specified, the PAGE FOOTING may not occur on one or more of the initial pages of the report (see REPORT HEADING for details).

PAGE FOOTING

EXAMPLES:

)OPEN FILE INVDET

Page footings are automatically placed at the bottom of the page. Default placement for footing items is the center of the page, except for summaries, whose default position is below their field.

```
)TERMINAL $WIDTH=65
)REPORT
>PAGE FOOTING=("TOTAL THIS PAGE:";TAB=5),&
&>              ($TOTAL(QTY_O)),&
&>              ($TOTAL(QTY_S)),&
&>              (NEWLINE=3),&
&>              ("PAGE";TAB=25),&
&>              ($PAGE)
>FIELDS=(INVNO),(PART),(DESC),(QTY_O),(QTY_S)
>GO
```

INVNO	PART	DESC	QTY_O	QTY_S
5237	A98-425	8x11 PAPER	100	100
5237	A57-620	PRINTER RIBBONS	40	30
5238	W09-145	X24 TERMINAL	10	10
5239	A57-620	PRINTER RIBBONS	50	30
5239	A57-192	PRINTER RIBBONS	30	30
5239	A57-421	RIBBON CARTRIDG	70	70
5240	W09-145X	REBUILT TERMINA	4	4
5241	M93-446	PRINTOUT BINDER	200	200
5241	A87-011	15x11 PAPER	40	40
5242	A87-103	15x11 PAPER UNL	20	20
5242	D00-301	TAPE LABELS	40	40
5242	D45-642	MAG TAPE	5	5
5243	H03-492	RS-232 CONNECT	35	35

TOTAL THIS PAGE   644   614

PAGE   :

GROUP HEADING num[=(headspec)[,(headspec)[,...]]]

Defines the information to be printed before printing the first record of a new control group with a break level of num or higher.

num
: Required. A number referring to the BREAK level on some field. Whenever a new value for that field is found, the GROUP HEADING will be printed. Appendix E explains the concepts of grouping data with break levels.

headspec
: Optional. The specification for one item to appear in the heading. This specification might contain only text to be printed, or the name of a field whose contents are to be printed, or it might contain several parameters describing the appearance and positioning of part of the heading. Multiple headspecs may be given.

If headspecs are not specified, this command clears any existing GROUP HEADING for this level.

Each headspec may contain no more than one item to be printed:
        text, a fieldname, or FIELDHEADS
and zero or more keywords about the item's:
        print format: FORMAT=(formatspec)
        position on page: NEWLINE, either POSITION=pos or TAB=tab, LINE=line
        page control: NEWPAGE, RESETPAGE
        lines to be printed: UNDERLINE, OVERLINE, DRAWLINE
See the HEADING SPECIFICATION section for more information.

For example, if department number has a BREAK level of 3, and

GROUP HEADING 3=(NEWLINE=5; DEPTNAME)

is specified, the name of the new department will be printed on the fifth line after the last record of the old department.

Any text delineated by quotes in a headspec will be printed exactly as shown. Any field name in a headspec will print the value of the field from the first record of the group. If a NEWPAGE is part of the GROUP HEADING, and field names are listed in either the PAGE FOOTING or PAGE HEADING, these fields will also take their value from the first record of the group.

Group headings will always be printed at the beginning of each new group. The heading will never be split across a page unless a NEWPAGE is requested. CREATE checks only that there is sufficient room on the page for the heading; data may not start printing until the following page unless REPORT OPTIONS HEADDATA is used.

EXAMPLES:

When doing GROUP headings or footings, your data should be in sorted order. This is accomplished with a SET INDEX command on a file or with a BY clause on a SELECT command.

```
)OPEN FILE INVMAS
)SET INDEX 1
INDEX #1 IS NOW THE CURRENT INDEX.
```

The BREAK parameter defines which field or fields are to be checked for changes in value. The GROUP HEADING and GROUP FOOTING commands make reference to this break value.

```
)REPORT
>FIELDS=(CNO;BREAK=3;NOPRINT),&
&>        (INVNO;TAB=10),&
&>        (D_INV),(REMARKS)
>GROUP HEADING 3=(NEWLINE;"INVOICES FOR VENDOR #";POS=LEFT),&
&>                (CNO;TAB=22;FORMAT=(JUST=LEFT)),&
&>                (NEWLINE;TAB=5;NAME)
>GO
```

```
            INVNO          D_INV  REMARKS


INVOICES FOR VENDOR #100200
     AMERICAN POLYMERS
          5237           8/15/82  SHIP VIA TRUCK

INVOICES FOR VENDOR #103400
     NORTHLANDERS INC.
          5238           8/15/82  CALL WHEN READY
          5240           8/18/82  RETURN IF DEFECTIVE
          5243           8/22/82

INVOICES FOR VENDOR #103500
     SUTO TRAVEL ADVISORS
          5239           8/16/82  CALL OUR REP AT 408-767-3000

INVOICES FOR VENDOR #152700
     UNITED VIDEO CORP.
          5241           8/18/82
          5242           8/18/82  SHIP WITH INVOICE 5241
```

GROUP FOOTING num[=(footspec)[,(footspec)[,...]]]

Defines the information to be printed after the last record of a control group with a break level of num or higher.

num   Required. A number referring to the BREAK level on a field. Whenever the value of that field changes, the GROUP FOOTING will be printed. Appendix E explains the concepts of grouping data with break levels.

footspec   Optional. The specification for one item to appear in the footing. This specification might contain only text to be printed, the name of a field whose contents are to be printed, or a summary to be calculated, or it might contain several parameters describing the appearance and positioning of part of the footing. Multiple footspecs may be given.

If no footspec is specified, this command clears any existing GROUP FOOTING for this level.

Each footspec may contain no more than one item to be printed:
        text, a fieldname, or a summary function
and zero or more keywords about the item's:
        print format: FORMAT=(formatspec)
        position on page: NEWLINE, either POSITION=pos or TAB=tab, LINE=line
        page control: NEWPAGE, RESETPAGE
        lines to be printed: UNDERLINE, OVERLINE, DRAWLINE
See the FOOTING SPECIFICATION section for detailed information.

Any text delineated by quotes in a footspec will be printed exactly as shown. Any field name in a footspec will print the value of the field from the last record of the group. If a NEWPAGE is part of the GROUP FOOTING, and any field names are listed in either the PAGE FOOTING or PAGE HEADING, these fields will also take their value from the last record of the group.

Group footings will always appear at the end of each group unless there was only one record in the group and REPORT OPTIONS NOFOOTING was requested, in which case two linefeeds are substituted for the footing. The footing will never be split across a page unless NEWPAGE is requested. CREATE does not check to see if there is enough room for the footing on the same page as the last line(s) of data unless REPORT OPTIONS FOOTDATA is used.

EXAMPLES:

When doing GROUP headings or footings, your data should be in sorted order. This is accomplished with a SET INDEX command on a file or with a BY clause on a SELECT command. In this example, we'll sort the data by customer number and invoice number.

```
)OPEN FILE INVDET
)SELECT ●,GTOT=PRICE*QTY_S BY CNO,INVNO
```

The BREAK parameter in a field specification defines which field or fields are to be checked for a change in value. The GROUP HEADING and FOOTING commands make reference to this break value. The actual value of the BREAK parameter is unimportant as long as major fields have larger numbers than minor fields. (So CNO could actually have a BREAK level of anything higher than INVNO's BREAK level of 5.)

```
)TERMINAL $WIDTH=65
)REPORT
>FIELDS=(CNO;BREAK=7),&
&>       (INVNO;BREAK=5),&
&>       (PART),&
&>       (QTY_S),&
&>       (PRICE),&
&>       (GTOT)
>GROUP FOOTING 7=&
&>         ("CUSTOMER TOTAL:";TAB=13),&
&>         ($TOTAL(QTY_S)),&
&>         ($TOTAL(GTOT)),&
&>         ("NUMBER OF DETAILS FOR CUSTOMER:"),&
&>         ($COUNT(INVNO);TAB=50),&
&>         (NEWLINE=2)
>GROUP FOOTING 5=&
&>         ("INVOICE TOTAL:";TAB=10),&
&>         ($TOTAL(QTY_S)),&
&>         ($TOTAL(GTOT)),&
&>         (NEWLINE)
>GO
```

CNO	INVNO	PART	QTY_S	PRICE	GTOT
100200	5237	A98-425	100	34.50	3450.00
100200	5237	A57-620	30	8.25	247.50
		INVOICE TOTAL:	130		3697.50
		CUSTOMER TOTAL:	130		3697.50
		NUMBER OF DETAILS FOR CUSTOMER: 2			
103400	5238	W09-145	10	1490.95	14909.50
		INVOICE TOTAL:	10		14909.50
103400	5240	W09-145X	4	795.00	3180.00
		INVOICE TOTAL:	4		3180.00
103400	5243	H03-492	35	6.23	218.05
		INVOICE TOTAL.	35		218.05
		CUSTOMER TOTAL:	49		18307.55
		NUMBER OF DETAILS FOR CUSTOMER: 3			
103500	5239	A57-620	30	8.25	247.50
103500	5239	A57-192	30	6.50	195.00
103500	5239	A57-421	70	19.25	1347.50
		INVOICE TOTAL:	130		1790.00
		CUSTOMER TOTAL:	130		1790.00
		NUMBER OF DETAILS FOR CUSTOMER: 3			
152700	5241	M93-446	200	6.47	1294.00
152700	5241	A87-011	40	40.25	1610.00
		INVOICE TOTAL:	240		2904.00
152700	5242	A87-103	20	40.25	805.00
152700	5242	D00-301	40	22.15	886.00
152700	5242	D45-642	5	310.50	1552.50
		INVOICE TOTAL:	65		3243.50
		CUSTOMER TOTAL:	305		6147.50
		NUMBER OF DETAILS FOR CUSTOMER: 5			

REPORT OPTIONS
[;BETWEEN=spaces]
[;AFTER=lines]
[;MARGINS=left[,right]]
[;NOHEADING]
[;SPACING=num]
[;NOBLANKS]
[;UNDERLINE[="char"]]
[;NOFOOTING]
[;HEADDATA=num]
[;FOOTDATA=num]

Changes the defaults in spacing, headings, and footings for portions of the report.

BETWEEN   Optional. If used, the keyword must be followed by an integer from zero to twenty, indicating the number of spaces placed between columns in a report. The default is two.

AFTER   Optional. If used, the keyword must be followed by an integer from zero to ten, indicating the number of blank lines to be left after the column headings. The default is one.

MARGINS   Optional. If used, the keyword must be followed by an integer indicating the number of spaces to leave on the left side of the report. The number of spaces to leave on the right side may also be specified. The defaults for both are zero. These margins occur within the page width, so if the page (terminal) width is 80 characters and there are left and right margins of 10 each, the actual printing area for the report will be 60 characters. The combined width of the margins must be less than the width of the page.

NOHEADING   Optional. If specified, the default column headings will be suppressed. Only field headings defined explicitly will be printed.

SPACING   Optional. If specified, the keyword must be followed by a positive integer indicating the spacing to be used between data lines in the body of the report (generated by the FIELDS command). Use 1 for single-spacing (no blank lines between lines of the report), 2 for double-spacing, and so on. Spacing in headings and footings will NOT be affected by this, as the NEWLINE parameter can be used. Default is single-spacing.

NOBLANKS   Optional. If specified, any line in the body of the report (generated by the FIELDS command) that would normally print is suppressed if the value of all fields on the line is blank. This will not suppress blank lines if they are caused by the LINE= parameter.

UNDERLINE   Optional. If specified, all column headings will be underlined as if "UNDERLINE" had been specified for each one individually. A single underline character enclosed in quotes may be specified. If a character is not specified, a minus sign ("-") is used.

NOFOOTING   Optional. If specified, the group footing for the lowest numbered break will not print if it is preceded by only one data line; instead, two blank lines will be used as the group footing.

HEADDATA   Optional. If specified, this keyword must be followed by an integer from zero to five. This number tells CREATE the minimum number of records (each of which may take up more than one line) that must appear after the lowest numbered group heading on the same page. If there is not enough room for the group heading and the indicated number of records, a formfeed will occur before the heading is printed. Default is zero.

FOOTDATA   Optional. If specified, this keyword must be followed by an integer from zero to five. This number tells CREATE the minimum number of records (each of which may take up more than one line) that must appear before the lowest numbered group footing on the same page. If there is not enough room for the indicated number of records and group footing, a formfeed will occur and the appropriate number of records will print on the next page. Default is zero.

EXAMPLES:

The BETWEEN parameter allows the user to spread fields across the page without having to count or specify the exact TAB positions.

The AFTER parameter allows the user to leave several blank lines after the field headings and before the data.

The MARGIN keyword allows the user to center the body of the report (or align it to one side or another) again without having to count and specify exactly where fields should print.

The NOHEADING keyword is most useful when headings are desired for only a small number of fields. The user then doesn't need to specify NOHEADING on each field individually.

The NOBLANKS keyword will prevent any lines in the body of the report from printing if all of the fields on that line are blank, such as with the second name of the customer in the following file.

```
)OPEN FILE CUST
)PRINT

$LINE       CNO BNAME                  BNAME2              BADDRESS
BCITY          BS BZIP

       1 100200 AMERICAN POLYMERS       PLASTICS DIVISION   832
WILDWOOD DR
ASPEN          CO 80237
       2 103400 NORTHLANDERS INC.                           PO BOX 827
GREEN BAY  WI 60444
       3 103500 SUTO TRAVEL ADVISORS                        18A MAIN ST
DALLAS         TX 75230
       4 152700 UNITED VIDEO CORP.      CORPORATE FINANCE   2332
LAFAYETTE
HOUSTON        TX 73211

4 LINES PRINTED.
)REPORT
>REPORT OPTIONS BETWEEN=5;AFTER=3;MARGINS=10;NOHEADING;NOBLANKS
>FIELDS=(CNO;HEADING=("CUST|NUMBER")),&
&>      (BNAME;HEADING=("CUSTOMER NAME")),&
&>      (BNAME2;TAB=BNAME),&
&>      (BADDRESS;TAB=BNAME),&
&>      (BCITY;TAB=BNAME),&
&>      (BST),&
&>      (BZIP)
>GO
```

REPORT OPTIONS

```
    CUST
  NUMBER        CUSTOMER NAME


  100200        AMERICAN  POLYMERS
                PLASTICS  DIVISION
                832  WILDWOOD  DR
                ASPEN              CO      80237
  103400        NORTHLANDERS  INC.
                PO  BOX  827
                GREEN  BAY         WI      60444
  103500        SUTO  TRAVEL  ADVISORS
                18A  MAIN  ST
                DALLAS             TX      75230
  152700        UNITED  VIDEO  CORP.
                CORPORATE  FINANCE
                2332  LAFAYETTE
                HOUSTON            TX      73211
```

We use the SPACING to ensure that there are blank lines printed between each detail line of the report. NOFOOTING prevents the lowest group footing from printing for one-line groups. UNDERLINE underlines all column headings.

```
)OPEN FILE EMPL
)REPORT FOR DIV=1
>FIELDS=(DIV;BREAK=3;SUPPRESS=3),&
&>        (DEPT;BREAK=2;SUPPRESS=2),&
&>        (EMP), (SALARY)
>REPORT OPTIONS SPACING=2; NOFOOTING; UNDERLINE
>GROUP FOOTING 3= ("DIVISION TOTAL";TAB=15),&
&>                  ($TOTAL(SALARY); UNDERLINE="=")
>GROUP FOOTING 2 = ("DEPT TOTAL"; TAB=15),&
&>                  ($TOTAL(SALARY); OVERLINE), (NEWLINE=2)
>GO
```

REPORT OPTIONS

DIV	DEPT	EMP	SALARY
1	5	JIM BROWN	1945.90
		MIKE WALLACE	820.00
		BERNIE PERKINS	1250.00
		KEN LEONG	1050.40
		DEPT TOTAL	5066.30
	12	MARK MOONEY	1520.50
		SUZANNE DE LOACH	1700.00
		DEPT TOTAL	3220.50
	102	RICHARD BABB	910.00
		SCOTT LUND	1245.90
		CLAUDIA GREY	789.50
		DEPT TOTAL	2945.40
	150	CHRISTINE COLE	1836.50
	170	FRANK ANSELMO	2260.00
		DIVISION TOTAL	15328.70

LIST[:P] REPORT [COMMANDS [rangelist]]
[TO filename[;RECORDS=records] [;WIDTH=width]]

Lists CREATE commands which have been entered during the current RELATE session.

:P   Optional global switch.   Directs output to the file RDBLIST (usually
                the printer).   If RDBLIST cannot be opened, the output is directed to
                the device class "LP".

COMMANDS   Optional.   If not specified, only the latest valid CREATE command for
                each type of command will be listed.   If specified, this keyword may
                optionally be followed by a range of CREATE command numbers to be
                listed.   If rangelist is not specified, all CREATE commands entered
                thus far will be listed.

filename   Optional.   If specified, the indicated CREATE commands will be listed
                to the file with this name.   If the file does not already exist, it will
                be created as a permanent ASCII MPE file.   Commands listed to a
                file will be listed without command numbers.

RECORDS   Optional.   Specifies the number of records to allocate for the file
                referenced by filename.   If filename already exists, this parameter is
                ignored.   If filename does not exist and RECORDS is not specified,
                the number of records defaults to 1024.

WIDTH   Optional.   Specifies the width in bytes (characters) of the records for
                the file referenced by filename.   If filename already exists, this
                parameter is ignored.   If filename does not exist and WIDTH is not
                specified, the record width defaults to 72 bytes.

The user can use the REDO command to reexecute any previous command (see the
RELATE manual for further information).

LIST REPORT

EXAMPLES:

CREATE keeps track of all CREATE commands entered during the current RELATE session.

```
)OPEN FILE CUST
)REPORT
>FIELDS=(CNO),(BNAME)
>PAGE HEAD=("ADDRESSES FOR CUSTOMERS")
>FIELDS=(BNAME),(BADDRESS),(BCITY),(BST),(BZIP)
>//
```

Using the LIST command, the user can either see all valid CREATE commands that have been entered thus far, or choose to see only the latest valid commands of each type.

```
)REPORT
>LIST REPORT COMMANDS 1/3

>FIELDS=(CNO),(BNAME)
>PAGE HEAD=("ADDRESSES FOR CUSTOMERS")
>FIELDS=(BNAME),(BADDRESS),(BCITY),(BST),(BZIP)

>LIST REPORT

>PAGE HEAD=("ADDRESSES FOR CUSTOMERS")
>FIELDS=(BNAME),(BADDRESS),(BCITY),(BST),(BZIP)

>
>//
```

SECTION 3

DETAILED SPECIFICATIONS

FIELD SPECIFICATION

A complete field specification can be composed of the following:

```
fieldname I "text"
        [;OPTIONAL]
   [;FORMAT=(formatspec)]
   [;HEADING=(headspec)]
        [;NOHEADING]
[;TAB=[+]pos I fieldname[+count]]
        [;LINE=line#]
        [;NOPRINT]
        [;BREAK=blev]
        [;SUPPRESS=slev]
```

fieldname   Required. The name of a field that is to appear in the body of the report. The fieldname must not have a file qualifier attached to it (eg. FILE.fieldname). CREATE takes the field from the current file or SELECTion.

If a fieldname is not specified, text must be specified. Text appearing on a detail line with no fields will always be printed. Text appearing on a detail line with fields that are all suppressed will also be suppressed. Text appearing on a detail line with fields that are all blank with REPORT OPTION NOBLANK will not be printed.

OPTIONAL   Optional. If specified, this field doesn't have to exist in the current path. If it doesn't exist, the entire field specification for that field is ignored instead of generating an error.

FORMAT   Optional. If specified, the keyword must be followed by information that describes the appearance of the field. If not used, the default print format from the file will be used. This may not be specified for text.

Valid parameters in the formatspec are: BLANK, FILL, FLOAT, JUSTIFY, SIGN, and PICTURE. See the FORMAT SPECIFICATIONS section for more information.

HEADING   Optional. If specified, the keyword must be followed by information that describes the heading to be used for this column. If HEADING is not specified, the name of the field is used or NOHEADING is used for text. To avoid printing a heading for the field, the NOHEADING option should be used.

Only one headspec may be specified for a field heading. Valid parameters in the headspec are: "text", POSITION, and UNDERLINE. See the HEADING SPECIFICATION section for more information.

NOHEADING   Optional. If specified, no heading will be printed for this column.

TAB   Optional. If specified, the keyword must be followed by either a number or a fieldname. A number indicates the position in a line at which the field should begin printing. If a plus sign ("+") is included, the tab will be relative to the right side of the last field printed on

the line and the number will indicate how many positions to the right of the last field this field should begin. If a plus sign is not specified, the number indicates the absolute position on the page, where the left-most position is 1. If a fieldname is specified, it must be a field that has already been listed in the FIELD command. TAB=fieldname will align the field under the indicated field, unless a "+count" is included, in which case the field will begin underneath the indicated field but moved the requested number of positions to the right. If a TAB position is less than that of a previous field, the field will be moved onto the next line (See the LINE keyword, below). If TAB is not specified, CREATE allows 2 spaces between fields in the absence of a REPORT OPTION BETWEEN specification.

LINE   Optional. If specified, the keyword must be followed by a number indicating which line of a record the field should be printed on. Default is the first line or the first available line. If there are more fields requested than will fit across a page, CREATE will automatically move the remaining fields onto the next line. Whenever data is moved onto a new line, either automatically or with the LINE command, the new line will be indented five spaces unless the user specifies otherwise. For example, if the previous field was in the last position available on the first line, this field will be moved onto the second line. Once a new line has been specified, all following fields are assumed to be on that line and the line# does not need to be respecified. Previous lines cannot be specified (you cannot put the third field on line two and the fourth field on line one).

NOPRINT   Optional. If specified, neither the field nor its heading will be printed and no room will be left for it in the report. This is most likely to be used when this field is given a break level to control output, but the value of the field itself is not needed or is printed in a heading instead of in the report body.

BREAK   Optional. If specified, the keyword must be followed by a number from 1 to 100 designating the importance of this field. The higher the number, the more control this field has over other fields. The highest number would be for the field whose value would change least often, and the lowest for the field whose value would change most often. When the value of this field changes, a "control break" is said to occur. Usually something happens in a report on the occurrence of a control break as specified by the GROUP HEADING and FOOTING commands. APPENDIX E has information on defining and using groupings of data.

SUPPRESS   Optional. If specified, the keyword must be followed by a number from 1 to 100. This indicates that the field should be suppressed instead of printed unless a control break occurs in a field with a BREAK level of slev or higher. This might happen if you only want to print a customers name once and then list all of his invoices. Then the name would be SUPPRESSed for all but the first occurrence. The field will also print on the first data line of a new page. SUPPRESS cannot be specified if NOPRINT is used.

EXAMPLES:

In this example, we use information from two files, the INVMASter file and the INVDETail file. The SELECT command is used to join the two files together. Since we will be using BREAK parameters, the data should be in sorted order. This is the purpose of the BY clause on the SELECT command.

```
)OPEN FILE INVMAS
)OPEN FILE INVDET
)SELECT INVMAS.@,INVDET.@,GTOT=INVDET.PRICE*INVDET.QTY_S &
&)     BY CNO,INVNO &
&)   WHERE INVMAS.CNO=INVDET.CNO &
&)     AND INVMAS.INVNO=INVDET.INVNO
)PRINT CNO,NAME,INVNO,D_INV,GTOT
```

CNO	NAME	INVNO	D_INV	GTOT
100200	AMERICAN POLYMERS	5237	8/15/82	3450.00
100200	AMERICAN POLYMERS	5237	8/15/82	247.50
103400	NORTHLANDERS INC.	5238	8/15/82	14909.50
103400	NORTHLANDERS INC.	5240	8/18/82	3180.00
103400	NORTHLANDERS INC	5243	8/22/82	218.05
103500	SUTO TRAVEL ADVISORS	5239	8/16/82	247.50
103500	SUTO TRAVEL ADVISORS	5239	8/16/82	195.00
103500	SUTO TRAVEL ADVISORS	5239	8/16/82	1347.50
152700	UNITED VIDEO CORP.	5241	8/18/82	1294.00
152700	UNITED VIDEO CORP.	5241	8/18/82	1610.00
152700	UNITED VIDEO CORP.	5242	8/18/82	805.00
152700	UNITED VIDEO CORP.	5242	8/18/82	886.00
152700	UNITED VIDEO CORP.	5242	8/18/82	1552.50

```
13 LINES PRINTED.
```

Notice that INVNO is not suppressed at its own break level (2), but CNO (level 3) is. D_INV is suppressed at level 2, and NAME is also suppressed at level 3.

```
)REPORT
>FIELDS=(CNO;BREAK=3;SUPPRESS=3;&
&>          HEADING=(UNDERLINE;"CUST|NUMBER")),&
&>       (NAME;SUPPRESS=3;HEADING=(UNDERLINE)),&
&>       (INVNO;BREAK=2;HEADING=(UNDERLINE)),&
&>       (D_INV;SUPPRESS=2;HEADING=("DATE|INVOICED")),&
&>       (GTOT;FORMAT=(FLOAT 0="$"))
>GROUP FOOTING 2=("INVOICE TOTAL";TAB=35),&
&>             ($TOTAL(GTOT)),&
&>             (NEWLINE)
>GROUP FOOTING 3=(NEWLINE;"TOTAL FOR CUST #";TAB=10),&
&>             (CNO;TAB=27),&
&>             ($TOTAL(GTOT)),&
&>             (NEWLINE)
>GO
```

FIELD SPECIFICATION

CUST NUMBER	NAME	INVNO	DATE INVOICED	GTOT
------	--------------------	--------		
100200	AMERICAN POLYMERS	5237	8/15/82	$3450.00
		5237		$247.50
			INVOICE TOTAL	$3697.50
	TOTAL FOR CUST # 100200			$3697.50
103400	NORTHLANDERS INC.	5238	8/15/82	$14909.50
			INVOICE TOTAL	$14909.50
		5240	8/18/82	$3180.00
			INVOICE TOTAL	$3180.00
		5243	8/22/82	$218.05
			INVOICE TOTAL	$218.05
	TOTAL FOR CUST # 103400			$18307.55
103500	SUTO TRAVEL ADVISORS	5239	8/16/82	$247.50
		5239		$195.00
		5239		$1347.50
			INVOICE TOTAL	$1790.00
	TOTAL FOR CUST # 103500			$1790.00
152700	UNITED VIDEO CORP.	5241	8/18/82	$1294.00
		5241		$1610.00
			INVOICE TOTAL	$2904.00
		5242	8/18/82	$805.00
		5242		$886.00
		5242		$1552.50
			INVOICE TOTAL	$3243.50
	TOTAL FOR CUST # 152700			$6147.50

The TAB parameter is versatile, enabling you to specify a field's position exactly (absolute positioning) or in relation to other fields (relative positioning). Relative tabbing is especially useful in ensuring that the report still lines up nicely even if the field's print size (or edit PICTURE) is changed.

```
)OPEN FILE CUST
)REPORT
>FIELDS=(CNO;TAB=10),&
&>       (BNAME),&
&>       (BADDRESS;TAB=BNAME),&
&>       (BCITY;TAB=BNAME+3),&
&>       (BST;HEADING=("ST")),&
&>       (BZIP;TAB=+1)
>GO
```

FIELD SPECIFICATION

```
CNO    BNAME
       BADDRESS
          BCITY        ST BZIP

100200  AMERICAN POLYMERS
        832 WILDWOOD DR
           ASPEN          CO 80237
103400  NORTHLANDERS INC.
        PO BOX 827
           GREEN BAY    WI 60444
103500  SUTO TRAVEL ADVISORS
        18A MAIN ST
           DALLAS       TX 75230
152700  UNITED VIDEO CORP.
        2332 LAFAYETTE
           HOUSTON      TX 73211
```

HEADING SPECIFICATION

A complete heading specification can be composed of the following:

```
                    [headeritem]
                 [;NEWLINE[=nlines]]
          [;POSITION=RIGHT|LEFT|CENTER]
                  [;TAB=[+]pos]
                  [;LINE=line#]
          [;UNDERLINE[=["uchar"][,ALL]]]
          [;OVERLINE[=["ochar"][,ALL]]]
                   [;NEWPAGE]
                [;RESETPAGE[=page]]
       [;DRAWLINE[=["lchar"][,[from][,to]]]]
```

headeritem Optional. Specifies the data to be printed. May be text, a fieldname, or the keyword FIELDHEADS. See the HEADER ITEM section for more information.

NEWLINE Optional. If specified, the keyword may be followed by a number indicating the number of linefeeds to perform before printing the headeritem. If nlines is not specified, default is one. If NEWLINE is not specified, default is zero.

CREATE will automatically perform a NEWLINE (so NEWLINE need not be specified) when printout would overlap. This may occur when:

   1) printout would overlap something already printed if it was left on the current line.

   2) automatic lining up of a summary beneath its field would overlap printout.

   3) TAB position would overlap printout.

NEWLINE does NOT indicate lines to be SKIPPED. For example, if some text has been printed, and the next text specifies NEWLINE (or NEWLINE=1), the new text will print on the line immediately below the first text. If NEWLINE is used in conjunction with LINE, LINE will be performed first. NEWLINE is not allowed in field headings.

POSITION Optional. If specified, the keyword must be followed by RIGHT, LEFT, or CENTER. This determines the position of the headeritem on the page (or, for field headings, the position of the text over the area allotted for the field). May not be used in conjunction with TAB. CENTER is the default for all except field headings, where the justification of the data is the default. RIGHT pushes the right-most character to the right margin, and LEFT pushes the left-most character to the left margin.

TAB   Optional. If specified, the keyword must be followed by a number indicating the absolute or relative position in a line at which the headeritem should begin printing. If no plus sign ("+") is used, the TAB will position the headeritem at the absolute column of the page, where the left-most position is 1. If a plus is specified, the headeritem will begin printing POS spaces beyond the right side of the space allocated for the previous headeritem. If a TAB position is less than that of the previous text, it will cause this text to move onto the next line. TAB may not be used in conjunction with POSITION or in field headings.

LINE   Optional. If specified, the keyword must be followed by a number indicating on which line of the page to print the headeritem. One is the top line of the page (Since CREATE leaves 3 blank lines at the top of the page by default, this is actually the first AVAILABLE line, e.g., the fourth line of the page). Default is the first available line, or the current line if there is room. If a line number is specified that is lower than the current line number, CREATE assumes that a miscalculation has been made and prints on the next available line. Line is not allowed in field headings.

UNDERLINE   Optional. If specified, the headeritem will be underlined. For a field heading, the entire width of the column is underlined and the underline will appear only beneath the last line of the field heading. The underline will take up a line. A single underline character enclosed in quotes may be specified. If a character is not specified, a minus sign ("-") is used. See Appendix B for a discussion on the length of the underline.

OVERLINE   Optional. If specified, the headeritem will be overlined. Not allowed on a field heading. The overline will take up a line. A single overline character enclosed in quotes may be specified. If a character is not specified, a minus sign ("-") is used. See Appendix B for a discussion on the length of the overline.

NEWPAGE   Optional. If used, a page feed will occur before the headeritem is printed. Any specified PAGE FOOTING and PAGE HEADING will be printed. Not allowed in field headings or in page headings and footings.

RESETPAGE   Optional. Allowed only for REPORT and GROUP headings or footings. When this parameter is encountered, the page number is reset to the indicated page number the next time a form feed occurs (so that the page footing will have the old page number but the page heading will have the new page number). Page may be any number from 1 to 255. If page is not specified, the page number will be reset to one.

DRAWLINE   Optional. When used, a line is drawn according to the given
                specifications after the headeritem has been printed.   A single
                character enclosed in quotes may be specified as the character to
                draw the line with; a dash ("-") is used otherwise. If a from position
                is specified, this indicates the first column in which the line character
                should appear.   If from is not specified, 1 is assumed.   If a to
                position is specified, this indicates the last column in which the line
                character should appear.   If to is not specified, the right-most column
                is assumed.

EXAMPLES:

Here we demonstrate several different heading specifications as used for FIELD (column) headings on the report. For this example we use the field PART, an alphabetic field of 8 characters.

Heading text: If no heading text is specified, the field name is used, as in the first two columns. If a heading text is specified and contains a vertical bar, the heading will be split onto multiple lines as in the last two columns.

Underlines: If UNDERLINE is requested without a specific character, the minus sign (dash) is used to underline; otherwise, the requested character is used. The underline will always be at least the width of the field's picture, as in the first and last columns. If the heading text is wider than the field, ho   r, the underline will be extended to match the heading, as in the fifth column.

Justification: If POSITION is not specified in the headspec, the heading will line up to match the justification of the data. Since PART is alphabetic, the default is LEFT and the first and fifth column headings line up on the left. If CENTER is specified, the heading is centered over the total width of the field, not over any data that may be in the field (as in the third and last columns). If the heading is RIGHT justified, as in the second column, it is pushed to the right of the field width.

Extra wide headings: In the fourth column, the heading text is wider than the width of the field. Notice that the wide heading is centered over the 8 characters allowed for PART. This will always be true, regardless of how PART is aligned within those eight characters.

Disallowed parameters: The parameters NEWLINE, OVERLINE, TAB, LINE, NEWPAGE, and RESETPAGE cannot be used in a field headspec. More simply, only a text headeritem, UNDERLINE, and POSITION may be used in a field headspec.

```
)OPEN FILE INVDET
)REPORT
>FIELDS=(PART;HEADING=(UNDERLINE)),&
&>       (PART;HEADING=(POS=RIGHT)),&
&>       (PART;HEADING=("PARTNO";POS=CENTER)),&
&>       (PART;HEADING=("PART NUMBER";UNDERLINE="•")),&
&>       (PART;HEADING=("PART|NUMBER")),&
&>       (PART;HEADING=("PART|NUMBER";UNDERLINE;POS=CENTER))
>GO
```

PART	PART	PARTNO	PART NUMBER	PART NUMBER	PART NUMBER
--------			• • • • • • • • • •	--------	--------
A98-425	A98-425	A98-425	A98-425	A98-425	A98-425
A57-620	A57-620	A57-620	A57-620	A57-620	A57-620
W09-145	W09-145	W09-145	W09-145	W09-145	W09-145
A57-620	A57-620	A57-620	A57-620	A57-620	A57-620
A57-192	A57-192	A57-192	A57-192	A57-192	A57-192
A57-421	A57-421	A57-421	A57-421	A57-421	A57-421
W09-145X	W09-145X	W09-145X	W09-145X	W09-145X	W09-145X
M93-446	M93-446	M93-446	M93-446	M93-446	M93-446
A87-011	A87-011	A87-011	A87-011	A87-011	A87-011
A87-103	A87-103	A87-103	A87-103	A87-103	A87-103
D00-301	D00-301	D00-301	D00-301	D00-301	D00-301
D45-642	D45-642	D45-642	D45-642	D45-642	D45-642
H03-492	H03-492	H03-492	H03-492	H03-492	H03-492

The following example contains heading specifications as used in a PAGE HEADING and a GROUP HEADING. An example of a REPORT HEADING is given under that command. All three of these heading types can use virtually the same parameters with the same results; the main difference is at what point the output is printed.

Underlines in a heading will usually underline only the characters actually printed.

```
)TERM $WIDTH=65
)REPORT
>FIELDS=(CNO;BREAK=5;TAB=6),(PART),(DESC)
>PAGE HEADING=("PAGE HEADING";UNDERLINE="•"),&
&>              (LINE=4;"PRINT ON FOURTH LINE";DRAWLINE),&
&>              ("PRINT A BLANK LINE BEFORE FIELD HEADINGS":&
&>                        POSITION=LEFT),&
&>              (NEWLINE)
>GROUP HEADING 5=("SKIP A LINE BEFORE:";NEWLINE;POS=LEFT),&
&>              ("CUST #";POSITION=LEFT),&
&>              (CNO;TAB=7),&
&>              ("PRINT THIS IN COLUMN TEN";TAB=10;&
&>                  DRAWLINE="+",35,60),&
&>              ("DEFAULT IS CENTER")
>GO
```

```
                          PAGE HEADING
                          ............

                    PRINT ON FOURTH LINE
------------------------------------------------------------------
PRINT A BLANK LINE BEFORE FIELD HEADINGS

          CNO    PART       DESC


SKIP A LINE BEFORE:
CUST #100200
          PRINT THIS IN COLUMN TEN +++++++++++++++++++++++++++
                          DEFAULT IS CENTER
     100200   A98-425   8x11 PAPER
     100200   A57-620   PRINTER RIBBONS


SKIP A LINE BEFORE:
CUST #103400
          PRINT THIS IN COLUMN TEN +++++++++++++++++++++++++++
                          DEFAULT IS CENTER
     103400   W09-145   X24 TERMINAL


SKIP A LINE BEFORE:
CUST #103500
          PRINT THIS IN COLUMN TEN +++++++++++++++++++++++++++
                          DEFAULT IS CENTER
     103500   A57-620   PRINTER RIBBONS
     103500   A57-192   PRINTER RIBBONS
     103500   A57-421   RIBBON CARTRIDG


SKIP A LINE BEFORE:
CUST #103400
          PRINT THIS IN COLUMN TEN +++++++++++++++++++++++++++
                          DEFAULT IS CENTER
     103400   W09-145X  REBUILT TERMINA


SKIP A LINE BEFORE:
CUST #152700
          PRINT THIS IN COLUMN TEN +++++++++++++++++++++++++++
                          DEFAULT IS CENTER
     152700   M93-446   PRINTOUT BINDER
     152700   A87-011   15x11 PAPER
     152700   A87-103   15x11 PAPER UNL
     152700   D00-301   TAPE LABELS
     152700   D45-642   MAG TAPE


SKIP A LINE BEFORE
CUST #103400
          PRINT THIS IN COLUMN TEN +++++++++++++++++++++++++++
                          DEFAULT IS CENTER
     103400   H03-492   RS-232 CONNECT
```

FOOTING SPECIFICATION

FOOTING SPECIFICATION

A complete footing specification can be composed of the following:

```
[headeritem]
[;NEWLINE[=nlines]]
[;TAB=[+]pos]
[;LINE=line#]
[;POSITION=RIGHT|LEFT|CENTER]
[;UNDERLINE[=["uchar"][,ALL]]]
[;OVERLINE[=["ochar"][,ALL]]]
[;NEWPAGE]
[;RESETPAGE[=page]]
[;DRAWLINE[=["lchar"][,[from][,to]]]]
```

headeritem   Optional. Specifies data to be printed. May be text, a fieldname, or a summary. See the HEADER ITEM section for more information.

NEWLINE   Optional. If specified, the keyword may be followed by a number indicating the number of linefeeds to perform before printing the headeritem. If nlines is not specified, default is one. If NEWLINE is not specified, default is zero.

CREATE will automatically perform a NEWLINE (so NEWLINE need not be specified) when printout would overlap. This may occur when:

     1) printout would overlap something already printed if it was left on the current line.

     2) automatic lining up of a summary beneath its field would overlap printout.

     3) TAB position would overlap printout.

NEWLINE does NOT indicate lines to be SKIPPED. For example, if some text has been printed, and the next text specifies NEWLINE (or NEWLINE=1), the new text will print on the line immediately below the first text. If NEWLINE is used in conjunction with LINE, LINE will be performed first.

TAB   Optional. If specified, the keyword must be followed by a number indicating the absolute or relative position in a line at which the headeritem should begin printing. If no plus sign ("+") is used, the TAB will position the headeritem at the absolute column of the page, where the left-most position is 1. If a plus is specified, the headeritem will begin printing POS spaces beyond the right side of the space allocated for the previous headeritem. If a TAB position is less than that of the previous text, it will cause this text to move onto the next line. May not be used in conjunction with POSITION.

FOOTING SPECIFICATION

LINE
: Optional. If specified, the keyword must be followed by a number indicating on which line of the page to print the headeritem. One is the top line of the page (Since CREATE leaves 3 blank lines at the top of the page by default, this is actually the first AVAILABLE line, e.g., the fourth line of the page). Default is the first available line, or the current line if there is room. If a line number is specified that is lower than the current line number, CREATE assumes that a miscalculation has been made and prints on the next available line.

POSITION
: Optional. If specified, the keyword must be followed by RIGHT, LEFT, or CENTER. This determines the postion of the headeritem on the page. CENTER is the default. RIGHT pushes the right-most character to the right margin, and LEFT pushes the left-most character to the left margin. May not be used in conjunction with TAB.

UNDERLINE
: Optional. If specified, the headeritem will be underlined. The underline will take up a line. A single underline character enclosed in quotes may be specified. If a character is not specified, a minus sign ("-") is used. See Appendix B for a discussion on the length of the underline.

OVERLINE
: Optional. If specified, the headeritem will be overlined. The overline will take up a line. A single overline character enclosed in quotes may be specified. If a character is not specified, a minus sign ("-") is used. See Appendix B for a discussion on the length of the overline.

NEWPAGE
: Optional. If used, a page feed will occur before the headeritem is printed. Any specified PAGE FOOTING and PAGE HEADING will be printed. Not allowed for page headings and footings.

RESETPAGE
: Optional. Allowed only for REPORT and GROUP headings or footings. When this parameter is encountered, the page number is reset to the indicated page number the next time a form feed occurs (so that the page footing will have the old page number but the page heading will have the new page number). Page may be any number from 1 to 255. If page is not specified, the page number will be reset to one.

DRAWLINE
: Optional. When used, a line is drawn according to the given specifications after the headeritem has been printed. A single character enclosed in quotes may be specified as the character to draw the line with; a dash ("-") is used otherwise. If a from position is specified, this indicates the first column in which the line character should appear. If from is not specified, 1 is assumed. If a to position is specified, this indicates the last column in which the line character should appear. If to is not specified, the right-most column is assumed.

EXAMPLES:

Here is an example of a footspec used in a PAGE FOOTING. The parameters that can go into a footspec are virtually the same for REPORT, PAGE, and GROUP FOOTINGS.

The NEWLINE parameter only performs a carriage return/linefeed; that is, it ensures that the headeritem will print on the next line. NEWLINE=1 is the same thing as NEWLINE. NEWLINE=2 will print the headeritem on the next line plus 1 (that is, leave a blank line). The first headspec below contains a simple NEWLINE. Normally this will not be visible to us because data will not run all the way down the page. But if it should, this first NEWLINE ensures that there will always be one line between the last row of data and the first line of the footing.

The NEWLINE is not the only way to put the headeritem on the next line. If output will overlap, the system automatically moves it to the next line. This will occur in three situations, two of which are demonstrated.

The first case is when a simple text or field will obviously on fit on the previous line, as when "THIS WILL NOT FIT..." is printed. The second case is triggered by a summary lining up under the column it is summarizing. In this report, $TOTAL(QTY_S) is requested first, then $TOTAL(PRICE). But PRICE is located to the left of QTY_S, so CREATE would have to go backwards in the line to print PRICE's total. Instead, it moves the total onto the next line.

The third case would be where a TAB tries to place something earlier in a line than has already been printed.

```
)OPEN FILE INVDET
)TERMINAL $WIDTH=65
)REPORT
>FIELDS=(PART),(DESC),(PRICE),(QTY_S),(UM)
>PAGE FOOTING=(DRAWLINE=,20),&
&>              (NEWLINE=2;"PRINT BLANK LINE AND CENTER THIS"),&
&>              ("*RIGHT*";POSITION=RIGHT),&
&>              ("CENTER AGAIN AND UNDERLINE";UNDERLINE),&
&>              ("THIS WILL NOT FIT ON THE PREVIOUS LINE";&
&>                      POSITION=RIGHT),&
&>              ($TOTAL(QTY_S);UNDERLINE="*"),&
&>              ($TOTAL(PRICE)),&
&>              (NEWLINE=2;TAB=10;&
&>                      "SKIP A LINE AND PRINT IN 10th PLACE"
&>              ("THIS IS THE LAST LINE";POS=LEFT),&
&>              ($PAGE)
>GO
```

FOOTING SPECIFICATION

PART	DESC	PRICE	QTY_S	UM
A98-425	8x11 PAPER	34.50	100	BX
A57-620	PRINTER RIBBONS	8.25	30	EA
W09-145	X24 TERMINAL	1490 95	10	EA
A57-620	PRINTER RIBBONS	8.25	30	EA
A57-192	PRINTER RIBBONS	6.50	30	EA
A57-421	RIBBON CARTRIDG	19.25	70	EA
W09-145X	REBUILT TERMINA	795.00	4	EA
M93-446	PRINTOUT BINDER	6.47	200	EA
A87-011	15x11 PAPER	40.25	40	BX
A87-103	15x11 PAPER UNL	40.25	20	BX
D00-301	TAPE LABELS	22.15	40	BX
D45-642	MAG TAPE	310.50	5	BX
H03-492	RS-232 CONNECT	6.23	35	EA

PRINT BLANK LINE AND CENTER THIS   •RIGHT•
       CENTER AGAIN AND UNDERLINE

                  THIS WILL NOT FIT ON THE PREVIOUS LINE
                        614
                       • • • •
              2788 55

       SKIP A LINE AND PRINT IN 10th PLACE
THIS IS THE LAST LINE   '

HEADER ITEMS

A header item may be one of the following:

fieldname[;FORMAT=(formatspec)]
"text"
$TOTAL I $AVERAGE I $COUNT(fieldname)[;FORMAT=(formatspec)]
$PAGE[;FORMAT=(formatspec)]
FIELDHEADS

fieldname   Optional. If specified, the current value of this field will be printed.
                   Not allowed for field headings.   The fieldname may not have a file
                   qualifier attached to it (e.g.: FILE.fieldname).   CREATE takes the
                   field from the current file or selection.   Fields will be justified to
                   match the field's POSITION, or justified normally if a TAB is given.
                   For details on justification, see Appendix D.

FORMAT   Optional. If specified, the keyword must be followed by information
                   that describes the appearance of the value of the field to be printed.
                   For a summary, only the parts of the formatspec that are explicitly
                   stated will differ from the formatspec for the field being summarized.
                   All other parts will be the same.   The formatspec may include the
                   parameters: BLANK, FILL, FLOAT, JUSTIFY, SIGN, and PICTURE.
                   See the FORMAT SPECIFICATIONS section for more information.

text   Any characters, enclosed in quotes, to be printed.   For field headings,
                   each occurrence of a single bar ("I") means the heading should be split
                   at that point onto the next line.   Double bars are treated as a single
                   printable bar and the line does not split.   Bars are ignored for all
                   other headings.

$TOTAL   Optional. If specified, the keyword must be followed by the name of
$AVERAGE   a field to be summarized enclosed in parentheses.   The field must
$COUNT   appear in the FIELDS command.   May only be used in a footing. The
                   decimal point in a summary will always be aligned with the field it is
                   summarizing unless a TAB or POSITION is specified in the footspec.

                   $TOTAL   totals the field since the last control break at or above
                               the current level.

                   $AVERAGE   averages the field since the last control break at or
                               above the current level.

                   $COUNT   counts the occurrences of the field since the last control
                               break at or above the current level.

$PAGE   Print the current page number.   Allowed only in PAGE headings and
                   footings.   The page number is treated as a character string with a
                   length of the number of digits in the current page number.

FIELDHEADS   Print the field (column) headings. May be used only in a heading. Normally, the field headings are printed automatically after the PAGE HEADING. If FIELDHEADS is specified, however, the automatic printing will not occur; instead, the field headings will appear where specified by FIELDHEADS. This allows the field headings to be printed in the middle of a page heading, for example, or at each control break, instead of immediately following the page heading.

EXAMPLES:

Print a page footing with the following items: text, a field, a summary, and $PAGE.

```
)OPEN FILE INVMAS
)REPORT
>FIELDS=(CNO),(NAME),(INVNO),(FREIGHT)
>PAGE FOOTING=("LAST CUSTOMER ON THIS PAGE:";POS=LEFT),&
&>              (CNO;TAB=30;FORMAT=(JUSTIFY=LEFT)),&
&>              (NEWLINE;$TOTAL(FREIGHT);FORMAT=(FLOAT="$")),&
&>              ("PAGE";TAB=25),&
&>              ($PAGE;TAB=30)
>GO
```

HEADER ITEMS

CNO	NAME	INVNO	FREIGHT
100200	AMERICAN POLYMERS	5237	445.30
103400	NORTHLANDERS INC.	5238	0.00
103500	SUTO TRAVEL ADVISORS	5239	227.83
103400	NORTHLANDERS INC.	5240	230.02
152700	UNITED VIDEO CORP.	5241	26.95
152700	UNITED VIDEO CORP.	5242	18.00
103400	NORTHLANDERS INC.	5243	8.20

LAST CUSTOMER ON THIS PAGE· 103400

$ 956.30

PAGE 1

FORMAT SPECIFICATIONS

A complete format specification can be composed of the following:

[;BLANK]
[;FILL="fillchar"]
[;FLOAT [place]="floatchar"]
[;JUSTIFY=RIGHT|LEFT|CENTER]
[;SIGN=+|-|DB|CR|P]
[;PICTURE="picturestring"]

BLANK   Optional. If specified, blanks will be printed when the value of the field is zero. If not specified, zero will be printed in the regular format.

FILL   Optional. If specified, the keyword must be followed by a non-blank character to be used to fill in any portions of the output string not occupied by data. It may be any valid character except a quote ("). If FILL is not specified, blanks are assumed. The fillchar will be placed in all blank positions on the left of a right-justified field, on the right of a left-justified field, and on both sides of a centered field. If FILL and FLOAT are both used on a right-justified field, Fill will only fill the spaces between the float character and the left-most data position. This is the only case in which FILL and FLOAT may be used together.

FLOAT   Optional. If specified, the keyword must be followed by a single non-blank character to appear to the left of the left-most position occupied by data. The floatchar may be any valid character except a quote ("). The user may use "place" to specify how many spaces there should be between the floatchar and the data. Default is one.

JUSTIFY   Optional. If specified, the keyword must be followed by RIGHT, LEFT, or CENTER to describe the alignment of the resulting PICTURE in the output column. All justification takes place AFTER all other output formatting, except FILL, has occured. CENTERing or LEFT-justifying numeric data may mean that decimal places will not line up. RIGHT-justifying a numeric field means aligning decimal points. LEFT is the default for alpha fields and RIGHT is the default for numeric fields. If no JUSTIFY is specified for an alpha field in the body of the report, the field will be printed as it appears in the file (that is, leading blanks are not removed). When a PICTURE is justified it means that the first non-blank character is aligned with the indicated side of the column.

PICTURE   Optional. If specified, the keyword must be followed by a picturestring enclosed in quotes. If PICTURE is not specified, the default output appearance will be taken from the data file. The picturestring may contain any valid characters except quotes (") and digits (0-9). The place-holder character is an up-arrow (^) and marks the positions in the output string into which the data will be placed. There must be at least one placeholder in the picturestring. Certain other characters have special meanings for numeric fields.

Period (.)	Indicates the print position of the decimal point. If no decimal point appears in the picture and the field is numeric, the decimal point is assumed to exist on the right hand side of the rightmost holder character. Digits will be printed for every place holder to the right of the decimal point. Leading zeroes will be replaced by blanks except for the ones' position.
Comma (,)	When preceded by zeroes, a comma will not be printed.

If a number has more non-zero significant digits than there are room for in the picturestring, the width of the column will be filled with pound signs ("#"). Extra alphabetic characters or decimal places will be truncated.

PACKED and ZONED numbers given a picture with fewer decimal positions than are stored in the data file will truncate instead of round.

SIGN	Optional. If specified, the keyword must be followed by +, -, DB, CR, or P describing how the sign of a number will be indicated. The default is a leading minus sign ("-").

Plus (+)	Indicates that a plus should be printed to the left of the data for a positive number and a minus sign should be printed for a negative number.
Dash (-)	Indicates that a minus sign should be printed to the left of the data for a negative number (this is the default).
Debit (DB)	DB will be printed on the right side of the picture for positive values and CR for negative values. The PICTURE of the field will automatically be expanded on the right to make room for this.
Credit (CR)	CR will be printed on the right side of the picture for negative values. The PICTURE of the field will automatically be expanded on the right to make room for this.
Capital P (P)	The number will be surrounded by parentheses if it is negative. The picture will automatically be expanded on the right to make room for a right parenthesis. The left parenthesis must fit into the given picture (as a negative sign would have to).

If a field is set up in the file with a print format (see the RELATE commands CREATE FILE and MODIFY on how to do this), that print format will be used unless overridden by a CREATE formatspec. The RELATE field options and the formatspecs that will override a print format are as follows:

RELATE	CREATE
FORMAT=number (sign specification)	SIGN (CREATE changes trailing signs to leading signs).
DOLLAR	PICTURE containing anything other than "^" in the first position; or FLOAT.
COMMA	PICTURE of any kind.
FORMAT="datestring"	PICTURE of any kind.
FORMAT=UPPERCASE	Ignored by CREATE.

FORMAT SPECIFICATIONS

EXAMPLES:

In this example we demonstrate the effect that different format parameters would have on the field SERVICE, a numeric field of 9 characters (including 2 decimal places).

For all fields, data is:

1. Fed into the PICTURE from the left for alphabetic, from the decimal point or right for numeric.

2. Given any SIGN.

3. Given any requested FLOAT character.

4. Aligned in the column according to any JUSTIFY.

5. Given FILL if requested.

BLANK: When SERVICE is zero, its space on the report is left completely blank. This is seen in the second column.

FILL: If the field is right-justified, FILL will plug the fill character into blank spaces starting from the left side of the picture, as in the fifth column. If the field is centered, as in the third column, the fill character fills in from both sides after all other formatting is completed.

FLOAT: A float position may be specified if desired. If not specified, the float character is placed to the left of the actual data with one blank in between. If a float position is specified, as in the fourth column where "2" is requested, that many blanks are left.

JUSTIFY: Justification takes place after everything except FILL has occurred. In the second column, the data is left justified so decimal places no longer line up. In the third column, the sign "DB" is attached before the data is centered.

PICTURE: If a PICTURE is specified, the heading will be truncated to match the field width, as in the next to last column. In the same column, no decimal point is specified in the picture so it is assumed to exist to the right of the picture. Notice that data is rounded, not truncated. Blanks in a picture are significant, as in the last column, where the sign appears to the right of the picture.

SIGN: If a sign of DB, CR, or P is requested, the PICTURE is automatically expanded to make room for the extra characters. Hence, in the third column you will notice that the column width is 11 characters instead of 9. The DB and CR signs will be stuck onto the right side of the PICTURE before JUSTIFY, FLOAT, and FILL take place.

```
)OPEN FILE INVMAS
)REPORT
>FIELDS=(SERVICE),&
&>        (SERVICE;FORMAT=(BLANK;JUSTIFY=LEFT)),&
&>        (SERVICE;FORMAT=(FILL="*";JUSTIFY=CENTER;SIGN=DB)),&
&>        (SERVICE;FORMAT=(FLOAT 2="$";SIGN=P)),&
&>        (SERVICE;FORMAT=(PICTURE="↑↑↑↑↑";SIGN=+;FILL="$")),&
&>        (SERVICE;FORMAT=(PICTURE="000↑.↑↑↑.↑↑   ";SIGN=DB))
>GO
```

FORMAT SPECIFICATIONS

SERVICE	SERVICE	SERVICE	SERVICE	SERVI		SERVICE	
2.75	2.75	••2.75DB•••	$ 2.75	$$$+3	●●●	2.75	DB
-28.50	-28.50	••28.50CR••	$ (28.50)	$$-29	●●●	28.50	CR
0.00		••0.00DB•••	$ 0.00	$$$+0	●●●	0.00	DB
28.50	28.50	••28.50DB••	$ 28.50	$$+29	●●●	28.50	DB
140.00	140.00	•140.00DB••	$ 140.00	$+140	●●●	140.00	DB
0.00		••0.00DB•••	$ 0.00	$$$+0	●●●	0.00	DB
26.30	26.30	••26.30DB••	$ 26.30	$$+26	●●●	26.30	DB

APPENDICES

APPENDIX A

COMMAND FORMATS

FIELDS[=(fieldspec)[,(fieldspec)[,...]]]

PURPOSE: Specifies the fields, and the appearance of the fields, to be used in the body
            of the report.

GO

PURPOSE: Tells the system that all report definitions have been entered and it is time
            to generate the report.

GROUP FOOTING num[=(footspec)[,(footspec)[,...]]]

PURPOSE: Defines the information to be printed and actions to be taken after the last
            record of a group. The "num" refers to the break level in a fieldspec.

GROUP HEADING num[=(headspec)[,(headspec)[,...]]]

PURPOSE: Defines the information to be printed and actions to be taken before the
            first record of a group. The "num" refers to the break level in a fieldspec.

LIST REPORT [COMMANDS [rangelist]] [TO filename[:RECORDS=records]
            [;WIDTH=width]]

PURPOSE: Lists CREATE commands which have been entered during the current
            RELATE session.

PAGE FOOTING[=(footspec)[,(footspec)[,...]]]

PURPOSE: Defines the information to be printed and actions to be taken at the bottom
            of each page in the report.

PAGE HEADING[=(headspec)[,(headspec)[,...]]]

PURPOSE: Defines the information to be printed and actions to be taken at the top of
            each page in the report.

[range] REPORT[:P][:I] [USING procfile[;SHOW]] [modifiers] [FOR condition]

PURPOSE: Informs RELATE that CREATE is being entered. Modifiers may be
            [COPIES=num] [;PAGES=range] [;WAIT]

REPORT FOOTING[=(footspec)[,(footspec)[,...]]]

PURPOSE: Defines the information to be printed and actions to be taken at the end of
            the report.

REPORT HEADING[=(headspec)[,(headspec)[,...]]]

PURPOSE: Defines the information to be printed and actions to be taken at the
            beginning of the report.

REPORT OPTIONS [BETWEEN=spaces] [;AFTER=lines] [;MARGINS=left[,right]]
               [;NOHEADING] [;SPACING=num] [;NOBLANKS] [;UNDERLINE[="char"]]
               [;NOFOOTING] [;HEADDATA=num] [;FOOTDATA=num]

PURPOSE: Alters the defaults in spacing portions of the report.

FIELD SPECIFICATION

```
                    fieldname
                  [;OPTIONAL]
              [;FORMAT=(formatspec)]
              [;HEADING=(headspec)]
                  [;NOHEADING]
        [;TAB=[+]pos I fieldname[+count]]
                  [;LINE=line#]
                  [;NOPRINT]
                [;BREAK=blev]
              [;SUPPRESS=slev]
```


HEADING or FOOTING SPECIFICATION

```
                  [headeritem]
              [;NEWLINE[=nlines]]
        [;POSITION=RIGHT I LEFT I CENTER]
          [;UNDERLINE[=["uchar"][,ALL]]]
          [;OVERLINE[=["ochar"][,ALL]]]
                [;TAB=[+]pos]
                [;LINE=line#]
                [;NEWPAGE]
              [;RESETPAGE[=page]]
      [;DRAWLINE[=["lchar"][,[from][,to]]]]
```


HEADER ITEMS

```
        fieldname[;FORMAT=(formatspec)]
                    "text"
  $TOTAL I $AVERAGE I $COUNT(fieldname)[;FORMAT=(formatspec)]
          $PAGE[;FORMAT=(formatspec)]
                  FIELDHEADS
```


FORMAT SPECIFICATION

```
                  [,BLANK]
              [;FILL="fillchar"]
          [;FLOAT [place]="floatchar"]
        [;JUSTIFY=RIGHT I LEFT I CENTER]
              [;SIGN=+ I - I DB I CR I P]
            [;PICTURE="picturestring"]
```

APPENDIX A

PICTURE STRING
   consists of the following enclosed in quotes:

   ^   place holder.
   .   position of the decimal point.
   ,   not printed for numbers if no higher digits.

   any other characters except numbers or quotes (").

APPENDIX B

UNDERLINES AND OVERLINES

Underlines and overlines are among the more versatile elements of CREATE. By being able to specify the UNDERLINE and OVERLINE keywords in heading and footing specifications, the user never has to figure out where the over/underline goes or how long it is, as CREATE does this automatically. For REPORT, PAGE, and GROUP headings and footings, the following apply:

Over/Underlining Text

CREATE will draw its line under/over the exact width of the specified text. If you have a short text but want a long line, you can pad the text with blanks.

Over/Underlining Field Data

CREATE will draw its line under/over only the characters from the field that are actually printed. If you want the entire print width (picture size) of the field to be under/overlined, the keyword ALL can be included on the UNDER/OVERLINE keyword.

Over/Underlining Summaries

CREATE will draw its line under/over the print width (picture size) of the summary. If no PICTURE is specified for the summary, then CREATE uses the print width of the field being summarized.

Field Heading Underlines

When UNDERLINE is specified for a column (field) heading, the underline will always be the entire width of the column (see Appendix C, Field Headings and Column Width, for how this is determined). The ALL parameter has no effect on a column heading UNDERLINE.

APPENDIX B

EXAMPLES:

Here are underlines and overlines of text with and without padding blanks.

```
)TERMINAL $WIDTH=65
)REPORT
>FIELDS=(EMP)
>PAGE HEADING=("NO PADDING BLANKS";POSITION=LEFT;&
&>                       OVERLINE;UNDERLINE),&
&>         ("  2 BLANKS  ";POSITION=RIGHT;OVERLINE;UNDERLINE)
>GO
```

```
------------------                                          ------------
NO PADDING BLANKS                                           2 BLANKS
------------------                                          ------------
EMP

JIM  BROWN
MIKE  WALLACE
BERNIE  PERKINS
KEN  LEONG
MARK  MOONEY
SUZANNE  DE  LOACH
RICHARD  BABB
SCOTT  LUND
CLAUDIA  GREY
CHRISTINE  COLE
FRANK  ANSELMO
SCOTT  MAC  DONALD
WALLIS  SMITH
BOB  LOGAN
CHARLES  JONES
RICK  SMITH
CINDY  FREEMAN
JUAN  CERVANTES
ED  CHU
```

Here are underlines and overlines for fields showing how the length varies if ALL is not specified and how the length remains constant if ALL is specified.

```
)TERMINAL $WIDTH=65
)REPORT FOR DIV=1
>FIELDS=(DEPT;BREAK=5;NOPRINT),&
&>       (SALARY)
>GROUP HEADING 5=("FIRST EMP IN DEPT:";POSITION=LEFT),&
&>                (EMP;OVERLINE;UNDERLINE)
>GROUP FOOTING 5=("LAST EMP IN DEPT:";POSITION=LEFT),&
&>                (EMP;OVERLINE=ALL;UNDERLINE=ALL),&
&>                (NEWLINE=2)
>GO
```

SALARY

```
                                     ----------
FIRST EMP IN DEPT:                   JIM BROWN
                                     ----------

    1945.90
     820.00
    1250.00
    1050.40
                             --------------------
LAST EMP IN DEPT:               KEN LEONG
                             --------------------



                                     -----------
FIRST EMP IN DEPT:                   MARK MOONEY
                                     -----------

    1520.50
    1700.00
                             --------------------
LAST EMP IN DEPT:             SUZANNE DE LOACH
                             --------------------



                                     ------------
FIRST EMP IN DEPT:                   RICHARD BABB
                                     ------------

     910.00
    1245.90
     789.50
                             --------------------
LAST EMP IN DEPT:              CLAUDIA GREY
                             --------------------



                                     --------------
FIRST EMP IN DEPT:                   CHRISTINE COLE
                                     --------------

    1836 50
                             --------------------
LAST EMP IN DEPT:             CHRISTINE COLE
                             --------------------



                                     -------------
FIRST EMP IN DEPT:                   FRANK ANSELMO
                                     -------------

    2260.00
                             --------------------
LAST EMP IN DEPT:             FRANK ANSELMO
                             --------------------
```

This shows that overlines and underlines for summaries are as wide as the maximum print width for that total.

```
)REPORT FOR DIV=1
>FIELDS=(DEPT;BREAK=6),&
&>        (EMP),&
&>        (SALARY)
>GROUP FOOTING 6=($TOTAL(SALARY);OVERLINE),&
&>               ($TOTAL(SALARY);OVERLINE="•";&
&>                   FORMAT=(PICTURE="↑,↑↑↑,↑↑↑.↑↑")),&
&>               (NEWLINE=2)
>REPORT FOOTING=($TOTAL(SALARY);UNDERLINE="=")
>GO
```

```
DEPT   EMP                        SALARY

  5    JIM BROWN                 1945.90
  5    MIKE WALLACE               820.00
  5    BERNIE PERKINS            1250.00
  5    KEN LEONG                 1050.40
                                --------
                                 5066.30
                                ............
                                 5,066.30


 12    MARK MOONEY               1520.50
 12    SUZANNE DE LOACH          1700.00
                                --------
                                 3220.50
                                ............
                                 3,220.50


102    RICHARD BABB               910.00
102    SCOTT LUND                1245.90
102    CLAUDIA GREY               789.50
                                --------
                                 2945.40
                                ............
                                 2,945.40


150    CHRISTINE COLE            1836.50
                                --------
                                 1836.50
                                ............
                                 1,836.50


170    FRANK ANSELMO             2260.00
                                --------
                                 2260.00
                                ............
                                 2,260.00


                                15328.70
                                ========
```

APPENDIX B

APPENDIX C

FIELD HEADINGS AND COLUMN WIDTH

Column Width

The number of horizontal spaces allocated to a column of information is determined one of two ways. First, the system checks to see if the user has explicitly stated a PICTURE for the data. If so, the width of the PICTURE determines the column width, and field headings may be truncated to match the PICTURE width. If the column width is not specified using the PICTURE keyword, the larger of the field heading or the default print format for the field is used. If a field heading is defined by the user and vertical bars are employed to split the heading into more than one line, the largest portion of the heading is the width of the heading.

Spaces between Columns

By default, the system leaves two spaces between each column of data (each column having a width as described above). This may be overridden with the use of the TAB parameter, or by using the BETWEEN parameter on the REPORT OPTION command.

Default Field Headings

The default heading for each column of data is the field name listed in the FIELDS command.

Placement of Data Under Heading

If the heading width is narrower than the column width, and no heading justification is explicitly stated, then the heading will be: aligned on the right with right-justified data, aligned on the left with left-justified data, and centered over centered data.

If the heading width is narrower than the column width and a heading justification is explicitly stated, then the heading will be aligned to the left-most position in the column for JUSTIFY=LEFT, aligned to the right-most position in the column for JUSTIFY=RIGHT, and centered over the available column area for JUSTIFY=CENTER.

If the heading width is wider than the data width (that is, the column width is based on the heading width), then there are actually two widths for each column: one width to accomodate the size of the heading and a narrower width, centered under the heading width, in which data is manipulated. Left- or right-justified data will now be justified to the edges of the inner column which always remains centered under the heading. Placing a justification on the heading is now meaningless since the column size is exactly the same as the heading width.

Bars In the Field Heading

Using a single vertical bar in a field heading indicates that the text should be split onto separate lines. A field heading can be split into an unlimited number of lines.

Spaces are significant in a heading specification. A bar followed by a space followed by another bar will print the first portion of the text on the first line, then a blank line, then the next portion of the text. A heading specified to have spaces at the beginning or end will count those spaces as characters when determining justification.

Two adjacent vertical bars will not split the line and will be printed as a single vertical bar.

The system automatically lines up the last lines of all field headings onto the same line. If two fields have the headings "FIRST|HEADING|TEXT" and "SECOND", the words "TEXT" and "SECOND" will appear on the same output line. To top-align the headings, all shorter headings need to have bars followed by spaces inserted into them, as in "SECOND| |". (Since a single vertical bar always generates a new line, this will produce the same results as "SECOND| | ".)

If a heading is centered, all portions of the heading will be centered. If a heading is left- or right-justified, all portions of the heading will be justified accordingly.

Placement of Field Headings on a Page

Field headings will appear at the top of the page unless a PAGE HEADING has been specified, in which case they will appear immediately after the PAGE HEADING. If FIELDHEADS is specified anywhere, the field headings will appear only where requested (e.g. in the middle of a PAGE HEADING or GROUP HEADING), and will not appear immediately after the PAGE HEADING.

There are normally no blank lines left after the page heading and before the field headings. There is one blank line left after the field headings unless the AFTER parameter in REPORT OPTIONS specifies otherwise. The suggested manner to add lines before the field headings is to use a NEWLINE parameter in the PAGE HEADING.

EXAMPLES:

Column width: If a PICTURE is not explicitly stated, and the heading is narrower than the default picture (field width), then the column width will be equal to the width of the default picture, as for the field INVNO (a 6-character field). If a PICTURE is not explicitly stated, but the heading is wider than the default picture, the column width will be equal to the width of the heading, as for TERM_D (a 3-character field).

```
)OPEN FILE INVMAS
)SHOW

FILE NAME               =INVMAS.DOC81.RDB

             T
             Y  PRINT   INT
NAME         P   LEN   SIZE

CNO          R    6     2W
INVNO        A    8     8B
NAME         A   20    20B
ADDRESS      A   15    16B
CITY         A   10    10B
ST           A    2     2B
ZIP          A    6     6B
PO           A    5     6B
D_ORD        R    8     2W
D_INV        R    8     2W
REMARKS      A   30    30B
DISC         R    9.2   2W
FREIGHT      R    9.2   2W
SERVICE      R    9.2   2W
C_TAX        R    7.2   2W
S_TAX        R    7.2   2W
TERM_P       R    5.2   2W
TERM_D       I    3     1W

PRINT LINE WIDTH = 190 CHARACTERS.
```

APPENDIX C

```
)REPORT
>FIELDS=(INVNO),(TERM_D)
>GO


INVNO      TERM_D

5237         60
5238         30
5239         30
5240         30
5241         10
5242         60
5243         10
```

Column width: If a PICTURE is explicitly stated, then all headings will be truncated to fit the PICTURE width whether or not the user specified the heading.

```
)REPORT
>FIELDS=(INVNO;FORMAT=(PICTURE="↑↑↑↑↑↑");&
&>                  HEADING=("INVOICE NUMBER")),&
&>         (TERM_D;FORMAT=(PICTURE="↑↑↑"))
>GO


INVOIC   TER

5237      60
5238      30
5239      30
5240      30
5241      10
5242      60
5243      10
```

Placement of data: Default placement of data in a column is left-justified for alphabetic and right-justified (decimals aligned) for numeric. The heading justification will follow the data justification unless otherwise stated in the headspec. Compare the headings for NAME (a 20-character field) and FREIGHT (a 9-character field).

```
)REPORT
>FIELDS=(NAME),(NAME;HEADING=(JUSTIFY=RIGHT)),&
&>        (FREIGHT),(FREIGHT;HEADING=(JUSTIFY=CENTER))
>GO
```

NAME	NAME	FREIGHT	FREIGHT
AMERICAN POLYMERS	AMERICAN POLYMERS	445.30	445.30
NORTHLANDERS INC.	NORTHLANDERS INC.	0.00	0.00
SUTO TRAVEL ADVISORS	SUTO TRAVEL ADVISORS	227.83	227.83
NORTHLANDERS INC.	NORTHLANDERS INC.	230.02	230.02
UNITED VIDEO CORP.	UNITED VIDEO CORP.	26.95	26.95
UNITED VIDEO CORP.	UNITED VIDEO CORP.	18.00	18.00
NORTHLANDERS INC.	NORTHLANDERS INC.	8.20	8.20

Placement of data: If no PICTURE is specified and the heading is wider than the default picture, the width of the data will always be centered under the heading although within that width the justification may be different. INVNO is an 8-character field.

```
)REPORT
>FIELDS=(INVNO;HEAD=("INVOICE NUMBER")),&
&>       (INVNO;FORMAT=(JUSTIFY=RIGHT);HEAD=("INVOICE NUMBER")),&
&>       (INVNO;FORMAT=(JUSTIFY=CENTER);HEAD=("INVOICE NUMBER"))
>GO


INVOICE NUMBER   INVOICE NUMBER   INVOICE NUMBER

    5237             5237           5237
    5238             5238           5238
    5239             5239           5239
    5240             5240           5240
    5241             5241           5241
    5242             5242           5242
    5243             5243           5243
```

Bars and spaces in field headings: A vertical bar moves the following text onto a new
line. Spaces placed in the heading by the user will be counted as characters.

```
)REPORT
>FIELDS=(INVNO),&
&>        (INVNO;HEAD=("INVOICE|#|")),&
&>        (INVNO;HEAD=("|INVOICE|#")),&
&>        (INVNO;HEAD=("INVOICE| |#")),&
&>        (INVNO;HEAD=("INVOICE|  #"))
>GO
```

	INVOICE #		INVOICE 	
		INVOICE #		INVOICE
INVNO		#	#	#
5237	5237	5237	5237	5237
5238	5238	5238	5238	5238
5239	5239	5239	5239	5239
5240	5240	5240	5240	5240
5241	5241	5241	5241	5241
5242	5242	5242	5242	5242
5243	5243	5243	5243	5243

All parts of a heading will be justified in the same way.

```
)REPORT
>FIELDS=(INVNO;HEAD=("CUST|INVOICE|#")),&
&>        (INVNO;HEAD=("CUST|INVOICE|#";JUST=RIGHT)),&
&>        (INVNO;HEAD=("CUST|INVOICE|#";JUST=CENTER))
>GO


CUST              CUST      CUST
INVOICE        INVOICE   INVOICE
#                    #         #

5237           5237      5237
5238           5238      5238
5239           5239      5239
5240           5240      5240
5241           5241      5241
5242           5242      5242
5243           5243      5243
```

APPENDIX C

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APPENDIX D

JUSTIFICATION IN HEADINGS AND FOOTINGS

All of the following apply to headings and footings of REPORT, PAGE, and GROUP types. When the term "headspec" is used in this section, it means either "headspec" or "footspec".

Position on a line

If no POSITION is used in the headspec, the data will be printed in the center of the line. POSITION=LEFT pushes the headeritem to the left margin, and POSITION=RIGHT to the right. If TAB is used instead of POSITION, the data will begin printing at the position indicated by the TAB.

Justification of data

A headspec containing a field to be printed may contain a FORMAT specification (formatspec). Within the formatspec, there is a JUSTIFY parameter which can be used. This justification refers to the appearance of the data, not its position on the page. This justification places the headeritem to the left, center, or right of the area allocated for it. In other words, if the PICTURE for the field is 8 characters wide, the JUSTIFY in the formatspec determines whether the data will be pushed to the left, center, or right of those 8 characters. Then all 8 characters are pushed to the left, center, or right of the page depending on the POSITION in the headspec.

The default justification will match the POSITION specified in the headspec. This will always happen with text headeritems because no formatspec is allowed.

If a TAB was given for the data instead of a POSITION, data will be justified as normal at that tab position unless otherwise specified in the formatspec.

APPENDIX D

EXAMPLES:

The following is an example of the effects of different combinations of the POSITION parameter in the headspec and the JUSTIFY parameter in the formatspec. For comparison purposes, we use an explicit text of 8 characters, ("PRNTTEXT"), an alphabetic field containing a maximum of 8 characters (INVNO), and a numeric field which we will temporarily modify to also have 8 characters for comparison purposes (S_TAX).

```
)OPEN FILE INVMAS
)MODIFY FIELD S_TAX:SIZE=8.2
```

When the headspec contains a POSITION=RIGHT, the following will happen:

For explicit text: Text will always be aligned with the right side of the page no matter what the FORMAT says.

For alphabetic fields (INVNO): The width of the picture will be aligned with the right side of the page and any JUSTIFY in the FORMAT spec will align the data within that width. If FORMAT is not specified, the default JUSTIFY matches the headspec POSITION (in this case, RIGHT).

For numeric fields (S_TAX): Same as for alphabetic fields.

```
)TERMINAL $WIDTH=65
)REPORT
>FIELD=(CNO;NOPRINT)
>PAGE HEAD=("THIS IS THE RIGHT SIDE ->";POSITION=RIGHT),&
&>    ("PRNTTEXT";POSITION=RIGHT),&
&>    (S_TAX;POSITION=RIGHT;FORMAT=(JUSTIFY=CENTER)),&
&>    (S_TAX;POSITION=RIGHT;FORMAT=(JUSTIFY=LEFT)),&
&>    (S_TAX;POSITION=RIGHT;FORMAT=(JUSTIFY=RIGHT)),&
&>    (S_TAX;POSITION=RIGHT),&
&>    (INVNO;POSITION=RIGHT;FORMAT=(JUSTIFY=CENTER)),&
&>    (INVNO;POSITION=RIGHT;FORMAT=(JUSTIFY=LEFT)),&
&>    (INVNO;POSITION=RIGHT;FORMAT=(JUSTIFY=RIGHT)),&
&>    (INVNO;POSITION=RIGHT)
>GO


                              THIS IS THE RIGHT SIDE ->
                                             PRNTTEXT
                                              226.80
                                              226.80
                                               226.80
                                               226.80
                                               5237
                                             5237
                                                 5237
                                                 5237
```

APPENDIX D

When the headspec contains a POSITION=LEFT, the following will occur:

For explicit text: The text will always be aligned with the left side of the page.

For alphabetic or numeric fields: Everything will occur as in POSITION=RIGHT except that things are aligned with the left side of the page, and the default FORMAT for fields is JUSTIFY=LEFT to match the headspec's LEFT.

```
)REPORT
>FIELD=(CNO;NOPRINT)
>PAGE HEADING=&
&>     ("<- THIS IS THE LEFT";POSITION=LEFT),&
&>     ("PRNTTEXT";POSITION=LEFT),&
&>     (S_TAX;POSITION=LEFT;FORMAT=(JUSTIFY=CENTER)),&
&>     (S_TAX;POSITION=LEFT;FORMAT=(JUSTIFY=LEFT)),&
&>     (S_TAX;POSITION=LEFT;FORMAT=(JUSTIFY=RIGHT)),&
&>     (S_TAX;POSITION=LEFT),&
&>     (INVNO;POSITION=LEFT;FORMAT=(JUSTIFY=CENTER)),&
&>     (INVNO;POSITION=LEFT;FORMAT=(JUSTIFY=LEFT)),&
&>     (INVNO;POSITION=LEFT;FORMAT=(JUSTIFY=RIGHT)),&
&>     (INVNO;POSITION=LEFT)
>GO


<- THIS IS THE LEFT
PRNTTEXT
 226.80
226.80
   226.80
226.80
   5237
5237
     5237
5237
```

When the headspec contains a POSITION=CENTER, the following will occur:

For explicit text: The text will always be centered on the page.

For fields: Same as for RIGHT and LEFT, except that the default is CENTER.

```
)TERMINAL $WIDTH=65
)REPORT
>FIELD=(CNO;NOPRINT)
>PAGE HEADING=&
&>     ("THIS IS-><- CENTER"),&
&>     ("PRNTTEXT";POSITION=CENTER),&
&>     (S_TAX;POSITION=CENTER;FORMAT=(JUSTIFY=CENTER)),&
&>     (S_TAX;POSITION=CENTER;FORMAT=(JUSTIFY=LEFT)),&
&>     (S_TAX;POSITION=CENTER;FORMAT=(JUSTIFY=RIGHT)),&
&>     (S_TAX;POSITION=CENTER),&
&>     (INVNO;POSITION=CENTER;FORMAT=(JUSTIFY=CENTER)),&
&>     (INVNO;POSITION=CENTER;FORMAT=(JUSTIFY=LEFT)),&
&>     (INVNO;POSITION=CENTER;FORMAT=(JUSTIFY=RIGHT)),&
&>     (INVNO;POSITION=CENTER)
>GO
```

```
                    THIS IS-><- CENTER
                         PRNTTEXT
                         226.80
                    226.80
                           226.80
                      226.80
                        5237
                    5237
                             5237
                        5237
```

APPENDIX E

APPENDIX E

CONTROL BREAKS
or
DEFINING AND USING GROUPINGS OF DATA

Let us say that we would like to generate a report that lists employee names and salaries and then subtotals the salaries for every Department and every Division. We are saying that we would like to "GROUP" the data by Department and Division. That is, we want our report to be controlled by Department and Division. We call Department and Division our "CONTROL FIELDS."

When a record is read and the value of a control field is different from its value in the previous record, a "CONTROL BREAK" is said to occur.

To tell CREATE which fields are control fields, we must:

1. Give the FIELDS command the names of the fields.

2. In the FIELDS command, give each control field the BREAK keyword followed by a BREAK LEVEL.

If our file contains the fields DIV (division), DEPT (department), EMP (employee) and SALARY, then the FIELD command for our report might look something like this:

    FIELDS=(DIV;BREAK=20),(DEPT;BREAK=10),(EMP),(SALARY)

The "BREAK LEVEL" determines the importance of a field: the most important field will usually be the one with the largest number of records in its group. Another way of thinking of it is that the most important field changes its value least often (has the least number of control breaks occurring).

The higher the break level, the more important the field. The actual value of the break level is unimportant, as long as:

1. The most important fields have the highest numbers.

2. Not more than one field has the same break level.

3. The break levels are between 1 and 100.

After the control fields have been defined, the GROUP HEADING and GROUP FOOTING commands can be used to describe actions to perform when a control break occurs. GROUP HEADING specifies what to print at the beginning of a new group. GROUP FOOTING specifies what to print at the end of a group of data.

The GROUP commands must include the number of a break level to tell CREATE which group of data the heading or footing belongs to. The break level on the GROUP command must match a break level from one of the BREAK keywords. For our example, we would say:

    GROUP FOOTING 10=("DEPARTMENT TOTAL"),($TOTAL(SALARY))

    GROUP FOOTING 20=("DIVISION TOTAL"),($TOTAL(SALARY))

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If we wanted to print a heading at the beginning of each Department, naming the Department about to be listed, we could say:

GROUP HEADING 10=("SALARIES FOR DEPT #:"), (DEPT)

In this case, we probably wouldn't want the Department number to print on every line. We can respecify the Department's fieldspec to be:

...,(DEPT; BREAK=10; SUPPRESS=10),...

which will cause the printing of the field to be SUPPRESSed at all times except when a control break occurs in a field with the same break level. In this case, DEPT is its own control field for suppression. This means that DEPT will only print on the first line of each Department group.

We could also redefine it as:

...,(DEPT; BREAK=10; NOPRINT),...

which means that DEPT will never print on a line of the report and no space will be left for it. The only place it will appear is in the group heading.

If we wanted each Division to start on a new page and include the name of the Division in the page headings, we would use the commands:

GROUP HEADING 20=(NEWPAGE)

PAGE HEADING=("SALARIES FOR DIVISION #:"), (DIV)

A control break will trigger control breaks in all fields with lower break levels. In other words, when you come to the end of a Division, you have also automatically come to the end of a Department. Therefore, at the end of a Division, you will get the total of the last Department before you get the total for the Division.

For more information on what can appear in HEADINGS and FOOTINGS, see the HEADING SPECIFICATION and FOOTING SPECIFICATION sections.

EXAMPLES:

```
)OPEN FILE EMPL
)PRINT

$LINE DI DEP EMP                      SALARY

    1  1    5 JIM BROWN              1945.90
    2  1    5 MIKE WALLACE            820.00
    3  1    5 BERNIE PERKINS         1250.00
    4  1    5 KEN LEONG              1050.40
    5  1   12 MARK MOONEY            1520.50
    6  1   12 SUZANNE DE LOACH       1700.00
    7  1  102 RICHARD BABB            910.00
    8  1  102 SCOTT LUND             1245.90
    9  1  102 CLAUDIA GREY            789.50
   10  1  150 CHRISTINE COLE         1836.50
   11  1  170 FRANK ANSELMO          2260.00
   12  2    5 SCOTT MAC DONALD       1740.00
   13  2    5 WALLIS SMITH            835.50
   14  2   12 BOB LOGAN              1100.00
   15  2  103 CHARLES JONES          1320.80
   16  2  103 RICK SMITH             2050.30
   17  2  103 CINDY FREEMAN           906.00
   18  2  170 JUAN CERVANTES         1580.45
   19  2  170 ED CHU                 1840.95

19 LINES PRINTED.
```

```
)REPORT
>FIELDS=(DIV;BREAK=20),(DEPT;BREAK=10;SUPP=10),&
&>      (EMP),(SALARY)
>GROUP FOOTING 10=("DEPARTMENT TOTAL:";TAB=15),&
&>               ($TOTAL(SALARY);OVERLINE),(NEWLINE=2)
>GROUP FOOTING 20=("DIVISION TOTAL:";TAB=15),&
&>               ($TOTAL(SALARY);UNDERLINE="=")
>GROUP HEADING 10=("SALARIES FOR DEPARTMENT #:";TAB=10),&
&>               (DEPT;TAB=37)
>GROUP HEADING 20=(NEWPAGE)
>PAGE HEADING=("SALARIES FOR DIVISION #:";TAB=5),&
&>            (DIV;TAB=30),(NEWLINE=2)
>GO
```

```
        SALARIES FOR DIVISION #:   1


DIV   DEPT   EMP                        SALARY

            SALARIES FOR DEPARTMENT #:   5
  1      5    JIM BROWN                 1945.90
  1           MIKE WALLACE               820.00
  1           BERNIE PERKINS            1250.00
  1           KEN LEONG                 1050.40
                                       ---------
              DEPARTMENT TOTAL:         5066.30


            SALARIES FOR DEPARTMENT #:  12
  1     12    MARK MOONEY               1520.50
  1           SUZANNE DE LOACH          1700.00
                                       ---------
              DEPARTMENT TOTAL:         3220.50


            SALARIES FOR DEPARTMENT #: 102
  1    102    RICHARD BABB               910.00
  1           SCOTT LUND                1245.90
  1           CLAUDIA GREY               789.50
                                       ---------
              DEPARTMENT TOTAL:         2945.40


            SALARIES FOR DEPARTMENT #: 150
  1    150    CHRISTINE COLE            1836.50
                                       ---------
              DEPARTMENT TOTAL:         1836.50


            SALARIES FOR DEPARTMENT #: 170
  1    170    FRANK ANSELMO             2260.00
                                       ---------
              DEPARTMENT TOTAL:         2260.00


              DIVISION TOTAL:          15328.70
                                       =========
```

APPENDIX E

```
        SALARIES FOR DIVISION #:   2


DIV    DEPT    EMP                         SALARY

                SALARIES FOR DEPARTMENT #:    5
 2       5     SCOTT MAC DONALD            1740.00
 2             WALLIS SMITH                 835.50
                                          ---------
                DEPARTMENT TOTAL:          2575.50


                SALARIES FOR DEPARTMENT #:   12
 2      12     BOB LOGAN                   1100.00
                                          ---------
                DEPARTMENT TOTAL:          1100.00


                SALARIES FOR DEPARTMENT #:  103
 2     103     CHARLES JONES               1320.80
 2             RICK SMITH                  2050.30
 2             CINDY FREEMAN                906.00
                                          ---------
                DEPARTMENT TOTAL:          4277.10


                SALARIES FOR DEPARTMENT #:  170
 2     170     JUAN CERVANTES              1580.45
 2             ED CHU                      1840.95
                                          ---------
                DEPARTMENT TOTAL:          3421.40


                DIVISION TOTAL:           11374.00
                                          =========
```

APPENDIX F

CREATING AN INVOICE REPORT STEP–BY–STEP

A report can be a very general or a highly customized listing of information. CREATE was designed with the idea that a user should be able to arrange output in the format most useful to him. Most of the functions of CREATE are simple and easily applied; others are more subtle and require using the available commands in a less obvious manner.

To give an idea of how a report is formulated, we will give the example of a company attempting to create an invoice to send to their customers. The final appearance of the invoice should be: (See next page)

APPENDIX F

```
                  Petersen Equipment Company
                      Computer Division
                     300 Westchester Ave.
                   White Plains, NY  11430
                        212-838-2922
                      January 9, 1985
                            INVOICE NUMBER:        5241

BILL TO:                      SHIP TO:
    UNITED VIDEO CORP.            UNITED VIDEO CORP.
    2332 LAFAYETTE                8282 W. MAIN
    HOUSTON, TX  73211            GALVESTON, TX  74437

CUSTOMER NUMBER:   152700     PURCHASE ORDER:6572

DATE ORDERED:      8/12/82    DATE INVOICED:  8/18/82

REMARKS:


LNUM   PART       DESCRIPTION        PRICE   QTY_S      AMOUNT

  1    M93-446    PRINTOUT BINDER     6.47    200      1294.00

  2    A87-011    15x11 PAPER        40 25     40      1610.00

TERMS   2.00%,  10 DAYS       TOTAL AMOUNT:     $ 2904.00


                              DISCOUNT:           50.00
                              FREIGHT:            26.95
                              SERVICE:           140.00
                              STATE TAX:         116.16
                              CITY TAX:           43.50
                              TOTAL:         $ 3180.61
```

The information necessary to generate an invoice exists in four different files. The contents of the files are indicated here, but we will deal with them one at a time to show how they are mixed together.

UINFO   Contains the name and address of the user's company.

CUST   Contains the billing addresses of all customers.

INVMAS   Contains the master portion of all invoices, including any information that is recorded only once for each invoice, including shipping address, freight charges, invoice date.

INVDET   Contains the details portion of all invoices; that is, L I N E n u m b e r s, p a r t numbers, quantities ordered and shipped, price per item, and so forth. There may be many records in INVDET for each record in INVMAS.

```
)OPEN FILE UINFO
)PRINT

$LINE UNAME                                    UNAME1
UADDRESS               UCITY                    US UZIP    UPHONE

      1 Petersen Equipment Company       Computer Division
300 Westchester Ave. White Plains            NY 11430   212-838-2922


1 LINE PRINTED.
)OPEN FILE CUST
)PRINT:S

      CNO BNAME                   BNAME2              BADDRESS
BCITY          BS
BZIP

100200 AMERICAN POLYMERS      PLASTICS DIVISION   832 WILDWOOD DR
ASPEN          CO
80237
103400 NORTHLANDERS INC.                          PO BOX 827
GREEN BAY   WI
60444
103500 SUTO TRAVEL ADVISORS                       18A MAIN ST
DALLAS         TX
75230
152700 UNITED VIDEO CORP.    CORPORATE FINANCE   2332 LAFAYETTE
HOUSTON        TX
73211


4 LINES PRINTED.
```

APPENDIX F

```
)OPEN FILE INVMAS
)SHOW

FILE NAME                =INVMAS.DOC81.RDB


              T
              Y  PRINT   INT
NAME          P  LEN    SIZE


CNO           R    6      2W
INVNO         A    8      8B
NAME          A   20     20B
ADDRESS       A   15     16B
CITY          A   10     10B
ST            A    2      2B
ZIP           A    6      6B
PO            A    5      6B
D_ORD         R    8      2W
D_INV         R    8      2W
REMARKS       A   30     30B
DISC          R   9.2     2W
FREIGHT       R   9.2     2W
SERVICE       R   9.2     2W
C_TAX         R   7.2     2W
S_TAX         R   7.2     2W
TERM_P        R   5.2     2W
TERM_D        I    3      1W


PRINT LINE WIDTH = 190 CHARACTERS.
)PRINT:S CNO,INVNO,DISC,FREIGHT,SERVICE,C_TAX,S_TAX

    CNO INVNO         DISC    FREIGHT   SERVICE    C_TAX     S_TAX

  100200 5237       700.00    445.30      2.75      0.00    226.80
  103400 5238         0.00      0.00    -28.50      0.00   5963.80
  103500 5239       150.00    227.83      0.00     29.33     78.20
  103400 5240       100.00    230.02     28.50      0.00    127.20
  152700 5241        50.00     26.95    140.00     43.50    116.16
  152700 5242        50.00     18.00      0.00     48.65    129.75
  103400 5243        20.00      8.20     26.30      0.00      8.75

7 LINES PRINTED.
```

```
)OPEN FILE INVDET
)SHOW

FILE NAME            =INVDET.DOC81.RDB


            T
            Y  PRINT   INT
NAME        P  LEN    SIZE


CNO         R   6      2W
INVNO       A   8      8B
LINE        I   3      1W
PART        A   8      8B
DESC        A  15     16B
PRICE       R   9.2    2W
QTY_O       I   4      1W
QTY_S       I   4      1W
UM          A   2      2B


PRINT LINE WIDTH = 73 CHARACTERS.
)PRINT:S

      CNO INVNO     LIN PART      DESC              PRICE QTY_ QTY_ UM

   100200 5237       1 A98-425   8x11 PAPER         34.50  100  100 BX
   100200 5237       2 A57-620   PRINTER RIBBONS     8.25   40   30 EA
   103400 5238       1 W09-145   X24 TERMINAL     1490.95   10   10 EA
   103500 5239       1 A57-620   PRINTER RIBBONS     8.25   50   30 EA
   103500 5239       2 A57-192   PRINTER RIBBONS     6.50   30   30 EA
   103500 5239       3 A57-421   RIBBON CARTRIDG    19.25   70   70 EA
   103400 5240       1 W09-145X  REBUILT TERMINA   795.00    4    4 EA
   152700 5241       1 M93-446   PRINTOUT BINDER     6.47  200  200 EA
   152700 5241       2 A87-011   15x11 PAPER        40.25   40   40 BX
   152700 5242       1 A87-103   15x11 PAPER UNL    40.25   20   20 BX
   152700 5242       2 D00-301   TAPE LABELS        22.15   40   40 BX
   152700 5242       3 D45-642   MAG TAPE          310.50    5    5 BX
   103400 5243       1 H03-492   RS-232 CONNECT      6.23   35   35 EA


13 LINES PRINTED.
```

The next step is to have each individual invoice on a new page. This requires the use of a control break. Since the occurrence of a new invoice depends on the invoice number, we give the INVNO field a break level.

From here on, we will add a "WHERE INVDET.CNO=152700" to the SELECT command so that we will only have two invoices printed for testing purposes. This will be replaced later with "BY CNO" when we are ready to print all invoices.

```
)SELECT
DE-SELECTED.   THE CURRENT PATH IS "INVDET".
)SELECT INVDET.@,&
&)    LNUM=INVDET.LINE,&
&)    AMOUNT=INVDET.QTY_S*INVDET.PRICE &
&)       WHERE INVDET.CNO=152700
)REPORT
>FIELDS=&
&>    (INVNO;NOPRINT;BREAK=3),&
&>    (LNUM),&
&>    (PART),&
&>    (DESC;HEADING=("DESCRIPTION")),&
&>    (PRICE),&
&>    (QTY_S),&
&>    (AMOUNT)
>GROUP HEADING 3=(NEWPAGE)
>GO
```

LNUM	PART	DESCRIPTION	PRICE	QTY_S	AMOUNT
1	M93-446	PRINTOUT BINDER	6.47	200	1294.00
2	A87-011	15x11 PAPER	40.25	40	1610.00

```
&>        (C_TAX;POSITION=RIGHT),&
&>    ("TOTAL:";TAB=40),&
&>        (INVTOT;POSITION=RIGHT)
>GO
```

LNUM	PART	DESCRIPTION	PRICE	QTY_S	AMOUNT
1	M93-446	PRINTOUT BINDER	6.47	200	1294.00
2	A87-011	15x11 PAPER	40.25	40	1610.00
			TOTAL AMOUNT:		2904.00

DISCOUNT:	50.00
FREIGHT:	26.95
SERVICE:	140.00
STATE TAX:	116.16
CITY TAX:	43.50
TOTAL:	3180.61

APPENDIX F

LNUM	PART	DESCRIPTION	PRICE	QTY_S	AMOUNT
1	A87-103	15x11 PAPER UNL	40.25	20	805.00
2	D00-301	TAPE LABELS	22.15	40	886.00
3	D45-642	MAG TAPE	310.50	5	1552.50
			TOTAL AMOUNT:		3243.50

DISCOUNT:	50.00
FREIGHT:	18.00
SERVICE:	0.00
STATE TAX:	129.75
CITY TAX:	48.65
TOTAL:	3389.90

With the same selection, one can also get the shipping address and most of the other information to be used in the invoice heading. We must make it a page heading instead of a group heading because the column headings containing the field names come AFTER the page heading but BEFORE any group headings. The pleasing output of city, state, and zip is done with the $CONCAT function in the SELECT command. To put blank lines between the detail lines, we define a "dummy" break level on the LNUM field and give it a GROUP FOOTING that does nothing but print a blank line.

```
)SELECT INVDET.@,INVMAS.@,&
&)     LNUM=INVDET.LINE,&
&)     AMOUNT=INVDET.PRICE*INVDET.QTY_S,&
&)     INVTOT=INVMAS.FREIGHT+INVMAS.SERVICE+&
&)       INVMAS.S_TAX+INVMAS.C_TAX-INVMAS.DISC+&
&)       $SUM(INVDET.PRICE*INVDET.QTY_S BY INVDET.CNO,&
&)                 INVDET.INVNO),&
&)     SLINE=$CONCAT(INVMAS.CITY,",  ",INVMAS.ST, &
&)                       "  ",INVMAS.ZIP) &
&)     WHERE INVMAS.CNO=INVDET.CNO &
&)       AND INVMAS.INVNO=INVDET.INVNO &
&)       AND INVDET.CNO=152700
)TERMINAL $WIDTH=65
)REPORT
>PAGE HEADING=&
&>     ("INVOICE NUMBER:";TAB=40),&
&>         (INVNO;POSITION=RIGHT),&
&>     (NEWLINE=2;"SHIP TO:";TAB=35),&
&>         (NEWLINE;NAME;TAB=40),&
&>         (ADDRESS;TAB=40),&
&>         (SLINE;TAB=40),&
&>     (NEWLINE=2;"CUSTOMER NUMBER:";POSITION=LEFT),&
&>         (CNO;TAB=20),&
&>     ("PURCHASE ORDER:";TAB=35),&
&>         (PO;TAB=50),&
&>     (NEWLINE=2;"DATE ORDERED:";POSITION=LEFT),&
&>         (D_ORD;TAB=20),&
&>     ("DATE INVOICED:";TAB=35),&
&>         (D_INV;TAB=50),&
&>     ("REMARKS:";NEWLINE=2;POSITION=LEFT),&
&>         (REMARKS;TAB=10),&
&>     (NEWLINE=3)
>FIELDS=&
&>     (INVNO;NOPRINT;BREAK=3),&
&>     (LNUM;BREAK=2),&
&>     (PART),&
&>     (DESC;HEADING=("DESCRIPTION")),&
&>     (PRICE),&
&>     (QTY_S),&
&>     (AMOUNT)
>GROUP FOOTING 2=(NEWLINE)
>GROUP HEADING 3=(NEWPAGE)
>GROUP FOOTING 3=&
&>     ("TERMS";POSITION=LEFT),&
&>         (TERM_P;TAB=8),&
&>         ("%,  ";TAB=13),&
&>         (TERM_D;TAB=16),&
```

```
&>        ("DAYS";TAB=20),&
&>     ("TOTAL AMOUNT:";TAB=35),&
&>        ($TOTAL(AMOUNT);FORMAT=(FLOAT="$")),&
&>     (NEWLINE=4;"DISCOUNT:";TAB=40),&
&>        (DISC;POSITION=RIGHT),&
&>     ("FREIGHT:";TAB=40),&
&>        (FREIGHT;POSITION=RIGHT),&
&>     ("SERVICE:";TAB=40),&
&>        (SERVICE;POSITION=RIGHT),&
&>     ("STATE TAX:";TAB=40),&
&>        (S_TAX;POSITION=RIGHT),&
&>     ("CITY TAX:";TAB=40),&
&>        (C_TAX;POSITION=RIGHT),&
&>     ("TOTAL:";TAB=40),&
&>        (INVTOT;POSITION=RIGHT;FORMAT=(FLOAT="$"))
>GO
```

```
                              INVOICE NUMBER:        5241

                         SHIP TO:
                              UNITED VIDEO CORP.
                              8282 W. MAIN
                              GALVESTON, TX   74437

CUSTOMER NUMBER:    152700    PURCHASE ORDER:6572

DATE ORDERED:       8/12/82   DATE INVOICED:  8/18/82

REMARKS:


LNUM    PART      DESCRIPTION          PRICE   QTY_S      AMOUNT

  1     M93-446   PRINTOUT BINDER       6.47    200      1294.00

  2     A87-011   15x11 PAPER          40.25     40      1610.00

TERMS   2.00%,  10 DAYS        TOTAL AMOUNT:     $ 2904.00


                                       DISCOUNT:        50.00
                                       FREIGHT:         26.95
                                       SERVICE:        140.00
                                       STATE TAX:      116.16
                                       CITY TAX:        43.50
                                       TOTAL:       $ 3180.61
```

```
                                    INVOICE NUMBER:        5242

                                 SHIP TO:
                                    UNITED VIDEO CORP.
                                    8282 W. MAIN
                                    GALVESTON, TX   74437

CUSTOMER NUMBER:     152700      PURCHASE ORDER:6575

DATE ORDERED:        8/12/82     DATE INVOICED:  8/18/82

REMARKS:  SHIP WITH INVOICE 5241
```

LNUM	PART	DESCRIPTION	PRICE	QTY_S	AMOUNT
1	A87-103	15x11 PAPER UNL	40.25	20	805.00
2	D00-301	TAPE LABELS	22.15	40	886.00
3	D45-642	MAG TAPE	310.50	5	1552.50

```
TERMS  10.75%,  60 DAYS       TOTAL AMOUNT:     $ 3243.50


                                 DISCOUNT:            50.00
                                 FREIGHT:             18.00
                                 SERVICE:              0.00
                                 STATE TAX:          129.75
                                 CITY TAX:            48.65
                                 TOTAL:           $ 3389.90
```

The final step is to add the billing address of the customer and the name of the user's company. The user's company name and address are contained in the UINFO file. Since we want this to print at the top of every page, we will put this information in a page heading. Since we want it all centered, and since the system automatically centers things, we will not need any formatting specifications at all. The only thing to be done with this is to concatenate the city, state, and zip code with the SELECT command like we did with the customer's shipping address.

We would also like to print the current date in the invoice heading. RELATE has a number of date manipulation functions which can be used by the SELECT command to obtain the date in any format. We will create the field TODAY as the current date in "month day,year" format.

The billing addresses of customers are kept in the CUST file. We will need to join this file to the invoices by matching the customer number (CNO). This is done in the WHERE clause also. Then we add the information in the desired format to the GROUP HEADING, and the report is finished.

```
)SELECT
DE-SELECTED.   THE CURRENT PATH IS "INVMAS".
)SELECT INVDET.O,INVMAS.O,UINFO.O,CUST.O,&
&)    LNUM=INVDET.LINE,&
&)    AMOUNT=INVDET.PRICE*INVDET.QTY_S,&
&)    TODAY=$CONCAT($MONTH($DATE,2)," ",$DAY($DATE),", ",&
&)              $YEAR($DATE)),&
&)    INVTOT=INVMAS.FREIGHT+INVMAS.SERVICE+&
&)      INVMAS.S_TAX+INVMAS.C_TAX-INVMAS.DISC+&
&)      $SUM(INVDET.PRICE*INVDET.QTY_S BY INVDET.CNO,&
&)              INVDET.INVNO),&
&)    SLINE=$CONCAT(INVMAS.CITY,", ",INVMAS.ST, &
&)                    " ",INVMAS.ZIP),&
&)    ULINE=$CONCAT(UINFO.UCITY,", ",UINFO.UST, &
&)                    " ",UINFO.UZIP), &
&)    BLINE=$CONCAT(CUST.BCITY,", ",CUST.BST, &
&)                    " ",CUST.BZIP) &
&)    WHERE INVMAS.CNO=INVDET.CNO &
&)      AND INVMAS.INVNO=INVDET.INVNO &
&)      AND CUST.CNO=INVMAS.CNO &
&)      AND INVDET.CNO=152700
)TERMINAL $WIDTH=65
)REPORT
>PAGE HEADING=&
&>    (UNAME),&
&>    (UNAME1),&
&>    (UADDRESS),&
&>    (ULINE),&
&>    (UPHONE),&
&>    (TODAY),&
&>    (NEWLINE;"INVOICE NUMBER:";TAB=40),&
&>        (INVNO;POSITION=RIGHT),&
&>    (NEWLINE=2;"BILL TO:";POS=LEFT),&
&>    ("SHIP TO:";TAB=35),&
&>        (BNAME;TAB=5),&
&>        (NAME;TAB=40),&
&>        (BADDRESS;TAB=5),&
```

```
&>          (ADDRESS;TAB=40),&
&>          (BLINE;TAB=5),&
&>          (SLINE;TAB=40),&
&>      (NEWLINE=2;"CUSTOMER NUMBER:";POSITION=LEFT),&
&>          (CNO;TAB=20),&
&>      ("PURCHASE ORDER:";TAB=35),&
&>          (PO;TAB=50),&
&>      (NEWLINE=2;"DATE ORDERED:";POSITION=LEFT),&
&>          (D_ORD;TAB=20),&
&>      ("DATE INVOICED:";TAB=35),&
&>          (D_INV;TAB=50),&
&>      ("REMARKS:";NEWLINE=2;POSITION=LEFT),&
&>          (REMARKS;TAB=10),&
&>      (NEWLINE=3)
>FIELDS=&
&>      (INVNO;NOPRINT;BREAK=3),&
&>      (LNUM;BREAK=2),&
&>      (PART),&
&>      (DESC;HEADING=("DESCRIPTION")),&
&>      (PRICE),&
&>      (QTY_S),&
&>      (AMOUNT)
>GROUP FOOTING 2=(NEWLINE)
>GROUP HEADING 3=(NEWPAGE)
>GROUP FOOTING 3=&
&>      ("TERMS";POSITION=LEFT),&
&>          (TERM_P;TAB=8),&
&>          ("%, ";TAB=13),&
&>          (TERM_D;TAB=16),&
&>          ("DAYS";TAB=20),&
&>      ("TOTAL AMOUNT:";TAB=35),&
&>          ($TOTAL(AMOUNT);FORMAT=(FLOAT="$")),&
&>      (NEWLINE=4;"DISCOUNT:";TAB=40),&
&>          (DISC;POSITION=RIGHT),&
&>      ("FREIGHT:";TAB=40),&
&>          (FREIGHT;POSITION=RIGHT),&
&>      ("SERVICE:";TAB=40),&
&>          (SERVICE;POSITION=RIGHT),&
&>      ("STATE TAX:";TAB=40),&
&>          (S_TAX;POSITION=RIGHT),&
&>      ("CITY TAX:";TAB=40),&
&>          (C_TAX;POSITION=RIGHT),&
&>      ("TOTAL:";TAB=40),&
&>          (INVTOT;POSITION=RIGHT;FORMAT=(FLOAT="$"))
>GO
```

Petersen Equipment Company
Computer Division
300 Westchester Ave.
White Plains, NY 11430
212-838-2922
April 12, 1985

INVOICE NUMBER: 5241

BILL TO: SHIP TO:
    UNITED VIDEO CORP.   UNITED VIDEO CORP.
    2332 LAFAYETTE   8282 W. MAIN
    HOUSTON, TX 73211   GALVESTON, TX 74437

CUSTOMER NUMBER: 152700   PURCHASE ORDER:6572

DATE ORDERED: 8/12/82   DATE INVOICED: 8/18/82

REMARKS:

LNUM	PART	DESCRIPTION	PRICE	QTY_S	AMOUNT
1	M93-446	PRINTOUT BINDER	6.47	200	1294.00
2	A87-011	15x11 PAPER	40.25	40	1610.00

TERMS   2.00%, 10 DAYS   TOTAL AMOUNT: $ 2904.00

                              DISCOUNT   50.00
                              FREIGHT   26.95
                              SERVICE: 140.00
                              STATE TAX: 116.16
                              CITY TAX: 43.50
                              TOTAL: $ 3180.61

APPENDIX F

```
                 Petersen Equipment Company
                      Computer Division
                     300 Westchester Ave.
                   White Plains, NY   11430
                        212-838-2922
                       April 12, 1985
                             INVOICE NUMBER:        5242


  BILL TO:                        SHIP TO:
     UNITED VIDEO CORP.              UNITED VIDEO CORP.
     2332 LAFAYETTE                  8282 W. MAIN
     HOUSTON, TX  73211              GALVESTON, TX  74437

  CUSTOMER NUMBER:  152700        PURCHASE ORDER:6575

  DATE ORDERED:      8/12/82      DATE INVOICED:  8/18/82

  REMARKS: SHIP WITH INVOICE 5241


  LNUM   PART      DESCRIPTION       PRICE   QTY_S      AMOUNT

    1    A87-103   15x11 PAPER UNL   40.25    20        805.00

    2    D00-301   TAPE LABELS       22.15    40        886.00

    3    D45-642   MAG TAPE         310.50     5       1552.50

  TERMS  10.75%,  60 DAYS          TOTAL AMOUNT    $  3243.50


                                   DISCOUNT:         50.00
                                   FREIGHT:          18.00
                                   SERVICE:           0.00
                                   STATE TAX:       129.75
                                   CITY TAX:         48.65
                                   TOTAL         $  3389.90
```

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