NASA Technical Memorandum 80144

NASA-TM-80144 19800012559

ISIS USERS MANUAL

CAROLYN GRANTHAM

MARCH 1980

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665

ABSTRACT

The Interactive Software Invocation System (ISIS) is an interactive data management system. ISIS is being developed to act as a buffer between the user and host computing system. ISIS provides the user with a powerful system for developing software systems in an interactive environment. ISIS protects the user from the idiosyncracies of the host computing system by providing such a complete range of capabilities that the user should have no need for direct access to the host computing system. These capabilities include a data editor, a file manager, and a tool invoker, all under the control of a PASCAL-like Interactive Programming Language (IPL).

TABLE OF CONTENTS

INTRODUCTION

This document covers the latest version of the Interactive Software Invocation System (ISIS) (12/20/79) discussing the syntax and operation of the Interactive Program Language, IPL. IPL is based on the higher order language PASCAL and anyone wishing to use ISIS should have a working knowledge of PASCAL or have access to a PASCAL Manual (see ref. 1). PASCAL was chosen as the base language because of its simplicity and its wide range of capabilities. IPL and PASCAL differences are discussed on page 12. IPL contains most of the arithmetic operations, functions, and control statements of a traditional programming language. This language has been extended to include statements for data and text editing, file management, and tool invocation. The editor manipulates pages of text or data. The IPL statements allow insertion, deletion, replacement, and modification of lines of text or data. The file manager allows the user to save, access, and purge pages within a 5-level hierarchical file system. The tool invoker allows the user to communicate with the host computer system.

ISIS is being developed by Dr. W. Joseph Berman on contract for Langley Research Center (LaRC). ISIS was originally developed under the CDC NOS-BE operating system at the University of Virginia and is currently running under the CDC NOS 1.3 operating system at LaRC. The transportability of ISIS is being tested by efforts to rehost it to an IBM 370 system and to a PDP-11 machine. Anyone having an application for ISIS is welcome to use it with the understanding that ISIS is not a production system, but a developing system.

On the LaRC system, ISIS is stored on a direct access permanent file under

the user number 961300N. The control statements to access and execute ISIS are:

```
/attach,isis/un=961300n. CR                    - Retrieve the ISIS file.
/isis CR                                       - Executes ISIS

 ISIS MONITOR   V 1.00     80/02/13. 15.02.18.
 15.02.20?

          .
          .                                    - Acceptable ISIS statements.
          .

 15.02.47?stop CR                              - Terminate ISIS session.

ISIS TERMINATED.  (ADDRESS:    5)
- LOAD FL 043210     STACK FL 024570
/
```

INTERACTIVE PROGRAMMING LANGUAGE (IPL) SYNTAX

The IPL descriptions provided in subsequent sections have the following format: The IPL statement syntax at the top of the page. The words appearing in caps must be typed as shown, whereas, the words in small letters can be replaced with appropriate information. A discussion of the statement, what it does, and how to use it is followed by examples illustrating how the statement can be used. See example page 18.

The statements are discussed in groups according to capabilities. The first group, Interactive Programming Statements, contains statements of a traditional programming language. The second group, File Management Statements, allows the user to save, replace, access, and purge information which is contained within a 5-level hierarchical file system. The third group, Text Editing Statements, contains statements which allows editing (Insertion, Deletion, Replacing, and Modification) of lines of text or data which is contained in the file system. The fourth group, Tool Invocation Statements, allows the user to communicate with the host computer system. The fifth, and last group, Interrogation Statements, allows the user to make inquiries of ISIS, relating to statements in any of the above groups.

Syntax Conventions

These conventions will be used in the IPL statements or in the discussions of the statements.

?	ISIS prompt - informs the user that ISIS is ready
>	ISIS indication that the current statement is not yet complete and more input is required
id	Identifier
id(s)	One or more identifiers separated by commas
ℓn	Line number
nℓ	A specific number of lines
[ ]	Optional information for command
{|}	Command choices are enclosed in brackets separated by vertical slashes (|)
col	Column number
inc	Line increment
...	ISIS acknowledgement to the BREAK key
.	Separators in DATA BASE library page name
,	List separator

[BREAK] Key

The [BREAK] key has two functions. It enables the user to discard a partially typed line and reenter it. This is in addition to the normal [BKSP] key. It also allows the user to terminate a command. The line to be reentered may be a command statement (statement verb) or a line in the ACTIVE page the user is in the process of editing. A good example would be if he made a typographical error in the text being inserted. The user hits the BREAK key, ISIS acknowledges this by printing 3 dots (...), reprompts with the line number for reentry of the line, and then the user retypes the information.

To terminate commands using the [BREAK] key, the user simply depresses the [BREAK] key after he receives the prompt for the next line number.

No other information may appear on the line preceeding the [BREAK] key.

EXAMPLES:

```
INSERT 4//2
   4.     =THIS IS AN EXAMPLE
   6.     =PROGRAM ILLISTRATING(BR)*..
   6.     =PROGRAM ILLUSTRATING THE
   8.     =USE OF THE BREAK KEY
  10.     =FOR DISCARDING ALINE
  12.     =CURRENTLY BEINF(BR)*..
  12.     =CURRENTLY BEING TYPED
  14.     =(BR)*

INSERT TERMINATED.
 16.40.41?
          LIST
   4.     =THIS IS AN EXAMPLE
   6.     =PROGRAM ILLUSTRATING THE
   8.     =USE OF THE BREAK KEY
  10.     =FOR DISCARDING ALINE
  12.     =CURRENTLY BEING TYPED
 16.40.51?
```

- Mistake here in spelling. User depressed the [BREAK] key. ISIS responded with 3 dots and prompted the user for reentry of the line.
- Another mistake in spelling -
- User depressed the BREAK key to terminate the command.
- List the ACTIVE page to check correctness.

* - BREAK key ((BR)) is typed but does not echo back to terminal.

ERRORS

Error indications in ISIS are similar to those in PASCAL. Syntax errors are denoted by an error message line printed directly below the statement containing faulty code. Like PASCAL, this message consists of an up arrow (^) under the statement column where the ISIS parser became confused. A short message describing the problem follows rather than the error code numbers as in PASCAL. These messages are intended to be self-explanatory. Several typical examples of errors are shown below. A complete list of all possible error messages is located in Appendix D.

```
 13.57.51?VAR V: ARRAY[1..3] OF REAL;
 13.58.57?VAR R,H: REAL;
 13.59.23?   R=2; H=1;
 13.59.52?  REPEAT
 14.00.13?      V(R,H)=.333*PI*R*R*H;
XXXXXXXXX         ↑ ':=' EXPECTED
```

- Parentheses were used for arrays instead of square brackets ([])

```
 15.03.56?A1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
XXXXXXXXX    ↑ UNRECOGNIZED STATEMENT
 15.04.47?
```

- A1 frame has not been declared.

```
          FRAME A1,A2
 15.05.21?A1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
XXXXXXXXX  ↑ '=' OR ':' EXPECTED.
 15.05.51?SHOW FRAMES
** NONE **
 15.06.46?
```

- The TYPE (:STRING) is missing on the FRAME declaration.

```
          VAR X,Y,Z:REAL    X=10; Y=5;
XXXXXXXXX                   ↑ ';' EXPECTED
 15.07.49?SHOW VARS
'X          ': REAL;
'Y          ': REAL;
'Z          ': REAL;
 15.08.21?PRINT Y,'=Y',X,'=X';
                    0=Y                          0=X
 15.09.00?
```

- The statement terminator (;) is missing after the VAR declaration.

```
          VAR I,J,K:INT; I=3; J=2;
 15.10.31?                X=2.5;  Y=5;
 15.11.18? Z=X*J;  PRINT Z,'=Z'
  5.000000000000000E+000=Z
 15.12.02?     K=Y*I; PRINT K,'=K';
XXXXXXXXX            ↑ INCOMPATIBLE TYPES
 15.13.00?K=I*J;PRINT K,'=K'
         6=K
```

- Incompatible types (INT=REAL*INT)

Programming Statements

IPL/PASCAL Differences

IPL contains the PASCAL variable types, REAL, INTEGER, and BOOLEAN in abbreviated forms: REAL, INT, BOOL. ISIS has two data types not in PASCAL: STRING and KEY. ISIS deviates from PASCAL in not allowing CHARS and ALFA's but instead includes a type called STRING. This STRING type is similar to the PASCAL ALFA except that there is no set length on the STRING. A STRING contains alphanumeric information enclosed by quotation marks and may be assigned to a variable.

The other data type not in PASCAL is the KEY type. KEY is defined as a line number that is assigned to each line of code in the work frame. The KEY type allows the user to define a variable which may be used in the range of the edit commands of ISIS. KEY values are between 0.0000 and 999.9999.

In IPL a semicolon (;) placed at the end of a statement is optional if it is not followed by another statement on that line. If there is more than one statement on a line, then the semicolon (;) must be used to separate the two statements.

In IPL, each simple statement must be completed on a single line, unless explicitly continued to the next line by having a $ as the last nonblank character on the line. The maximum number of characters permitted on a line is limited to 133 characters.

Another IPL/PASCAL difference is in the assignment statement. IPL allows either = or := for assignments, whereas, PASCAL requires a :=.

Another difference of IPL is it does not use BEGIN and END's to surround compound statements. All that is required is an END to terminate a compound statement.

Comments are similar to those of PASCAL in that they begin with a (*; however, unlike PASCAL, IPL comments are automatically ended with the end of the line. This means the user doesn't have to close comments. It also means that comments may not be followed by code nore are they automatically continued on the next line.

Records cannot have CASE variants. IPL does not presently allow underscores to be used as part of the variable name. IPL does not allow packing, does not have a CASE statement, and does not allow sub range types.

System Variables Used in Programming Statements

There are several ISIS system variables which have been made available to the user. These variables are contained in a record (ref. 1, p. 42) named SYSTEM. The SYSTEM record field identifiers are as follows:

Identifier	Type	Description
.VERBOSE	BOOL	If TRUE, SET, and CLEAR statements print acknowledgement. If FALSE, no such acknowledgement is printed.
.DELTA	KEY	The default range increment (inc) on the Text Editing Statement, INSERT (default value is 1)
.ALARM	INT	Twenty-four hour clock alarm - when ALARM (clock time) is 0, then a message is printed to the user on the CRT- ***ALARM***. This may be useful to a person with a very tight schedule and a poor memory.
.CLOCK	INT	Is the number of elapsed milliseconds in the current terminal session (read only variable)
.TIME	STRING	Current day time (read only variable)
.DATE	STRING	Current date (read only variable)
.F	KEY	The first line number in a frame.
.L	KEY	The last line number in a frame.
.C	KEY	The current line number in a frame.
.K	KEY	Current line number in a FOREACH loop only, otherwise it is zero.
.COUNT	INT	Number of items in the range of the last editing command (other than FOREACH).
.USERNUM	STRING	Current seven character user number.

To obtain the information in this record, the user may inquire with SHOW ID SYSTEM, or PRINT SYSTEM. The SHOW ID SYSTEM will print out the field identifier names and types. The PRINT SYSTEM will print out the current values of these field identifiers.

EXAMPLE:

```
11.54.29?.ALARM=1156                    - Set .ALARM for 11:56
11.54.53?
          PRINT .CLOCK                  - Print SYSTEM.CLOCK
      133
11.55.03?
          PRINT .TIME                   - Print SYSTEM.TIME
11.55.14.
11.55.15?
          PRINT .DATE                   - Print SYSTEM.DATE
79/08/29.
11.55.27?
          SHOW ID SYSTEM                - Display SYSTEM record
VARIABLE
'SYSTEM     ': RECORD
                 VERBOSE: BOOL;
                 DELTA: KEY;
                 ALARM: INT;
                 K: READONLY (KEY);
                 F: READONLY (KEY);
                 L: READONLY (KEY);
                 CLOCK: READONLY (INT);
                 DATE: READONLY (STRING);
                 TIME: READONLY (STRING);
               END;
11.55.42?
          PRINT SYSTEM                  - Print SYSTEM record
VERBOSE =       TRUE                      variables and values
DELTA =     1.
ALARM =        1156
K =     0.
F =  999.9999
L =     0.
CLOCK =         279
DATE =   79/08/29.
TIME =   11.56.06.
***** ALARM *****                       - Alarm message is
11.56.07?                                typed when the alarm
                                         went off at 11:56
```

Programming Statements

Comments

[line of code] [(*comment]

User comments may be added to program code. A left parenthesis followed by an asterisk, (*, indicates the beginning of the comment. The end of the comment is denoted by the end of the line. This means that comments cannot be embedded in IPL statements. Comments are not automatically continued on the next line.

Programming Statements

These have been divided into two groups: the Declarative statements which describe program variables, and the Action statement which are the executable statements. It should be noted here that the IPL compiler collects all declarations first, allocates space for them and then puts them into a symbol table. This is done without regard to the program logic or the order in which they appear. An illustration of this is shown in the example below:

```
IF  X > Y   THEN   VAR Z:STRING;
            ELSE   VAR Z:REAL;

END;
```

You would expect only one of the declarations to be declared based on the program logic, but in actuality both declarations will be collected for allocating space and since a variable may be declared only once, the IPL compiler will consider this an error. IPL, being an interactive language, allows the user to make declarations at any time or anywhere in the program.

ABBREV abbrev-id(s) : statement - verb

The ABBREV statement allows the user to abbreviate ISIS statement verbs. More than one abbreviation may be given to a single statement verb. See SHOW STATEMENTS for list of verbs that may abbreviated. ABBREVS are cleared by the ERASE statement. ABBREV can only be used in the ACTIVE frame at present.

EXAMPLE:

```
ABBREV P:PR,W:PRINT
 08.32.52?
          SHOW ABBREVS
'PR         ': PRINT
'P          ': PRINT
'W          ': PRINT
 08.33.17?
          P .DATE
 79/08/10.
 08.33.39?
          PR .TIME
 08.33.56.
 08.33.57?
          W .CLOCK
       218
 08.34.17?
          ERASE PR,W

 08.34.31?SHOW ABBREVS
'P          ': PRINT
```

- Set P, PR, and W as abbreviation for PRINT
- Show abbreviations
- Use abbreviations in place of PRINT

Programming Statements

TYPE type-id(s) {=|:} type-specification

The TYPE statement is similar to the TYPE section of a PASCAL program. It allows the user to specify a new TYPE for subsequent use in variable declaration statements. The type specification consists of combining any of the system-provided types (INT,BOOL,REAL,STRING,KEY,ARRAY,RECORD) into RECORDS and ARRAYS, etc. to obtain a user-defined type. Subsequent type specifications may involve previous user-defined types in addition to system-provided types. Types are disposed of by the ERASE statement. As each TYPE statement is processed, the types are immediately entered into tables. No code is generated by this statement. This means that pages which contain TYPE statements are EXEC'ed repeatedly or those which have compilation errors and are re-executed will fail on the second execution because their types have been previously declared. This may be overcome by preceding all TYPE statements with an ERASE statement for that type.

EXAMPLE:

```
SHOW TYPES
** NONE **
 08.35.56?TYPE PERSONS:REAL;                                    - Declare types
 08.36.11?TYPE MESS : ARRAY[1..5] OF BOOL;
 08.36.40?TYPE REC1 : RECORD NUM:INT; FLAG:BOOL; NAM:STRING; END;
 08.37.24?TYPE RECM : ARRAY[1..3] OF REC1;
 08.38.06?
          SHOW TYPES
'MESS       ': ARRAY [1..5] OF BOOL;                           - Display TYPE symbol table
'PERSONS    ': REAL;
'RECM       ': ARRAY [1..3] OF
                  RECORD
                     NUM: INT;
                     FLAG: BOOL;
                     NAM: STRING;
                  END;
'REC1       ': RECORD
                     NUM: INT;
                     FLAG: BOOL;
                     NAM: STRING;
                  END;
 08.38.17?
```

VAR var-id(s): type-specification

The VAR statement is similar to the VAR section of a PASCAL program. It allows the user to assign a prespecified type (REAL, INT,BOOL,STRING,KEY and user defined types) to program variables. All program variables must be declared in this manner. If the user fails to declare all variables being used, the ISIS system interrogates the user for the type of the undeclared variable instead of aborting the command. Variables are eliminated using the ERASE statement.

Declared variables are assigned default values by the ISIS system. Integers and real numbers are set equal to zero, Booleans are set FALSE and strings are empty (zero length). As each VAR statement is processed, the variables are immediately entered into tables. No code is generated by this statement. This means that pages which contain VAR statements are EXEC'd repeatedly as those which have compilation errors and are re-executed will fail on the second execution because the variables have been previously declared. This may be overcome by preceding all VAR statements with an ERASE statement for that variable.

EXAMPLE:

```
 14.08.08?SHOW VARS
** NONE **
 10.34.17?VAR X,Y,Z:REAL;                                  - Declare variables
 10.34.41?VAR I,J:INT
 10.34.54?VAR B,C: BOOL;
 10.35.04?VAR HAM: STRING;
 10.35.16?TYPE RECM: ARRAY[1..3] OF BOOL;                  - Define types
 10.35.42?VAR INPT: RECM;
 10.36.21?TYPE LOCK: RECORD UN:BOOL; SHUT:STRING; END;
 10.36.58?VAR BTHE: LOCK;

 10.37.11?SHOW VARS                                        - Display variables in
'BTHE       ': RECORD                                        symbol table to show
                 UN: BOOL;                                   the new declared
                 SHUT: STRING;                               Variables have been
               END;                                          included in the symbol
'B          ': BOOL;                                        table
'C          ': BOOL;
'HAM        ': STRING;
'INPT       ': ARRAY [1..3] OF BOOL;
'I          ': INT;
'J          ': INT;
'X          ': REAL;
'Y          ': REAL;
'Z          ': REAL;

 09.48.45?Z=A+Y;
VAR A          : REAL
```

System prompt — User response

- Equation to be calculated contains the undefined variable, A. The system interrogates users for type. The user responds with type and execution continues.

ERASE {abbrev-id(s)|type-id(s)|var-id(s)|frame-id(s)}

The ERASE statement removes the specified types, variable-ids or frame name from the identifier tables. More than one id may be erased at one time with ids separated by a comma. Caution should be exercised when using ERASE. Erasure of a TYPE will not affect already defined variables of that type, but it will prevent the user from defining new variables of that type. Also, note that erasure of the ACTIVE frame is not allowed.

EXAMPLE:

```
09.24.44?SHOW TYPES                    - Display existing types
'PERSONS    ': REAL;
'RECM       ': ARRAY [1..3] OF BOOL;
09.25.21?
          SHOW VARS                    - Display existing variables
'A          ': REAL;
'B          ': REAL;
'C          ': REAL;
'PROMPT     ': STRING;
'RESPONSE   ': STRING;
'X          ': INT;
'Y          ': REAL;
'Z          ': REAL;
09.25.43?
          ERASE PERSONS,A,B,C          - Erase types and variables from tables
09.26.15?
          SHOW TYPES
'RECM       ': ARRAY [1..3] OF BOOL;
09.26.38?
          SHOW VARS                    - Display types and variables again to show
'PROMPT     ': STRING;                   that the erased variables and types were
'RESPONSE   ': STRING;                   removed from the identifier table
'X          ': INT;
'Y          ': REAL;
'Z          ': REAL;
```

var-id {=|:=} arithmetic expression

The assignment statement consists of a program variable, an = sign and an expression. The resultant value of the expression is assigned to the variable on the left hand side of the equal sign.

Types must be compatible as there is not implicit conversion in IPL.

EXAMPLES:

```
A = X + Y

B := Z * (A-1)
```

Programming Statements

EXITIF conditional

The EXITIF statement allows the user to exit from the middle of a loop statement (IF, WHILE, REPEAT, LOOP, AND FOR) when a specified condition becomes true. The EXITIF may appear anywhere in the loop. A single loop may contain any number of EXITIFs.

EXAMPLE:

```
.1.37.4/YLC:
  1.      =VAR R,T,X:REAL;
  3.      =R=10.
  5.      =T=.1745329;
  7.      =WHILE T < 3.14 DO
  9.      =       X=R*COS(T);
 11.      =       PRINTLN T*57.295780,'=T(DEG)',X,'=X';
 13.      =       T=T+.1745329;
 15.      =    EXITIF X <= 0;
 17.      =END
:1.38.24>?
         EXEC
 9.999996411620E+000=T(DEG)   9.848077573880 4E+000=X
 1.999999728232 4E+001=T(DEG)   9.396926380233 3E+000=X
 2.999995923486E+001=T(DEG)   8.660254415835 8E+000=X
 3.999994564648E+001=T(DEG)   7.660445079105 0E+000=X
 4.999993205813E+001=T(DEG)   6.427877052059 6E+000=X
 5.999991846972E+001=T(DEG)   5.000001309400 9E+000=X
 6.999990488134E+001=T(DEG)   3.420203090837 1E+000=X
 7.999989129296E+001=T(DEG)   1.736483761997 0E+000=X
 8.999987770458E+001=T(DEG)   2.267948940372 6E-006=X
 9.999986411620E+001=T(DEG)  -1.736479295009 6E+000=X
```

- A WHILE loop containing an EXITIF statement (residing in ACTIVE page)

- Execute ACTIVE page

The output shows the WHILE loop was exited via the EXITIF (x becomes < 0)

IF condition THEN { statement(s) [ELSE statement(s)] / [EXITIF condition] } END

The IF statement allows for conditional execution of statements. The condition must evaluate to a BOOL value. If the condition is TRUE, the statements following the THEN are executed and those following the ELSE (if present) are skipped. If the condition is FALSE, the statements following the THEN are skipped and those following the ELSE (if present) are executed.

It should be noted that ISIS deviates from PASCAL by not requiring BEGIN . . . END's around the THEN and ELSE sections of the IF statement when multiple statements are contained in them.

EXITIF in either the THEN or ELSE clause transfers to the END of the entire IF statement.

EXAMPLE:

```
15.08.59?LOOP
15.09.10>    IF B<A THEN PRINTLN B; B=B+1;
15.09.39>           ELSE IF B=A THEN PRINTLN 'ONE MORE STEP';
15.10.06>                       ELSE PRINTLN ' READY TO STOP';
15.10.29>                       END
15.10.36>                B=B+1
15.10.46>          END
15.10.53>    EXITIF B>16
15.11.05>END
 1.000000000000000E+001
 1.100000000000000E+001
 1.200000000000000E+001
 1.300000000000000E+001
 1.400000000000000E+001
ONE MORE STEP
 READY TO STOP
```

Programming Statements

FOR var-id = initial-value {TO|DOWNTO} final-value DO { statement(s) [EXITIF condition] } END

The FOR statement is another form of loop statement which allows the user to perform a sequence of statements repeatedly while the variable-id takes on a progression of values between an initial and final value. This progression may go either upward or downward in value. The initial-value and final-value may be INT variables, literals, or expressions.

EXAMPLE:

```
        VAR A : REAL
10.46.11?VAR Z : ARRAY[1..10] OF REAL;
10.46.36?VAR L,I : INT;
10.46.52?  I=-5;
10.47.15?   FOR L=I+15 DOWNTO 1 DO
10.47.55>                          A=L*L;
10.48.19>                          Z[L]=3.14*A;
10.48.47>                          PRINTLN L,Z[L];
10.49.11>   END;
        10  3.140000000000E+002
         9  2.543400000000E+002
         8  2.009600000000E+002
         7  1.538600000000E+002
         6  1.130400000000E+002
         5  7.850000000000E+001
         4  5.024000000000E+001
         3  2.826000000000E+001
         2  1.256000000000E+001
         1  3.140000000000E+000
```

- For statement with downward progression (10 to 1)

LOOP [statement(s)] EXITIF condition [statement(s)] END

The LOOP statement is a generalization of the WHILE and REPEAT statements. A set of statements are executed repetitively until the condition of the EXITIF becomes true. This EXITIF becomes part of the loop statement. EXITIF may appear anywhere in the loop and when the condition becomes true, the loop is exited at that point in the code. If the EXITIF is left out, the LOOP will be executed infinitely. If this occurs, the user can abort the command by depressing the BREAK key.

EXAMPLE:

```
 10.53.40?VAR X:REAL;  VAR S:STRING
 10.54.15?SHOW VARS
'A          ': REAL;
'I          ': INT;
'L          ': INT;
'S          ': STRING;
'X          ': REAL;
'Z          ': ARRAY [1..10] OF REAL;
 10.54.24?VAR B:BOOL;

 10.59.19?  X=45.45; I=99;  B=TRUE;
 10.59.40?
          LOOP
 10.59.59?     ASK S,'PLEASE TYPE INPUT EXP *'
 11.00.35>     EXITIF S='0'
 11.00.54>     XEQ CAT('PRINTLN ',S)
 11.01.19>END
PLEASE TYPE INPUT EXP * 6+6*2
         18
PLEASE TYPE INPUT EXP * X+2
  4.74500000000000E+001
PLEASE TYPE INPUT EXP * I
         99
PLEASE TYPE INPUT EXP * B
       TRUE
PLEASE TYPE INPUT EXP * 5
          5
PLEASE TYPE INPUT EXP * 0
```

Loop of statements is executed until the user types an input of S = 0.

WHILE condition DO { statement(s) / [EXITIF condition] } END

The WHILE statement is a type of LOOP statement. The statements contained in the loop will be executed WHILE a certain conditions exists. The WHILE statement evaluates a condition, which must reduce to a BOOL result. If the condition is FALSE, the statements are skipped. If the condition is TRUE, the statements are executed and the condition is then re-evaluated. If the condition is again TRUE, the statements are re-executed and the condition is then re-evaluated. This process continues until the condition is FALSE. When this happens, the statements are skipped and execution continues with the next statement.

EXAMPLE:

```
12.21.18?
12.21.58?VAR S:STRING
12.22.16?VAR I:INT
12.22.26?  S='CHECK WHILE'
12.22.43?  I=1
12.22.49?  WHILE I<10 DO PRINTLN SUB(S,I,1):2*I
12.23.29>                 I=I+1
12.23.38>  END
C
  H
    E
      C
        K

            W
              H
                I
```

REPEAT { statement(s) / [EXITIF condition] } UNTIL condition

The REPEAT statement is a type of LOOP statement. The statements contained in the loop will be repeated UNTIL a condition occurs. The REPEAT statement is similar to the WHILE statement. The differences are that the REPEAT statement first executes the statements it controls and then evaluates and checks the condition, and that the statements are re-executed as long as the condition is FALSE, i.e., the statements will always be executed at least once.

EXAMPLE:

```
15.20.43?VAR V:ARRAY[1..6,1..6] OF REAL;
15.21.19?VAR I,J:INT;
          VAR R,H,PI: REAL
15.21.33?  R=2; H=1; PI=3.14; I=1; J=1;

15.22.24?REPEAT
15.26.46?    V[I,J]=.333*PI*R*R*H;
15.27.12>    J=J+1;
15.27.21>    H=H+.5;
15.27.31>    PRINTLN H,V[I,J];
15.27.49>    UNTIL J=6;
 1.5000000000000E+000  6.2737200000000E+000
 2.0000000000000E+000  8.3649600000000E+000
 2.5000000000000E+000  1.0456200000000E+001
 3.0000000000000E+000  1.2547440000000E+001
 3.5000000000000E+000                     0
```

[frame-id/]FOREACH string-var DO { statement(s) / [EXITIF condition] } END;

FOREACH allows the user to execute a set of statements for each line contained in the active frame or specified frame.

EXAMPLE:

```
   1.     =ERASE S; VAR S:STRING;
   2.     =SHOW PAGES HALNELL.PCODE.CONTROL. . :KEEP;
   3.     =SHOWN/FOREACH S DO
   4.     =XEQ CAT('MYJUNK/USE ',S);
   5.     =MYJUNK/COUNT;       (*    ANY EDITTING COMMAND
   6.     =END;
 13.46.08?EXEC
7 ITEMS INSERTED. LAST ITEM INSERTED IN SHOWN     :    7.
HALNELL.PCODE.CONTROL.CARD.EXEC USED AS MYJUNK
12 ITEMS IN SPECIFIED RANGE.
 H=12, I=0
HALNELL.PCODE.CONTROL.CARD.RUN USED AS MYJUNK
21 ITEMS IN SPECIFIED RANGE.
 H=21, I=0
HALNELL.PCODE.CONTROL.CARD.RERUN USED AS MYJUNK
20 ITEMS IN SPECIFIED RANGE.
 H=20, I=0
HALNELL.PCODE.CONTROL.CARD.REEXEC USED AS MYJUNK
12 ITEMS IN SPECIFIED RANGE.
 H=12, I=0
HALNELL.PCODE.CONTROL.CARD.EXECOLD USED AS MYJUNK
11 ITEMS IN SPECIFIED RANGE.
 H=11, I=0
HALNELL.PCODE.CONTROL.WILL.RUN USED AS MYJUNK
23 ITEMS IN SPECIFIED RANGE.
 H=23, I=0
HALNELL.PCODE.CONTROL.WILL.EXEC USED AS MYJUNK
12 ITEMS IN SPECIFIED RANGE.
 H=12, I=0
 13.47.04?
```

XEQ string-expression

The XEQ statement allows the user to specify that the contents of a string-expression are to be interpreted as a command to the system.

EXAMPLE:

```
12.16.39?
12.18.01?VAR S:STRING
12.18.21?VAR ABC:REAL
12.18.30?  S='1+2+3'
12.18.46?  ABC=10
12.18.56?
          XEQ CAT('PRINTLN ',S)
         6
12.19.22?
          XEQ 'PRINTLN S'
1+2+3
12.19.47?
          S='ABC'
12.20.26?
          XEQ CAT('PRINTLN ',S)
 1.000000000000000E+001
```

- PRINTLN is concatenated (CAT) with contents of S (1+2+3) and then executed (XEQ). PRINTLN 1+2+3 evaluates expression and prints the value (6).
- PRINTLN S is executed, printing value of S, which is 1+2+3
- Redefine S
- PRINTLN is concatenated with contents of S (ABC) then executed (XEQ). PRINTLN ABC evaluates ABC and prints the value of the variable (10).

```
S='FOR I=1 TO 5 DO PRINTLN I END';
 13.31.43?XEQ S
          1
          2
          3
          4
          5
```

- User can assign a number of statements to a string variable and then execute these statements by executing that string variable (XEQ S)

SET TAG tag-id

CLEAR TAG

SET TAG allows the user to assign an identifier to a line of code. This gives the user a way to keep track of the program modifications made during an editing session. After setting a tag, all lines of code modified or added will bear the tag-id. This tag-id could be the date the modifications are made, or the name of the person making the modifications. All lines modified will continue to contain this tag-id until the user gets rid of it. The tag may be changed at any time by executing another SET TAG command and from there on the new tag-id is appended to the modified code. The CLEAR TAG command clears the tag-id and no more tags will be placed on modified lines of code. The modified frames with the tag-ids may be viewed by listing the code with the tag option on (LIST {range} :T). The tag-id is limited to seven characters. There is also a limit of 63 different tags in any one frame.

EXAMPLE:

```
 13.27.15?USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS WORK
 13.27.43?LIST 1.3/1.5                                  - List existing text
   1.3   =   WDBLANKS = '          ';
   1.4   =
   1.5   =   IDLEN = 10;
 13.28.09?
          SET TAG CXG
WORK      NOW TAGGED AS: CXG                            - SET TAG
 13.28.43?INSERT 1.41//.01                              - INSERT new code
   1.41  =INSERT 3 LINES AT 1.4
   1.42  =  WHICH WILL BE TAGGED
   1.43  =  WITH CXG!!!
   1.44  =

INSERT TERMINATED.
 13.30.49?LIST 1.3/1.5:T                                - List with T option.
          1.3   =   WDBLANKS = '          ';              Modifications have been
          1.4   =                                        tagged.
CXG       1.41  =INSERT 3 LINES AT 1.4
CXG       1.42  =  WHICH WILL BE TAGGED
CXG       1.43  =  WITH CXG!!!
          1.5   =   IDLEN = 10;
```

SET TAG continued

```
 13.32.00?
          SET TAG RWW
WORK      NOW TAGGED AS: RWW                          - Change the TAG
 13.32.45?
          CHANGE 'CXG' TO 'RWW TODAY' IN 1.43         - Modify code
   1.43  =  WITH RWW TODAY!!!
 13.33.41?
          LIST 1.3/1.5:T                              - List with TAG option.
          1.3   =   WDBLANKS = '          ';           Modifications have been
          1.4   =                                      tagged. Previous tags
CXG       1.41  =INSERT 3 LINES AT 1.4                 are retained.
CXG       1.42  =  WHICH WILL BE TAGGED
RWW       1.43  =  WITH RWW TODAY!!!
          1.5   =   IDLEN = 10;
 13.33.59?
          CLEAR TAG
WORK       NO LONGER TAGGED.
```

Programming Statements

SET TRACE var-id(s)

CLEAR TRACE var-id(s)

The SET TRACE statement is used to trace variables. Each time the variable's value is assigned, the variable-id and the new value are printed. A TRACE applies to entire program. Once a variable is traced, it will be traced wherever it is used. Records and array variables can be traced but no values are printed.

The CLEAR TRACE command releases a TRACE on a variable.

EXAMPLE:

```
 11.31.52?VAR I,J:INT
 11.32.10?VAR X:REAL
 11.32.21?VAR B:BOOL;
 11.32.28?VAR S:STRING
 11.32.36?   J=1;       X=0;
 11.32.56?
          SET TRACE J                    - Set trace on J
'J         ' NOW TRACED.
 11.33.15?SET TRACE X                    - Set trace on X
'X         ' NOW TRACED.
 11.33.26?
          LOOP
 11.26.55>     J=J+1;
 11.27.05>     IF J < 5 THEN X=X+2;
 11.27.23>                ELSE X=X-1;
 11.27.38>     END
 11.27.44>     PRINTLN '***':2*J;
 11.28.07>     EXITIF J=6;
 11.28.36>END
'J          '=          2
'X          '=  2.000000000000006E+000
 ***
'J          '=          3
'X          '=  4.000000000000000E+000
   ***
'J          '=          4
'X          '=  6.000000000000000E+000
     ***
'J          '=          5
'X          '=  5.000000000000000E+000
       ***
'J          '=          6
'X          '=  4.000000000000000E+000
         ***
 11.28.48?
          CLEAR TRACE J                  - Clear Trace on J
'J         ' NO LONGER TRACED.
 11.29.57?X=45.5;  J=99;
'X          '=  4.550000000000000E+001  - Change values being traced
                                        - Trace output
```

- TRACE output is printed each time the value of the variable is changed.

ASK response, prompt

The ASK statement allows the user to interrupt program processing and accept input from the terminal. The ASK statement has two parameters. The first is the name of the variable which receives the users input. It can be any simple variable type (STRING,BOOL,REAL,INT,KEY). The second parameter is an expression which is typed to the user as a "prompt" for input. This expression may be an actual string expression enclosed in quotes or a string variable or function which has been previously defined. ISIS does not supply a separator between the printed output (prompt) and the users typed input (response); therefore, the user should supply his own separation character(s) within the prompt definition if he desires to be able to discriminate between the prompt and his response. If, in typing the input, (response) to ASK, the user makes a typographical error, he may hit the BREAK key in which case ISIS will disregard what has been typed, indicate this action by typing 3 dots (...) and then reprompt the user for correct input.

EXAMPLE:

```
 14.31.19?VAR SANS: STRING
 14.31.33?VAR IANS:INT
 14.31.44?VAR RANS:REAL
 14.31.53?VAR BANS:BOOL
 14.32.03?VAR PROMPT: STRING
 14.32.14?
          PROMPT='INPUT='                    - Define users PROMPT variable.
 14.32.30?
          ASK SANS,PROMPT
INPUT=THIS IS A STRING INPUT!
 14.32.59?
          ASK IANS,PROMPT
INPUT=1254
 14.33.25?
          ASK RANS,'INPUT REAL NO.'
INPUT REAL NO.1.456732E+2
 14.34.15?
          ASK BANS,'INPUT BOOL VALUE'
INPUT BOOL VALUETRUE
 14.34.57?
          PRINT SANS,'   ',IANS,'   ',RANS,'   ',BANS
THIS IS A STRING INPUT!          1254     1.45673200000000E+002          TRUE

 14.38.05?ASK SANS,'INPUT ?'
INPUT ? NOTICE BLANK AFTER THE '?'

 14.41.33?
          ASK SANS,'TYPE NOW -'
TYPE NOW -AM TYPING ERRRRR...
TYPE NOW -WAS TYPING ERROR
```

- Interrupt program, PRINT prompt and wait for user to type response. (STRING, INT, REAL & BOOL)

- A blank is added by NOS system when you have odd number of characters. This is due to the way the CYBER prints characters.

- User made error, then hit the BREAK key. ISIS prints ... and reprompts user for input.

ASK continued

```
 12.42.56?VAR A : REAL; VAR Y : REAL; VAR Z : REAL;
 12.43.29?X=16;  Y=5.;  Z=2.;
VAR X           : REAL
 12.43.55?

          ASK SANS,'STRING INPUT'
VAR SANS        : STRING
STRING INPUTX+Y-3/Z
 12.44.50?PRINT SANS
X+Y-3/Z
 12.44.58?VAR RANS : REAL;
 12.47.18?
          ASK RANS,'REAL INPUT?'
REAL INPUT? X+Y-3/Z
 12.47.59?PRINT RANS
  1.95000000000000E+001
 12.48.14?
          ASK RANS,'INPUT?'
INPUT?RANS+2
```

– **Examples of expressions as input.**

```
 08.27.13?VAR RAY:ARRAY[1..3] OF REAL
 08.28.54?VAR IRAY:ARRAY[1..2] OF INT
 08.29.19?VAR SRAY:ARRAY[1..4] OF STRING
 08.29.42?
          ASK IRAY[2],'INPUT 2ND ELEMENT *'
INPUT 2ND ELEMENT *:635
```

– **Array elements can be used in ASK statement**

ASK prompt

User response

```
 08.30.88?
          PRINTLN IRAY
[  1] =          0
[  2] =        635
```

PRINT expression [:FORMAT1[:FORMAT2]]
PRINTLN expression [:FORMAT1[:FORMAT2]]

The PRINT or PRINTLN statement evaluates each expression and prints its value. After printing the output, PRINT leaves the cursor at its current position, whereas PRINTLN advances the cursor to the beginning of the next line. The optional FORMAT is similar to that of PASCAL in that each expression may have its own format. The format may specify total field width, scaling factors or base conversions. Default formats are as follows:

REAL numbers - an E format type with field width of 22

INT numbers - a field width of 10 with all digits right justified

STRING - the field width is equal to the length of the complete string and string is left justified

BOOL - a field width of 10 and right justified

Variables that have been declared but not defined are assigned default values by the ISIS system. Integers and real variables are set equal to zero, Booleans are set to FALSE and strings are of zero length. Discussion of optional formats is supplied below. All formats are ignored for ARRAY and RECORD outputs.

Format options - :FORMAT1 - is the total field width. The expression is printed in the E format for real variables (PRINT x:10, y:15). It can be used with integer, real, and string variables. Where FORMAT1 is smaller than the number of characters in a string the field width is ignored and the complete string is printed. If FORMAT is greater than the string length, blanks are added until the string length specified by the format is printed.

:FORMAT1:FORMAT2 - sets up total field width (FORMAT1) (as described above) and defines the number of significant digits to the right of the decimal point. This means the variable is printed in a fixed format. This format applies only to real expressions.

EXAMPLE: (see next page)

```
09.50.10?VAR Z:ARRAY[1..3] OF INT
09.50.40?
          Z[2]=126                    - Print an array of numbers.
09.51.07?PRINT Z
[  1] =          0
[  2] =        126
[  3] =          0
```

PRINT continued

```
09.35.18?TYPE REC=RECORD NUM:INT; FLAG:BOOL; NAM:STRING; END;
09.36.18?VAR X:INT
09.36.32?VAR Y,R:REAL;
09.36.42?VAR S:STRING
09.36.52?VAR B:BOOL
09.37.01?VAR VREC:REC
09.37.10?
          PRINTLN S,'=S',X,'=X',B,'=B',R,'=R'
=S          0=X      FALSE=B                        0=R
09.38.12?
          PRINTLN VREC
NUM =             0
FLAG =        FALSE
NAM =

09.38.36?X=15;    Y=250.452;
09.39.16?PRINT SQRT(X*2-5), X/2*10-4
 5.000000000000000E+000  7.100000000000E+001
09.39.53?PRINT SQRT(X*2-5):20:4
                5.0000
09.40.27?
          PRINT X,X:20
        15                  15
09.40.59?               PRINT Y
 2.504520000000E+002
09.41.40?               PRINT Y:20
 2.50452000000E+002
09.41.55?               PRINT Y:20:10
      250.4520000000
09.42.18?               PRINT Y:20:5
           250.45200
```

- Declarative statements
- Uninitialized variables printed to show their default values
- Print undefined record variables

(Please note default strings are of zero length (NULL))

- Print expressions
- Print INT (with and without format).
- Print REALS (with and without format)

```
12.13.27?

        I=1
VAR I          : INT
 12.14:14?S='CK UNTIL OUT'
 12.15.05?REPEAT
 12.15.39>      PRINT I
 12.15.51>      PRINTLN SUB(S,I,1):2*I
 12.16.18>      I=I+1
 12.16.27>UNTIL I=10
         1 C
         2   K
         3
         4       U
         5         N
         6           T
         7             I
         8               L
         9
```

- Prints I (default format)
- Prints a subset (I) of length 1. from the string S with a format of (2 * I), which increases as the value of I increase

CLEAR RUN

The CLEAR RUN statement is used to clear the contents of the RUN (input) file.

EXAMPLE:

```
 10.29.55?SHOW RUN
42 LINES IN RUN.

 10.30.49? CLEAR RUN
RUN CLEARED.

 10.31.12?SHOW RUN
0 LINES IN RUN.
 10.31.33?
```

Shown below are the operators and functions available to the user in programming desk top type calculations.

RESULT TYPE -

STRING:

Functions: CAT(X,Y...A): Concatenation of as many strings as you like.
SUB(X,Y,Z): Substring of X (string) starting at character number Y (Integer) for Z (Integer) number of characters. Y and Z can be variables, constants, or expressions.

INT

Operators: +,-,DIV,MOD

Functions:

ABS(x):	Absolute value of integer x
LEN(x):	Length of string x
ORD(x):	Ordinal number of the first character of the string x (ORD('C') = 3) [Implementation dependent]
ROUND(x):	Rounded value of real x
SQR(x):	Square of integer x
TRUNC(x):	Truncated value of real x
LOC(S1,S2):	Is S2 a substring of S1? If S2 is an undefined string variable (zero length string) then LOC(S1,S2) = -1 If S2 is not a substring of S1 then LOC(S1,S2) = 0 If S2 is a substring of S1 then LOC(S1,S2) = the character position (index) within S1 at which the 1st occurrence of S2 begins

REAL

Operators: +,-,/,*

Functions:

ABS(x):	Absolute value of real x
ARCTAN(x):	Arc-tangent of x radians
COS(x):	Cosine of x radians
EXP(x):	e raised to the power x
LN(x):	Natural logarithm of x
SIN(x):	Sine of x radians
SQR(x):	Square of real x
SQRT(x):	Square root of real or integer x

BOOL

Operators: <,>,<=,>=,<>,=,AND,OR,NOT

Functions: ODD(x): x must be integer. The result is BOOL -

If x is odd then ODD(x) = TRUE
IF x is even then ODD(x) = FALSE

KEY

Operators: +,-

Library Statements

The ISIS library is a 5-level hierarchical file structure. The library is where the user save, accesses, and purges pages of information. These pages of information might be programs, data, control cards, or combinations of these. Each page of information is assigned a pagename and is written in the form:

library.shelf.book.chapter.page

These levels allow the user to easily describe and identify the information contained on a page. Each level of the page name is separated by a dot (.). Library pages are transferred by page name to frames for editing. The page name will remain associated with a frame until the user changes the name (SET NAME) or transfers another page into the frame. Further discussion on the association between the library page and the frame is discussed on page 49. All five levels of the page name must be specified if the frame being used for editing has not previously been assigned a page name. Otherwise, the page name may be specified by typing only those levels of the name that change. However, when the user changes one level of a page name, then all lower levels, if not being changed, must be replaced by the dot separator and a blank space. For example, if the page name is ISIS.CKCASES.SOURCE.PG1.SUB and the user wishes to change it to ISIS.CKCASE.BINARY.PG1.SUB then he may abbreviate as follows: BINARY. . (all lower levels must be specified or abbreviated with dot and blank). For the users convenience, default names have been provided for the first four levels of all new frames. The default names are of the forms

ISISLIB.S.B.C.(user supplied page level)

Where the user only has to assign the page level part of the name. Before trying to store anything in a library, the library file must be created on the host computer. This is done using one of the interface programs, ISISGEN.

The interface between the ISIS library environment and the NOS operating system is handled by 3 utility programs, ISISGEN, ISISPUT, and ISISGET. ISISGEN sets up an NOS file in the format required by ISIS for its library system. ISISPUT handles the transfer of information from the NOS system to the ISIS library. ISISGET handles the transfer of ISIS library information to the NOS file system. Detailed writeups of these utility programs appear on the next page.

NOTE: The user should try and keep the number of shelves and books less then 40 in order to allow ISIS to run fast. Also, each level of the page name is limited to seven characters.

LIBRARY STATEMENTS

ISIS/NOS Interface

ISISGEN

ISISGEN is a program which allows the user to create a library for use by ISIS. A library must be created before any pages may be stored. To do this an NOS direct access file must first be created. This file is where the users library is saved on the NOS system. Then ISISGEN will convert the file to the format required by the ISIS library. The control cards necessary to do this are shown below.

```
ATTACH,ISISGEN/UN=961300N.
DEFINE,LIBRARY=isislib/M=W.
ISISGEN.
RETURN,LIBRARY,ISISGEN.
```

ISISPUT

ISISPUT is a program which allows the user to take an NOS local file (Nfn) and put it into the ISIS library system. The NOS file is rewound before it is stored. The full ISIS page name must be typed. This means that any NOS file can now be edited by ISIS. The control cards for using ISISPUT are as follows:

```
ATTACH,ISISPUT/UN=961300N.
ISISPUT,Nfn.   library.shelf.book.chapter.page   (see writeup on page 40)
```

NOTE: ISISPUT uses the smallest possible increment (.001) for the line number assignment. This means the user must REKEY the page before he may make any editing INSERTS.

ISISGET

ISISGET is a program which allows the user to get an ISIS library page and write it into an NOS local file. The NOS file is NOT rewound after it is retrieved. The full ISIS page name must be typed. Control cards necessary to use ISISGET are shown below.

```
ATTACH,ISISGET/UN=961300N.
ISISGET,Nfn.   library.shelf.book.chapter.page   (see writeup on page 40)
```

[frame-id/] SET NAME [library].[shelf].[book].[chapter].[page]

The SET NAME statement assigns a library page name to the contents of the ACTIVE frame or specified frame. This allows the user to assign a new name or change the library page name associated with that frame. The page name contains 5 levels for identification purposes. If the frame has not been previously assigned a page name (SET NAME or USE), then each level of the name must be specified (SET NAME library. shelf . book . chapter . page). Otherwise, the pagename may be abbreviated as discussed in the library statement writeup on the previous page. When the contents of a frame are saved, they will be saved under the library name assigned to it with this statement.

When the user changes the pagename associated with a frame and wishes to avoid retyping lower level parts of the name which do not change, he must type the DOT separator followed by a blank to replace the next lower level name. See 2nd, 3rd, and 5th examples.

EXAMPLE:

```
 10.04.22?SET NAME ALIB.MUST.ISIS.EDITOR.SPECS      - The initial SET NAME
ALIB.MUST.ISIS.EDITOR.SPECS  IS THE NAME OF WORK      statement must include all
                                                      levels of names (NO DEFAULT)

 10.04.50?SET NAME DATBASE.                         - Rename ACTIVE frame changing
ALIB.MUST.ISIS.DATBASE.SPECS  IS THE NAME OF WORK     the 2nd level (chapter) of
                                                      name only

 10.05.25?SET NAME MISC.NEWPOOP. .                  - Rename ACTIVE frame
ALIB.MISC.NEWPOOP.DATBASE.SPECS  IS THE NAME OF WORK  changing the SHELF and
                                                      BOOK level of name

 10.06.02?SET NAME WILL                             - Rename ACTIVE frame
ALIB.MISC.NEWPOOP.DATBASE.WILL  IS THE NAME OF WORK   changing only lower level
                                                      of name

 10.06.35?SET NAME COPY. . .                        - Rename ACTIVE frame
ALIB.COPY.NEWPOOP.DATBASE.WILL  IS THE NAME OF WORK   changing SHELF level of
                                                      name

 14.42.03?FRAME W1,W2:STRING;                       - Declare frames

 14.42.56?W1/SET NAME ALIB.NEWVER.CKCASES.IMPL.MOVE - Assign pagename to W1 frame

ALIB.NEWVER.CKCASES.IMPL.MOVE  IS THE NAME OF W1
 14.44.23?
          W1/SET NAME EXPL.                         - Rename W1 frame changing
                                                      chapter level of name.
ALIB.NEWVER.CKCASES.EXPL.MOVE  IS THE NAME OF W1
```

[frame-id/] USE [library].[shelf].[book].[chapter].[page]

The USE statement is used to read the contents of a specified page into the ACTIVE or specified frame. The library page name associated with that frame becomes what was specified in the USE statement and the contents become what was extracted from the page in the library. To specify a frame other than the ACTIVE frame the user must precede the statement with the frame-id and a slash.

EXAMPLE:

```
  14.12.56?
            SHOW NAME
 ALIB.NEWVER.CKCASES.TEST.PROGRAM  IS NAME OF WORK

 14.15.17?USE TEST.
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS WORK


 14.35.52?FRAME A1,A2: STRING;


 14.38.59?A1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM

ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS A1
 14.39.42?
           A1/USE SHOWS

ALIB.NEWVER.CKCASES.TEST.SHOWS USED AS A1
```

- ACTIVE frame name

- Put new page into ACTIVE frame

- Declare frame-ids

- Put page into A1 working frame

- Put new page into A1 frame

[frame-id/] SAVE [*]

The SAVE statement is used to create a new page in the library or to replace an already existing page. SAVE places the contents of the ACTIVE frame into the library under the same library name now associated with the ACTIVE frame. The SAVE statement followed by an * will replace a page in the library of the same name as the ACTIVE frame. At the present time, the user may replace a page (SAVE*) even if the page does not already exist. The user should be cautious in saving or replacing a page to make sure the library page name is correct. The page name may be changed using the SET NAME statement before saving or replacing it.

EXAMPLE:

```
 16.25.30?SET NAME ALIB.SHELF.BK.CH.CG
ALIB.SHELF.BK.CH.CG  IS NAME OF  WORK  .
 16.26.10?SAVE                                  - Save the ACTIVE frame by storing
ALIB.SHELF.BK.CH.CG SAVED.                        it in the library under this name.
 16.26.27?SET NAME XXX
ALIB.SHELF.BK.CH.XXX  IS NAME OF  WORK  .
 16.26.52?SAVE                                  - Save the contents of the ACTIVE
ALIB.SHELF.BK.CH.XXX SAVED.                       frame under this page name in the
                                                  library


 16.27.17?SAVE*
ALIB.SHELF.BK.CH.XXX SAVED.                    - Replace the contents on the
                                                  already existing page of the
                                                  library

 14.46.04?FRAME W1:STRING;                         - Declare frame

 14.46.17?W1/USE ALIB.NEWVER.CKCASES.EXPL.COPY  - Put a page into W1 frame

ALIB.NEWVER.CKCASES.EXPL.COPY USED AS W1
 14.48.21?
          W1/SET NAME EXPIMP.                      - Reset the page name of W1 frame

ALIB.NEWVER.CKCASES.EXPIMP.COPY  IS THE NAME OF W1
 14.49.35?
          W1/SAVE                                  - SAVE contents of W1 frame

ALIB.NEWVER.CKCASES.EXPIMP.COPY SAVED.
```

Library Statements

[frame-id/] PURGE [library].[shelf].[book].[chapter].[page]

The specified page is eliminated from the library. If the specified page is the only page in its chapter, the chapter is eliminated from the library. If this chapter is the only chapter in its book, then that book is eliminated from the library. Finally, if the book is the only book in its shelf, then that shelf is eliminated from the library. If the page name is incompletely specified, its library, shelf, book, chapter, page parts will be taken from the name currently associated with the ACTIVE frame (or the specified frame).

EXAMPLE:

```
 11.21.18?SET NAME ALIB.GRANT.BOOK.CHAP.PG2        - Set the ACTIVE frame name
ALIB.GRANT.BOOK.CHAP.PG2  IS NAME OF WORK
 11.22.32?
          SHOW PAGES ALIB. . . .                   - Display the library ALIB
ALIB    .GRANT   .BOOK    .CHAP    .PGALL
        .        .        .        .CCA
        .        .        .        .PG1
        .        .        .        .PG2
        .SHELF   .BK      .CH      .CG
        .        .        .        .XXX
        .        .BOOK    .CHAP    .PAGE
 11.24.24?
          PURGE  PG2                               - Purge  PG2
ALIB.GRANT.BOOK.CHAP.PG2 PURGED.
 11.25.33?

          PURGE SHELF. .CHAP.PAGE                  - Purge PAGE (resides on
ALIB.SHELF.BOOK.CHAP.PAGE PURGED.                    different shelf and chapter)
 11.26.06?

          SHOW PAGES ALIB. . . .                   - Display the library to show
ALIB    .GRANT   .BOOK    .CHAP    .PGALL           there are 2 less pages in
        .        .        .        .CCA             it now
        .        .        .        .PG1
        .SHELF   .BK      .CH      .CG
        .        .        .        .XXX

 14.46.04?FRAME W1:STRING;                         - Declare frame

 14.46.17?W1/USE ALIB.NEWVER.CKCASES.EXPIMP.COPY   - Put a page into W1 frame

ALIB.NEWVER.CKCASES.EXPIMP.COPY USED AS W1
 14.53.12?
          W1/PURGE EXPIMP.                         - Purge a page in W1 frame

ALIB.NEWVER.CKCASES.EXPIMP.COPY PURGED.
```

[frame-id/] VOID

This command disposes of the contents of the ACTIVE frame or the specified frame but it retains the library page name assigned to the frame. To void other frames the user must precede the command with the frame name and a slash.

EXAMPLE:

```
 08.52.41?USE ALIB.NEWVER.CKCASES.TEST.PROGRM  - The page to be edited is read
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK     from the data base library.
 08.53.18?

 08.53.37?LIST .1/.3
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);   - List first few lines of page.
   0.2    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   0.3    =
 08.54.03?


 08.54.13?VOID                                  - VOID the active frame
 08.55.25?                                        contents.

          LIST ALL
NO ITEMS IN SPECIFIED RANGE.                    - Contents have been voided.
 08.55.37?

          SHOW NAME
ALIB.NEWVER.CKCASES.TEST.PROGRM  IS NAME OF WORK - Name remains in tact.
 08.55.47?


 14.56.11?FRAME A1,A2:STRING;                   - Declare frames

 14.56.59?A1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM - Put a page into A1 frame

ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS A1
 14.57.34?A1/VOID                               - VOID A1 frame contents

 14.57.59?A1/SHOW NAME                          - A1 frame still retains
                                                  the pagename
ALIB.NEWVER.CKCASES.TEST.PROGRAM  IS NAME OF A1
```

Library Statements

STORE library.shelf.book.chapter.page

The STORE statement allows the user to save the current environment on a specified page in the library. The current environment includes TYPES, VARS, ABBREVS and FRAMES.

EXAMPLE:

```
09.51.06!TYPE DIRS: REAL;
09.51.20?VAR PI,X,Y,Z: REAL;
09.51.48?ABBREV P: PRINTLN;
09.52.02?ABBREV I: INSERT;
09.52.14?FRAME F1,F2: STRING;
09.52.33?X=15;  Y=20;  PI=3.14;
09.52.54?
          STORE ALIB.TEST.PROGRAM.ENVIR.AUG3
ALIB.TEST.PROGRAM.ENVIR.AUG3 SAVED.
```

- Current environment.

- Store the above environment in a library page.

RESTORE library.shelf.book.chapter.page

The RESTORE statement retrieves an environment previously stored in a page. This means that all current VARS, TYPES, ABBREVS, and FRAMES will be replaced with the environment previously stored on a library page. If RESTORE is contained within a group of statements being executed, the statements following the RESTORE are not executed. At present, values of VARS and contents of FRAMES are not being restored.

EXAMPLE:

```
 09.51.02?TYPE DIRS: REAL;
 09.51.20?VAR PI,X,Y,Z: REAL;
 09.51.48?ABBREV P: PRINTLN;
 09.52.02?ABBREV I: INSERT;
 09.52.14?FRAME F1,F2: STRING;
 09.52.33?X=15;  Y=20;  PI=3.14;
 09.52.54?
          STORE ALIB.TEST.PROGRAM.ENVIR.AUG3
ALIB.TEST.PROGRAM.ENVIR.AUG3 SAVED.
 09.53.44?
          VAR A,B,C: REAL;
 09.54.04?ABBREV D:DELETE;
 09.54.24?FRAME XXX: STRING;
 09.54.37?  X=5.1;   Y=4.;
 09.54.56?
          SHOW ABBREVS
'D          ': DELETE
'I          ': INSERT
'P          ': PRINTLN
 09.55.13?SHOW VARS
'A          ': REAL;
'B          ': REAL;
'C          ': REAL;
'PI         ': REAL;
'X          ': REAL;
'Y          ': REAL;
'Z          ': REAL;
 09.55.26?RESTORE ALIB.TEST.PROGRAM.ENVIR.AUG3
CONTEXT RESTORED: ALIB.TEST.PROGRAM.ENVIR.AUG3
 09.56.05?
          SHOW ABBREVS; SHOW VARS; P X,'=X',Y,'Y=';
'I          ': INSERT
'P          ': PRINTLN
'PI         ': REAL;
'X          ': REAL;
'Y          ': REAL;
'Z          ': REAL;
  1.500000000000E+001=X  2.000000000000E+001Y=
```

- This environment was stored on a library page.

- This is current environment.

- Restore the environment to the one saved on this page.

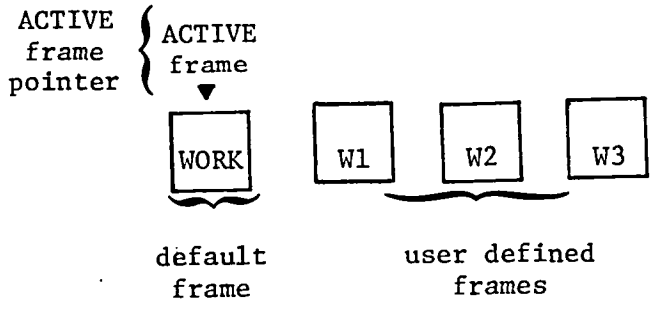
- These statements show the saved environment has been restored.

TEXT EDITING STATEMENT

Frame Concept

A working frame is used for temporary storage during editing. It may be a copy of a library page which is being modified or may be entered entirely by the user. There are 10 working frames available to the user. A default frame named WORK is provided and 9 other frames which must be named by the user before they can be used. The frames are named using the declarative statement, FRAME (FRAME W1,W2,W3:STRING;). The user can select a page from the library, put a copy in a working frame where the code may then be modified using any of the Edit Statement verbs. The working frames are also used for temporary storage of code for examination or for use with read only statement verbs such as LIST, RUN, EXEC, and COUNT. Any of these working pages may at any time become the current ACTIVE frame by designating a particular frame using the statement verb, ACTIVE frame. The ACTIVE frame does not require the frame name as a prefix to the statement verb. In other words, the statement ACTIVE acts like a pointer. If a frame name is not specified in the command, then editing automatically takes place in the ACTIVE page. The default ACTIVE frame is the same as the default working frame, WORK. The example below may help explain the frame concept better.

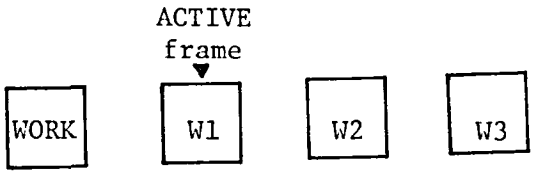
FRAME W1,W2,W3:STRING; - user declares working frames



LIST - list the ACTIVE frame which is WORK

W2/LIST - list the W2 frame (W2 is not ACTIVE and must prefix the LIST statement)

ACTIVE W1 - the W1 frame is declared to be the new ACTIVE frame



so now

LIST - list ACTIVE frame which is now W1 - W1 was declared the ACTIVE frame in the above statement.

WORK/LIST - list the default frame WORK (inactive now) by preceding command with the frame name.

Since the editor must retrieve pages from the library to be modified and store information in the library, an interface between the editor and library is required. Associated with each editor frame is the name of a library page into which that frame will be SAVEd or from which library information will be retrieved by a USE command. This page name is specified and changed by the SET NAME or USE statements. The specification of this page name via SET NAME or USE follows the format and abbreviation procedure discussed in the library statement writeup on page 40.

TEXT EDITING

RANGE Concept

The ISIS text editor differs from other editing systems available on the CDC Cyber system such as the CDC text editor (EDIT) and the XEDIT system. These systems are pointer oriented, in that the text to be edited is accessed by sliding a pointer up and down the page. Any line that the pointer is pointing to is the line which is operated on by the editing command. In contrast, the ISIS text editor is line oriented. It does not reference text with respect to the position of a pointer. Instead, the text is referenced in an "absolute" sense by designating, within each command, the text to be modified. This means that each line of text must be capable of being uniquely identified. The ISIS editor does this by assigning a number to each line of text. The line numbers run in ascending order and represent reference points for the specification of the text be accessed by the editing commands. Those lines affected by a particular edit command are referred to as the RANGE of that command.

The use of explicit line numbers, as in the context "from line 1 to line 5," permit the user to operate on everything within a certain area of the page. This range specification is referred to as an explicit range. A second means of designating text to be operated on consists of specifying a search for all lines having a particular characteristic , such as all those containing the string "ABC." This is the familiar search-for-string facility available in most text editors, and will be referred to as an implicit range. Explicit and implicit qualifiers can be combined, as in "all lines containing 'ABC' between line 1 and line 5."

The explicit range, as mentioned earlier allows the user to look at a certain area of a page, which can be as small as

one line or as large as the complete page. Figure 1 shows all of the possibilities for the explicit range. The explicit range can consist of one line number (ℓn). When the range consists of more than one line, the first line number and the last line number to be considered are separated by a slash ($\ell n_1/\ell n_2$). It is also possible to put a limit on the total number of lines to be considered within this particular area. In this case, the total number of lines allowed would appear in parentheses and follow the line numbers specifying the particular area ($\ell n_1/\ell n_2(n\ell)$). The first nℓ lines will be operated on. When the range includes the whole page the range would be specified by the word ALL. Also available are multiple ranges separated by commas. This means that more than one range may appear in an edit statement and they do not have to be in any order. Line numbers used in the explicit range specifications are referred to as KEYS and must be KEY type variables. Hence, line numbers (ℓn) can be any type of KEY operand, a simple number, a KEY variable or a KEY expression. Operators in KEY expressions are addition (+) and subtraction (-) only. The limit put on the number of lines (nℓ) must be an INT operand such as a simple number, an INT variable, an INT expression, or an INT function. Following are some examples of explicit ranges used with the different edit statements:

```
LIST     KV2
INSERT   KV2=.5/KV3/.01(IV3-2)
REPLACE  2.9,SV1/10,9/KV3-.8(IV2)
CHANGE   'CH' to CAT (SV5,'1') IN KV2/KV3-1(2)
```

The implicit range allows the user to look at all lines containing a particular characteristic. The characteristic is made up of a string of characters and must be a STRING operand. The STRING (string-id) can be a simple string enclosed in quotes, a STRING

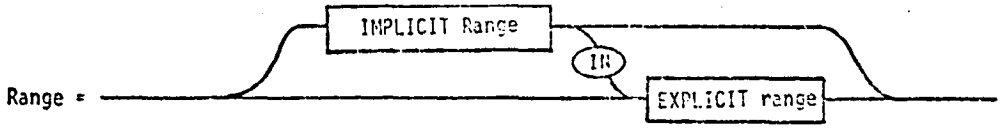
variable or a STRING function. The string of characters may be specified to begin in a specific column (col) or begin some where between two columns (col_1,col_2). This part of the range will be enclosed in parenthesis and follow the string characteristic ('DECLARE'(2,8)). The column number (col) must be an INT type operand, a simple number, a variable, an expression, or an INT function. It is also possible to look at all lines NOT containing a specific characteristic. This is accomplished by placing a NOT in the range in front of the string of characters (NOT 'DECLARE'(4)). Lines containing two or more characteristics may be specified as follows: The first string characteristic is followed by an AND or OR which in turn is followed by the second characteristic ('DECLARE'(2,8) AND 'PARTI'). Following are some examples of the implicit ranges used with some of the edit statements:

```
LIST  'CH'
REPLACE SV2(34,IV3)
CHANGE SV1 to 'XX'  IN  'CH' (29,36):M
ADD  '*'  AT SV1  IN '777B'
```

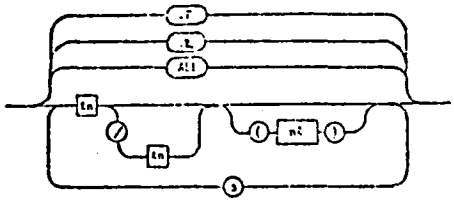
The implicit and explicit ranges can be used together. This allows the common character string search to be restricted to a particular area of the page. This implicit part of the range is stated first followed by the word IN which is followed by the explicit range as shown figure 1. Examples of this range combination are shown below:

```
LIST  SV1 AND NOT ('IN')  IN 15.4/20
REPLACE  'CHQUO'  IN  SV1/SV2+5(4)
CHANGE  'MAX'  to 'MIN'  IN 'BITS'  IN 3/4
ADD  '#'  AT 20  IN 'LB'  IN .5, KV2-KV1
```

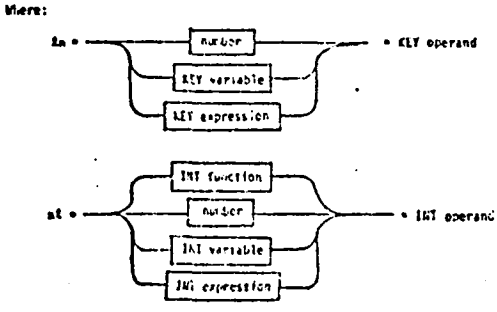
The INSERT command, since it does not deal with existing text, differs radically from the other edit commands in its permissible range specifications. Obviously, the implicit range (string search) has no meaning since the text does not exist. For the same reason the explicit range, ALL,.F,.L, and .C, are not applicable to INSERT either. The explicit range for the INSERT statement differs slightly by allowing the user to specify an incremental option (inc) separated from the line numbers by a slash ($\ell n_1/\ell n_2/inc$). This is the increment between line numbers that ISIS uses when assigning line numbers to the text being inserted. The incremental value (inc) must also be a KEY operand, but may also include an integer function.



EXPLICIT Range Syntax



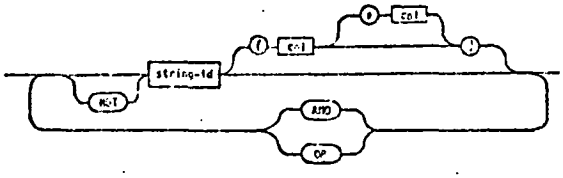
Where:



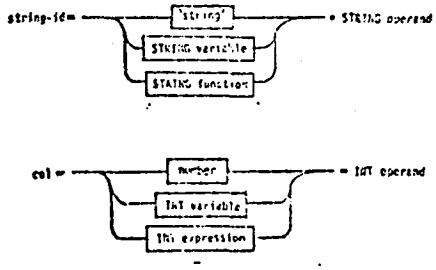
Range Options:

ℓn	- edit line number ℓn
ℓn (nℓ)	- beginning with line number ℓn, edit nℓ number of lines
$\ell n_1/\ell n_2$	- edit all lines between and including ℓn_1 & ℓn_2
$\ell n_1/\ell n_2$(nℓ)	- edit lines between and including ℓn_1 & ℓn_2 without exceeding nℓ number of lines
$\ell n/\ell n_2, \ell n_3, \ell n_4$	- edit multiple ranges. They do not have to be in any order. Any of the above ranges may be used.
All	- edit all lines in the frame.
.F	- edit the first line in the frame.
.L	- edit the last line in the frame.
.C	- edit the current line in the frame.

IMPLICIT Range Syntax



Where:



string-id	- edit all lines containing this string characteristic
string-id (col)	- edit all lines containing this string in the column number col
string-id (col_1,col_2)	- edit all lines containing this string and appearing between the columns, col_1 and col_2
NOT string-id	- edit all lines <u>not</u> containing the string-id where it may be any of the above options
string-id {AND / OR} string-id	- edit all lines containing string-id {AND OR} string-id where the string-ids may be any of the above options

Figure 1.- Range concept for text editing commands.

FRAME frame-id(s) : STRING

The FRAME statement allows the user to declare the working frames. There is one default frame-id, WORK, but the remaining available frames (9) must be declared by the user with this statement before they can be used.

EXAMPLE:

```
FRAME W1,W2: STRING;
 14.21.59?
          W1=USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1
```

ACTIVE frame-id

This command allows the user to activate any working frame. This means that the statement verbs referring to a particular frame will not have to be preceded by the frame-id now.

EXAMPLE:

```
FRAME W1,W2: STRING;
 14.21.59?
           W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1
 14.23.57?
           ACTIVE W1
 14.27.03?
           SHOW NAME
ALIB.NEWVER.CKCASES.TEST.PROGRAM  IS NAME OF W1
```

ERASE {abbrev-id(s)|type-id(s)|var-id(s)|frame-id(s)}

The ERASE statement removes the specified types, variable-ids or frame name from the identifier tables. More than one id may be erased at one time with ids separated by a comma. Caution should be exercised when using ERASE. Erasure of the ACTIVE frame is not allowed.

EXAMPLE:

```
 13.34.00?FRAME F1,F2,X1,X2:STRING     - Declare frames
 13.34.28?
          SHOW FRAMES                   - Show frames
'F1         ': WORK4      : STRING;
'F2         ': WORK3      : STRING;
'X1         ': WORK2      : STRING;
'X2         ': WORK1      : STRING;
 13.34.41?
          ERASE F1,X1                   - Erase frames, F1,X1
 13.35.24?SHOW FRAMES                   - Frames F1,X1 now erased
'F2         ': WORK3      : STRING;
'X2         ': WORK1      : STRING;
 13.35.37?
          ACTIVE X2                     - Make X2 the ACTIVE frame
 13.36.32?
          SHOW FRAMES
'F2         ': WORK3      : STRING;
'X2         ': WORK1      : STRING;
 13.36.45?
          ERASE X2                      - User cannot erase the ACTIVE frame
XXXXXXXXX          ↑ MAY NOT BE ERASED
```

[frame-id/] LIST [range] [:[{NI|NK}], [V], [T]]

The LIST statement is used to view all or part of the ACTIVE frame or specified frame. The range is optional and if not specified, the entire page is listed. The range may consist of the implicit and/or explicit range discussed on page 55. In addition to this range are two range options: .F which lists the first line of the frame and .L which lists the last line of the frame. The display option follows the range specification and is described below:

Display Option:

- NI (NO ITEM) - do not display the contents of the line, only the line number.
- NK (NO KEY) - do not display the line number (key) only the contents of the line.
- V (VETO) - user may VETO or Verify Listing by responding to 'OK?' with:
  - Y - YES continue listing
  - N - NO do not list
  - K - KILL terminate listing and abort command
- T (TAG) - Display tag-ids

EXAMPLES: IMPLICIT

```
 13.45.34?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 13.46.24?
         VAR SV1,SV2:STRING;
 13.46.53?VAR IV1,IV2:INT;
 13.47.16?
           SV1='CH';  SV2='LEN';
 13.48.00?  IV1=14;
 13.48.23?
         LIST CAT(SV1,'NOT')
   1.2   =    CHNOT = '#';
 13.49.09?

         LIST SV2(6)
   1.5   =    IDLEN = 10;
   1.6   =    NMLEN = 7;
   1.7   =    INLEN = 82;
   6.    =    VNLEN = 7;
 13.49.43?

         LIST '777'(IV1,IV1+2)
   2.3   =    BLKMAX = 3777B;
   3.6   =    BVDMAX = 777777B;
   5.3   =    LRUMAX = 777777B;
 13.50.25?

         LIST SV1 AND NOT 'IN'
   0.7   =    CHBLANK = ' ';
   0.8   =    CHQUOTE = '''';
   0.9   =    CHZERO = '0';
   1.    =    CHEOL = '$';
   1.1   =    CHSEMI = ';';
   1.2   =    CHNOT = '#';
```

- The page to be edited is read from the data base library into the ACTIVE frame.
- List all lines containing the concatination of 'CH' (SV1) and 'NOT' - CHNOT -
- List all lines containing 'LEN' (SV2) in column number 6.
- List all lines containing '777' in columns 14(IV1) thru 16 (IV1+2).
- List all lines containing 'CH' (SV1) and not the string 'IN'.

```
LIST
    * EXPLICIT

 09.31.46?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB:NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 09.32.37?
        VAR KV1,KV2,KV3,KV4:KEY;
 09.33.17?VAR IV2: INT
 09.33.29?VAR IV3:INT
 09.33.49?    IV2=2;  IV3=5;
 09.34.06?    KV1=20;  KV2=.2;  KV3=2;  KV4=6;
 09.34.45?
        LIST KV2
  0.2   =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
 09.34.58?

        LIST KV2+1(3)
  1.2   =  CHNOT = '#';
  1.3   =   WDBLANKS = '
  1.4   =
 09.35.30?

        LIST .9/KV3-.8;
  0.9   =   CHZERO = '0';
  1.    =   CHEOL = '$';
  1.1   =   CHSEMI = ';';
  1.2   =   CHNOT = '#';
 09.35.54?

        LIST 3.5/KV1-15(SQR(IV2))
  3.5   =   BVDLEN = 250;
  3.6   =   BVDMAX = 777777B;
  3.7   =   BVDSYN = -1;
  3.8   =   BVDFIRST = 2;
 09.36.28?

        LIST KV2, 5.1/KV4-KV2(IV2), KV3+.1/KV3+.2;
  0.2   =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
  5.1   =
  5.2   =   STATUSBLK = 1;
  2.1   =   BLKSZ = 256;
  2.2   =   BLKLEN = 250;
 09.37.33?
```

- Read the page to be edite from the data base library into the ACTIVE frame.
- List line .2 (KV2).
- List lines starting at 1.2 (KV2+1) with a limit of 3 lines.
- List lines beginning with .9 through 1.2 (KV3-.8)
- List lines 3.5 through 5. (KV1-15) with a limit of 4 (KV2**2) total lines.
- List 3 separate ranges.
  1) line .2 (KV2)
  2) line 5.1 through 5.8 with a limit of 2 lines
  3) line 2.1 (KV3+.1) through line 2.2 (KV3+.2).

```
 09.16.27?FRAME W1:STRING;
 09.16.44?
 09.16.54?W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1
 09.18.04?
        W1/LIST .3/.5
  0.3   =
  0.4   =CONST  (* GLOBAL CONSTANTS *)
  0.5   =   CHFIRST = ':';
```

- Declare frame
- Put a page into the W1 frame.
- LIST a few lines of the W1 frame.

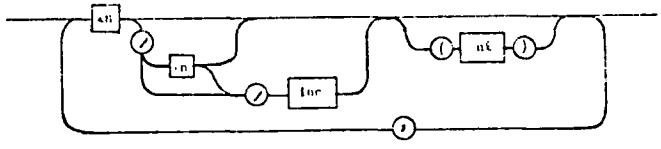
Text Editing Statement

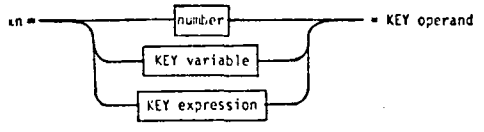
[frame-id/] INSERT range

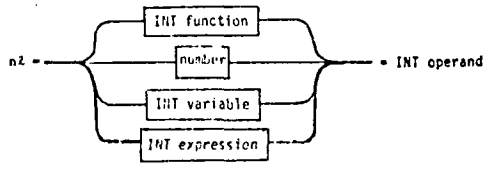
The INSERT statement is used to add new lines to the ACTIVE frame or specified frame. INSERT differs from the other edit statements because it adds new lines to a frame instead of operating on existing lines. Since INSERT is not working with an already existing line, an implicit range for INSERT does not make sense. The explicit ranges, ALL, .F, .L, and .C are not applicable to this command either.

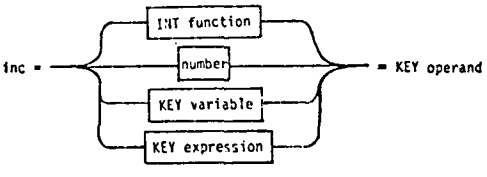
The explicit range differs slightly by allowing the user to specify an incremental option (inc) separated from the line numbers by a slash ($\ell n_1/\ell n_2$/inc). This is the increment ISIS uses when assigning line numbers to the inserted text. The incremental value (inc) must be a key operand (see below). If inc is not specified in the range, then it will assume the current value of the system variable, SYSTEM.DELTA (see page 14). The user is prompted for successive lines to fill the range. Insertion may be halted by depressing the BREAK key. A range must be specified and may be taken from the table below.

Range =









Range with inc: $\ell n_1/\ell n_2$/inc - insert lines between and including ℓn_1 and ℓn_2 incrementing the line number by inc.

ℓn//inc - insert lines beginning with ℓn, incrementing the line number by inc, until the user halts insertion by depressing the BREAK key.

NOTE: The user should take care and not insert lines overlapping already existing line numbers. Insertion must be made between two existing line numbers.

EXAMPLES:

```
 16.57.42?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 16.58.30?
          VAR KV1,KV2,KV3,KV4:KEY;
 16.58.54?VAR IV1,IV2,IV3,IV4:INT;
 16.59.11?
          KV1=1.41;  KV2=7.;  KV3=.001;
 16.59.40?IV1=1;    IV2=3;   IV3=5;
 17.00.59?
          INSERT .41
   0.41   =
 17.02.02?
```

- The page to be edited is read from the data base library into the ACTIVE frame.

- Insert line number .41.

```
          INSERT KV2-.5//KV3
   6.5    =
   6.501  =
   6.502  =
   6.503  =

INSERT TERMINATED.
```

- INSERT beginning with line 6.5 and an increment of .001. Insertion may continue until user depresses the BREAK key which will then abort the command.

```
 17.14.00?INSERT KV1/KV1+.05/.01(IV3-IV2)
   1.41   =
   1.42   =
 17.14.57?
```

- Insert beginning with line 1.41 through line 1.46 with an increment of .01, but with a limit of 2 lines.

```
          INSERT KV1+.05/1.469/KV3+KV3, KV2+1
   1.46   =
   1.462  =
   1.464  =
   1.466  =
   1.468  =
   8.     =
 17.23.44?
```

- Insert using different ranges.
  (1) Insert beginning with line 1.46 going through 1.469 with an increment of .002.
  (2) Insert a line at 8.

```
14.56.11?FRAME A1,A2:STRING;
```

- Declare frames

```
15.00.07?A1/SET NAME ALIB.OLDVER.CKCASES.TEST.PROGRAM
```

- Set pagename of A1 frame

```
ALIB.OLDVER.CKCASES.TEST.PROGRAM  IS THE NAME OF A1

15.03.48?VAR KINC:KEY; KINC=.5;
```

- Declare variables

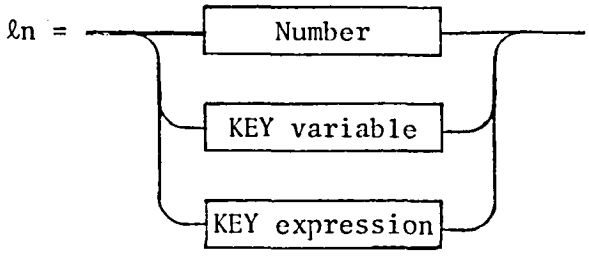
```
15.07.34?A1/INSERT KV2/8./KINC

   7.     =
   7.5    =
   8.     =
```

- Insert information on the page residing in the A1 frame

Text Editing Statements

[frame-id]/READ string-var {Δ|,} ℓn

The READ statement is used to read a single line of code from the ACTIVE or designated frame into a string variable. A frame option will allow the user to read a line from any of the working frames. The variable where the code is to be stored must be a predefined STRING-variable. The variable name is separated with a blank or a comma from the line number (ℓn) where the code is read from. The line number (ℓn) is a KEY operand and may be simply the line number, a KEY variable, or a KEY expression as shown below.



If the line number (ℓn) specified does not exist, the STRING variable is set to a null string and no indication is given.

EXAMPLE:

```
14.20.33?USE HLIB.NEWVER.CKCASES.TEST.PROGRAM
HLIB.NEWVER.CKCASES.TEST.PROGRAM USED AS WORK
```

- The page to be edited is read from the data base library.

```
14.21.07?LIST .3/.6
  0.3    =
  0.4    =CONST  (* GLOBAL CONSTANTS *)
  0.5    =    CHFIRST = ':';
  0.6    =    CHLAST = ';';
14.21.24?
        VAR X:STRING;  READ X,.5;  PRINT X;
  CHFIRST = ':';
14.22.13?
```

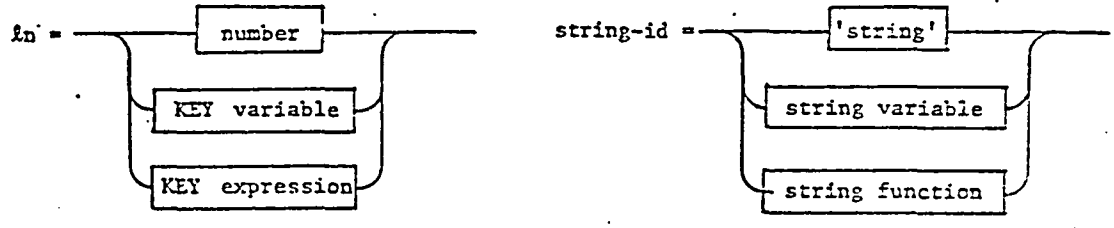
- Read the contents of line .5 , store it in the string variable X and PRINT it to check for correctness.

```
 09.29.20?FRAME W1:STRING;                                  - Declare frame
 09.29.26?
 09.29.29?W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1                 - Put a page into the W1
 09.29.55?                                                    frame.
          W1/LIST .3/.4                                     - LIST lines
   0.3    =
   0.32   =THIS IS A COMMENT LINE
   0.4    =CONST  (* GLOBAL CONSTANTS *)
 09.32.20?
          VAR X:STRING;
 09.33.46?
          W1/READ X,.32                                     - Read a line in W1 frame.
 09.34.52?PRINT X;
THIS IS A COMMENT LINE
```

Text Editing Statements

[frame-id/] WRITE string-id {Δ|,} &n

The WRITE statement is used to add a single line of code to the ACTIVE working frame. This command is a simple and quick version of the INSERT or REPLACE statement (since there is no prompt). A frame option will allow the user to add code to any of the working frames. The code to be inserted (string-id) may be in the form of a simple string, a predefined variable or a string function as shown in the diagram below. The code is separated with a blank or a comma from the line number (&n) where it will be inserted. The line number is a KEY operand and may be simply the line number, a KEY variable or a KEY expression as shown below. Please note that this command assumes that you know what you are doing - for example, if the line already exists, then it will be replaced without notifying the user.



EXAMPLES:

```
 15.12.01?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 15.15.38?
          VAR KV1:KEY;
 15.16.48?VAR SV1:STRING;
 15.17.20? VAR R1,SQ1:REAL
 15.18.19?   KV1=.41;  R1=2; SV1='SQ1=SQR(R1);'
 15.20.21?
 15.20.53?WRITE 'ALPMAX=1.047',.45
 15.21.18?LIST .45
   0.45   =ALPMAX=1.047
 15.22.11?

          WRITE SV1,KV1+.06
 15.22.38?LIST .47
   0.47   =SQ1=SQR(R1);
 15.22.58?

          WRITE CAT(SV1,'  PRINTLN SQR') KV1
 15.23.40?LIST.41
   0.41   =SQ1=SQR(R1);  PRINTLN SQR
```

- The page to be edited is read from the data base library.

- Insert line number .45 with the code, ALPMAX = 1.047.

- Insert line number .47 with the code, SQ1 = SQR(R1).

- Insert line number .41 with the code ΔΔΔ PRINTLN SQR.

WRITE continued

```
09.29.23?FRAME W1:STRING;                                  - Declare frame
09.29.26?
09.29.29?W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1                - Put a page into the W1
09.29.55?                                                    frame.
          W1/WRITE 'THIS IS A COMMENT LINE',.32            - INSERT a new line (.32)
09.30.26?
          W1/LIST .3/.4                                    - LIST new line
  0.3    =
  0.32   =THIS IS A COMMENT LINE
  0.4    =CONST  (* GLOBAL CONSTANTS *)
09.30.42?
```

Text Editing Statement

[frame-id/] DELETE range [:{NL|NK|NI},[V]]

The DELETE statement is used to remove lines from the ACTIVE frame or specified frame. The range must be specified and may consist of the implicit and/or explicit range discussed on page 55. Upon deletion, the deleted lines and their line numbers will be displayed for the user's convenience unless the user has selected a display option. The display option follows the range specification and is described below.

Display Option:

- NL (NO LIST) - do not display line number or the contents of the line being replaced
- NI (NO ITEM) - do not display the contents of the line, only the line number
- NK (NO KEY) - do not display the line number (KEY) only the contents of the line.
- V (VETO) - user may VETO or verify deletion by responding to 'OK?' with:
  - Y - YES - delete
  - N - NO - do not delete
  - K - KILL - do not delete and abort the command.

EXAMPLES: IMPLICIT

```
 09.10.29?
 09.10.51?VAR KV1,KV2,KV3,KV4:KEY;
 09.10.59?VAR IV1,IV2,IV3,IV4:INT;
 09.11.04? KV2=.2;  KV3=2; KV4=6;  IV2=2;  IV3=5;
 09.11.09?
 09.11.13? USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 09.11.38?
 09.11.46?DELETE 'CHEOL'
   1.     =   CHEOL = '$';
 09.12.23?

          DELETE 'CH'(4)
   0.5    =   CHFIRST = ':';
   0.6    =   CHLAST = ';';
   0.7    =   CHBLANK = ' ';
   0.8    =   CHQUOTE = '''';
   0.9    =   CHZERO = '0';
   1.1    =   CHSEMI = ';';
   1.2    =   CHNOT = '#';
 09.13.01?

          DELETE 'IN'(44,45):NL
13 ITEMS IN SPECIFIED RANGE.
 09.13.59?

          VAR SV1:STRING;  SV1='MAX';
 09.18.55? DELETE SV1 AND NOT 'IN' :NL
37 ITEMS IN SPECIFIED RANGE.
 09.19.27?
```

- Put a library page into the ACTIVE frame for editing.
- Delete all lines containing CHEOL
- Delete all lines containing CH beginning in column 4
- Delete all lines containing IN and beginning between columns 44 and 45.
- Delete all lines containing MAX (SV1) and not IN. Do not want a print out (NL option). ISIS informs the user of the number of lines deleted (37)

```
EXPLICIT

08.58.01?VAR KV1,KV2,KV3,KV4:KEY;
08.59.26?VAR IV1,IV2,IV3,IV4:INT;
09.00.22? KV2=.2;  KV3=2; KV4=6;  IV2=2;  IV3=5;
09.01.08?
09.02.44? USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
09.03.26?
09.03.35?DELETE KV2                                    - Delete line .2 (KV2)
  0.2   =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
09.03.53?

        DELETE .4(IV2)                                 - Delete beginning with
  0.4   =CONST  (* GLOBAL CONSTANTS *)                    line .4 and delete up to
  0.5   =   CHFIRST = ':';                               2 (IV2) lines.
09.04.24?

        DELETE 1.1-KV2/KV3-.2:NL                       - Delete lines beginning
10 ITEMS IN SPECIFIED RANGE.                             at .9 through 1.8.
09.05.39?

        DELETE KV3/2.5(IV3-IV2)                        - Delete lines beginning
  2.    =   BUFLEN = 7;                                  at 2 (KV3) through 2.5
  2.1   =   BLKSZ = 256;                                 with a limit of 3 lines.
  2.2   =   BLKLEN = 250;
09.06.55?

        DELETE KV2+2, 5.1/KV4-KV2(IV2),KV3+1.4/KV4-KV3:NI - Delete 3 differe:
  5.1                                                      ranges with the option t
  5.2                                                      print only the line num-
  3.4                                                      ber.  NOTE:  The first
  3.5                                                      range (line 2.2) has
  3.6                                                      already been deleted in
  3.7                                                      the above example.
  3.8
  3.9
  4.
09.08.14?


15.14.00?FRAME W2:STRING;                              - Declare frame
15.17.36?W2/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM       - Put a library page into the
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W2               W2 frame

15.19.20?W2/LIST .6
  0.6   =   CHLAST = ';';

15.19.30?W2/DELETE .6(IV2)                             - Delete lines residing in W2
  0.6   =   CHLAST = ';';                                 frame
  0.7   =   CHBLANK = ' ';
```

Text Editing Statement

[frame-id/] REPLACE range [: NL]

The REPLACE statement is used to replace existing lines in the ACTIVE frame or specified frame. The range must be specified and may consist of the implicit and/or explicit range discussed on page 55. The user is prompted for successive lines to replace the lines in the specified range. The prompt is a display of the line to be replaced. Following the range specification is the display specification which is optional and described below.

If you don't want to replace the line, hit the BREAK key and the command is aborted.

Display Options: NL (NO LIST) - do not list line numbers or contents of the line being replaced.

EXAMPLES: IMPLICIT

```
      USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
```

- The page to be edited is read from the data base library into the ACTIVE frame.

```
09.16.56? VAR SV1,SV2,SV3,SV4,SV5: STRING;
09.17.12? VAR IV3,IV4: INT;
09.17.15?     SV1='BLK';  SV2='CH';  SV4='LEN';  SV5='BLO';
09.17.17?     IV3=36;     IV4=4;    SV3='LENGTH';
09.17.20?
          REPLACE 'CHQUO'
  0.8   =.  CHQUOTE = '''';
  0.8   =
09.17.45?
          REPLACE CAT(SV2,'ZERO')
  0.9   =   CHZERO = '0';
  0.9   =
09.18.08?
          REPLACE SV2(34:IV3)
  0.5   =   CHFIRST = ':';
  0.5   =
  0.6   =   CHLAST = ';';
  0.6   =
09.18.33?
          REPLACE CAT('DIR',SV4)(IV4)
  4.    =   DIRLEN = 62;
  4.    =
09.19.43?
          REPLACE SV1 AND NOT 'LEN'
  2.1   =   BLKSZ = 256;
  2.1   =
  2.3   =   BLKMAX = 3777B;
  2.3   =
  5.2   =   STATUSBLK = 1;
  5.2   =
```

- Replace all lines containing 'CHQUO'. REPLACE prompts the user with line number(s) and the user types the replacement line(s).

- Replace all lines containing the concatination of 'CH' (SV2) and 'ZERO'

- Replace all lines containing 'CH' (SV2) in columns 34 thru 36 (IV3). REPLACE continually prompts the user with line numbers until all lines have been replaced.

- Replace all lines containing the concatination of 'DIR' and 'LEN' (SV4) with a limit of 4 lines.

- Replace all lines containing 'BLK' (SV1) and NOT 'LEN'

EXPLICIT

```
09.20.31?VAR KV1,KV2,KV3,KV4: KEY;
09.20.34?VAR IV2:INT;
09.20.37?KV1=20.; KV2=.2; KV3=2; KV4=6; IV2=2;
09.21.21?
          USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS WORK
09.21.47?
          REPLACE KV2
   0.2    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   0.2    =
09.22.05?
          REPLACE KV1-19.5:NL;
   0.5    =
1 ITEMS IN SPECIFIED RANGE.
09.22.33?
          REPLACE 2.9/KV4-2(IV2)
   2.9    =    LFNDLEN = 250;
   2.9    =
   3.     =    HASHSZ = 1;
   3.     =
09.23.46?
          REPLACE KV2, 5.1/KV4-KV2(IV2), KV4-.1/KV4
   0.2    =
   0.2    =
   5.1    =
   5.1    =
   5.2    =    STATUSBLK = 1;
   5.2    =
   5.9    =    WVN = 0;
   5.9    =
   6.     =    VNLEN = 7;
   6.     =
09.24.38?
```

- Read the page to be edited from the data base library into the ACTIVE frame
- Replace line .2 (KV2)
- Replace line .5(KV1-19.5) with NO LIST.
- Replace lines 2.9 through and including 4(KV4-2) with a limit of 2 lines ~~to~~ total.
- Replace 3 separate ranges.
  1) line .2(KV2)
  2) line 5.1 through 5.8 (KV4-KV2) with a limit of 2 (IV2) lines.
  3) line 5.9 (KV4-.1) through 6 (KV4).

```
15.14.00?FRAME W2:STRING;
15.17.36?W2/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W2
```

- Declare frames
- Put a library page into the W2 frame

```
15.19.30?W2/REPLACE .9(IV2)
   0.9    =    CHZERO = '0';
   0.9    =
   1.     =    CHEOL = '$';
   1.     =

15.24.43?
```

- Replace lines in the W2 frame

Text Editing Statement

[frame-id/] CHANGE string-id$_1$ [(col$_1$ [,col$_2$])] TO string-id$_2$

IN range [:[NL|NI|NK],[E] ,[V] ,[M]]

The CHANGE statement is used to modify existing lines on the ACTIVE frame or specified frame. An item to be changed (string-id$_1$) and the change (string-id$_2$) are string operands. They can be a literal string enclosed in quotes, 'ABC,' a string variable or a STRING expression. The string to be changed (string-id) may be required to begin in a specific column (col) or begin between two columns (col$_1$,col$_2$). The column specification is optional and if used must be enclosed in parenthesis following string-id. The column number must be an INT operand. It can be a simple number, INT variable or an INT expression. The range may consist of implicit and/or explicit ranges discussed on page 55. It should be noted that only the first occurrence of the string on a line is changed, unless the M or multiple occurrence option is selected. The display option follows the range specification and is described below.

Display Option:	NL (NO LIST)	- do not display the line number or contents of the line being changed.
	NI (NO ITEM)	- do not display the contents of theline, only the number.
	NK (NO KEY)	- do not display the line number (key) only the contents of the line.
	E (ECHO)	- display the old version of the line and the new version after the change has been made.
	V (VETO)	- user may veto or verify CHANGE by responding to 'OK?' with: Y - YES - make the change; N - NO - don't make the change; K - KILL - don't make the change and abort the command.
Multiple Occurrence Option	M	- change all occurrences of the string-id appearing on a single line.

EXAMPLES: IMPLICIT

```
 14.40.56?USE ALIB.NEWVER.CKCASES.TEST.PROGRM - Page to be edited is read from
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK     the data base library.
 14.41.25?
         VAR SV1,SV2:STRING;
 14.42.14?  SV1='CH';  SV2='BVD';
 14.42.48?

         CHANGE SV1 TO CAT(SV1,'10') IN 'CH' AND 'IN'- Change CH to CH10
   0.5   =   CH10FIRST = ':';                          in all lines containi
   0.6   =   CH10LAST = ';';                           CH and IN.
```

```
 14.43.38?CHANGE SV1 TO 'XX' IN 'CH'(29,36):M
   0.6   =    XX10LAST = ';';
   0.7   =    XXBLANK = ' ';
 14.44.27?
```

- Change CH to XX in all lines containing a CH beginning in line 29 through 36. Also if more than one occurence of CH appears in a line change them all (opt = M).

```
        CHANGE '1' TO '150' IN SV2
   3.4   =    BVDSZ = 150;
   3.6   =    BVDMAX = 777777B;
   3.7   =    BVDSYN = -150;
 14.45.16?
```

- Change 1 to 150 in all lines containing BVD.

```
 14.45.49?CHANGE 'LEN' TO 'LLL' IN 'LEN' AND '250'
   2.2   =    BLKLLL = 250;
   2.5   =    TRLRLLL = 250;
   2.7   =    NTNDLLL = 250;
   2.9   =    LFNDLLL = 250;
   3.1   =    HASHLLL = 250;
   3.5   =    BVDLLL = 250;
   4.8   =    PDXLLL = 250;
 14.46.22?
```

- Change LEN to LLL in all lines containing LEN and 250

```
EXPLICIT

 USE PROGRM

ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 14.30.47?VAR KV1,KV2,KV3,KV4:KEY;

 14.31.16?VAR IV1,IV2,IV3,IV4:INT

 14.31.34?VAR SV1,SV2:STRING;
 14.32.50?
         KV2=.2;  KV3=2;  KV4=6;  KV1=.1;
 14.33.40?SV1='CH';  SV2='MAIN';
 14.34.05?
```

- The page to be edited is read from the data base library.

```
        CHANGE 'CHFIRST' TO CAT(SV1,'1') IN .5
  0.5   =    CH1 = ':';
 14.34.51?
```

- Change CHFIRST to CH1 in line 5

```
        CHANGE SV2 TO 'TEST' IN KV1(2)
  0.1   =PROGRAM TEST(SFILE,DFILE,OUTPUT+);
  0.2   =PROGRAM TEST(SFILE,DFILE,OUTPUT+);
 14.35.19?
```

- Change MAIN to TEST in line .1 for 2 lines.

```
        CHANGE SV1(29,36) TO 'XCH' IN KV2/KV3-1(2);
  0.5   =    CH1 = ':';
  0.6   =    CHLAST = ';';
 14.36.10?
```

- Change CH beginning in line 29 through 36 to XCH in lines .2 through 1 with a limit of 2 lines.

```
          CHANGE 'MAX' TO 'MIN' IN KV3,2.3,KV4-.7/KV4(2):M
   2.     =    BUFLEN = 7;
   2.3    =    BLKMIN = 3777B;
   5.3    =    LRUMIN = 777777B;
   5.4    =    HOLDMIN = 7B;
```

- Change MAX MIN in 3 ranges. Also chang all occurences of the string appearing in one line (M).
  (1) line 2
  (2) line 2.3
  (3) line 5.3 through 6 with a limit of 2 lines.

IMPLICIT AND EXPLICIT

```
 14.50.05?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 14.50.15?
         VAR SV1,SV2:STRING;
 14.50.22?  SV1='CH';  SV2='BVD';
```

- The page to be edited is read from the data base library.

```
COUNT 'MAX'
6 ITEMS IN SPECIFIED RANGE.
```

- Count all lines containing MAX.

```
 14.50.54?CHANGE 'MAX' TO 'MIN' IN 'BITS' IN 3/4
   3.6    =    BVDMIN = 777777B;
 14.51.23?
```

- Change MAX to MIN in all lines containing BITS within the line numbers 3 through 4

```
 09.35.46?FRAME W1:STRING;
 09.35.49?
 09.35.52?W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1
 09.36.00?
          W1/LIST .1
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
 09.39.48?W1/CHANGE 'MAIN' TO 'EXPER' IN .1
   0.1    =PROGRAM EXPER(SFILE,DFILE,OUTPUT+);
```

- Declare frame
- Put a page into the W1 frame.
- LIST a line
- Change a line in W1 frame.

[frame-id/] ADD string-id [AT col] IN range [:[NL|NK|NI],[E],[V]]

The ADD statement is used to alter existing lines on the ACTIVE frame or specified frame. The item to be added must be any type of STRING operand. It can be a simple string enclosed in quotes, a STRING variable, or a STRING function. The string-id may be required to be added AT a particular column (col). This AT col specification is optional and if not specified, the string-id will be appended to the end of the line. The column number must be an INT operand such as a simple number, an INT variable, an INT expression or an INT function. The range must be included and may consist of implicit and/or explicit ranges discussed on page 55. The altered line contents and line number are listed unless a display option has been specified. The display options are described below.

Display Option:

NL (NO LIST) - **do not display the line number or the contents of the line being added.**

NI (NO ITEM) - **do not display the contents, only the number.**

NK (NO KEY) - **do not display the line number (key) only the contents of the line.**

ECHO - **display the old version of the line, and the altered version.**

V (VETO) - user may veto or verify the additions by responding to 'OK?' with:
Y - YES - make addition
N - NO - don't make addition
K - KILL - don't make addition and abort the command.

EXAMPLES: IMPLICIT

```
16.05.13?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
16.15.21?R.CKCASES.TEST.PROGRM USED AS WORK
16.15.28?
      VAR SV1,SV2,SV3,SV4:STRING;
16.15.35?VAR KV1,KV2,KV3:KEY;
16.15.39?VAR IV1,IV2:INT;
16.15.43?
16.15.46?SV1='   PRINTLN;';  SV2='(*ADD-NO COL OPT*)';
16.15.50?SV3='X';  KV1=1.;  KV2=1.7; IV1=20;
16.15.54?
16.15.58?ADD '*' AT IV1 IN '777B'
  2.3    =   BLKMAX = 3777B; *       (* MAX NUM OF BLOCKS/PAGE; 11 BITS *)
  3.6    =   BVDMAX = 777777B*;      (* MAX NUM OF BLOCKS/LIBRARY; 18 BITS *)
  5.3    =   LRUMAX = 777777B*;      (* MAX VALUE OF LRU; 18 BITS *)
16.16.40?
```

The page to be edited is read from the data base library.

Add an * in column 20 in all lines containing 777B.

```
      ADD SV3 AT 9 IN 'LEN'(6)
  1.5    =   IDLENX = 10;            (* LENGTH OF AN IDENTIFIER *)
  1.6    =   NMLENX = 7;             (* LENGTH OF A DIRECTORY NAME *)
  1.7    =   INLENX = 82;            (* LENGTH OF AN INPUT BUFFER *)
  6.     =   VNLENX = 7;             (* STORED VERSIONS ALLOWED PER PAGE *)
```

Add an X in column 9 in all lines containing LEN in column 6.

EXPLICIT

```
 16.05.13?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 16.05.36?
        VAR SV1,SV2,SV3,SV4:STRING;
 16.07.13?VAR KV1,KV2,KV3:KEY;
 16.07.37?VAR IV1,IV2:INT;
 16.07.53?
 16.07.57?SV1='   PRINTLN;';  SV2='(*ADD-NO COL OPT*)';
 16.09.00?SV3='X';  KV1=1.;  KV2=1.7; IV1=20;
 16.09.46?
 16.09.49?ADD '  PRINTLN;' AT IV1+9 IN .8(2)
   0.8   =   CHQUOTE ='''';                  PRINTLN;
   0.9   =   CHZERO = '0';                   PRINTLN;
 16.10.23?
 16.10.39?
        ADD SV1 IN KV2-.3
   1.4   =      PRINTLN;
 16.10.59?

        ADD SV2 IN KV1/KV1+.2
   1.    =   CHEOL = '$';(*ADD-NO COL OPT*)
   1.1   =   CHSEMI = ';';(*ADD-NO COL OPT*)
   1.2   =   CHNOT = '#';          (* ONLY USE OF THIS CHARACTER *)(*ADD-NO COL O
T*)
 16.11.29?

        ADD '#' AT 20 IN .5,KV2-KV1
   0.5   =   CHFIRST = ':';  #       (* FIRST CHARACTER IN CHAR *)
   0.7   =   CH2BLANK = ' ';  #      (* CHARACTER IDENTIFIERS *)
 16.14.05?
```

- The page to be edited is read from data base library.
- Add PRINTLN; at column 29 in lines PRINTLN; beginning with .8 for 2 lines.
- Add PRINTLN; to line 1.4
- Add (*ADD-NO COL OPT*) in lines 1. through 1.2
- Add # at column 20 in 2 ranges - (1) line .5 (2) line .7

```
  15.14.00?FRAME W2:STRING;
  15.17.36?W2/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W2

  15.19.30?W2/ADD '*' AT 21 IN '777B'
    2.3   =   BLKMAX = 3777B;  *
    3.6   =   BVDMAX = 777777B;*
    5.3   =   LRUMAX = 777777B;*
```

- Declare frames
- Put a library page into the W2 frame
- Add lines in the W2 frame

MODIFY range [:S]

The MODIFY statement allows the user to make changes in a line of code without retyping the entire line. Modify displays the line and then asks the user for alterations to the line with the prompt, "Alters?". The user then types in the alterations using the following modify commands:

space bar	- This leaves the character unchanged.
B	- B will delete the character appearing directly above it and replace it with a blank space.
D	- D will delete the character appearing directly above it and the rest of the text on the line is shifted to the left one character.
I	- I will insert a string of characters before the character that appears directly above it. The characters being inserted must be enclosed in quotes and directly follow the I command. NOTE that the characters appearing above this inserted string cannot now be modified. All commands apply to the character that appear directly above it. The multiple pass option can be used to solve this problem.
R	- R will replace any number of characters with a new string beginning with the character appearing directly above the R. The string must be enclosed in quotes and follow the R command. NOTE that the characters appearing above the replacement string cannot be modified. All commands apply to the characters that appears directly above it. The multiple pass option can be used to solve this problem.

The range must be specified and may consist of implicit and/or explicit range **discussed on page** 51 . Modify provides multiple prompts to the user for a single line, as many times as the user sees necessary to complete the modifications. A carriage return with no modifications preceding it will discontinue prompts for the current line and go onto the next line in the range. The BREAK key will abort the command with no modification made.

A single modification option (:S) is available which provides the user with only one prompt for modifying line.

EXAMPLE:

```
 13.37.27?USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS WORK

 13.38.17?MODIFY .1/.3
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   ALTERS?     DDD R'SUBP'     I'PA'
   0.1    =PROG SUBP(SFILE,PADFILE,OUTPUT+);
   ALTERS?          B  I'UB'
   0.1    =PROG SUB (SUBFILE,PADFILE,OUTPUT+);
   ALTERS?
   0.2    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   ALTERS?
   0.3    =
   ALTERS?
 13.42.36?
```

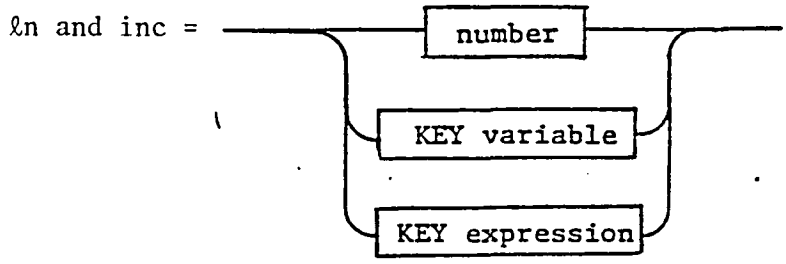
- Modify lines 1 through 3 with multiple modes per line.
- No more mods. Hit CR
- Modify line .2
- No mods. Hit CR
- Modify line .3
- No mods.
- Hit CR to abort command.

```
 09.51.47?FRAME W1:STRING;
 09.51.51?
 09.51.55?W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1
 09.52.00?
          W1/LIST .2
   0.2    =PROGRAM TEMP(SF,DF,OUTPUT+);
 09.52.05?
          W1/MODIFY .2:S
   0.2    =PROGRAM TEMP(SF,DF,OUTPUT+);
   ALTERS?          B     I'ILE'
   0.2    =PROGRAM T MP(SFILE,DF,OUTPUT+);
 09.53.45?
          W1/MODIFY .2
   0.2    =PROGRAM T MP(SFILE,DF,OUTPUT+);
   ALTERS?          D            I'ILE'
   0.2    =PROGRAM TMP(SFILE,DFILE,OUTPUT+);
   ALTERS?                              DDD
   0.2    =PROGRAM TMP(SFILE,DFILE,OUT+);
   ALTERS?

COMMAND ABORTED.  (ADDRESS:   17)
```

- Declare frame
- Put a page into the W1 frame.
- LIST a line of W1 frame.
- Modify a single line in W1 frame. [:S]
- More Modifications required to line .2.

[frame-id/] COPY range TO {&n[//inc]}

The COPY command allows the user to copy an existing line or lines of code to another location within the ACTIVE frame or from a specified frame to the ACTIVE frame. The frame copied to is always the ACTIVE frame. The line or lines being copied remains unchanged and will now appear in both locations. A range must be specified and may consist of implicit and/or explicit ranges discussed on page 55. The new location (&n) must be specified. The increment (inc) is optional and has a default value of SYSTEM.DELTA. The new line location and increment are both KEY operands and can be any of the following.



Upon execution of COPY, ISIS displays the number of lines copied in the last line number.

EXAMPLE: IMPLICIT

```
 16.04.39?  VAR IV3:INT;
 16.05.40?  VAR STRT,INC1,INC2:KEY;
 16.06.04?  VAR SV1,SV2,SV4:STRING;
 16.06.23?
         USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 16.06.54?
          IV3=36;  SV1='BLK';  SV2='CH';  SV4='LEN';
 16.08.09?INC1=.001;  INC2=.002;  STRT=7.4;
 16.09.26?
         COPY 'CHEOL' TO 7//INC2
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :   7.
 16.09.53?
 16.10.09?COPY CAT(SV2,'ZERO') TO STRT//.001
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :   7.4
 16.10.34?

         COPY SV2(34,IV3) TO STRT+.002//INC1+INC2
2 LINES INSERTED. LAST LINE INSERTED IN WORK      :   7.405
 16.11.29?

       COPY CAT('HASH',SV4) AND CAT(SV1,SV4) TO 7.9
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :   7.9
 16.12.23?LIST 7.9
   7.9    =    HASHLEN = 250;          (* BLKLEN/HASHSZ *)
 16.12.43?
```

- Put a library page into the ACTIVE working frame for editing.
- Copy all lines containing CHEOL to line 7 with an inc of .002
- Copy all lines containing CHZERO string function to line 7.4 with .001 increment
- Copy all lines containing CH beginning in col 34 thru 36 to line 7.402 with a .003 increment.
- Copy all lines containing HASHLEN and BLKLEN to line 7.9 with a 1 increment (default)

EXPLICIT

```
 09.51.56? USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 09.52.54?
 09.53.02?  VAR S1,V1,V2,INC2,LN1,LN2,STR1:KEY;
 09.53.49?  VAR NL:INT;
 09.54.02?      V1=.1;  S1=.02;  V2=2.;  INC2=.001;
 09.54.52?      V5=5.;  NL=3;  LN1=1.1;  LN2=1.2;
VAR V5        : KEY
 09.55.58?      STRT=7.4;
VAR STRT      : KEY
 09.56.32?
 09.56.46?COPY 1 TO STRT+S1
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :   7.42  7.42
 09.57.10?LIST 7.42
   7.42  =   CHEOL = '$';

09.59.13?LIST LN1(2); COPY LN1(2) TO V2+.01//.001; LIST 2.01/2.02
   1.1   =   CHSEMI = ';';
   1.2   =   CHNOT = '#';          (* ONLY USE OF THIS CHARACTER *)
2 LINES INSERTED. LAST LINE INSERTED IN WORK      :   2.011
   2.01  =   CHSEMI = ';';
   2.011 =   CHNOT = '#';          (* ONLY USE OF THIS CHARACTER *)
10.05.41?

         LIST 1.1,1.2
   1.1   =   CHSEMI = ';';
   1.2   =   CHNOT = '#';          (* ONLY USE OF THIS CHARACTER *)
10.07.57?



         COPY LN2-V1/2.+V1(SQR(NL-1)) TO V5+.03//.001; LIST 5.03/5.04
4 LINES INSERTED. LAST LINE INSERTED IN WORK      :   5.033
   5.03  =   CHSEMI = ';';
   5.031 =   CHNOT = '#';          (* ONLY USE OF THIS CHARACTER *)
   5.032 =   WDBLANKS = '          ';
   5.033 =
```

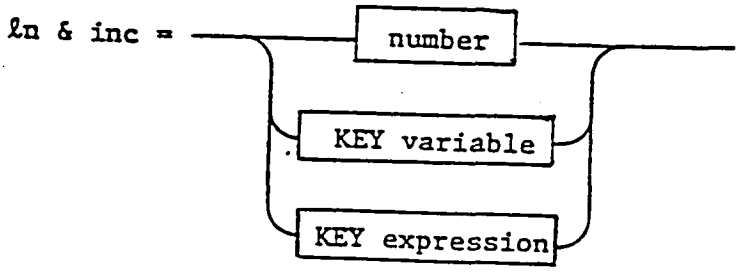
- Put a library page into the page for editing.
- Copy line 1 to line
- Declare frame name
- Put a library page into the W2 frame

```
 08.45.57?FRAME W2:STRING
 08.46.14?W2/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W2
 08.48.44?
         W2/COPY .3/.4 TO 10//.001
2 ITEMS INSERTED. LAST ITEM INSERTED IN WORK      :  10.001

 08.51.40?LIST 10.001
 10.001 =CONST  (* GLOBAL CONSTANTS *)
 08.52.02?
         W2/LIST .3/.4
   0.3   =
   0.4   =CONST  (* GLOBAL CONSTANTS *)
```

- Copy lines from W2 frame to the ACTIVE frame
- List the list lines copied to the Active page
- List the lines in W2 which were copied

[frame-id/] MOVE range TO { ℓn[//inc]}

The MOVE command allows the user to move an existing line or lines of code from one location with the ACTIVE frame or from a specified frame to the ACTIVE frame. (The frame moved to is always the ACTIVE frame.) The line(s) being copied in the old location will no longer exist. A range must be specified and may consist of implicit and/or explicit ranges discussed on page 55. The new line location (ℓn) and the incremental value (inc) are KEY operands. The increment (inc) is optional but must be specified when moving more than one line. They can be in the following form:



Upon execution of MOVE, ISIS displays the number of lines moved and the last line number.

EXAMPLES: IMPLICIT MOVE

```
16.15.16?  VAR SV1,SV3:STRING;
16.15.50?  VAR IV4,NUM:INT;
16.16.06?  VAR INC1,STRT:KEY;
16.16.24?   SV1='BLK';  SV3='CHS';   IV4=4;   INC1=.001;
16.17.05?   NUM=58;  STRT=7.4;
16.17.25?
        USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
16.17.59?
        MOVE SV3 TO 7.1//INC1
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :    7.1
16.18.28?
        LIST SV3
  7.1    =    CHSEMI = ';';
16.18.46?

        MOVE CAT(SV1,'MAX')(IV4) TO STRT+.1//INC1
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :    7.5
16.19.31?

        MOVE 'USE'(NUM DIV 2) TO STRT+.3//.001
2 LINES INSERTED. LAST LINE INSERTED IN WORK      :    7.701
16.20.12?
        LIST 'USE'
  1.2    =    CHNOT = '#';          (* ONLY USE OF THIS CHARACTER *)
  7.7    =    INLIMIT = 80;           (* USEFUL LENGTH OF INPUT BUFFER *)
  7.701  =    BLKLEN = 250;           (* USEFUL CELLS PER BLOCK *)
16.20.34?
```

- Put a library page into the ACTIVE frame for editing.

- Move all lines containing CHS to line 7.1 with a .001 increment

- This listing shows the line has been deleted from its original location.

- Move all lines containing BLKMAX in col 4 to line 7.5 with a .001 increment

- Move all lines containing USE beginning in col 29 to line 7.7 with a .001 increment

This LIST shows the lines containing USE in col 29 have been deleted from their original

```
        MOVE SV1 AND NOT 'LEN' TO 8//.001
3 LINES INSERTED. LAST LINE INSERTED IN WORK      :    8.002
 16.21.40?LIST 8/9
   8.     =    BLKSZ = 256;          (* SIZE OF BLOCKREC IN CELLS *)
   8.001  =    STATUSBLK = 1;        (* STATUS BLOCK NUMBER; MUST BE 1 *)
   8.002  =    BLKMAX = 3777B;       (* MAX NUM OF BLOCKS/PAGE; 11 BITS *)
 16.22.15?

USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 09.31.48?
 09.34.02? VAR V3,V5,LN1,STRT,INC2:KEY
 09.34.57?VAR NL:INT
 09.35.10?  V3=3;  V5=5;  LN1=1.1;  STRT=7.4;
 09.35.59?  INC2=.002;    NL=3;
 09.36.36?
 09.36.42?MOVE LN1 TO STRT//.001;  LIST 7.4
1 LINES INSERTED. LAST LINE INSERTED IN WORK      :    7.4
   7.4    =    CHSEMI = ';';
 09.37.20?

        MOVE V3-.5(NL+NL) TO 7.9//INC2;  LIST 7.9/8.
6 LINES INSERTED. LAST LINE INSERTED IN WORK      :    7.91
   7.9    =    TRLRLEN = 250;
   7.902  =    NTNDSZ = 1;
   7.904  =    NTNDLEN = 250;
   7.906  =    LFNDSZ = 1;
   7.908  =    LFNDLEN = 250;
   7.91   =    HASHSZ = 1;
 09.38.25?

        MOVE 4.5/V5-.4 TO 8.2//INC2;  LIST 8.2/9
2 LINES INSERTED. LAST LINE INSERTED IN WORK      :    8.202
   8.2    =    NDXSYN = -6;
   8.202  =    NDXFIRST = 7;
 09.39.28?

        MOVE V5/V5+.4(NL) TO STRT+1.3//INC2; LIST  8.7/9
3 LINES INSERTED. LAST LINE INSERTED IN WORK      :    8.704
   8.7    =    PDXFIRST = 8;
   8.702  =
   8.704  =    STATUSBLK = 1;
 09.43.46?
        LIST V5/V5+.4(NL)
   5.3    =    LRUMAX = 7777778;
   5.4    =    HOLDMAX = 78;
 09.44.39?
 08.45.57?FRAME W2:STRING
 08.46.14?W2/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W2
 08.48.44?
        W2/MOVE .3/.4 TO 8//.01
2 ITEMS INSERTED. LAST ITEM INSERTED IN WORK
 08.59.36?
        LIST 8/9
   8.     =
   8.01   =CONST  (* GLOBAL CONSTANTS *)
 09.00.35?
        W2/LIST .3/.4
NO ITEMS IN SPECIFIED RANGE.
```

- The page to be edited is read from the data base library.
- Move line 1.1 to line 7.4 with .001 increment
- Move lines beginning with 2.5 for 6 lines to lines beginning at 7.9 with an increment of .002
- Move lines between 4.5 and 4.6 to line 7.9 with .002 increment
- Move lines at 5 through 5.4 wit limit of 3 lines to line 8.7 with an increment of .002.
- Declare frame
- Put a page into the W1 frame.
- Move lines from W2 frame to the Active frame
- LIST new lines of the WORK frame.
- Lines no longer appear in W2 frame.

[frame-id/] REKEY range TO { &n//inc}

The REKEY statement allows the user to change the line number (KEYS) assigned to a single line of code or a group of lines in the ACTIVE frame. It should be noted that when rekeying, the line numbers must remain in ascending progression order. The range for REKEY is limited. The implicit part of range does not apply and the explicit range is limited, i.e., multiple ranges are not allowed and the n& total line designator is not permitted. n&n is the beginning line number for the range being REKEYed and inc is the new increment for line numbers.

EXAMPLE:

```
 09.15.17? VAR INC2,V4:KEY;
 09.15.51?      INC2=.001;    V4=4;
 09.16.13?
 09.19.11?USE ALIB.NEWVER.CKCASES.TEST.PROGRM
ALIB.NEWVER.CKCASES.TEST.PROGRM USED AS WORK
 09.20.34?

 09.23.27?REKEY V4-.1/V4+.2 TO V4-.1//.001; LIST 3.9/4
4 ITEMS IN SPECIFIED RANGE. LAST KEY:    3.903
   3.9    =    DIRSZ = 4;
   3.901  =    DIRLEN = 62;
   3.902  =    DIRPGSYN = -5;
   3.903  =    DIRFIRST = 3;
 09.24.18?

          LIST .F;LIST .L;    REKEY ALL TO .1//.01;  LIST .F; LIST .L;
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   6.     =    VNLEN = 7;
60 ITEMS IN SPECIFIED RANGE. LAST KEY:    0.69
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   0.69   =    VNLEN = 7;
 09.26.15?
```

- The page to be edited is read from the data base library.
- Rekey from line 3.9 through 4.2 to 3.9 with a .00 increment this time. The new lines are listed to show the new line numbers.
- In this example, the first and last lines of a page were listed; then the entire page was rekeyed then the first and last lines listed again show the entire page was rekeyed using the new line increment of .01.

```
 12.54.17?FRAME W2:STRING;
 12.54.40?W2/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W2
 12.55.08?
          W2/LIST .F; W2/LIST .L
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   6.     =    VNLEN = 7;
 12.55.38?
          W2/REKEY ALL TO 10.//.1
60 ITEMS REKEYED. LAST ITEM REKEYED IN W2
 12.56.31?
          W2/LIST .F; W2/LIST .L;
  10.     =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
  15.9    =    VNLEN = 7;
 12.57.01?
```

- Declare frame name
- Put a library page into the W2 frame
- List the first and last lines of the W2 frame
- REKEY the complete page. New line number should begin with 10 and increase by .1
- List the first and last line numbers after rekeying

Text Editing Statements

[frame-id/] COUNT [range] [:NC]

The COUNT statement allows the user to count the number of lines in the ACTIVE specified frame within a range. The range is optional and, if not specified, the default is ALL. A message indicating the number of items in the specified range is automatically printed unless otherwise indicated by the display option NC, described below.

Display Option: NC (No Confirmation) - Avoids printing the COUNT message, "x items in specified range"

EXAMPLES:

```
 18.12.17?LIST
   4.     =ISISTS1,T200,CM160000.
   6.     =USER,961300H.
   8.     =CHARGE,101481,LRC.
  10.     =GET,HALGO.
  12.     =GET,LST5=ATOM912.
  14.     =PACK,LST5.
  16.     =COPYBF,INPUT,INFIL.
  18.     =REWIND,INFIL.
  20.     =RFL,160000.
  22.     =REDUCE,-.
  24.     =NOEXIT.
  26.     =HALGO.
  28.     =)
```

- List the ACTIVE frame contents, a typical HAL/S applications program text
- EOR separator

```
 18.12.31?COUNT
13 ITEMS IN SPECIFIED RANGE.
```

- Count number of lines in ACTIVE frame

```
 18.13.15?
         COUNT 4/10
4 ITEMS IN SPECIFIED RANGE.
```

- Count number of lines between line number 4 and line number 10

```
 18.13.34?COUNT 4/10,12/28
13 ITEMS IN SPECIFIED RANGE.
```

- Count total number of lines 2 ranges.

```
 12.58.03?FRAME W3:STRING;
 12.58.23?W3/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W3
 12.58.45?
          W2/COUNT 'PROGRAM'
2 ITEMS IN SPECIFIED RANGE.

 12.59.26?W3/LIST 'PROGRAM'
   0.1    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
   0.2    =PROGRAM MAIN(SFILE,DFILE,OUTPUT+);
 12.59.47?
```

- Declare frame name
- Put a library page into the W3 frame
- Count the number of lines containing 'PROGRAM' in W3 frame
- Now list all lines containing 'PROGRAM' in W3 frame

[frame-id/] EXEC [range][:E]

The EXEC statement allows the user to execute the contents of the ACTIVE or specified frame. Any portion of the frame may be executed by using the range option. It should be noted that declarative statements (VAR, TYPE, etc) can only be executed once. An error message is given if an identifier is declared twice.

Display Option: E (ECHO) - displays a line of code as it is executed.

EXAMPLE:

```
14.04.51?LIST                          - List ACTIVE frame
  1.     =A=10
  2.     =B=11
  3.     =X=A+B
  4.     =Y=X+A
  5.     =PRINTLN A,B,X,Y
14.05.31?EXEC                          - Execute the ACTIVE frame
 1.000000000000000E+001  1.100000000000000E+001  2.100000000000000E+001  3.1000000000
000E+001


14.12.32?EXEC :E                       - Execute the ACTIVE frame and print out each
  1.     =A=10                           line of code as it is executed.
  2.     =B=22
  3.     =X=A+B
  4.     =Y=X+A
  5.     =PRINTLN A,B,X,Y
 1.000000000000000E+001  2.200000000000000E+001  3.200000000000000E+001  4.2000000000
000E+001
```

EXEC continued

```
 10.41.02?FRAME A1;A3:STRING;
 10.42.2?USE ALIB.ISIS.JOB.CONTROL.BUILD2
ALIB.ISIS.JOB.CONTROL.BUILD2 USED AS WORK
 10.43.12?LIST
   1.      A3/USE ALIB.ISIS.JOB.CONTROL.HEADER; A3/RUN:NK
   2.      A3/USE ALIB.ISIS.JOB.CONTROL.COPY2;  A3/RUN:NK
   3.      A3/USE JOELIB.ISIS.SOURCE.PASINTF.SEPT18; A3/RUN
 10.43.2?  A1/USE COPY
ALIB.ISIS.JOB.CONTROL.COPY USED AS A1
 10.44.33?A1/LIST
   1.     =ATTACH,ISISCIO/M=W.
   2.     =REWIND,ISISCIO.
   3.     =COPYEI,INPUT,ISISCIO.
   4.     =)
 10.44.45?
        EXEC
ALIB.ISIS.JOB.CONTROL.HEADER USED AS A3
3 ITEMS IN SPECIFIED RANGE.
ALIB.ISIS.JOB.CONTROL.COPY USED AS A3
4 ITEMS IN SPECIFIED RANGE.
JOELIB.ISIS.SOURCE.PASINTF.SEPT18 USED AS A3
599 ITEMS IN SPECIFIED RANGE..
 10.46.28?
        SEND
'AWVIBBP' SENT TO BATCH EXECUTION.
```

- Define working frames
- Read a library page into the ACTIVE frame
- List ACTIVE frame

- Read a library page into the A1 working frame
- List the A1 frame contents

- Execute the ACTIVE frame
- USE statement executed
- RUN statement executed
- Second line

- Third line

- INPUT file (generated by RUN) is sent to the CDC 6600 computer

RUN FILE (RFILE)

The RUN file is a file set up by the user as an input file for submission to the NOS internal reader. Records making up the RUN file are separated using a right parenthesis [)] in column 1 as the EOR mark. The RUN file is created using the RUN statement and is executed (submitted to NOS) using the SEND statement. See Tool Invocation Statements for examples. At present the last line in the file must be a right parenthesis [)] in column 1.

Tool Invocation Statements

[frame-id/] RUN [range] [:[E], [NK]]

The RUN statement allows the user to create an INPUT file (control cards, program source and/or data) for submission to the NOS internal reader. This file, referred to as RUN file in ISIS, has the NOS name RFILE. A right parenthesis [)] in the first column is used as an EOR mark for separating records such as the control cards, program source, and data on the RUN (input) file. If control cards are stored on one frame, program source on another, and data on still another, the user simply executes the RUN statement three times in succession. RUN will concatenate the indicated frames to the RUN (input) file for each time it is executed. The range is optional and if not specified, will be the entire frame. The line numbers (KEYS) will be stored in columns 81-98 if the NK option (described below) is not used.

Display Option:
- E (ECHO) - Displays the frame contents as it is being added to the RUN file (RFILE)
- NK (NO KEY) - The line numbers are deleted as the lines are transferred to the RUN file.

EXAMPLES:

```
        FRAME A1,A3:STRING;                                  - Define working frames
 18.18.33?USE ALIB.ISIS.JOB.CONTROL.BUILD2                   - Copy page from library into ACTIVE
ALIB.ISIS.JOB.CONTROL.BUILD2 USED AS WORK                      working page.
 18.19.03?
        A3/LIST                                              - List the ACTIVE frame
   1.   A3/USE ALIB.ISIS.JOB.CONTROL.HEADER;                      A3/RUN:NK
   2.   A3/USE ALIB.ISIS.JOB.CONTROL.COPY2;                    A3/RUN:NK
   3.   A3/USE JOELIB.ISIS.SOURCE.PASINTF.SEPT18;                   A3/RUN
 18.19.23?
       A1/USE COPY                                           - Read a library page into A1 working
ALIB.ISIS.JOB.CONTROL.COPY USED AS A1                          frame
 18.19.50?LIST
   1.   A3/USE ALIB.ISIS.JOB.CONTROL.HEADER;                      A3/RUN:NK
   2.   A3/USE ALIB.ISIS.JOB.CONTROL.COPY2;                    A3/RUN:NK
   3.   A3/USE JOELIB.ISIS.SOURCE.PASINTF.SEPT16;                   A3/RUN
 18.19.58?
        EXEC                                                 - Execute ACTIVE frame
ALIB.ISIS.JOB.CONTROL.HEADER USED AS A3                      - Execution of USE statement  } 1st line
3 ITEMS IN SPECIFIED RANGE.                                  - Execution of RUN statement  } of ACTIVE
ALIB.ISIS.JOB.CONTROL.COPY2 USED AS A3} 2nd line                                             frame is
5 ITEMS IN SPECIFIED RANGE.                                                                  being
JOELIB.ISIS.SOURCE.PASINTF.SEPT18 USED AS A3} 3rd line                                       executed
699 ITEMS IN SPECIFIED RANGE.
 18.20.37?
```

```
 10.53.23?A1/USE ALIB.GRANT.BOOK.CHOP.CCA
ALIB.GRANT.BOOK.CHOP.CCA USED AS A1
 10.54.06?       A1/LIST
   4.     =ISISTST,T200,CM160000.
   6.     =USER,961300N.
   8.     =CHARGE,101481,LRC.
  10.     =GET,HALGO.
  12.     =GET,LST5=ATOM912.
  14.     =PACK,LST5.
  16.     =COPYBF,INPUT,INFIL.
  18.     =REWIND,INFIL.
  20.     =RFL,160000.
  22.     =REDUCE,-.
  24.     =NOEXIT.
  26.     =HALGO.
  28.     =)
 10.54.21?
         USE PG1
ALIB.GRANT.BOOK.CHOP.PG1 USED AS ACTIVE
 10.54.57?LIST
   2.     =    GOPROC:PROGRAM;
   4.     =C     HALMAT TEST CASE ARRAYS
   6.     =C   R,S,T BEING INTEGER ARRAYS OF 10
   8.     =C   U BEING A 5X5 INTEGER ARRAY
  10.     =    DECLARE R ARRAY(10) INTEGER;
  12.     =    DECLARE S ARRAY(10) INTEGER;
  14.     =    DECLARE T ARRAY(10) INTEGER;
  16.     =    DECLARE U ARRAY(10) INTEGER;
  18.     =    DECLARE U ARRAY(5,5) INTEGER;
  20.     =    DECLARE INTEGER,A,B,C,D;
  22.     =    A=20;
  24.     =    B=18;
  26.     =    C=16;
  28.     =    R$(5)=10;
  30.     =    R$(7)=12;
  32.     =    U$(3,4)=15;
  34.     =    D=(A+B)+C;
  36.     =    D=A+(B+C);
  38.     =    A=R$(5);
  40.     =    S$(2)=R$(7);
  42.     =    A=U$(3,4);
  44.     =    U$(4,3)=A;
  46.     =    CLOSE GOPROC;
  48.     =)
 10.56.58?
              A1/RUN
13 ITEMS IN SPECIFIED RANGE.
 10.57.19?US
                        RUN
24 ITEMS IN SPECIFIED RANGE.
 10.57.42?
         SHOW RUN
37 LINES IN RUN.
 10.57.54?
         SEND
'AWVIKXZ' SENT TO BATCH EXECUTION.
 10.58.14?
```

- Put library page into working frame A1
- List working frame A1
  RM1150 GRANTHAM
- A1 contains NOS control cards
- EOR separator
- Put another library page into ACTIVE frame
- List ACTIVE frame
- User's source program (HAL/S)
- EOR separator
- Create RUN (input) file (control cards)
- Add ACTIVE frame to RUN(input) file (program source)
- Display the number of lines on the RUN(input) file.
- Send RUN(input) file to NOS internal reader
- NOS job identification is AWVIKXZ

SEND

The SEND command allows the user to submit the RUN(input) file to the NOS internal reader. NOS will respond by printing the 7 character identification code for the job. If the RUN(input) file happened to be empty, then a message is typed indicating this.

EXAMPLE:

```
 14.57.38?SEND
'AWVIOYA' SENT TO BATCH EXECUTION.      - NOS accepts job and returns
 14.57.59?                                the job ID name 'AWVIOYA'


 15.40.55?SEND
NOTHING TO SEND.                        - Empty RUN file
COMMAND ABORTED.  (ADDRESS:    8)
```

STOP:SEND

The STOP:SEND command allows the user to submit the contents of the RUN (INPUT) file to the NOS internal reader in an interactive mode. ISIS automatically performs a STORE operation (page 47) to preserve the current environment and transfers control to the control sequence defined by the RUN file. Upon completion of this sequence, control is returned to ISIS and the current environment is automatically RESTORED (page 48).

EXAMPLE:

Interactive Commands

```
USE   MYLIB.INTACT.TOOL.CONTROL.CARDS
RUN
STOP:SEND
```

Contents of MYLIB.INTACT.TOOL.CONTROL.CARDS:

```
.PROC name
GET,INTERACTIVE_TOOL.
ISISGET,INFILE.    MYLIB.INTACT.TOOL.INPUT.DATA
INTERACTIVE_TOOL,INFILE,OUTFILE.
REWIND,OUTFILE.
ISISPUT,OUTFILE.    MYLIB.INTACT.TOOL.OUTPUT.INFO
```

This control card sequence gets the interactive tool and then calls ISISGET to retrieve the tool's input data from the ISIS library page names MYLIB.INTACT.TOOL.INPUT.DATA and put it on an NOS file named INFILE. After tool execution (in the interactive mode), ISISPUT is called to store the tools output, OUTFILE, on an ISIS library page named MYLIB.INTACT.TOOL.OUTPUT.INFO. Completion of the control card sequence returns control to ISIS.

Interrogation Statements

SHOWN FILE

The SHOWN file will contain the output of the last SHOW statement which was executed using the KEEP option. The information is saved here for the user in case he wishes to refer to it later on. A message is displayed giving the total number of lines inserted and the line number of the last item on the file.

EXAMPLE:

```
 12.38.46?SHOW PAGES SUITLIB.CG.BOOK.EXEC. :KEEP
 6 ITEMS INSERTED. LAST ITEM INSERTED IN SHOWN     :    6.
```

total number of lines

last line number

SHOW SHOWS [:KEEP]

A self-help type of command. The SHOW SHOWS command prints a list of all statements which the user may SHOW, or the words he may select to follow the SHOW command verb. The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
.10.21.36?SHOW SHOWS
 ABBREVS     AVAIL       CLEARS      COLUMNS     FRAMES     *FUNCS
 ID          INDEX       INDEXES     NAME        OPTIONS     PAGES
*PROCS       RESERVED    RUN         SETS        SHOWS       STATEMENTS
 SUBS        TAGS       →TRAPS       TYPES       VARS       *VERSIONS
```

*Not available at present.
→Not available to user

Interrogation Statements

SHOW RESERVED [:KEEP]

The SHOW RESERVED statement is used to determine what words have been reserved for ISIS and cannot be used as identifier names in user programs. The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
 10.23.00?SHOW RESERVED
ABBREV      ACTIVE      ADD         ALL         AND         ARRAY
ASK         AT          BY          CALL        CHANGE      CLEAR
COMPARE     COMPILE     COPY        COUNT       DELETE      DIV
DOWNTO      DO          DUMP        ELSE        END         ERASE
EXEC        EXITIF      FALSE       FOREACH     FOR         FRAME
FROM        FUNC        IF          INSERT      INVOKE      IN
LIST        LOOP        MODIFY      MOD         MOVE        NOT
OF          ON          OR          OVER        PRINTLN     PRINT
PROC        PURGE       READ        RECORD      REKEY       REMOVE
REPEAT      REPLACE     RESTORE     RUN         SAVE        SEND
SET         SHOW        STOP        STORE       THEN        TO
TRUE        TYPE        UNION       UNTIL       USE         VAR
VOID        WHILE       WRITE       XEQ
```

SHOW STATEMENTS [:KEEP]

The SHOW STATEMENTS statement is used to display all available statement verbs in the ISIS system. The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
 10.24.02?SHOW STATEMENTS
ABBREV      ACTIVE      ADD         ASK         CALL        CHANGE
CLEAR       COMPARE     COMPILE     COPY        COUNT       DELETE
DUMP        ERASE       EXEC        FOREACH     FOR         FRAME
FUNC        IF          INSERT      INVOKE      LIST        LOOP
MODIFY      MOVE        PRINTLN     PRINT       PROC        PURGE
READ        REKEY       REMOVE      REPEAT      REPLACE     RESTORE
RUN         SAVE        SEND        SET         SHOW        STOP
STORE       TYPE        USE         VAR         VOID        WHILE
WRITE       XEQ
```

*Not implemented at present

Interrogation Statements

SHOW AVAIL [:KEEP]

This statement allows the user to obtain an estimate of program resources which are still available. The resource space already in use and remaining available are given in internal units. Program resources listed are

STRING - string variable space
TYPE - program TYPES
ID - program identifiers
PF - procedures and function/names
STACK,CORE,& XEQ - system information (not directly controllable by the user)

STACK - values of all nonstring variables (temporarily during execution)
CORE - generated code(intermediate language)
XEQ - nesting of XEQ, EXEC, and ASK

The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
10.24.53?SHOW AVAIL
        IN USE   AVAILABLE
        ------   ----------
STRING:     32          118
TYPE  :     12           51
ID    :     34          116
PF    :      0           15
STACK :      7          993
CORE  :     15          385
XEQ   :      0           20
```

SHOW ABBREVS [:KEEP]

The SHOW ABBREVS statement is used to determine which statement verbs have been abbreviated by the user and their abbreviation(s). The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
 10.25.23?SHOW ABBREVS
** NONE **
 10.25.32?ABBREV P,PR:PRINT
 10.25.53?SHOW ABBREVS
'PR          ': PRINT
'P           ': PRINT
```

SHOW TYPES [:KEEP]

The SHOW TYPES statement is used to allow the user to display all types which he has placed in the type-id table (systems declared TYPES are not presented). If the user wishes to inquire about one specific type, he should use the SHOW ID statement. The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
          SHOW TYPES                                              - No initial data types
** NONE **
 15.36.19?TYPE PERSONS:REAL                                       - Declare data types
 15.36.38?TYPE ADDR:RECORD  NUM:INT; NAM:STRING; END;
 15.37.16?
          SHOW TYPES                                              - New data types have
'ADDR       ': RECORD                                                been added
                  NUM: INT;
                  NAM: STRING;
               END;
'PERSONS    ': REAL;
```

SHOW VARS [:KEEP]

The SHOW VARS statement is used to determine which variables have been placed in the identifier table. All declared variables are printed. If the user wishes to inquire about one specific variable he should use the SHOW ID statement. The KEEP option will store the command output on the shown file.

EXAMPLE:

```
 14.00.47?SHOW VARS
** NONE **

 14.02.45?TYPE PERSONS:REAL
 14.03.03?TYPE MESS : ARRAY[1..5] OF BOOL                          - Define new data types
 14.03.40?TYPE REC1 : RECORD NUM:INT; FLAG:BOOL; NAM:STRING; END;
 14.04.28?TYPE RECM : ARRAY[1..3] OF REC1;
 14.05.16?
          VAR ST1,ST2:STRING
 14.05.32?VAR ABC:REAL
 14.05.44?VAR B1,B2:BOOL
 14.05.56?VAR KIM,KATE:PERSONS                                     - Declare new variables
 14.06.12?VAR AREC: REC1
 14.06.28?VAR BREC: RECM
 14.06.37?
          SHOW VARS
'ABC        ': REAL;
'AREC       ': RECORD
                  NUM: INT;
                  FLAG: BOOL;
                  NAM: STRING;
               END;
'BREC       ': ARRAY [1..3] OF                                    - Shows addition of new
                  RECORD                                           variables in the symbol
                     NUM: INT;                                     table
                     FLAG: BOOL;
                     NAM: STRING;
                  END;
'B1         ': BOOL;
'B2         ': BOOL;
'KATE       ': REAL;
'KIM        ': REAL;
'ST1        ': STRING;
'ST2        ': STRING;
```

Interrogation Statements

SHOW ID {abbrev-id|var-id|system-id|frame-id} [:KEEP]

The SHOW ID statement allows the user to obtain a description of program or system identifiers. The identifier name, type, and usage is displayed. The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
14.28.22?VAR X: REAL;
14.28.31?VAR B,C: BOOL;
14.28.54?VAR I,J,K: INT;
14.29.19?VAR IND: STRING;
14.29.39?VAR AREC: RECORD NUM:INT; FLG:BOOL; END;
14.30.13?VAR RAY: ARRAY[1..3] OF REAL;
14.30.40?
          TYPE PERSONS=REAL;
14.30.59?
          AREC.NUM=22;
14.31.18?J=11;
14.31.32?       RAY[2]=125.35;
14.31.55?
          SHOW ID X,B,J,RAY,AREC,PERSONS
VARIABLE
'X          ': REAL;
VARIABLE
'B          ': BOOL;
VARIABLE
'J          ': INT;
VARIABLE
'RAY        ': ARRAY [1..3] OF REAL;
VARIABLE
'AREC       ': RECORD
                  NUM: INT;
                  FLG: BOOL;
               END;
TYPE
'PERSONS    ': REAL;
```

SHOW SETS [:KEEP]

The SHOW SETS statement displays all items the user may SET. Most SET statements may be reversed by a corresponding CLEAR statement. The KEEP option stores the command output on the SHOWN file.

EXAMPLE:

```
  10.26.47?SHOW SETS
 INDEX      NAME        TAG          TRACE     →TRAP       →TRAPS
*VERSION
```

*Not available at present
→Not available to user

SHOW CLEARS [:KEEP]

The SHOW CLEARS statement is used to determine which items can be cleared. CLEAR is used to reverse the effect of a SET command. The KEEP option stores the command output on the SHOWN file.

EXAMPLE:

```
  10.27.04?SHOW CLEARS
 INDEX       INDEXES     NAME        RUN         TAG         TRACE
→TRAP       →TRAPS      *VERSION
```

*Not available at present
→Not available to user

[frame-id/] SHOW NAME

The SHOW NAME displays the current name of the ACTIVE or specified frame. The user also has the option of displaying the library names of frames which are not ACTIVE by preceding the command with the frame name and a slash.

EXAMPLE:

```
 10.27.24?SHOW NAME
....  IS NAME OF WORK                                    - The library page associated
 10.27.37?                                                with the ACTIVE frame has not
          SET NAME IALIB.SHELF.BOOK.CHAPTER.PAGE          yet been named.
IALIB.SHELF.BOOK.CHAPTER.PAGE  IS THE NAME OF WORK       - Set name of the page
 10.28.40?                                                associated with the
          SHOW NAME                                       ACTIVE frame.
IALIB.SHELF.BOOK.CHAPTER.PAGE  IS NAME OF WORK           - Show the library page
 10.29.02?                                                associated with the
          FRAME W1,W2:STRING                              ACTIVE frame.
 10.30.21?
          W1/USE ALIB.NEWVER.CKCASES.TEST.PROGRAM
ALIB.NEWVER.CKCASES.TEST.PROGRAM USED AS W1
 10.30.45?
          W1/SHOW NAME
ALIB.NEWVER.CKCASES.TEST.PROGRAM  IS NAME OF W1
 10.31.20?
          W2/SHOW NAME
....  IS NAME OF W2
```

Interrogation Statements

SHOW PAGES {[library].[shelf].[book].[chapter].[page]} [:KEEP]

The SHOW PAGES statement is used to display the structure of a complete library or a portion of a library. To display a complete library the user need only type the top level of the library name followed by 4 dots separated by blanks (SHOW PAGES ALIB . . . .). All pages for all levels of the library will be displayed. If the library name is not included in the statement (SHOW PAGES . . . .), it will use the library name of the ACTIVE frame. Also, for the users convenience, this command may be shortened by not typing the last 3 dots (SHOW PAGES .). This is the only level at which an assumption is made. If other level names are not included in the statement, then the library is searched for the specific combination of these levels which are specified and all combinations are listed. The SHOW PAGES may also be used to search for certain page names. For example, to find all page names in a specific chapter, the user would type the following: SHOW PAGES LIB.SHL.BK.CHAPTER. . To find all pages named SAM on a particular shelf, the user would type: SHOW PAGES .SHL. . .SAM. All books and chapters on that shelf would be searched for pages named SAM. The name specified in SHOW PAGES can thus be used to define an area of search for all pages or for specifically named pages within a desired region. The KEEP option will store the command output in the SHOWN file.

Note that this command (SHOW PAGES) does not in any way affect the name of any frame. This command only displays the names of pages of a library that have previously been saved.

EXAMPLE:

```
 08.57.34?set name alib.newver.ckcases.test.program
ALIB.NEWVER.CKCASES.TEST.PROGRAM  IS THE NAME OF WORK
```

- Set library page name associated with ACTIVE frame

```
 08.58.37?show pages .
ALIB    .NEWVER .CKCASES.TEST    .SHOWS
        .       .       .EXPL    .EXEC
        .       .       .EXEC    .SHOWS
        .       .       .TERM    .SETUP
        .       .EDITOR .TEST    .PROGRAM
        .       .       .EXPL    .DELETE
        .       .       .        .INSERT
        .       .       .        .LIST
```

- Display the entire library. (uses library name of ACTIVE frame.)

```
 08.59.52?show pages suitlib. . . .
SUITLIB.SHELF   .BOOK    .SUIT    .NAMLIST
        .       .        .        .EXEC
        .       .        .        .NAMBASH
        .       .        .        .ONEPLIN
        .       .        .NAMELST.PROGRAM
        .CG     .BOOK    .CHANGE  .NAMELST
        .       .        .        .NOPAREN
        .       .        .        .PAREN
```

- Display the entire library. (specifying the library name.)

SHOW PAGES continued

```
 14.18.32?SHOW PAGES ALIB.GRANT. . .
ALIB    .GRANT   .BOOK    .CHOP    .PG2
        .        .        .        .PGALL
        .        .        .        .CCA
        .        .        .        .PG1
 14.18.54?SHOW PAGES SOURCE
ALIB    .MUST    .ISIS    .EDITOR  .SOURCE
        .        .        .DATBASE.SOURCE
        .MISC    .NEWPOOP.DATBASE.SOURCE
 14.19.39?SHOW PAGES ALIB.MUST.ISIS.DATBASE.
ALIB    .MUST    .ISIS    .DATBASE.USERDOC
        .        .        .        .SPECS
        .        .        .        .SOURCE
        .        .        .        .CMDLST
 14.21.18?SHOW PAGES . .ISIS. .SPECS
ALIB    .MUST    .ISIS    .EDITOR  .SPECS
        .        .        .DATBASE.SPECS
```

- Show all pages contained in ALIB on the GRANT shelf

- Show where the SOURCE pages are located

- Show all pages in the DATBASE chapter

- Show all chapters containing SPECS residing in the ISIS book

Interrogation Statements

SHOW OPTIONS [:KEEP]

The SHOW OPTIONS statement is used to determine the print options which are available for some editor commands. These options allow the user to modify the printed output resulting from the editor statements. The KEEP option will store the command output in the SHOWN file. Most options are discussed on page . (CHANGE statement)

EXAMPLE:

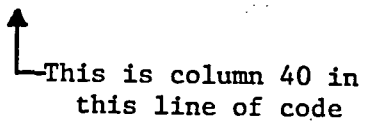
```
 10.39.09?SHOW OPTIONS
ECHO        NI          NK          NL          M           T
V
```

SHOW COLUMNS [:KEEP]

The SHOW COLUMNS statement is used to show position of code in a line. A line of 59 characters is printed. This line is formed by repeating the character sequence "123456789." The KEEP option will store the command output in the SHOWN file.

EXAMPLE:

```
10.39.31?SHOW COLUMNS
          123456789.123456789.123456789.123456789.123456789.123456789
10.42.52?LIST 1.
  1.     =ISISC,T200,CM60000.                          RM1150      GRANTHAM-ISIS
```



SHOW RUN [:KEEP]

The SHOW RUN statement determines the number of lines of code in the INPUT file and then prints the number. The KEEP option will store the command output on the SHOWN file.

EXAMPLE:

```
13.39.49? LIST
   4.     =ISISTST,T200,CM160000.
   6.     =USER,961300N.                              RM1150     GRANTHAM
   8.     =CHARGE,101481,LRC.
  10.     =GET,HALGO.
  12.     =GET,LST5=ATOM912.
  14.     =PACK,LST5.
  16.     =COPYBF,INPUT,INFIL.
  18.     =REWIND,INFIL.
  20.     =RFL,160000.
  22.     =REDUCE,-.
  24.     =NOEXIT.
  26.     =HALGO.
  28.     =)
  30.     =    GOPROC%PROGRAM;
  32.     =    DECLARE R ARRAY(10) INTEGER;
  34.     =    DECLARE S ARRAY(10) INTEGER;
  36.     =    DECLARE T ARRAY(10) INTEGER;
  40.     =    DECLARE U ARRAY(5,5) INTEGER;
  42.     =    DECLARE INTEGER,A,B,C,D;
  44.     =    A=20;  B=18;  C=16;
  46.     =    R$(5)=10;
  48.     =    R$(7)=12;
  50.     =    U$(3,4)=15;
  52.     =    D=(A+B)+C;
  54.     =    D=A+(B+C);
  56.     =    A=R$(5);
  57.     =  CLOSE GOPROC;
  60.     =)
  62.     =
 13.40.13?CLEAR RUN
RUN CLEARED.
 13.41.09?RUN 4/24
11 ITEMS IN SPECIFIED RANGE.
 13.41.36?RUN 28/60
16 ITEMS IN SPECIFIED RANGE.
 13.41.54?SHOW RUN
27 LINES IN RUN.
```

- LaRC/Control card file for compiling and executing a typical HAL/S program.
- EOR separator
- Typical HAL/S application program text
- EOR separator
- Clear INPUT file
- Put lines 4 through 24 on the RUN file.
- Add lines 28 through 60 to RUN file
- Display the total number of lines in the RUN file

Appendix A

Showing Equivalence Between Statement Verbs and Interrogation Statement

Programming Statements	Page No.	Interrogation Statements	Page No.
Declarative Statements			
ABBREV abbreviation(s): statement-verb	18	SHOW ABBREVS	96
TYPE type-id(s): type specification	19	SHOW TYPES	97
VAR var-id(s): type-id	20	SHOW VARS	98
ERASE {abbrev-id(s)|type-id(s)|var-id(s)}	21	SHOW ID	99
Action Statements			
EXITIF condition	23		
IF condition THEN {statement(s) [ELSE statement]|[EXITIF condition]} END	24		
FOR var-id = initial value TO|DOWNTO final-value DO {statement(s)|[EXITIF condition]} END	25	⟨SHOW SHOWS SHOW RESERVED SHOW STATEMENTS SHOW AVAIL⟩	92 93 94 95
LOOP [statement(s)] EXITIF condition [statement(s)] END	26		
WHILE condition DO {statement(s)|[EXITIF condition]} END	27		
REPEAT {statement(s)|[EXITIF condition]} UNTIL condition	28		
[frame-id/]FOREACH string-var DO {statement(s)|[EXITIF condition]} END	29		
XEQ string-expression	30		
SET TAG tag-id	31		
CLEAR TAG	31		
SET TRACE var-id(s)	33	SHOW SETS	100
CLEAR TRACE var-id(s)	33	SHOW CLEARS	101
ASK response, prompt	34		
PRINT, PRINTLN exp [:Format1[:Format2]]	36		
CLEAR RUN	38		
Library Statements			
[frame-id/]SET NAME [library].[shelf].[book].[chapter].[page]	42	SHOW NAME	102
[frame-id/]USE [library].[shelf].[book].[chapter].[page]	43	⟨SHOW PAGES⟩	103
[frame-id/]SAVE [*]	44		
[frame-id/]PURGE [library].[shelf].[book].[chapter].[page]	45		
[frame-id/]VOID	46		
STORE [library].[shelf].[book].[chapter].[page]	47		
RESTORE [library].[shelf].[book].[chapter].[page]	48		
Text Editing Statements			
FRAME frame-id(s) : STRING	56		
ACTIVE frame-id	57		
ERASE frame-id(s)	58		
[frame-id/]LIST [range] [:{NI|NK}], [V], [T]]	59		
[frame-id/]INSERT range	61		
[frame-id/]READ string-var {Δ|,} &n	63		
[frame-id/]WRITE string-id {Δ|,} &n	65		
[frame-id/]DELETE range [:[{NL|NI|NK}], [V]]	67		
[frame-id/]REPLACE range [:NL]	69		
[frame-id/]CHANGE string-id TO string-id IN range [:[{NL|NI|NK}], [E], [V], [M]]	71		
[frame-id/]ADD string-id [AT column] IN range [:[{NL|NI|NK}], [E], [V]]	74	⟨SHOW OPTIONS SHOW COLUMNS⟩	105 106
[frame-id/]MODIFY range [:S]	76		
[frame-id/]COPY range TO &n[//inc]	78		
[frame-id/]MOVE range TO &n[//inc]	80		
[frame-id/]REKEY range TO &n[//inc]	82		
[frame-id/]COUNT [range]	83		
[frame-id/]EXEC [range] [:E]	84		
Tool Invocation			
[frame-id/]RUN [range] [:[E], [NK]]	87	SHOW RUN	107
SEND	89		
STOP:SEND	90		

NOTE: ⟨⟩ - no corresponding statement

APPENDIX B

Alphabetical Listing of Statement Verbs

APPENDIX C

Local Files Used by ISIS

INPUT*	- A system file
ISIS	- Binary of ISIS
RFILE	- RUN file created by the ISIS RUN command
SFILE	- Used internally by SHOW and EXEC commands
INPUT	- Terminal input file
OUTPUT	- Terminal output file
WORK	- ISIS WORK frame
SHOWN	- ISIS SHOWN frame
WORK1-WORK10	- ISIS user defined frames

RFILE is the only file in NOS format that can be looked at outside of ISIS.

APPENDIX D

IPL Error Messages

```
'[' EXPECTED
']' EXPECTED
':' EXPECTED
';' EXPECTED
'(' EXPECTED
')' EXPECTED
',' EXPECTED
'.' EXPECTED
'/' EXPECTED
':=' EXPECTED
'=' OR ':' EXPECTED.
'PROC' EXPECTED
'THEN' EXPECTED
'END' EXPECTED
'UNTIL' EXPECTED
'DO' EXPECTED
'OF' EXPECTED
'IN' EXPECTED
'ON' EXPECTED
'ON' OR IDENTIFIER EXPECTED.
'TO' EXPECTED
'TO/DOWNTO' EXPECTED
IDENTIFIER EXPECTED
'.' OR IDENTIFIER EXPECTED.
VARIABLE EXPECTED
PROCEDURE ID EXPECTED
FRAME ID EXPECTED
SCALAR EXPECTED
INTEGER EXPECTED
STRING EXPECTED
STRING VARIABLE EXPECTED
BOOLEAN EXPECTED
KEY EXPECTED
KEY INCREMENT EXPECTED
FIELD ID EXPECTED
OPERATOR EXPECTED
RANGE EXPECTED
KEY RANGE EXPECTED

UNDECLARED IDENTIFIER
IDENTIFIER ALREADY IN USE

PARSE STACK OVERFLOW
LOCATION COUNTER STACK OVERFLOW
CONSTANT TABLE OVERFLOW
ID TABLE OVERFLOW
JUMP TABLE OVERFLOW
PROC/FUNC TABLE OVERFLOW
TYPE TABLE OVERFLOW
FRAME TABLE OVERFLOW
STRING BUFFER OVERFLOW
```

APPENDIX D (cont'd)

```
TEMPORARY STRING BUFFER OVERFLOW

MAY NOT BE ERASED
NOT ENOUGH ROOM FOR TYPE
PAGE DOES NOT CONTAIN CODE
UNDECLARED RECORD FIELD
UNDECLARED ARRAY FIELD
MISMATCHED OPERATOR
CORE TOO SMALL
ERROR IN TYPE
LOW BOUND EXCEEDS HIGH BOUND
KEYS IN BAD ORDER
BAD KEY
LIMIT COUNT REQUIRED
ERROR IN SUBROUTINE PARAMETER
ERROR IN FACTOR
BAD BLOCK NUMBER
INCOMPATIBLE TYPES
NOT A SYSTEM VARIABLE
VERSION NUMBER MUST BE INTEGER
READ-ONLY VARIABLE
XEQ STRING NOT COMPLETE COMMAND
BAD INCREMENT VALUE
MISSING OR BAD NAME
MISSING STATEMENT VERB
UNIMPLMENTED STATEMENT
MISSING CLOSING QUOTE FOR STRING
TOO MANY DIGITS IN INTEGER
EXPONENT OUT-OF-RANGE
UNRECOGNIZED STATEMENT
USE 'SHOW TRAPS'
USE 'SHOW SETS'
USE 'SHOW CLEARS'
USE 'SHOW SHOWS'
ONLY ONE KEY RANGE ALLOWED HERE
IMPROPER USE OF RESERVED WORD
MUST PRINT AT LEAST ONE EXPRESSION
TOO MANY DOTS IN NAME
TOO MANY CHARACTERS IN NAME
USE 'SHOW OPTIONS'
OPTION MUST FOLLOW ':'
'LIST:NL' IS NONSENSICAL
'NL' IMPROPER WITH VETO.
INAPPROPRIATE USE OF USING
INAPPROPRIATE DATASET
'ON' AND 'OVER' NOT ALLOWED AS INDEXES
STATEMENT CANNOT BEGIN WITH OPERATOR
UNRECOGNIZED ASK EXPRESSION
ASK EXPRESSION OF INCOMPATIBLE TYPE
INCORRECT SYNTAX FOR COPY/MOVE
```

References

1. Jensen, Kathleen; and Wirth, Kiklaus: PASCAL User Manual and Report. 2nd edition, Sprunger-Verlag, New York, NY, 1976.

INDEX

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA TM-80144		

4. Title and Subtitle	5. Report Date
ISIS Users Manual	March 1980
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Carolyn Grantham	

9. Performing Organization Name and Address	10. Work Unit No.
NASA Langley Research Center Hampton, VA 23665	520-72-03-02
	11. Contract or Grant No.

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
National Aeronautics and Space Administration Washington, DC 20546	Technical Memorandum
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The Interactive Software Invocation System (ISIS) is an interactive data management system. ISIS is being developed to provide the user with a powerful system for developing software in an interactive environment. ISIS will protect the user from the idiosyncracies of the host computer system by providing a complete range of capabilities including desk top calculator, data and text editor, file manager, and tool invoker. The user should have no need for direct access to the host computing system. This documentation covers the operational concepts and syntax of the Interactive Programming Language, IPL, for ISIS.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Software development Interactive software Text Editor File management	Unclassified - Unlimited Subject Category 61

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	116	$6.50

* For sale by the National Technical Information Service, Springfield, Virginia 22161