Hunt Institute for Botanical Documentation
5th Floor, Hunt Library
Carnegie Mellon University
4909 Frew Street
Pittsburgh, PA 15213-3890
Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
Web site: www.huntbotanical.org

The Hunt Institute is committed to making its collections accessible for research. We are pleased to offer this digitized item.

Usage guidelines
We have provided this low-resolution, digitized version for research purposes. To inquire about publishing any images from this item, please contact the Institute.

Statement on harmful and offensive content
The Hunt Institute Archives contains hundreds of thousands of pages of historical content, writing and images, created by thousands of individuals connected to the botanical sciences. Due to the wide range of time and social context in which these materials were created, some of the collections contain material that reflect outdated, biased, offensive and possibly violent views, opinions and actions. The Hunt Institute for Botanical Documentation does not endorse the views expressed in these materials, which are inconsistent with our dedication to creating an inclusive, accessible and anti-discriminatory research environment. Archival records are historical documents, and the Hunt Institute keeps such records unaltered to maintain their integrity and to foster accountability for the actions and views of the collections' creators.

Many of the historical collections in the Hunt Institute Archives contain personal correspondence, notes, recollections and opinions, which may contain language, ideas or stereotypes that are offensive or harmful to others. These collections are maintained as records of the individuals involved and do not reflect the views or values of the Hunt Institute for Botanical Documentation or those of Carnegie Mellon University.

About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

EXIRPG

REPORT GENERATOR MODULE OF THE EXIS SYSTEM

Prepared by James Warner of

THE TAXIMETRICS LABORATORY

TABLE OF CONTENTS

Developmental Background

EXIRPG

The Report Generator Module (EXIRPG) has been developed for and by the Taximetrics Laboratory of the University of Colorado in conjunction with the University Computing Center.

EXIRPG was designed and implemented on the University's Computing Center Control Data Corporation 6400 computer in February, 1975. The source language was FORTRAN IV with many non-standard CDC enhancements. Since that time EXIRPG has been significantly revised to standardize the CDC version. Separate versions of EXIRPG have been successfully created for both the Data General NOVA and the IBM 370/145 computers. Conversion to both Burrough's Corporation and Digital Equipment Corporation computers is anticipated within the next twelve months (1976-77).

EXIRPG was designed and programmed by James Warner and Scott Allman of the University of Colorado Computing Center. Standardazation of the original program and conversion to Data General and IBM was done with assistance from Mark Bailey of the Taximetrics Laboratory, University of Colorado.

REPORTING USER DIFFICULTIES

If difficulties or deficiencies are found, please document and contact:

James Warner
Taximetrics Laboratory
1229 University Avenue
Boulder, Colorado 80309

MANUAL UPDATES

Manual updates will be issued periodically. These can be obtained by writing to the above address.

1.0 EXIRPG - REPORT GENERATOR MODULE OF THE EXIS SYSTEM

The Report Generator (EXIRPG) is an independent program module of the EXIS system. It produces labeled listings in columns for a selected subset of an EXIR data bank. EXIRPG categorically lists the data for all or any specified portion of the input file descriptors. The user merely needs to identify those descriptors to be included in the report. The following parameters can be specified:

1. Report identification, including title, commentary, dates, author, descriptor headings;
2. Page definition, including margins, width, length, explicit pagination rules;
3. Creation and display of new descriptors generated as a function of retrieval file descriptors;
4. Decimal point precision and columnar tabulation.

1.1 EXIRPG IMPLEMENTATION - GENERATE & STATISTICS FILES

EXIRPG generates reports on a subset file of an EXIR data bank. The user creates this subset file by using the GENERATE or STATISTICS commands within EXIR. These commands have the following format: (See the EXIR Manual for more detail.)

GENERATE:
DESC-1,
DESC-2,
DESC-3,
.
.
.
DESC-n,
FOR WITH Boolean expression*

STATISTICS:
DESC-1,
DESC-2,
DESC-3,
.
.
.
DESC-n,
FOR WITH Boolean expression*

1.2 COMMAND CLASSES

EXIRPG commands may be separated into five categories. Each category identifies a distinct class of required or optional commands.

1. Required Commands: The required commands are COLUMN DATA: and FINISH: COLUMN DATA: identifies which descriptors from the retrieval file are to be included in the report. FINISH: denotes the end of EXIRPG commands.
2. Report Identification Commands: These commands allow the user to declare explicit report and page titles, any report comments in paragraph form, explicit column headings for each of the output descriptors, and other labeling information. The Report Identification Commands are: REPORT TITLE:, TITLE DATE:, AUTHOR:, REPORT COMMENTS:, OMIT TITLE DATE:, PAGE TITLE:, PAGE DATE:, OMIT PAGE DATE:, COLUMN TITLES:, NO NUMBER:.
3. Page Definition Commands: These commands override default page boundaries, allowing the user to explicitly specify top and left margins, page width and length, and any rules for page ejection. The Page Definition Commands are: LEFT MARGIN:, PAGE WIDTH:, PAGE LENGTH:, OMIT PAGE NUMBER:, OMIT DASHED LINES:, COLUMN SEPARATOR:, PAGE AT BOTTOM:, DATE AT BOTTOM:, REPORT LENGTH:, PAGE ON CHANGE:, TITLE ON CHANGE:, LINE SKIP:.
4. Creating New Descriptors (STATISTICS retrieval files only): CREATE DATA is the only command in this category. It defines a new column variable as a mathematical function of one or more of the input descriptors.
5. Precision and Tabulation Commands (STATISTICS retrieval files only): These commands allow the user to specify the number of digits after the decimal point for precision. All column values are summed and a cumulative total is printed under each column. The Precision and Tabulation Commands are: DIGITS: and TABULATE ON:.

1.3 COMMAND SYNTAX

Each command to the Report Generator consists of one or more free format input lines. In batch mode these input lines are punched on cards. Interactively, an input line is simply one typed line of information.

All commands start with a command directive followed by a colon : . e.g. COLUMN DATA: Directives must be spelled correctly, but spacing between successive words of multiple word directives is arbitrary. Command directives longer than 10 characters may be abbreviated to the first 10 characters. e.g. COLUMN SEPARATOR: may be abbreviated to COLUMN SEPA:

Most commands require one or more parameters to further define the command directive. Parameters are entered in free format following the colon. Multiple parameters must be separated by commas. The end of parameters is denoted by an asterisk * . All commands that require parameters must be terminated by an asterisk.

Three commands, COLUMN DATA:, COLUMN TITLES:, AND CREATE DATA: may be continued on successive input lines. However, parameters may not overlap between successive input lines.

DESCRIPTION OF COMMANDS

Required Commands

2.0 COLUMN DATA:

This command defines the output columns of the report in succession. COLUMN DATA: must be the first EXIRPG command.

Format: COLUMN DATA: COL-1, COL-2, COL-3,.....COL-n*

COL-1...COL-n are the literal names or abbreviations of the descriptors that are to appear as columns across the report. The descriptors in the retrieval file may appear in any columnar order across the page. Descriptors in the retrieval file may be omitted from the report.

Examples: Assume that the retrieval file was created with the following EXIR query:

```
{GENERATE   }
{STATISTICS } :  PLANT HEIGHT,
                 EAR HEIGHT,
                 MATURITY DAYS,
                 TOTAL YIELD,
                 PCT RAINFALL,
                 TOTAL RAINFALL,
                                 FOR WITH (boolean expression)*
```

Each retrieval file record will then contain, in order:

Literal descriptor name	Abbreviation
1) PLANT HEIGHT	.D1.
2) EAR HEIGHT	.D2.
3) MATURITY DAYS	.D3.
4) TOTAL YIELD	.D4.
5) PCT RAINFALL	.D5.
6) TOTAL RAINFALL	.D6.

The following two commands are equivalent. Each will generate a report with all the above descriptors appearing in order across the report page:

1. COLUMN DATA: PLANT HEIGHT, EAR HEIGHT, MATURITY DAYS,
TOTAL YIELD, PCT RAINFALL, TOTAL RAINFALL*

2. COLUMN DATA: .D1., .D2.,.D3.,.D4.,.D5., .D6.*

Either of the following two commands will generate the fourth, third, sixth, and first descriptors across the report page. The second and fifth descriptors will not appear in the report:

1. COLUMN DATA: TOTAL YIELD, MATURITY DAYS, TOTAL RAINFALL,
PLANT HEIGHT*

2. COLUMN DATA: .D4.,.D3.,.D6.,.D1.*

If the report is to contain new variables, these must also be included in the COLUMN DATA: command. New variables must later be defined in a CREATE DATA: command. Any arbitrary literal name may be chosen for a created variable. The name that is chosen must be unique. This name is then used in the CREATE DATA: command when the variable is defined.

The following equivalent examples demonstrate two new variables to be included as the third and fourth columns of a five column report:

1. COLUMN DATA: PLANT HEIGHT, EAR HEIGHT, NEW1, NEW2,
DAYS TO FLOWER*

2. COLUMN DATA: .D1.,.D2.,NEW1,NEW2,.D3.*

Note that there are no abbreviations for new variables.

2.1 FINISH:

This command must be the last input command to the Report Generator. It denotes the end of instructions.

Format: FINISH: no parameters

Note: The minimum command set for an EXIRPG report is:

1. COLUMN DATA: DESC-1, DESC-2,.....DESC-n*
2. FINISH:

REPORT IDENTIFICATION COMMANDS

3.0 REPORT TITLE:

This command allows the user to specify an explicit, one line title for the report. This title appears only on the first page of the report. The title is automatically centered on the report's title page.

Format: REPORT TITLE:..... any literal title ....*

Default:

If this command is not invoked, the character string,

- - - E X I R R E P O R T G E N E R A T O R - - - is centered on the title page.

Note that the entire title must be contained on one input line and must be terminated by an asterisk.

Example:

REPORT TITLE: CATALOG OF DURUM WHEAT COLLECTION*

3.1 TITLE DATE:

This command allows the user to specify an explicit, one line date to appear centered below the report title on the title page of the report. The date string may not exceed 30 characters.

Format: TITLE DATE:.... any literal date string ....*

Default: If this command is not invoked, the current date of the EXIRPG run is obtained from the computer system and centered below the report title in the format, month/day/year.

Example: 1) TITLE DATE: AUGUST 18, 1975*

2) TITLE DATE: 27 OCTOBER 1976*

3.2 OMIT TITLE DATE:

This command allows the user to suppress the printing of any date on the title page of the report.

Format: OMIT TITLE DATE: no parameters

Default: If this command is not invoked, a date in the form month/day/year will be printed on the title page.

3.3 AUTHOR:

This command allows the user to specify a one line author identification to appear on the title page of the report. The author is centered between the report title and the title date. The author string may not exceed 30 characters.

Format: AUTHOR: ... any literal string ...*

Default: If the command is not invoked, the author line on the title page will be blank.

Example:

AUTHOR: DAVID J. ROGERS*

3.4 REPORT COMMENTS:

This command allows the user to generate prose commentary following the title page and preceding the first information page of the report. Each line of input is written verbatim to the output device. Pagination and centering are performed automatically as a function of the number of comment lines and the page boundary definitions.

Format: REPORT COMMENTS: ... one or more lines of text; the last line must terminate with an asterisk ... *

Default: If this command is not invoked, no comments are written and the first information page of the report will directly follow the title page.

Example: REPORT COMMENTS: THIS IS A TEST REPORT GENERATED FROM THE SOUTH AMERICAN DURUM BANK*

3.5 PAGE TITLE:

This command allows the user to specify an explicit, one line title to appear on each information page of the report. The title is automatically centered as the first line of a page. The entire title must be contained in one input line and must be terminated by an asterisk.

Format: PAGE TITLE: ... any literal title string ... *

Default: If this command is not invoked, the character string,

- - - E X I R R E P O R T G E N E R A T O R - - -

is used as the title of each page.

Example: PAGE TITLE: ---DURUM WHEAT DATA---*

3.6 PAGE DATE:

This command allows the user to specify an explicit, one line date to appear left-justified on the third line of every report page. The date may not exceed 30 characters.

Format: PAGE DATE: ... any literal date string ...*

Default: If this command is not invoked, the current date of the EXIRPG run is obtained from the computer system and printed left-justified as month/day/year.

Examples:

1. PAGE DATE: AUGUST 18, 1975*
2. PAGE DATE: 27 JANUARY 1976*

3.7 OMIT PAGE DATE:

This command allows the user to suppress the printing of a date on each page of a report.

Format: OMIT PAGE DATE: no parameters

Default: If this command is not invoked, a date of the form, month/day/year, will be obtained from the computer system and printed left-justified on the third line of each report page.

3.8 COLUMN TITLES:

The COLUMN DATA: command (the first command to be used for EXIRPG) declares the number and order for both the retrieval file descriptors and the new variables that are to appear as individual columns on the report. COLUMN TITLES: allows the user to explicitly provide column headings for some or all of the output columns requested by the COLUMN DATA: command.

Format: COLUMN TITLES: TITLE-1, TITLE-2, TITLE-3,...TITLE-n*

Default: If this command is not invoked, the literal descriptor name (as used in the GENERATE/STATISTICS retrieval) becomes the column heading for a descriptor. For new variables, the defining name used in the COLUMN DATA: command becomes the column heading.

Commentary: A column heading produced by COLUMN TITLES: may be up to 20 characters long. If the character string for a heading is longer than 10 characters, the first 10 characters appear on the top line and the second 10 appear on the second line. Both lines are left-justified above the descriptor column. Any title longer than 20 characters is truncated to 20 characters.

Often it is useful to explicitly define fewer than the total number of output column headings, using the descriptor or new variable names, by default for the remaining column headings. An extra comma is used to denote each default column. The command sequence:

COLUMN DATA: PLANT HEIGHT, MATURITY DAYS, EAR HEIGHT*

COLUMN TITLES: HEIGHT OF PLANT,, HEIGHT OF EARS*

would explicitly define column headings one and three, but use the literal descriptor name:

MATURITY DAYS

as the heading of the second output column. Since commas are used as heading delimiters, they may not be used in the individual title.

COLUMN TITLES: is used to code column headings, to shorten lengthy names, and to space titles so that individual heading words do not overlap the two heading lines.

Example: The default heading, MATURITY DAYS, will be output on two PRINTED LINES AS:

```
MATURITY D
AYS
```

If in the COLUMN TITLES: command, it were defined as MATURITYbbDAYS, (two blanks between MATURITY and DAYS), the output heading would become:

```
MATURITY
  DAYS
```

Note: A $ as the first character of a column title acts as a sentinal character denoting the start of a title. The $ is converted to a blank when the title is written in the report. The $ allows the EXIRPG user to center the top line of a 2 line title (See the examples in Appendix A.)

3.9 NO NUMBER:

This command allows the user to produce a report as a sequential catalog or tabulation of each record in the EXIR retrieval file, without actually having a list of sequential numbers for each output line as the leftmost entry for each report line. The NO NUMBER: command suppresses line numbers on the report.

Format: NO NUMBER: no parameters

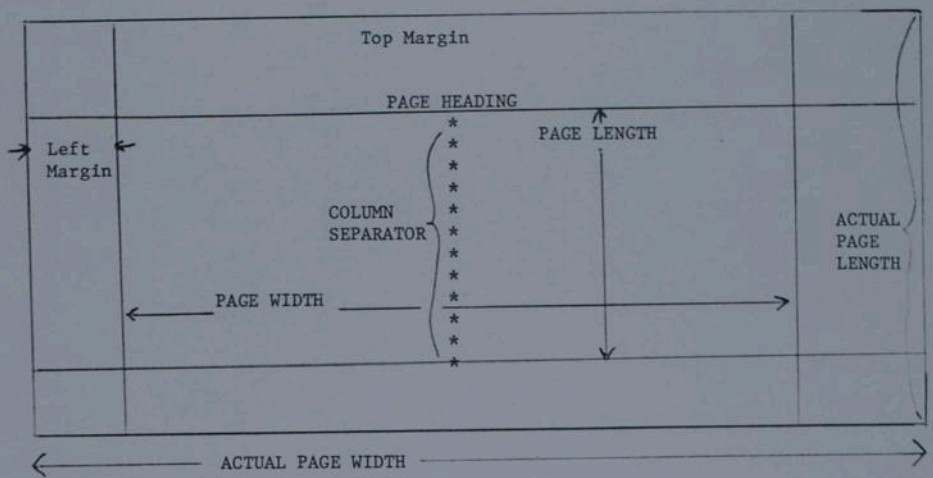
Default: By default, the Report Generator will list the sequence number of each output line as the left-most entry of each report line. This left-most column is called the ENTRY INDEX. It is useful for referring to particular lines in a report.

Commentary:

While line numbering is useful in many applications, the ENTRY INDEX column requires 10 extra printer columns for output. If many output data columns are desired, it is often useful and sometimes necessary to suppress the ENTRY INDEX column, thereby allowing 10 extra printer columns for report data.

PAGE DEFINITION COMMANDS

An output report page has the following layout:



where:

LEFT MARGIN is the column number of the left-most column of the report;

TOP MARGIN is the line number of the PAGE TITLE: line of the report (i.e. the top line);

PAGE WIDTH is the number of columns in the report;

PAGE LENGTH is the number of report lines per page;

COLUMN SEPARATOR is the character to be used as a column divider between successive columns of a report as well as the margins.

If a report is to have n output columns (including the ENTRY INDEX column if desired), then n + 1 column separator columns are required to delimit the columns of report information. No matter how many output columns are specified, these columns are evenly spaced across the entire page width.

Each informational page of a report has a page title, page number and spaced set of column headings. After PAGE LENGTH retrieval file records are written to the output device, a new page heading is written. When output is to a line printer, this involves ejecting the current page and writing the heading starting at the TOP MARGIN line of the next page. When output is to a scroll-type interactive terminal (i.e. ASR-33 Teletype, CDC 713, Texas Instrument 700), the new page heading is written after the initial spacing of five lines on the printer roll.

These five page definition parameters have the following default values:

	132 column printer	scroll terminal
LEFT MARGIN:	1	1
TOP MARGIN:	1	1
PAGE WIDTH:	130	65
PAGE LENGTH:	45	40
COLUMN SEPARATOR:	*	*

These default values may be explicitly changed by the commands described in this section.

4.0 LEFT MARGIN:

This command redefines the left margin of the report.

Format: LEFT MARGIN: Column number *

Example: LEFT MARGIN: 10 *

4.1 TOP MARGIN:

This command redefines the top margin of the report.

Format: TOP MARGIN: Row number *

Example: TOP MARGIN: 5 *

4.2 PAGE WIDTH:

This command redefines the number of output columns to be used in the report. The total number of output columns used in the report (i.e. counting from the left-most column of the output paper) is computed as TOTAL COLUMN = PAGE WIDTH + LEFT MARGIN - 1. EXIRPG exercises the following constraints on total page width:

1. 132 column printer --- TOTAL COLUMNS 133
2. scroll terminal --- TOTAL COLUMNS 73

Format: PAGE WIDTH: number of columns *

Example: 1) PAGE WIDTH: 80 *
2) PAGE WIDTH: 65 *

4.3 PAGE LENGTH:

This command redefines the number of output lines to be included in each page of a report. The page length is the actual number of retrieval file records to be written on each page. It does not include the page title.

Format: PAGE LENGTH: number of lines *

Example: PAGE LENGTH: 42 *

4.4 OMIT PAGE NUMBER:

This command suppresses printing of page numbers on the report.

Format: OMIT PAGE NUMBER: no parameters

Default: If this command is not invoked, page numbers will be printed on each page of the report. This command overrides the PAGE AT BOTTOM: command if both are given for the same report.

4.5 OMIT DASHED LINES:

This command will print blank lines above and below the headings of the column titles, as well as after the last report line of each page.

Format: OMIT DASHED LINES: no parameters

Default: By default, the Report Generator sets off the column titles by printing dashed lines above and below the headings. Dashed lines are also printed after the last report line of each page.

4.6 COLUMN SEPARATOR:

The user may invoke this command to explicitly define a single character, including blank, as a separator between successive output columns.

Format: COLUMN SEPARATOR: character *

Default: If this command is not invoked, an asterisk (*) appears as the separator character.

Examples: 1) COLUMN SEPARATOR: + *

2) COLUMN SEPARATOR: *

Note: Example 2 defines a blank as the separator character.

4.7 PAGE AT BOTTOM:

This command indicates that page numbers are to be placed at the lower right hand corner of the report page, two lines below the last report line on the page.

Format: PAGE AT BOTTOM: no parameters

Default: If this command is not invoked, page numbers will be printed in the upper right hand corner of the report page, two lines below the page title.

Commentary:

Note that page numbers at the bottom are two lines below the last report line. Depending on the page length (see command, PAGE LENGTH:), the page number may or may not be at the bottom of the actual printer page.

4.8 DATE AT BOTTOM:

This command indicates that the page date (see command, PAGE DATE:) is to be placed at the lower left hand corner of the report page, two lines below the last report line on the page.

Format: DATE AT BOTTOM: no parameters

Default: If this command is not invoked, the page date will be printed in the upper left corner of the report page, two lines below the page title.

Commentary:

If the page date is printed at the bottom, the page number is automatically printed at the bottom also. The Report Generator does not allow the date at the bottom and the page number at the top. All other position combinations of the page and date on the report page are possible.

4.9 REPORT LENGTH:

This command determines the total number of retrieval file records to be included in a report. It is very useful in test applications of EXIRPG. The report format may be tested for clarity, aesthetics, etc. on the first few records of the retrieval file prior to generating the full report of all retrieval file records.

Format: REPORT LENGTH: number of records desired *

Default: If this command is not invoked, EXIRPG will generate a report on all records in the retrieval file.

Example: REPORT LENGTH: 10 *

4.10 PAGE ON CHANGE (for GENERATE retrieval files only)

The PAGE ON CHANGE: command indicates that a page eject is to occur with each change in the value of the first descriptor in the description list of the EXIR GENERATE command, thereby overriding the PAGE LENGTH: command.

Format: PAGE ON CHANGE: no parameters

Default: If this command is not invoked, pagination occurs as usual, after the PAGE LENGTH: number of lines have been printed, regardless of the literal value of the first descriptor.

Commentary:

When a retrieval file is created via the EXIR command, GENERATE, the file is sorted on the first output descriptor. Sometimes there are few changes in the literal value of the first descriptor, but there are potentially many records for each of these values. In this case, it is desirable to begin cataloging each of the new first descriptors on a new output page. This is accomplished with the PAGE ON CHANGE: command.

4.11 TITLE ON CHANGE: (for GENERATE retrieval files only)

This command operates very much like PAGE ON CHANGE:. Every time the first descriptor changes value, a new page heading is generated. Each page heading contains the current value of the first descriptor.

Format: TITLE ON CHANGE:.... any literal title string ...*

The first descriptor value immediately follows the literal title string.

Example: TITLE ON CHANGE: COUNTRY OF ORIGIN --*

This could generate the following page titles:

COUNTRY OF ORIGIN -- CUBA

COUNTRY OF ORIGIN -- MEXICO

COUNTRY OF ORIGIN -- NIGERIA

COUNTRY OF ORIGIN -- USA

The general format of the title is:

(literal title string from command)(value of first descriptor)

Commentary:

The descriptor used in TITLE ON CHANGE is the first descriptor in the GENERATE command. This particular descriptor is not to be listed under COLUMN DATA or it will appear in the actual report columns in addition to appearing as the title.

4.12 LINE SKIP:

This command allows the user to skip a specified number of blank lines at specified intervals.

Format: LINE SKIP: RL, SL *

After RL report lines are printed, SL lines are skipped. Thus a single page may be blocked as desired.

Example: LINE SKIP: 10,2 *

Commentary:

The command in the above example will generate two blank lines after every ten report lines. These blank lines are counted in computing the cumulative page length. If 40 report lines are desired per page, with two blank lines every 10 report lines, the user should indicate the value 48 when defining the PAGE LENGTH: command; (e.g.PAGE LENGTH: 48*) so that each page will contain four 10 line blocks.

CREATING NEW DESCRIPTORS

5.0 CREATE DATA:

This command allows the user to define a new variable (i.e. report column) as an algebraic function of the STATISTICS retrieval file descriptors. The algebraic function is expressed as a sequence of arithmetic operators (ADD, MULT, SUBT, ABS, etc.) operating on the descriptors or on numeric constants.

Format: CREATE DATA: NAME,.... algebraic function...*

NAME is the literal name assigned to the new variable in the COLUMN DATA: command. The following are the only operator/operand combinations that are valid for the algebraic functions.

Operation	Description
ADD,OP1,OP2	OP1 + OP2
SUBT,OP1,OP2	OP1 - OP2
MULT,OP1,OP2	OP1 times OP2
DIVI,OP1,OP2	OP1 divided by OP2
EXPO,OP1,OP2	OP1 to the OP2 power
MINI,OP1,OP2	the minimum of OP1 and OP2
MAXI,OP1,OP2	the maximum of OP1 and OP2
ABS,OP1	absolute value of OP1
SQRT,OP1	square root of OP1

Each parameter must be separated by a comma. Descriptor abbreviations of the form: .D1.,.D2.,...,.Dn. may be used in place of literal descriptor names when declaring operands.

The combinations that have just been described yield a numeric value as their result. This value may then be used in another algebraic expression.

Numeric constants, either integer or floating point, may be used in these algebraic expressions.

Expressions are evaluated from right to left. Rather than elaborate on the actual evaluation method used internally by EXIRPG, a series of examples of the CREATE DATA: command follow.

Example: Each of the following examples of CREATE DATA: is presented in three parts. The purpose of this is to show the relationship between the algebraic expression being defined, the actual CREATE DATA: command, and the actual order in which the operations are performed.

Each example is presented in the following order:

a) the algebraic expression being defined;

b) the actual CREATE DATA: command;

c) an outline of the order in which operations are performed in the CREATE DATA: command. Please note: these parenthetical expressions are invalid and may not be used in the actual CREATE DATA: command. Their purpose here is to provide clarity and instruction.

I. a) NAME = A * B

b) CREATE DATA: NAME, MULT,A,B*

c) CREATE DATA: NAME,(MULT(A B))*

II. a) NAME = A^2

b) CREATE DATA: NAME,EXPO,A,2.*

c) CREATE DATA: NAME,(EXPO(A 2.))*

III. a) NAME = A + B + C + D

b) CREATE DATA: NAME,ADD,A,ADD,B,ADD,C,D*

c) CREATE DATA: NAME,(ADD A (ADD B (ADD C D)))*

or (a) above may be written

b) CREATE DATA: NAME, ADD,ADD,ADD, A,B,C,D*

c) CREATE DATA: NAME,(ADD(ADD(ADD(A B)C)D)*

IV. a) NAME = (A + B)/(C + D)

b) CREATE DATA: NAME,DIVIDE,ADD,A,B,ADD,C,D*

c) CREATE DATA: NAME,(DIVIDE (ADD A B) (ADD C D))*

V. a) NAME = -B + $(B^2$-4*A*C)/2*A

b) CREATE DATA: NAME,ADD,MULT,-1.,B,DIVI,DIVI,SUBT,EXPO,B,2.,MULT,4.,
MULT,A,C,2.,A*

c) CREATE DATA: NAME,(ADD(MULT -1. B) (DIVI(DIVI(SUBT(EXPO B 2.)
(MULT 4. (MULT A C)))2.)A)

VI. This example demonstrates the use of descriptor abbreviation.

COLUMN DATA: PLANT HEIGHT, EAR HEIGHT, RATIO*

a) RATIO = EAR HEIGHT/PLANT HEIGHT

b) CREATE DATA: RATIO,DIVI,EAR HEIGHT,PLANT HEIGHT* or abbreviated,

b) CREATE DATA: RATIO,DIVI, D2.,D1.*

c) CREATE DATA: RATIO,(DIVI(.D2. .D1.))*

6.0 DIGITS: (STATISTICS retrieval files only)

This command allows the user to specify the decimal precision of numeric values in the report.

Format: DIGITS: N1,N2,N3,...,Nn*

Default: The EXIR STATISTICS file contains information on the decimal significance of each descriptor. This includes both the total number of significant digits, and the number of significant decimal places to the right of the decimal point. By default, report descriptors are printed to exactly correspond with this STATISTICS file significance data. DIGITS allows the user to override the number of significant digits to the right of the decimal point. In the above Format description, the N1, N2, N3, ..., Nn correspond to the number of digits to the right of the decimal for the 1st, 2nd, 3rd, ..., nth output columns (excluding the entry index column).

By default, all transgenerated variables defined via the CREATE DATA: command have zero significant digits to the right of the decimal.

Examples: 1) DIGITS: 2,2,2,0,4*

2) DIGITS: 2,0,,,,0,3,2*

Note: In example 2, the default value of significant decimal digits is used for the 3rd, 4th, and 5th output columns.

6.1 TABULATE ON:

This command allows the user to generate final column totals from specific output columns.

Format: TABULATE ON: ... list of columns to be tabulated ...*

More than one column may be tabulated. Additional column descriptors or abbreviations must be separated by commas. If all columns are to be tabulated, the single abbreviation, .ALL., may be used, i.e., TABULATE ON: .ALL.*

Default: If this command is not specified, no tabulations are performed. The list of columns may be either the literal names of the descriptors/new variables or column abbreviations of the form, .Ci., where -i- corresponds to the left to right column number of the column being tabulated.

Examples: In each of the following examples, only YIELD is to be tabulated.

1) COLUMN DATA: PLANT HEIGHT, EAR HEIGHT, RATIO, YIELD*

.
.
.
.

TABULATE ON: YIELD *

-or-

TABULATE ON: .C4. *

2) COLUMN DATA: RATIO, YIELD *

TABULATE ON: .C2. *

APPENDIX A

Example Reports

This section provides three examples of the EXIR Report Generator. The first two examples use a GENERATE file as input to EXIRPG. The final example uses a STATISTICS input file.

Example one demonstrates the use of, descriptor abbreviations,invoking the NO NUMBER: command, and invoking a Page Definition Command.

```
                    THE EXIR REPORT GENERATOR
                    -------------------------
                        REPORT INPUT LINES

NUMBER          ---- COMMAND ----

   1 ---------- COLUMN DATA: .D1.,.D3..D7.,.D8..D10..D11.*
   2 ---------- NO NUMBER:
   3 ---------- PAGE WIDTH: 126*
   4 ---------- FINISH:

 GENE -- TYPE FILE ...

      30 DESCRIPTORS OF LENGTH ...

        -2- -1- -1- -1- -2- -2- -2- -2- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -2- -1-

      30 DESCRIPTORS ....
    1   SERIALNUMBER
    2   COUNTY
    3   CITY
    4   POPCLASS
    5   ROADSYSTEM
    6   ROADNUMBER
    7   ROADSECTION
    8   CITYSTREET
    9   VEHICLES
   10   KILLED
   11   INJURED
   12   MONTH
   13   DAY
   14   YEAR
   15   WEEKDAY
   16   HOUR
   17   AM/PM
   18   ACCTYPE1
   19   SURFACE
   20   ADVCOND
   21   LOCATION1
   22   LOCATION2
   23   LIGHT
   24   WEATHER
   25   HWYSYSTEM1
   26   HWYSYSTEM2
   27   VHCLTYPE1
   28   VHCLTYPE2
   29   SPEEDLIMIT
   30   SPEEDEST

... MAXIMUM NUMBER OF CHARACTERS IN EACH STATE ...

 6  2  4  1  1  4  5  5  2  2  2  2  2  2  1  4  3  2  2  2  2  2  2  1  2  2  2  2  3  3
```

30 WORDS READ FOR EACH RECORD ...

DESCRIPTOR -- 1 STARTS AT WORD -- 1
DESCRIPTOR -- 2 STARTS AT WORD -- 2
DESCRIPTOR -- 3 STARTS AT WORD -- 3
DESCRIPTOR -- 4 STARTS AT WORD -- 4
DESCRIPTOR -- 5 STARTS AT WORD -- 5
DESCRIPTOR -- 6 STARTS AT WORD -- 6
DESCRIPTOR -- 7 STARTS AT WORD -- 7
DESCRIPTOR -- 8 STARTS AT WORD -- 8
DESCRIPTOR -- 9 STARTS AT WORD -- 9
DESCRIPTOR -- 10 STARTS AT WORD -- 10
DESCRIPTOR -- 11 STARTS AT WORD -- 11
DESCRIPTOR -- 12 STARTS AT WORD -- 12
DESCRIPTOR -- 13 STARTS AT WORD -- 13
DESCRIPTOR -- 14 STARTS AT WORD -- 14
DESCRIPTOR -- 15 STARTS AT WORD -- 15
DESCRIPTOR -- 16 STARTS AT WORD -- 16
DESCRIPTOR -- 17 STARTS AT WORD -- 17
DESCRIPTOR -- 18 STARTS AT WORD -- 18
DESCRIPTOR -- 19 STARTS AT WORD -- 19
DESCRIPTOR -- 20 STARTS AT WORD -- 20
DESCRIPTOR -- 21 STARTS AT WORD -- 21
DESCRIPTOR -- 22 STARTS AT WORD -- 22
DESCRIPTOR -- 23 STARTS AT WORD -- 23
DESCRIPTOR -- 24 STARTS AT WORD -- 24
DESCRIPTOR -- 25 STARTS AT WORD -- 25
DESCRIPTOR -- 26 STARTS AT WORD -- 26
DESCRIPTOR -- 27 STARTS AT WORD -- 27
DESCRIPTOR -- 28 STARTS AT WORD -- 28
DESCRIPTOR -- 29 STARTS AT WORD -- 29
DESCRIPTOR -- 30 STARTS AT WORD -- 30

----- EXIR REPORT GENERATOR -----

11/19/75

----- EXIR REPORT GENERATOR -----

11/19/75 PAGE 1

SERIAL NUMBER	CITY	ROAD SECTION	CITY STREET	KILLED	INJURED
3901	1085	ABRIE	COLOR	1	0
5600	240	CHUCH	00024	1	0
5601	240	BANNE	PIKES	1	1
5681	240	CONAL	PALME	1	1
15000		00008	99999	1	0
16080	240	CRAGH	STANT	1	0
18200	1085	00018	1900W	1	0
24400	240	DURAN	HANCO	1	0
24911	1285	WASHI	00096	1	0
25700	240	RANCO	RIOGR	1	2
26631	1285	00088	0388E	1	0
28500	110	SPRUC	00009	1	2
29600	760	BALSA	JEWEL	1	4
30000	830	LAKEC	00029	2	0
30100	760	CAPES	NEXIC	1	0
30300	735	ELIZA	EMMAS	2	0
32445	455	BRYAN	MULBE	1	0
32871	240	DALES	UNION	1	0
33802	110	BASEL	GRANT	1	4
34323	1085	ABRIE	DIVIS	1	1
34491	570	00007	00011	1	2
34688	240	IOWAA	PIKES	2	0
35700	1085	LAMBE	00018	1	0
36569	570	ASTHE	00011	1	0
36877	745	ANDER	00002	1	0
41600	240	MOREN	RIOGR	1	2
43301	1285	COLOR	00121	1	1
45242	455	DRAKE	STOVE	1	2
45242	455	DRAKE	STOVE	1	2
49862	1295	ARIZO	COLOR	1	0
50100	1085	ABRIE	0800E	1	0
50500	55	NOMES	00017	1	4
50501	55	LAWSI	00025	1	0
51800	1200	OXFOR	1900W	1	0
56300	1285	00104	1200E	1	0
57600	110	ELDER	WASHI	1	0
58101	945	VARES	ZUNIS	1	0
65407	245	HOLLY	00048	2	0
67000	1250	LINCO	STOCK	1	0
67500	250	LINDE	00001	1	0
68000	535	GRAND	00027	1	0
73276	945	INMAD	00105	1	0
75800	80	WELCH	RRXNG	1	0
75802	40	EATON	00084	1	0
79700	455	LAURE	WASHI	1	0

SERIAL NUMBER	CITY	ROAD SECTION	CITY STREET	KILLED	INJURED
85100	55	PEORI	00030	1	0
85319	1355	CONCO	SHAWB	1	0
86650	1355	00072	RRXNG	1	1
89000	55	ELKHA	ILIFF	1	0
89002	55	EAGLE	MONTV	1	0
90400	555	PATTE	00012	1	0
90500	1085	SANTA	10003	1	0
90500	1085	SANTA	10003	1	0
90900	555	GURAY	00005	1	0
90900	555	GURAY	00005	1	0
903040	320	BRIGH	90029	1	1
905155	320	BAYAU	MARIO	1	5
905457	320	WELTO	90020	1	0
905463	320	DOWNT	ILIFF	1	0
908570	320	LINCO	00009	1	2
909395	320	RACES	00025	1	1
909761	320	LAFAY	WESLE	1	1
910035	320	DARTH	PLATT	1	0
912077	320	HOLLY	00033	1	2
912810	320	ALAME	LOGAN	1	0
913796	320	EAGLE	MAXWE	1	0
914852	320	CALIF	90023	1	0
914897	320	EXPOS	QUERE	1	0
915089	320	BOWMA	QUINC	1	0
915510	320	MARIP	00034	1	1
916077	320	SPEER	00008	1	0
919116	320	FOXST	00040	1	13
921598	320	YORKS	00028	1	0
922215	320	PETER	00048	1	1
922453	320	DANNO	00013	1	0
923044	320	EVANS	PECOS	1	1
924518	320	JASON	PLATT	1	0
924655	320	DALEC	EXPOS	1	0
925204	320	ASHST	00032	1	0
925684	320	GAYLO	00017	1	0
928628	320	ZUNIS	00029	1	0
928628	320	ZUNIS	00029	1	3
930814	320	EVANS	RRXNG	1	3
930814	320	EVANS	RRXNG	1	1
931170	320	DELGA	90020	1	1
931170	320	DELGA	90020	1	1

Example Two

```
                    THE EXIR REPORT GENERATOR
                    -------------------------
                        REPORT INPUT LINES

NUMBER          ---- COMMAND ----

  1 ---------- COLUMN DATA: SERIAL NUMBER,
  2 ----------              ROAD SYSTEM,
  3 ----------              CITY STREET,
  4 ----------              SURFACE,
  5 ----------              SPEED LIMIT,
  6 ----------              SPEED EST *
  7 ---------- COLUMN TITLES: $  NUMBER,
  8 ----------                 $   ROAD     SYSTEM,
  9 ----------                 $   CITY     STREET,
 10 ----------                 $ SURFACE,
 11 ----------                 $  SPEED     LIMIT,
 12 ----------                 $  SPEED    ESTIMATE *
 13 ---------- REPORT TITLE: --- SAMPLE GENERATE RUN FROM CITY DATA BANK --- *
 14 ---------- PAGE TITLE:   --- C I T Y   D A T A   B A N K --- *
 15 ---------- COLUMN SEPARATOR:*
 16 ---------- SO NUMBER:
 17 ---------- LEFT MARGIN:   20 *
 18 ---------- TOP MARGIN:     5 *
 19 ---------- PAGE WIDTH:   100 *
 20 ---------- PAGE LENGTH:   41 *
 21 ---------- LINE SKIP:    20,1 *
 22 ---------- TITLE DATE: NOVEMBER 20, 1975 *
 23 ---------- OMIT PAGE DATE:
 24 ---------- AUTHOR: JEROME C. KALTENHAUSER *
 25 ---------- FINISH:

GENE -- TYPE FILE ...

      30 DESCRIPTORS OF LENGTH ...

        -2- -1- -1- -1- -2- -2- -2- -2- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -2- -1-

      30 DESCRIPTORS ....
   1    SERIALNUMBER
   2    COUNTY
   3    CITY
   4    ROVCLASS
   5    ROADSYSTEM
   6    ROALNUMBER
   7    ROADSECTION
   8    CITYSTREET
   9    VEHICLES
  10    KILLED
  11    INJURED
  12    MONTH
  13    DAY
  14    YEAR
  15    WEEKDAY
  16    HOUR
  17    AM/PM
  18    ACCTYPE1
  19    SURFACE
  20    ROVCOND
  21    LOCATION1
  22    LOCATION2
  23    LIGHT
  24    WEATHER
  25    NWYSYSTEM1
  26    NWYSYSTEM2
  27    VHCLTYPE1
  28    VHCLTYPE2
  29    SPEEDLIMIT
  30    SPEEDEST
```

... MAXIMUM NUMBER OF CHARACTERS IN EACH STATE ...

6 2 4 1 1 4 5 5 2 2 2 2 2 2 1 4 3 2 2 2 2 2 2 1 2 2 2 2 3 3

30 WORDS READ FOR EACH RECORD ...

DESCRIPTOR -- 1 STARTS AT WORD -- 1
DESCRIPTOR -- 2 STARTS AT WORD -- 2
DESCRIPTOR -- 3 STARTS AT WORD -- 3
DESCRIPTOR -- 4 STARTS AT WORD -- 4
DESCRIPTOR -- 5 STARTS AT WORD -- 5
DESCRIPTOR -- 6 STARTS AT WORD -- 6
DESCRIPTOR -- 7 STARTS AT WORD -- 7
DESCRIPTOR -- 8 STARTS AT WORD -- 8
DESCRIPTOR -- 9 STARTS AT WORD -- 9
DESCRIPTOR -- 10 STARTS AT WORD -- 10
DESCRIPTOR -- 11 STARTS AT WORD -- 11
DESCRIPTOR -- 12 STARTS AT WORD -- 12
DESCRIPTOR -- 13 STARTS AT WORD -- 13
DESCRIPTOR -- 14 STARTS AT WORD -- 14
DESCRIPTOR -- 15 STARTS AT WORD -- 15
DESCRIPTOR -- 16 STARTS AT WORD -- 16
DESCRIPTOR -- 17 STARTS AT WORD -- 17
DESCRIPTOR -- 18 STARTS AT WORD -- 18
DESCRIPTOR -- 19 STARTS AT WORD -- 19
DESCRIPTOR -- 20 STARTS AT WORD -- 20
DESCRIPTOR -- 21 STARTS AT WORD -- 21
DESCRIPTOR -- 22 STARTS AT WORD -- 22
DESCRIPTOR -- 23 STARTS AT WORD -- 23
DESCRIPTOR -- 24 STARTS AT WORD -- 24
DESCRIPTOR -- 25 STARTS AT WORD -- 25
DESCRIPTOR -- 26 STARTS AT WORD -- 26
DESCRIPTOR -- 27 STARTS AT WORD -- 27
DESCRIPTOR -- 28 STARTS AT WORD -- 28
DESCRIPTOR -- 29 STARTS AT WORD -- 29
DESCRIPTOR -- 30 STARTS AT WORD -- 30

--- SAMPLE GENERATE RUN FROM CITY DATA BANK ---

JEROME C. KALTENHAUSER

NOVEMBER 28, 1975

NUMBER	ROAD SYSTEM	CITY STREET	SURFACE	SPEED LIMIT	SPEED ESTIMATE
	5	COLOR		25	15
3901	7	00024		15	5
5600	7	PIKES		35	60
5601	7	PALME	11	35	60
5681	7	99999		0	0
15000	7	STANT	11	30	25
16000	7	1900W	11	30	70
18200	7	HANCO	12	45	85
24400	5	00096	11	35	40
24911	7	RIOGR	11	30	30
25700	5	0388E	11	35	30
26631	7	00009	11	25	25
28500	5	JEWEL	12	35	35
29600	7	00029	11	0	0
30000	7	MEXIC	11	0	0
30100	7	EMMAS	11	25	90
30300	7	MULBE	11	30	50
32445	5	UNION	11	35	30
32871	7	GRANT	11	25	50
33802	7	DIVIS		0	0
34323				0	0
34491	7	00011	11	35	60
34688	7	PIKES	11	25	25
35700	7	00018	11	0	0
36569	7	00011	11	30	30
36877	7	03002	11	30	60
41600	7	RIOGR	11	50	50
43301	7	00121	11	30	30
45242	7	STOVE	11	0	0
45242	7	STOVE	11	0	0
45242	7	COLOR	11	0	0
49862	7	0800E	11	0	0
50100	7	00017	11	25	62
50500	7	00025	11	0	0
50501	7	1900A	11	35	35
51800	5	1200E	11	25	30
56300	7	WASHI	11	30	20
57600	7	ZUNIS	11	25	80
58101	7	0804R	11	25	5
65407	7	STOCK	11	30	3
67000	7	00001			
67500					

NUMBER	ROAD SYSTEM	CITY STREET	SURFACE	SPEED LIMIT	SPEED ESTIMATE
68000	7	00027	11	35	0
73276	7	00105	11	0	0
75800	7	RRXNG	11	30	5
75802	7	00084	11	30	10
79700	7	WASHI	11	30	30
85104	5	00030	11	40	20
85319	7	SHAWN	11	25	32
86500	7	RRXNG	11	0	0
89200	5	ILIFF	11	40	0
89002	7	NONIV	12	25	0
90400	7	00012	11	40	40
90500	7	10005	11	0	0
90500	7	10005	11	0	0
90900	7	00005	12	35	30
90906	7	00005	12	0	0
903040	5	90029		30	10
905155	7	MARIO		30	50
905457	7	90020	11	30	25
905463	5	ILIFF		30	25
906570	5	00009	11	30	30
909395	7	00025	11	0	0
909761	7	WESLE	11	25	35
910035	7	PLATT	11	35	60
912077	7	00033	11	25	25
912810	5	LOGAN	12	30	35
913796	7	MAXWE	11	25	25
914852	7	90023	11	30	20
914897	7	QUEBE	11	30	30
915089	7	QUINC	11	0	0
915510	7	00034	11	25	20
916077	5	00008	11	35	50
919116	7	00040	11	30	20
921598	5	00028	11	30	20
922215	7	00048	11	30	25
922453	7	00013	11	35	32
923544	5	PECOS	11	30	30
924510	7	PLATT	11	30	65
924855	7	EXPOS	11	25	25
925204	5	00032	12	35	35
925684	5	00017	12	30	25

NUMBER	ROAD SYSTEM	CITY STREET	SURFACE	SPEED LIMIT	SPEED ESTIMATE
928628	7	00029	11	30	5
928628	7	00029	11	0	0
930814	5	RRXNG	11	20	10
930814	5	RRXNG	11	0	0
931170	5	90020	11	30	20
931170	5	90020	11	0	0

Example three, is generated from a STATISTICS file.

```
                    THE EXIR REPORT GENERATOR
                    -------------------------
                        REPORT INPUT LINES

NUMBER          ---- COMMAND ----

   1 ---------- COLUMN DATA: .D1.,.D7..D8..NEW,.D25..D26.,NEW1*
   2 ---------- COLUMN TITLES: $ NUMBER,$ KILLED, $ INJURED,$ CASUAL-   ITIES,
   3 ----------                $ SPEED    LIMIT,
   4 ----------                $ SPEED   ESTIMATE,
   5 ----------                $ SPEED  DIFFERENCE*
   6 ---------- CREATE DATA: NEW,ADD,.D7..D8.*
   7 ---------- CREATE DATA: NEW1,SUBTRACT,.D26...D25.*
   8 ---------- LINE SKIP: 10,1*
   9 ---------- NO NUMBER:
  10 ---------- COLUMN SEPARATOR:$*
  11 ---------- PAGE WIDTH: 126*
  12 ---------- PAGE LENGTH:43*
  13 ---------- REPORT TITLE: --- CITY DATA BANK ---*
  14 ----------   PAGE TITLE: --- CITY DATA BANK ---*
  15 ---------- REPORT COMMENTS: THIS IS A TEST REPORT GENERATED FROM THE CITY
  16 ----------  DATA BANK ... YOU ARE NOW READING AN OPTIONAL
  17 ----------  SET OF REPORT COMMENTS THAT MAY PRECEDE
  18 ----------  ANY REPORT.*
  19 ---------- DIGITS: 0,0,0,0,0,0,0*
  20 ---------- TABULATE ON: .C2.,.C3.,.C4.*
  21 ---------- FINISH:

 STAT -- TYPE FILE ...

      27 DESCRIPTORS OF LENGTH ...

        -2- -1- -1- -1- -2- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -1- -2- -1- -2- -

      27 DESCRIPTORS ....
    1   SERIALNUMBER
    2   COUNTY
    3   CITY
    4   POPCLASS
    5   ROADSYSTEM
    6   VEHICLES
    7   KILLED
    8   INJURED
    9   MONTH
   10   DAY
   11   YEAR
   12   WEEKDAY
   13   HOUR
   14   ACCTYPE1
   15   SURFACE
   16   ADVCOND
   17   LOCATION1
   18   LIGHT
   19   WEATHER
   20   HWYSYSTEM1
   21   VHCLTYPE1
   22   VHCLTYPE2
   23   VHCLMOVE1
   24   VHCLMOVE2
   25   SPEEDLIMIT
   26   SPEEDEST
   27   TOTALDAMAGE

 ... MAXIMUM NUMBER OF CHARACTERS IN EACH STATE ...

   4  2  4  1  1  2  2  2  2  2  2  1  4  2  2  2  2  2  1  2  2  2  2  2  3  3  6
```

--- CITY DATA BANK ---

11/19/75

1

THIS IS A TEST REPORT GENERATED FROM THE CITY DATA BANK ... YOU ARE NOW READING AN OPTIONAL SET OF REPORT COMMENTS THAT MAY PRECEDE ANY REPORT.

NUMBER	KILLED	INJURED	CASUAL-ITIES	SPEED LIMIT	SPEED ESTIMATE	SPEED DIFFERENCE
3901	1	0	1	25	15	-10
5600	1	0	1	15	5	-10
5601	1	1	2	35	60	25
5681	1	1	2	35	60	25
15000	1	0	1	0	0	0
16080	1	0	1	30	25	-5
18200	1	0	1	30	70	40
24400	1	0	1	45	85	40
24911	1	0	1	35	40	5
25700	1	2	3	30	30	0
26631	1	0	1	35	30	-5
28500	1	2	3	25	25	0
29600	1	4	5	35	35	0
30000	2	0	2	0	0	0
30100	1	0	1	0	0	0
30300	2	0	2	25	90	65
32445	1	0	1	30	50	20
32871	1	0	1	35	30	-5
33802	1	4	5	25	50	25
34323	1	1	2	0	0	0
34491	1	2	3	0	0	0
34688	2	0	2	35	60	25
35700	1	0	1	25	25	0
36569	1	0	1	0	0	0
36877	1	0	1	30	30	0
41600	1	2	3	30	60	30
43301	1	1	2	50	50	0
45242	1	2	3	30	30	0
45242	1	2	3	0	0	0
49862	1	0	1	0	0	0
50100	1	0	1	0	0	0
50500	1	4	5	0	0	0
50501	1	0	1	25	62	37
51800	1	0	1	0	0	0
56300	1	0	1	35	35	0
57600	1	0	1	25	30	5
58101	1	0	1	30	20	-10
65407	2	0	2	25	80	55
67000	1	0	1	25	5	-20
67500	1	0	1	30	3	-27

NUMBER	KILLED	INJURED	CASUAL-ITIES	SPEED LIMIT	SPEED ESTIMATE	SPEED DIFFERENCE
68000	1	0	1	35	0	-35
73276	1	0	1	0	0	0
75800	1	0	1	30	5	-25
75802	1	0	1	30	10	-20
79700	1	0	1	30	30	0
85100	1	0	1	40	20	-20
85319	1	0	1	25	32	7
86500	1	0	1	0	0	0
89000	1	1	2	40	0	-40
89002	1	0	1	25	0	-25
90400	1	0	1	40	40	0
90500	1	0	1	0	0	0
90500	1	0	1	0	0	0
90900	1	0	1	35	30	-5
90900	1	0	1	0	0	0
90900	1	0	1	30	10	-20
903040	1	1	2	30	50	20
905155	1	1	6	30	25	-5
905457	1	5	1	30	25	-5
905463	1	0	1	30	30	0
908570	1	0	1	0	0	0
909395	1	2	3	25	35	10
909761	1	1	2	35	60	25
910035	1	1	1	25	25	0
912077	1	0	3	30	35	5
912810	1	2	1	25	25	0
913796	1	0	1	30	20	-10
914852	1	0	1	30	30	0
914897	1	0	1	0	0	0
915089	1	0	1	25	20	-5
915510	1	1	2	35	50	15
916077	1	0	1	30	20	-10
919116	1	13	14	30	20	-10
921598	1	0	1	30	25	-5
922215	1	1	2	35	32	-3
922453	1	0	1	30	30	0
923544	1	1	2	30	65	35
924518	1	0	1	25	25	0
924855	1	0	1	35	35	0
925204	1	0	1	30	25	-5
925684	1	0	1			

NUMBER	KILLED	INJURED	CASUAL-ITIES	SPEED LIMIT	SPEED ESTIMATE	SPEED DIFFERENCE
928628	1	0	1	30	5	-25
928628	1	0	1	0	0	0
928628	1	3	4	20	10	-10
930814	1	3	4	0	0	0
930814	1	3	4	20	20	-10
931170	1	1	2	30	0	0
931170	1	1	2	0	0	0

****** F I N A L T O T A L S ******

	90	65	155			

APPENDIX B: EXIRPG IMPLEMENTATION NOTES (USING THE CDC 6400 COMPUTER AT THE UNIVERSITY OF COLORADO)

1) Using the Procedure File, EXIS, in Batch Processing.

1a) Creating the GENERATE or STATISTICS file in the same run as the report generated.

```
dxxx,CMyyyy,Tzz
ACCOUNT
GET,EXIS/UN=0503D,PW=CORCO.
CALL,EXIS.
7/8/9
EXIR
REPORT
7/8/9
READ DATA BANK file name chosen by user*
GENERATE (or STATISTICS): descriptor list FOR noise WITH Boolean expression*
7/8/9
EXIRPG Commands
"
"
"
6/7/8/9
```

1b) Generating a report using a previously saved GENERATE or STATISTICS FILE AS INPUT.

```
dxxx,CMyyyy,TZZ.
ACCOUNT
GET,EXIS/UN=0503D,PW=CORCO
GET,TAPE3-filenam
CALL,EXIS.
7/8/9
REPORT
7/8/9
EXIRPG Commands
"
"
6/7/8/9
```

filenam is the name of the previously saved GENERATE or STATISTICS file.

2) Using the procedure file, EXIST, in interactive processing:

2a) Creating the GENERATE or STATISTICS file in the same run as the report is generated

```
(Standard Kronos 2.1 Sign on Procedure)
.
.
.
GET,EXIST/UN=0503D,PW=CORCO  <cr>
CALL,EXIST  <cr>
EXIST  <cr>
"
"
"
REPORT  <cr>
ENTER COMMAND
?
```

At this point you should type in your EXIRPG commands to generate the report. Command syntax (i.e. a colon : to indicate the end of the command directive, and an asterisk * to indicate end-of-line) is the same as in batch usage. An input line is terminated when you enter a carriage return (denoted in this write up as < cr >). Commands requiring more than one input line are valid (e.g. COLUMN TITLES:).

Syntactical errors are recoverable. A message is printed that defines the error, and the user is asked to re-enter the input line. Some errors, for example new variables listed in COLUMN DATA:, but not defined by CREATE DATA:, are not detected until after you have entered the FINISH: command. These errors are non-recoverable and will require that you re-enter your EXIRPG command sequence.

The interactive use of EXIRPG assumes the user is invoking the program from a scroll-type interactive terminal. Pagination is handled differently than in batch. Since there are no physically definable report pages (e.g. no perforated paper), the terminal cannot skip to the top of the next page when a report page is full. Instead, five blank lines are printed to denote end of page. A new heading with an incremented page number is then printed and the report continues. Note that because of this substitute for explicit pagination, reports created interactively cannot be routed to the line printer via DISPOSE.