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(NASA-IM-X-69505) GROUND OPERATIONS AEROSPACE LANGUAGE (GOAL): SYNTAX DIAGRAMS HANDBOOK (NASA) 55 p HC $4.75 CSCL 09B

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GROUND OPERATIONS

AEROSPACE LANGUAGE (GOAL)

SYNTAX DIAGRAMS HANDBOOK

GROUND OPERATIONS AEROSPACE LANGUAGE (GOAL)

SYNTAX DIAGRAMS HANDBOOK

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PREFACE

GROUND OPERATIONS AEROSPACE LANGUAGE (GOAL)

GOAL SYNTAX DIAGRAMS HANDBOOK

This handbook contains an alphabetical arrangement of syntax diagrams used in the Ground Operations Aerospace Language (GOAL). Descriptive writeups for the syntax diagrams are not included in this handbook; they are included in the GOAL Textbook. For background information about GOAL, refer to the GOAL Overview Document which relates the historical development of GOAL and provides a summary of features and capabilities of the language.

INDEX OF SYNTAX DIAGRAMS

FEEDBACK LETTERS VERSUS DIAGRAM CHART

LETTER	PROPOSED VALUE	DIAGRAM NAME
A		Declare Data Statement
B		Declare Data Statement
C		Record Data Statement Request Data Statement
D		Activate Table Statement Inhibit Table Statement
E		Apply Analog Statement Issue Digital Pattern Statement Set Discrete Statement
F		Leave Statement Perform Subroutine Statement
G		Release Concurrent Statement
H		Stop Statement
I		Disable Interrupt Statement
J		Begin Macro Statement Expand Macro Statement
K		Begin Subroutine Statement
L		Free Data Bank Statement Use Data Bank Statement
M		Specify Statement
N		Specify Statement
P		Character String
R		Function Designator
S		External Designator
T		Name
W		Macro Label
Y		Revision Label

FEEDBACK LETTERS VERSUS DIAGRAM CHART (CONTINUED)

LETTER	PROPOSED VALUE	DIAGRAM NAME
AB		Step Number
AC		Numeric Formula
AD		Integer Number
AE		Binary Number
AF		Octal Number
AG		Hexadecimal Number

DIMENSION TABLE Engineering units available for use in GOAL are listed in the following matrix.

FUNCTION TYPE	BASIC UNIT	$X10^0$	$X10^3$	$X10^6$	$X10^{-3}$	$X10^{-6}$
volts ac/dc	volt	V			MV	UV
current ac/dc	ampere	A			MA	UA
frequency	hertz	HZ	KHZ	MHZ		
	pulses per second	PPS	KPPS			
time	day	DAY				
	hour	HR				
	minute	MIN				
	second	SEC			MSEC	USEC
resistance	ohm	OHM	KOHM	MOHM		
inductance	henry	H			MH	UH
capacitance	farad	FD				UFD
power	watt	W	KW		MW	UW
	voltage, current or power	DB				
ratio	percent	PCT				
pressure	pounds per square inch	PSIG PSIA PSI				
	millimeters of mercury	MMHG				
	inches of mercury	INHG				
	millibars	MB				
distance	inch	IN				
	foot	FT				
	meter	M	KM		MM	
	nautical mile	NM				
velocity	feet per second	FT/SEC				
	meters per second	M/SEC				
	knot	KT				
	mach no.	MACH				
angle	degree	DEG				
	arcmin	ARCMIN				
	arcsec	ARCSEC				
	radian	RAD			MRAD	
	revolution	REV				
temperature	degrees centigrade	DEGC				
	degrees fahrenheit	DEGF				

CAUTION - The writer must take necessary precautions to insure the consistent use of compatible dimensions.

Other allowable dimensions are:

KILOVOLTS (AC or DC)	KV
DECIBELS above one milliwatt	DBM
DECIBELS above one watt	DBW
KILOVOLT AMPERES	KVA
VOLT AMPERES REACTIVE	VAR
KILOVOLT AMPERES REACTIVE	KVAR
PICOFARADS	PFD
MASS (grams)	G
ACCELERATION	M/SEC/SEC FT/SEC/SEC

If the full name of the basic unit DIMENSION is used, then either plural or singular will be allowed.

EXPLANATION OF GOAL SYNTAX DIAGRAMS

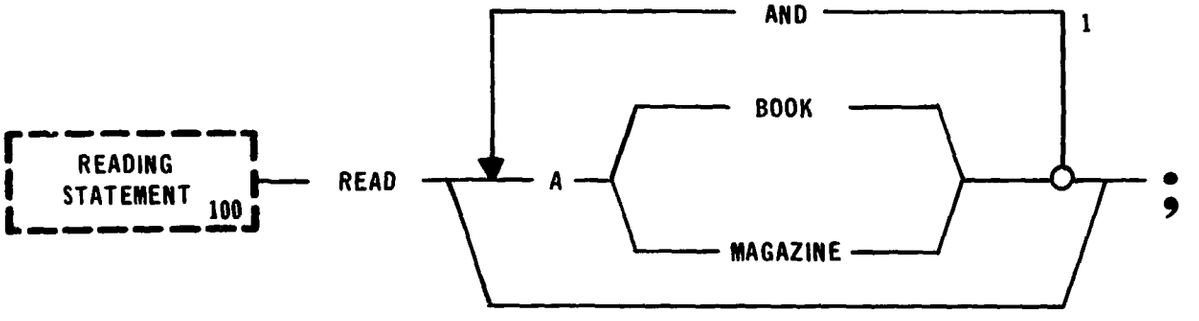
To illustrate the allowable variations of each GOAL statement, a presentation method using syntax diagrams was selected.

Syntax diagrams identify legal sequences of items in a GOAL statement, including alternate branches, optional entries, and feedback loops.

Some basic rules for using syntax diagrams are:

- Syntax diagrams are read from left to right except for feedback loops.
- ——— is a connecting path and indicates that the insertion of blanks and/or comments is allowed.
- Capital letters must be used as shown.
- Diagonal lines are alternate forward paths.
- A bubble indicates the start of a return (feedback) path.
- A numeral at the beginning of a return path indicates the maximum number of times a path may be taken.
- A letter at the beginning of a return path indicates the number will be assigned after a system is selected.
- Syntax notes provide semantical explanation.
- GOAL statements are terminated by a semi-colon.
- A syntax diagram reference number is placed in each syntax unit.

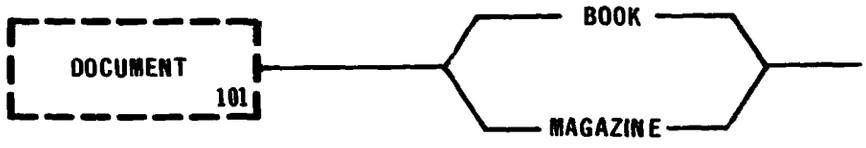
The following is an example of a syntax diagram illustrating a "READING STATEMENT."



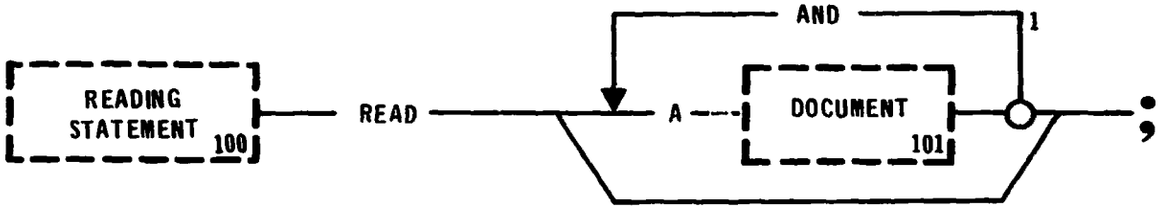
This allows any of the following sentences to be written:

```
READ;
READ A BOOK;
READ A BOOK AND A MAGAZINE;
READ A MAGAZINE AND A BOOK;
READ A BOOK AND A BOOK;
READ A MAGAZINE AND A MAGAZINE;
```

If the use of "BOOK" and "MAGAZINE" appeared the same way in several diagrams and represented a logical grouping, then a new syntax unit could be created.



The above diagram would then become:



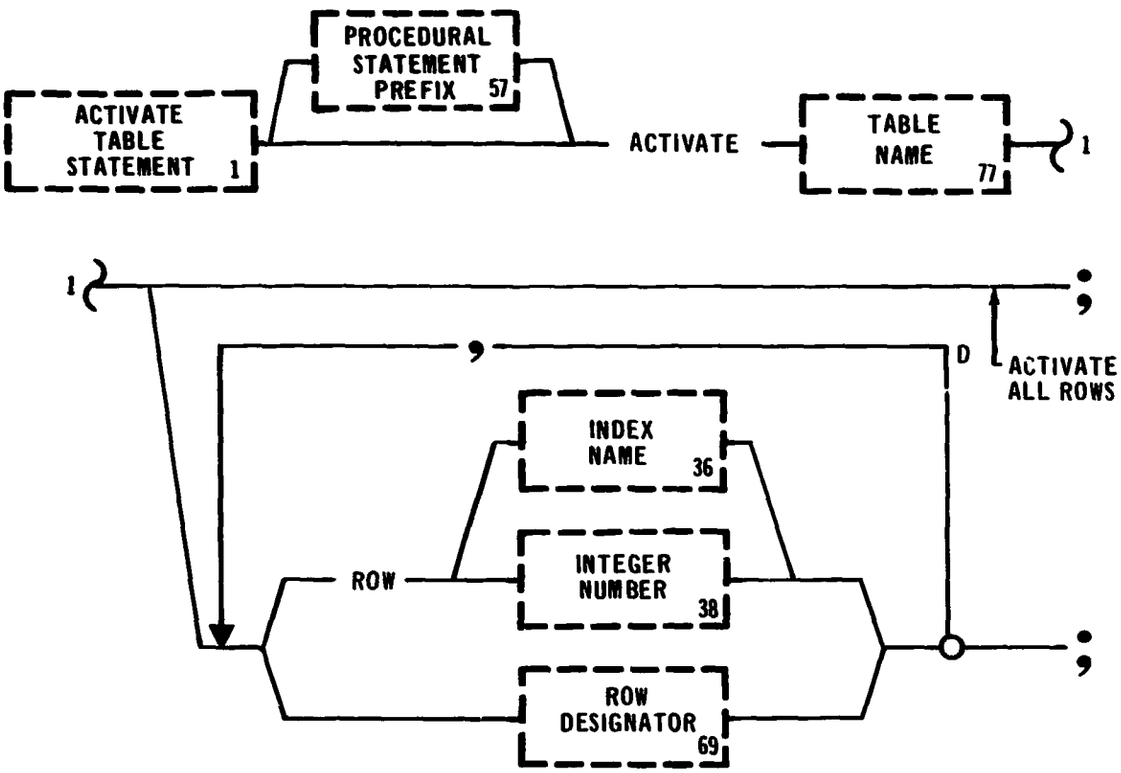
The dashed box represents a syntax unit. The syntax unit on the left is being defined in terms of "characters" and other syntax units.

To facilitate the location of any syntax diagram in this handbook, an INDEX OF SYNTAX DIAGRAMS on page"iii" lists the initial words of the diagram name, the number of the diagram, and the page where it is located. A FEEDBACK LETTERS VERSUS DIAGRAM CHART on pages "iv" and "v" list the letter annotations on diagram feedbacks and the appropriate definition of each letter. Page "vi" is a table of dimensions allowed when referenced by a syntax diagram.

By convention, when writing GOAL Statements, the letter "Ø" should be slashed and the numeral "0" should not be slashed. This convention is not shown in the Syntax Diagrams.

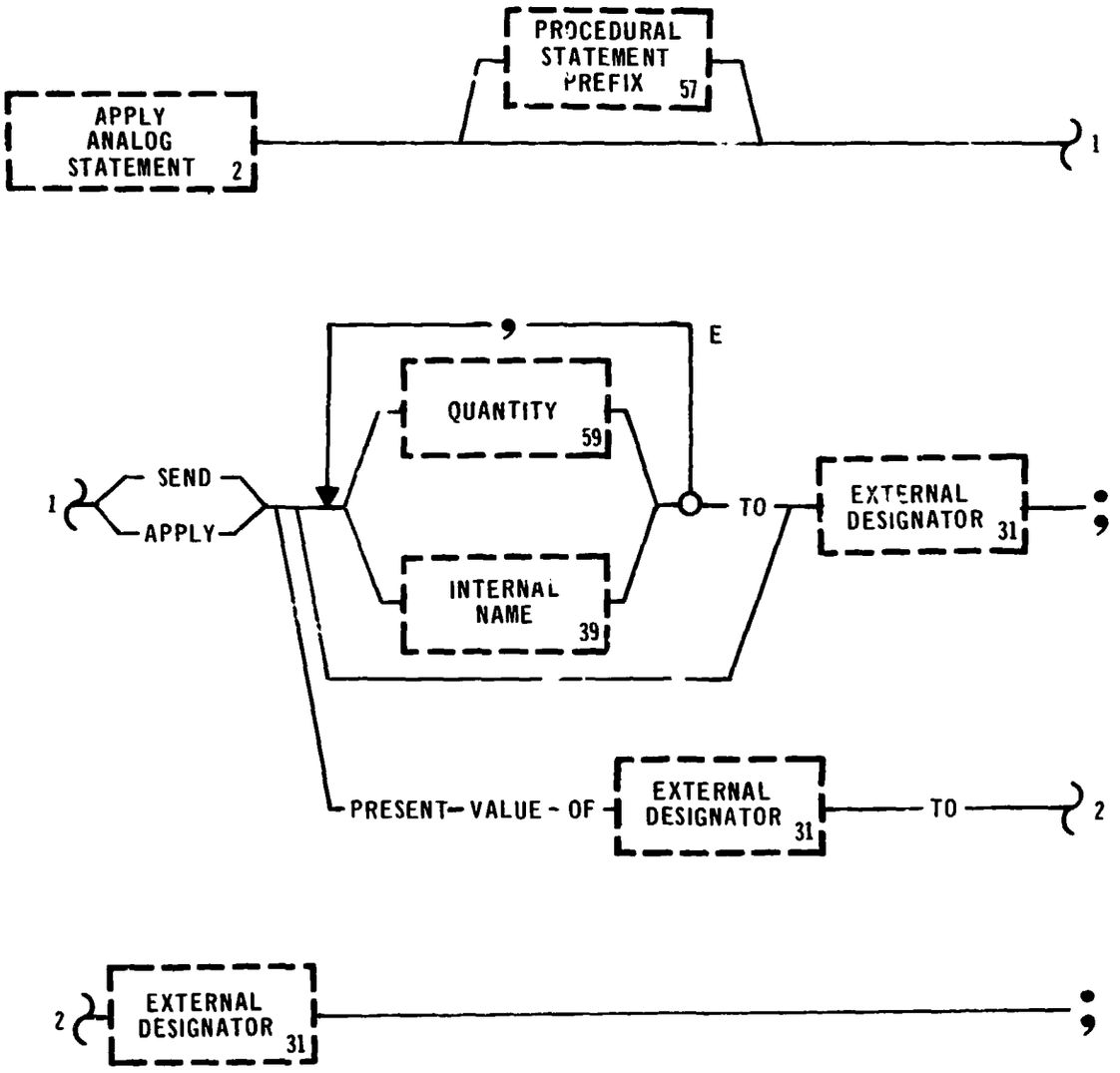
1
REV 0

ACTIVATE TABLE STATEMENT



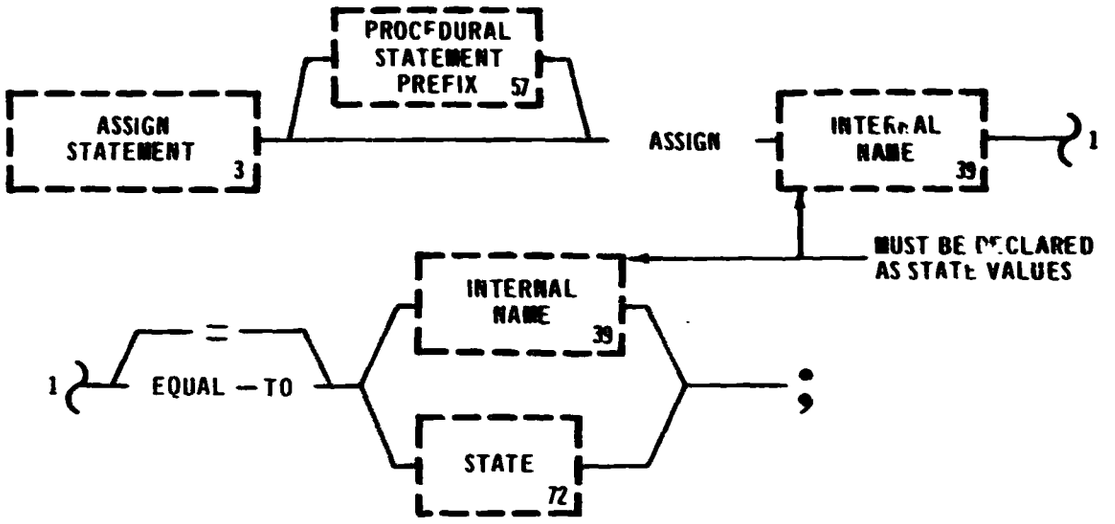
2 REV 0

APPLY ANALOG STATEMENT



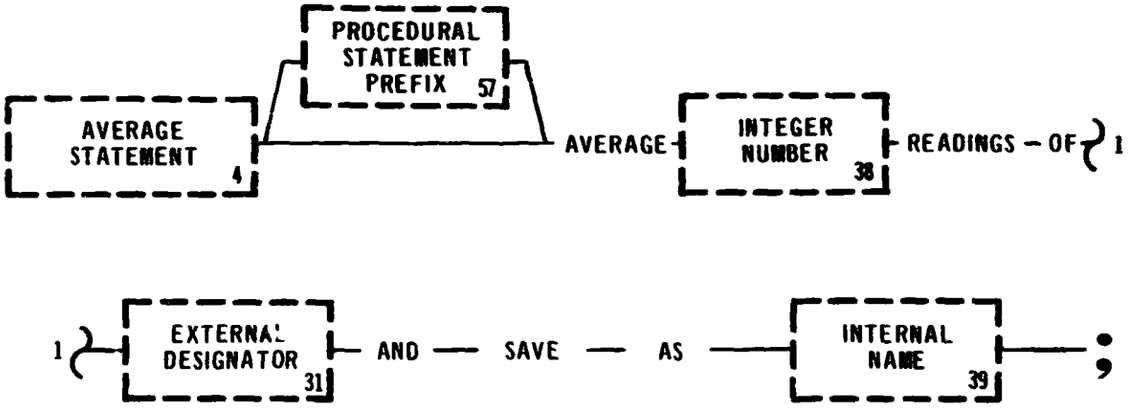
3 REV 0

ASSIGN STATEMENT



4 REV 0

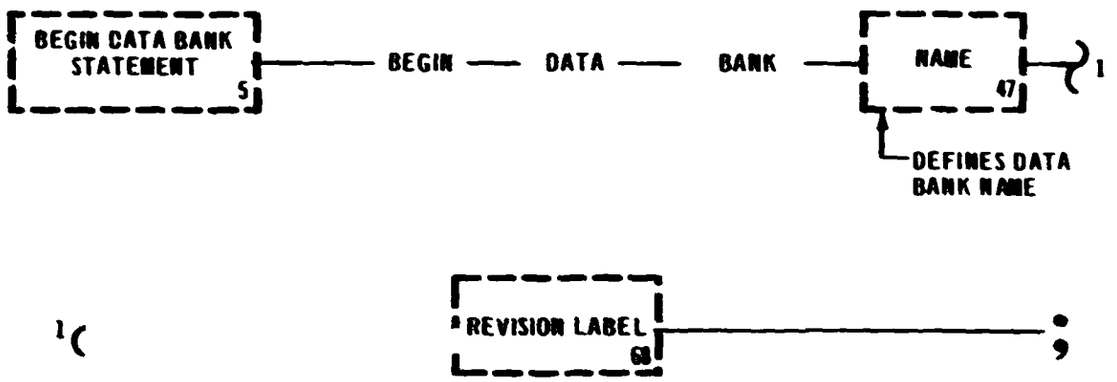
AVERAGE STATEMENT



BEGIN DATA BANK

5 REV 0

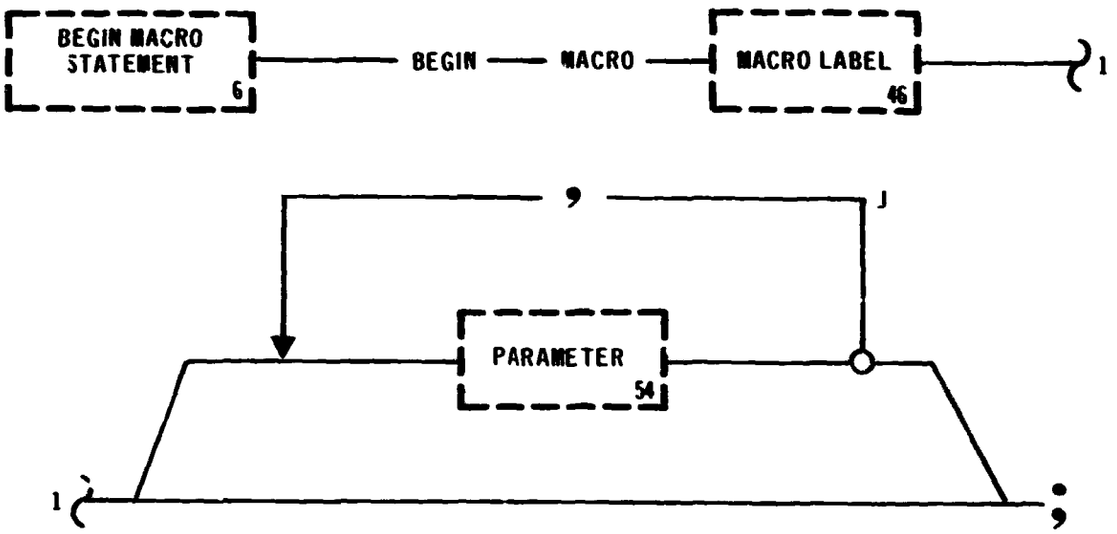
BEGIN DATA BANK STATEMENT



BEGIN MACRO

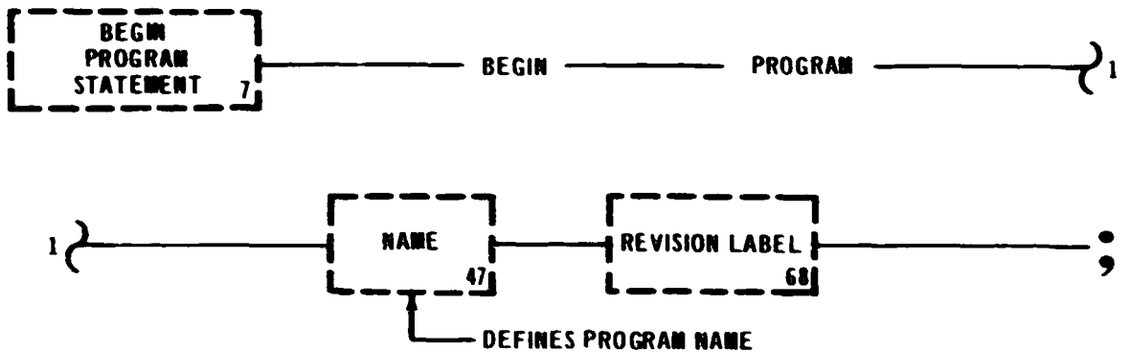
6 REV 0

BEGIN MACRO STATEMENT



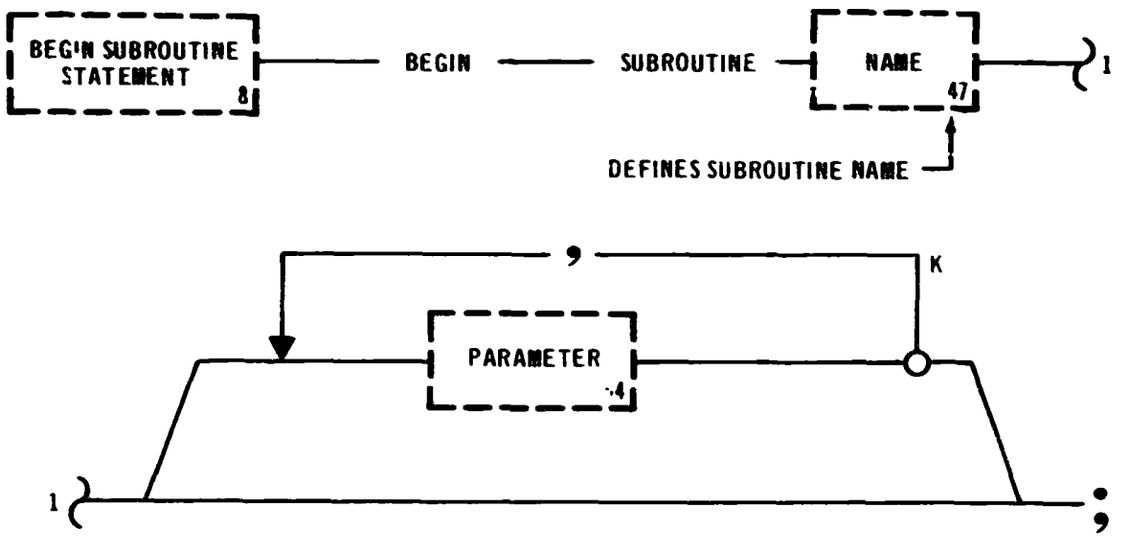
BEGIN PROGRAM

7 REV 0 BEGIN PROGRAM STATEMENT

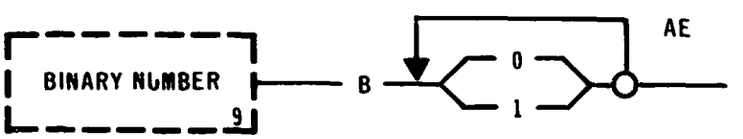


BEGIN SUBROUTINE

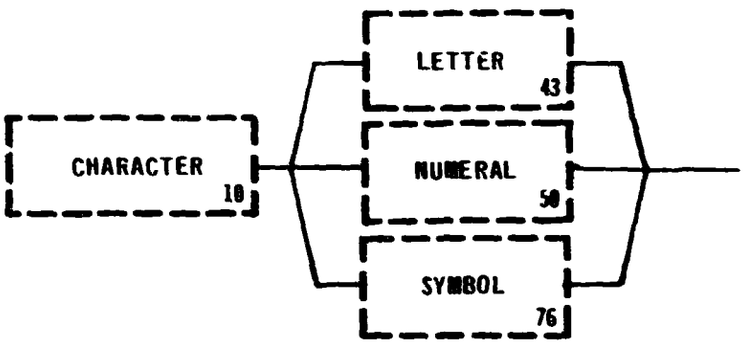
8 REV 0 BEGIN SUBROUTINE STATEMENT



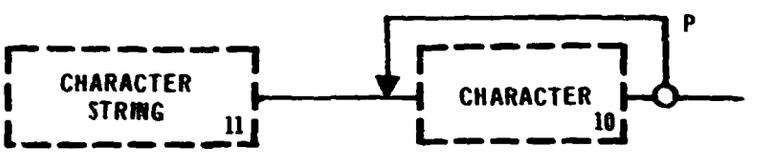
9 REV 0 BINARY NUMBER



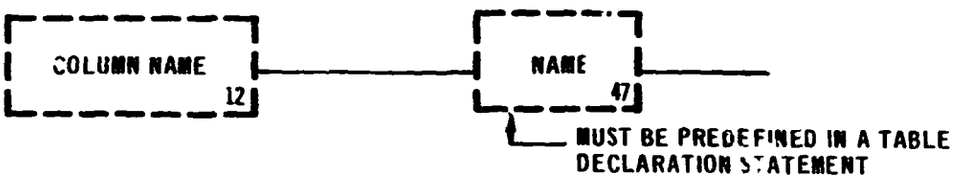
10 REV 0 CHARACTER



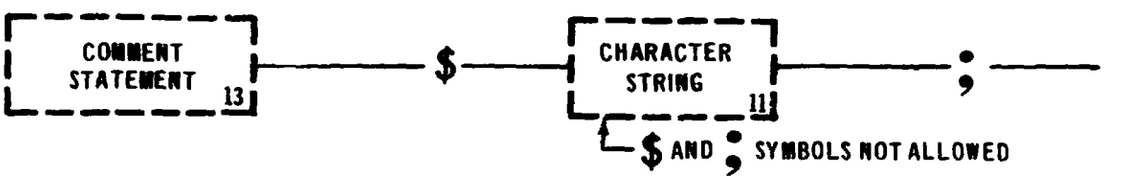
11 REV 0 CHARACTER STRING



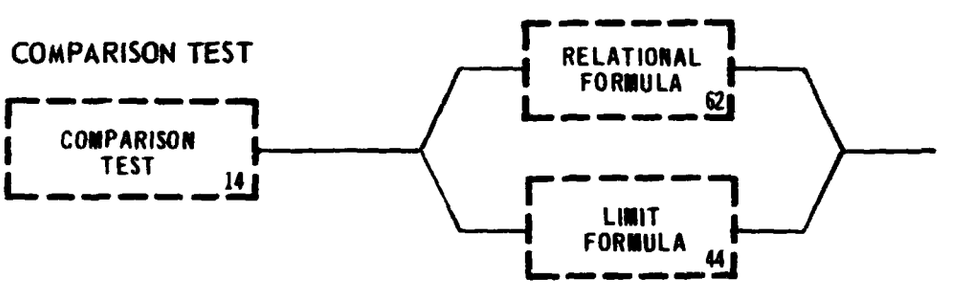
12 REV 0 COLUMN NAME



13 REV 1 COMMENT-STATEMENT

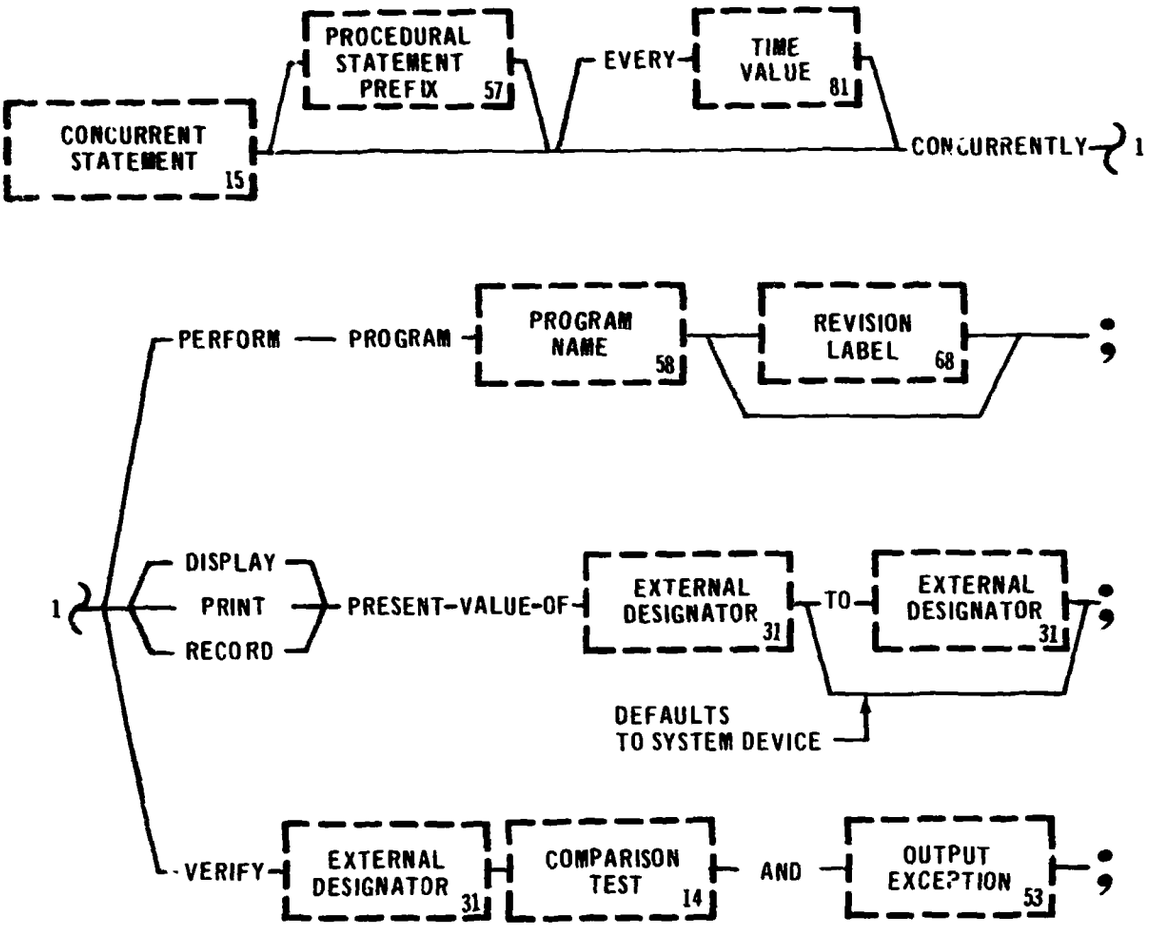


14 REV 0 COMPARISON TEST



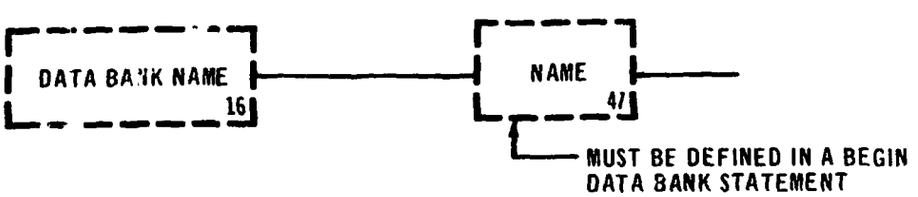
15 REV 1

CONCURRENT STATEMENT



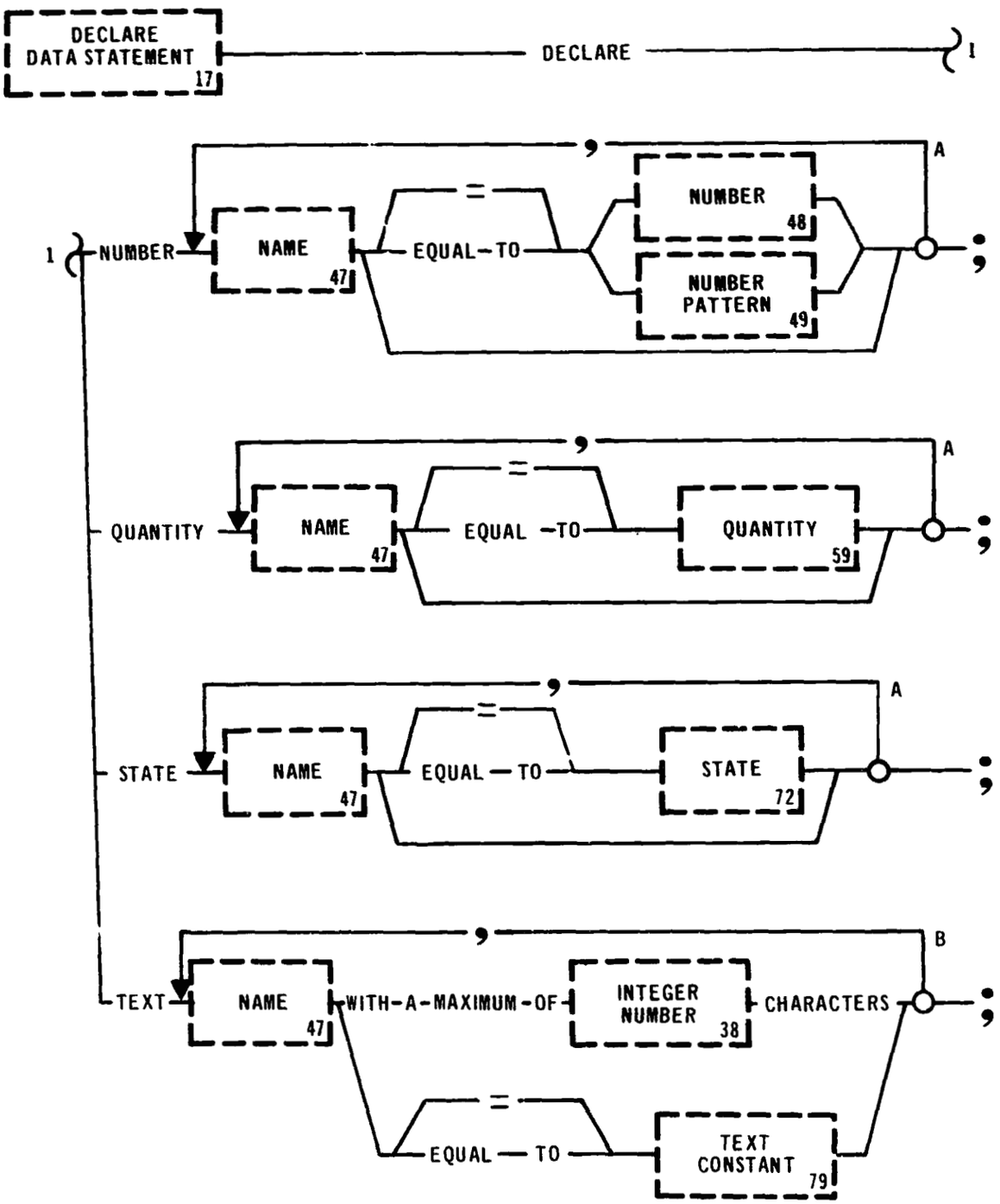
16 REV 0

DATA BANK NAME



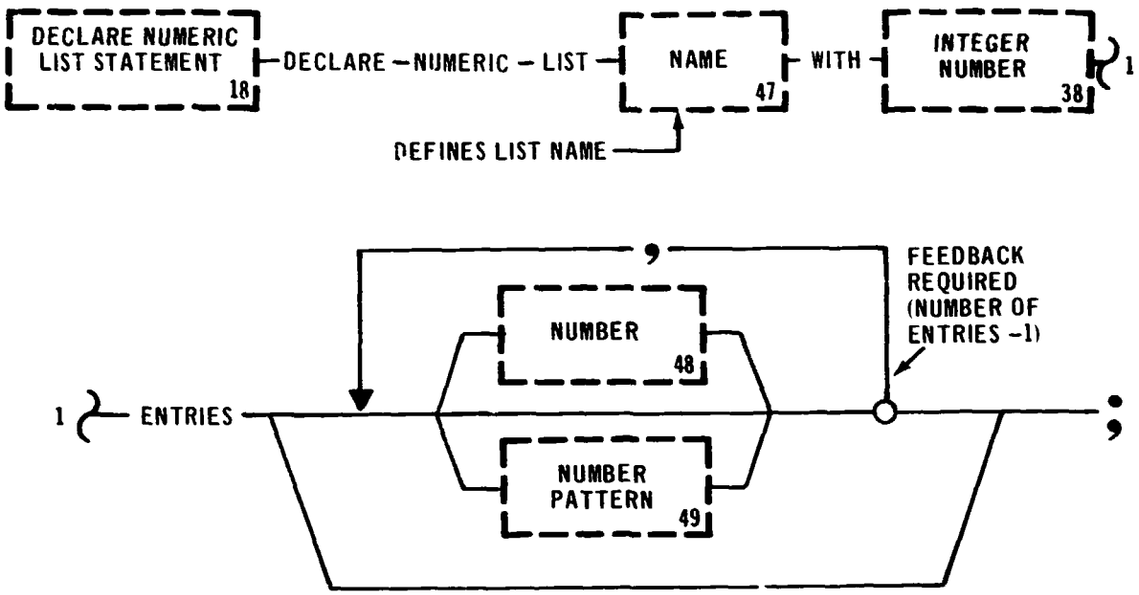
17
REV 0

DECLARE DATA STATEMENT



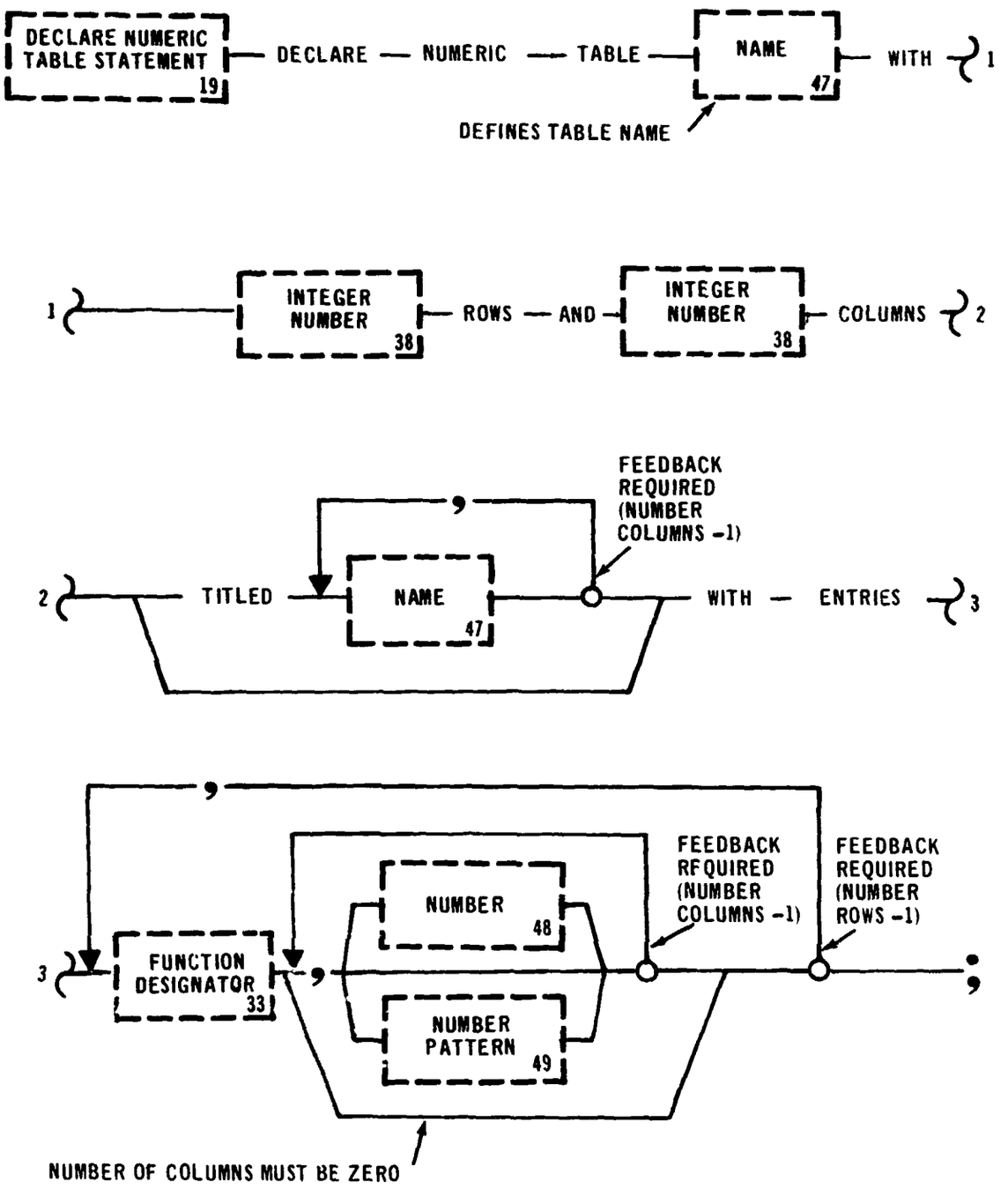
18 REV 0

DECLARE NUMERIC LIST STATEMENT



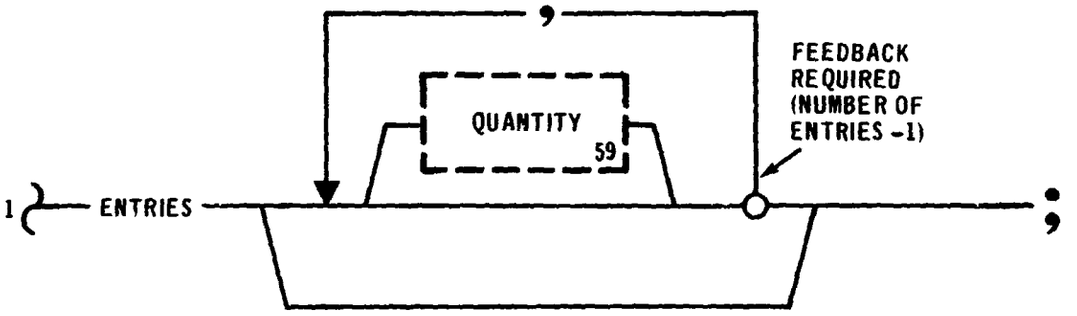
DECLARE NUMERIC TABLE STATEMENT

DECLARE NUMERIC TABLE



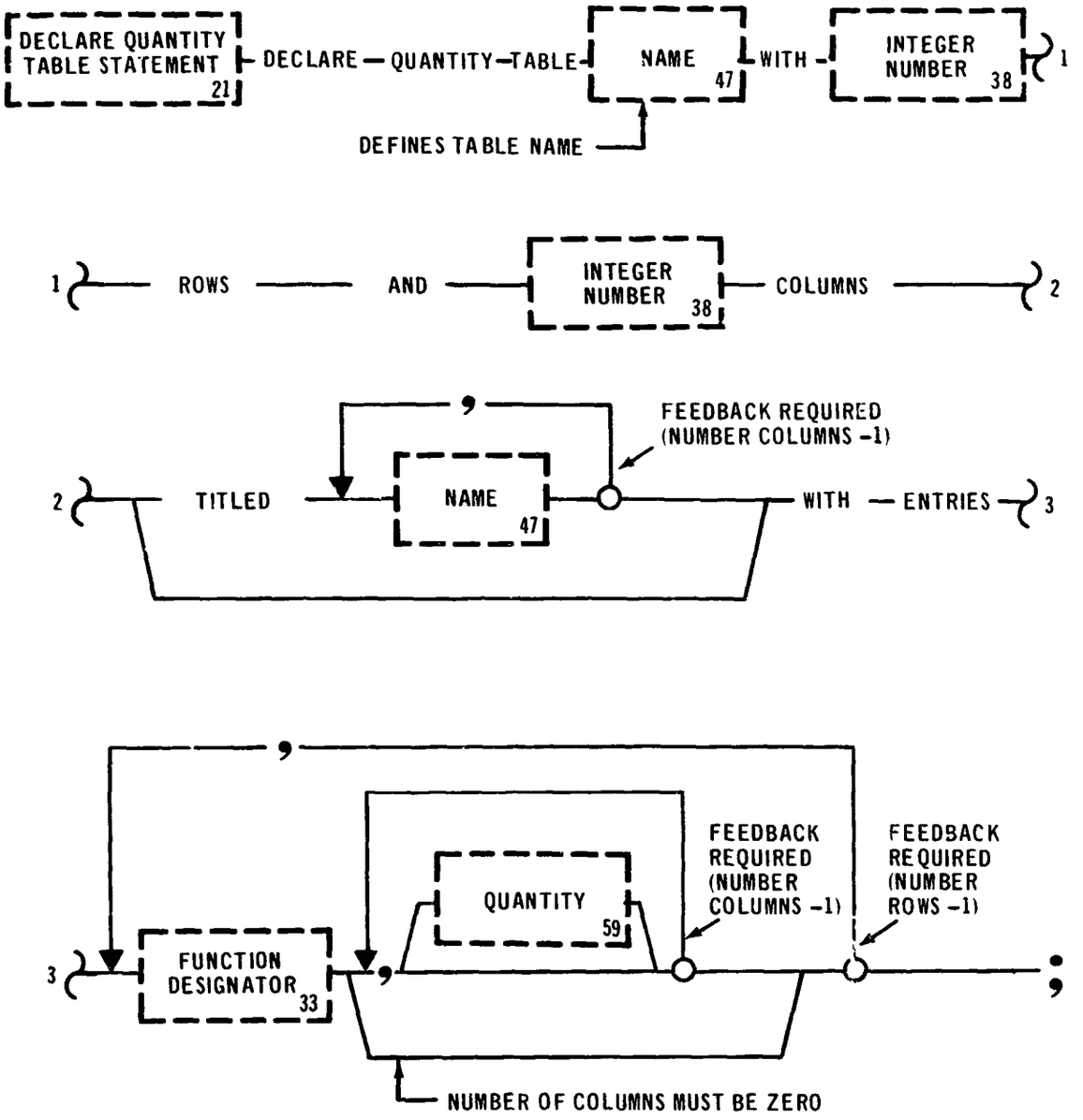
20
REV 0

DECLARE QUANTITY LIST STATEMENT



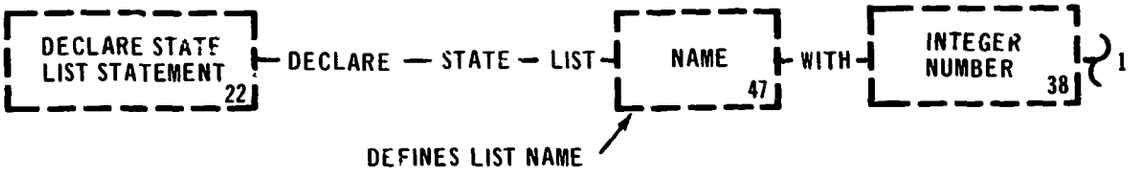
21 REV 1

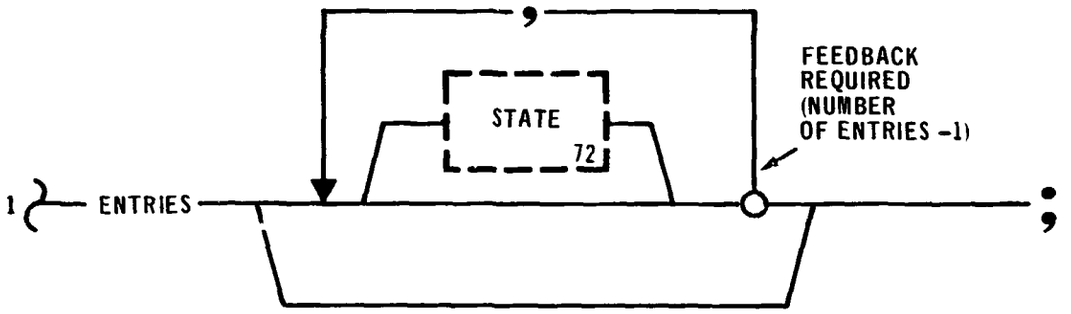
DECLARE QUANTITY TABLE STATEMENT



22
REV 0

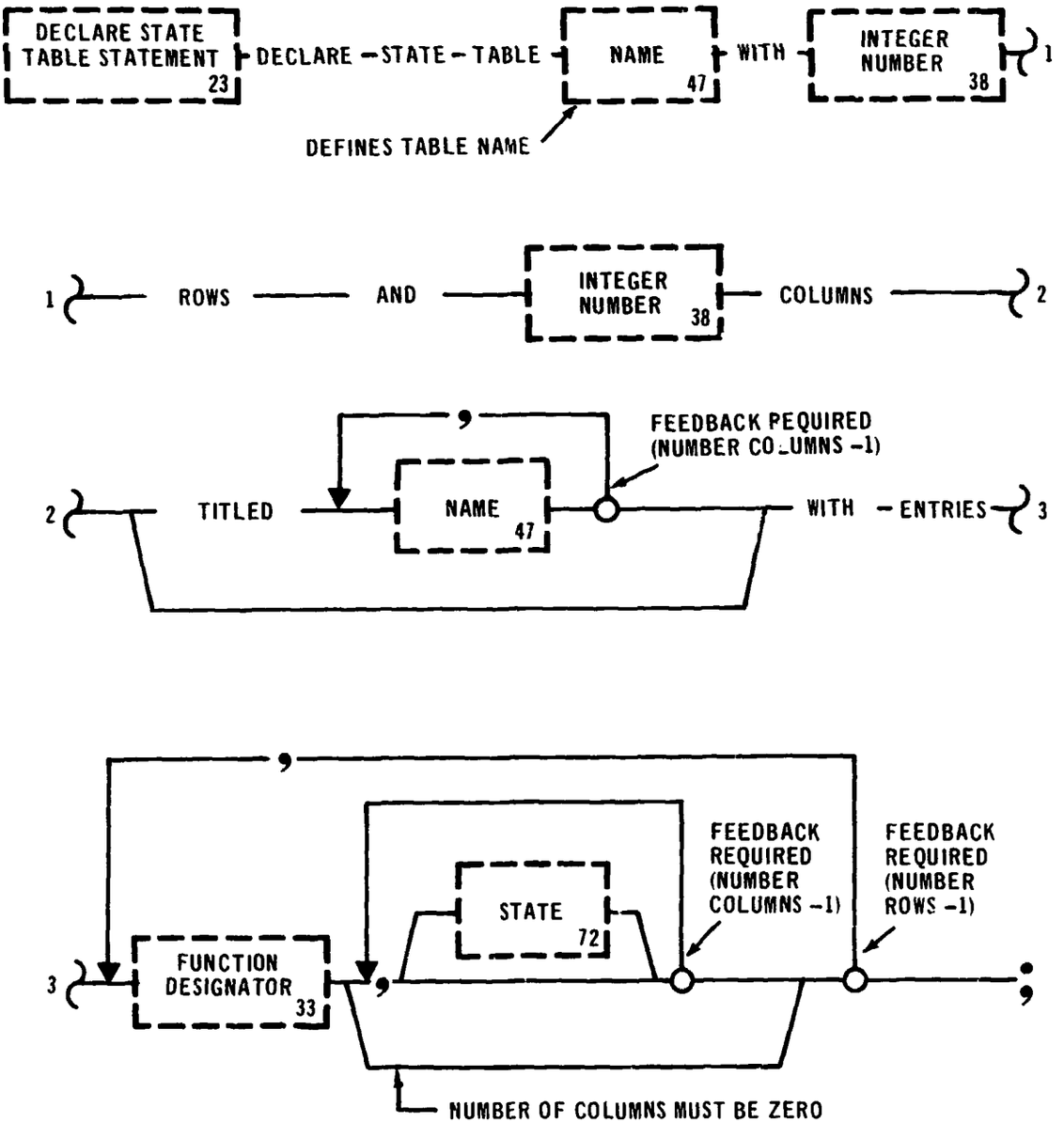
DECLARE STATE LIST STATEMENT





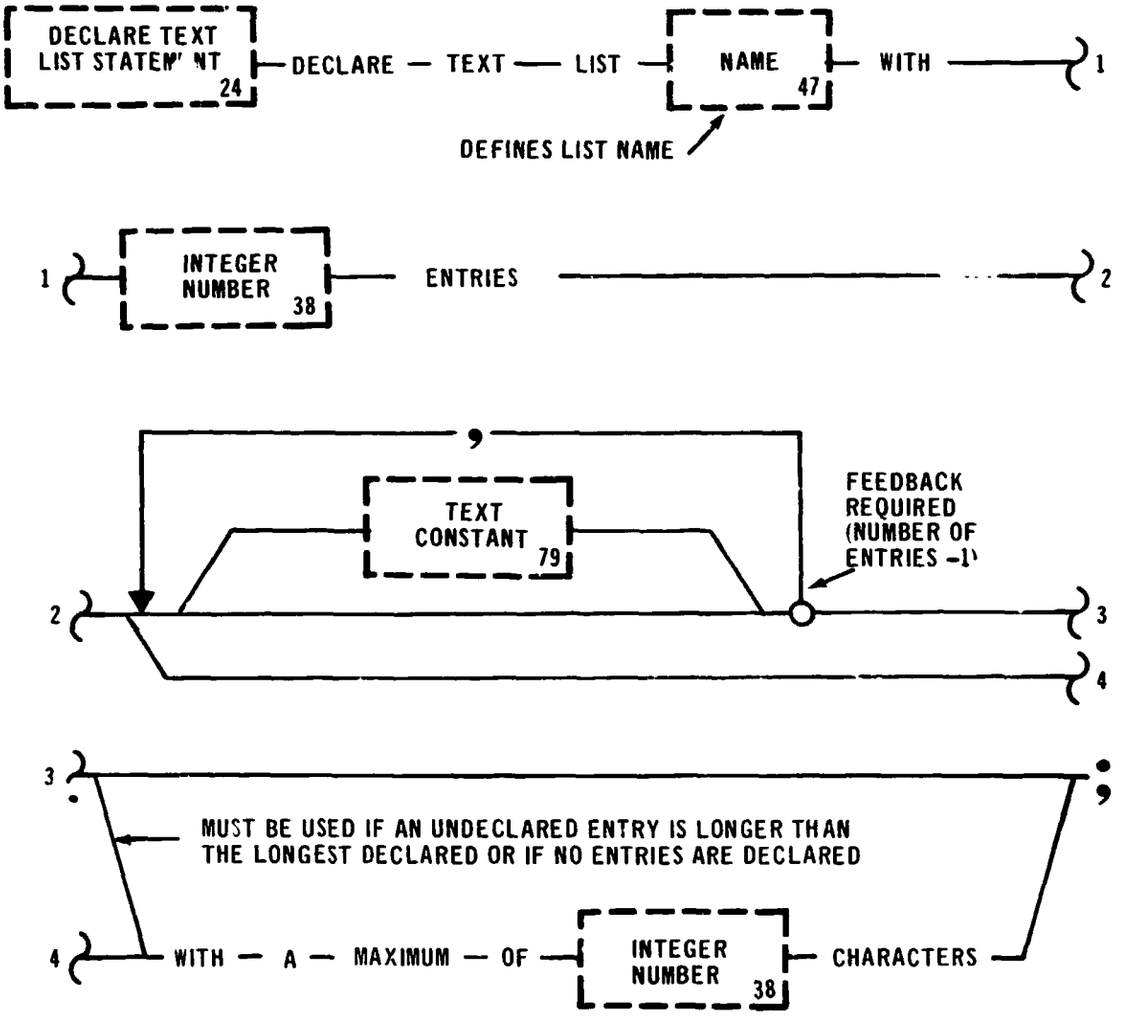
23 REV 0

DECLARE STATE TABLE STATEMENT



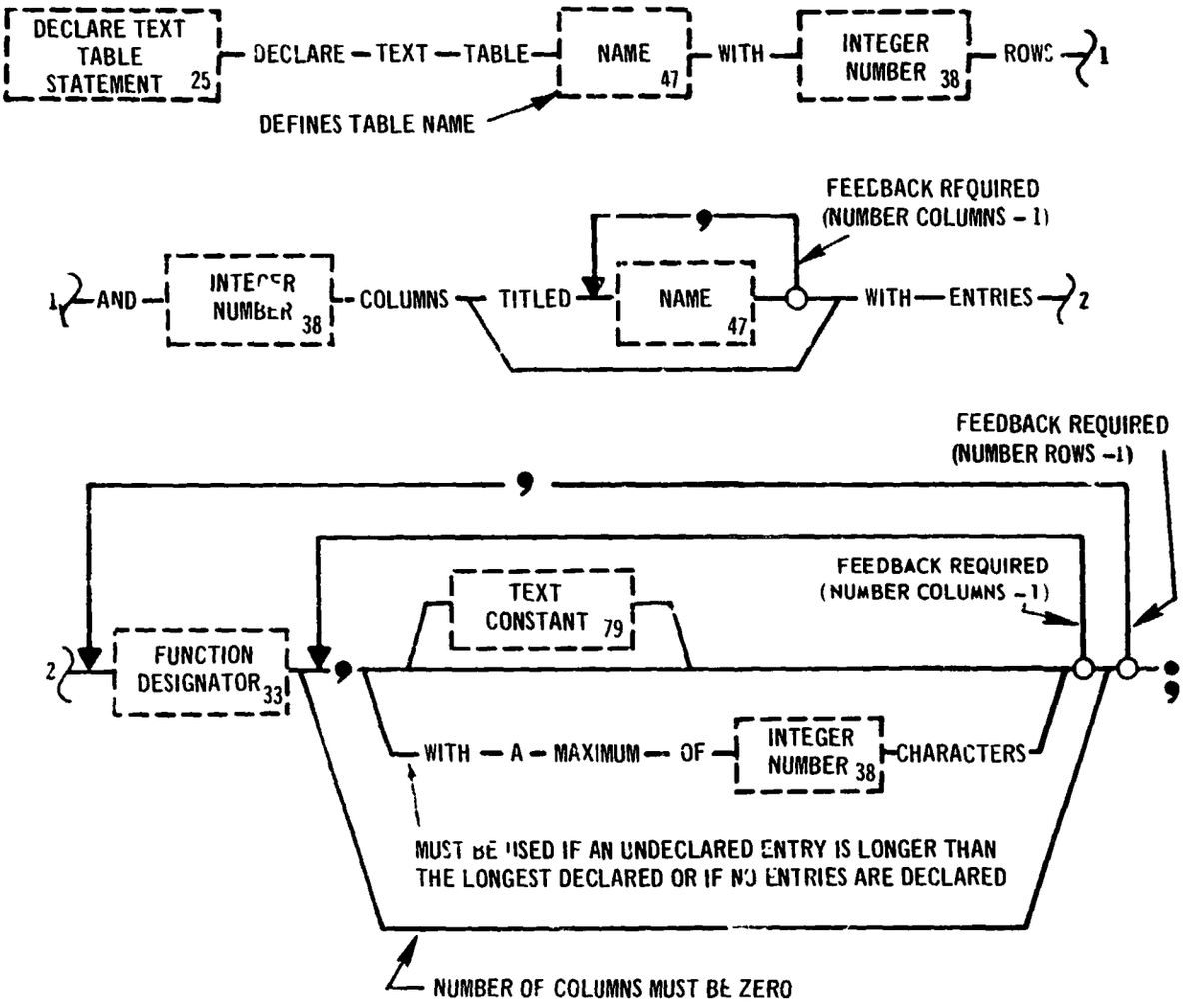
24 REV 1

DECLARE TEXT LIST STATEMENT

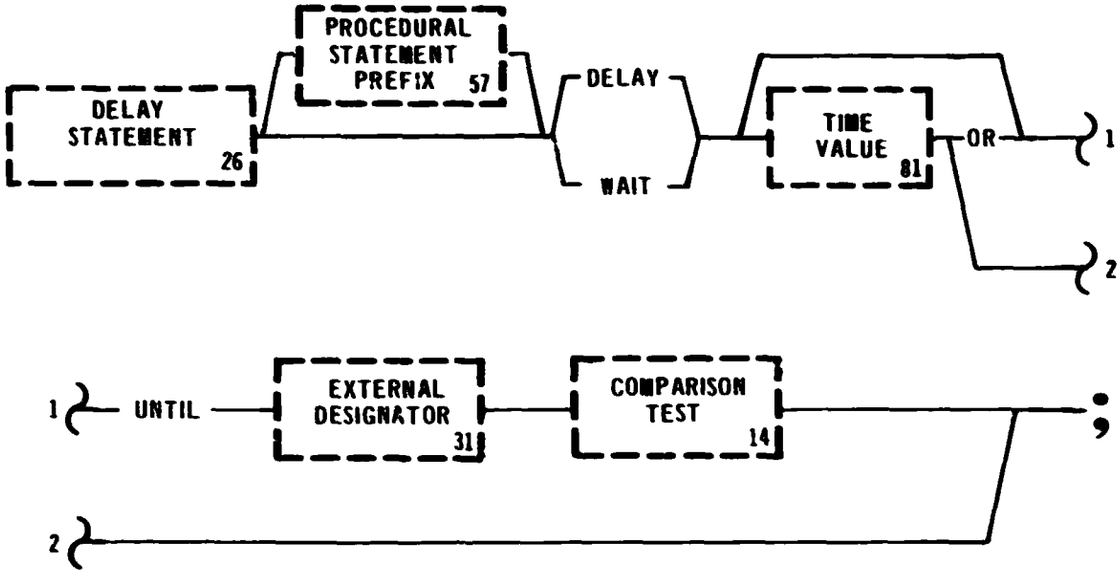


25 REV 1

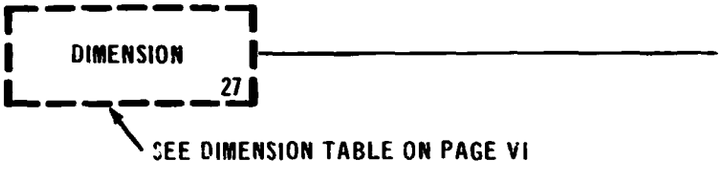
DECLARE TEXT TABLE STATEMENT



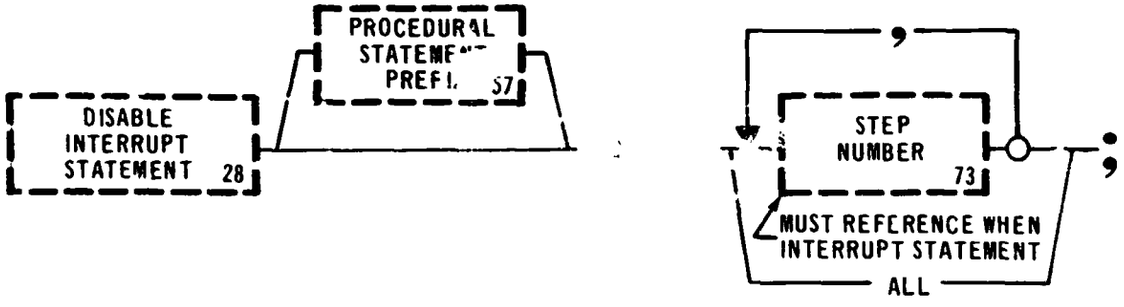
26 REV 1 DELAY STATEMENT



27 REV 0 DIMENSION



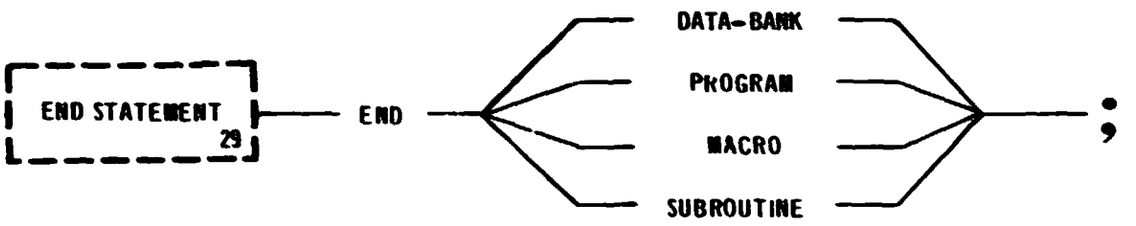
28 REV 0 DISABLE INTERRUPT STATEMENT



29 REV 0

END STATEMENT

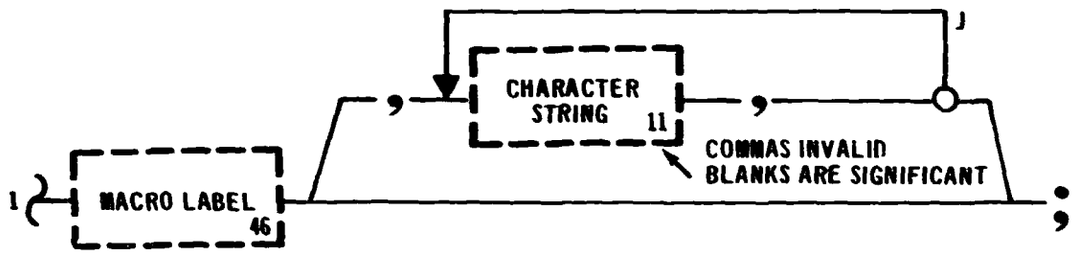
END



30 REV 0

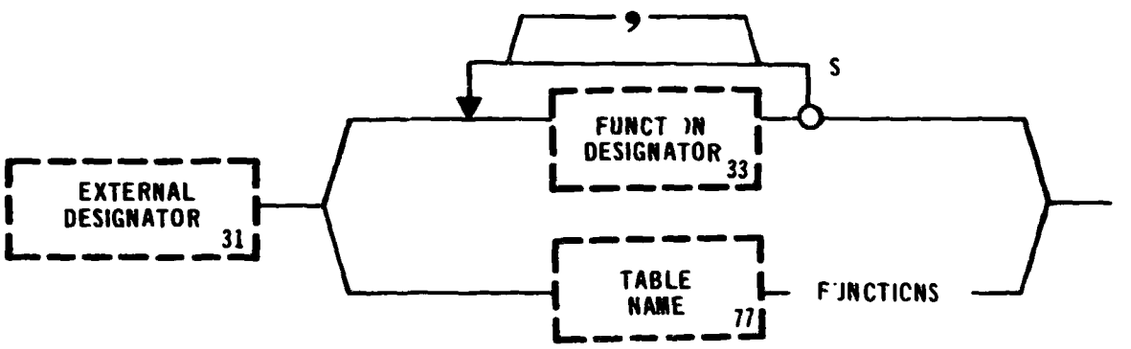
EXPAND MACRO STATEMENT

EXPAND



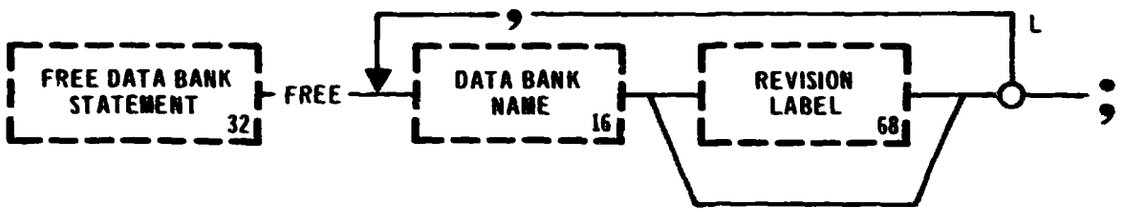
31 REV 1

EXTERNAL DESIGNATOR



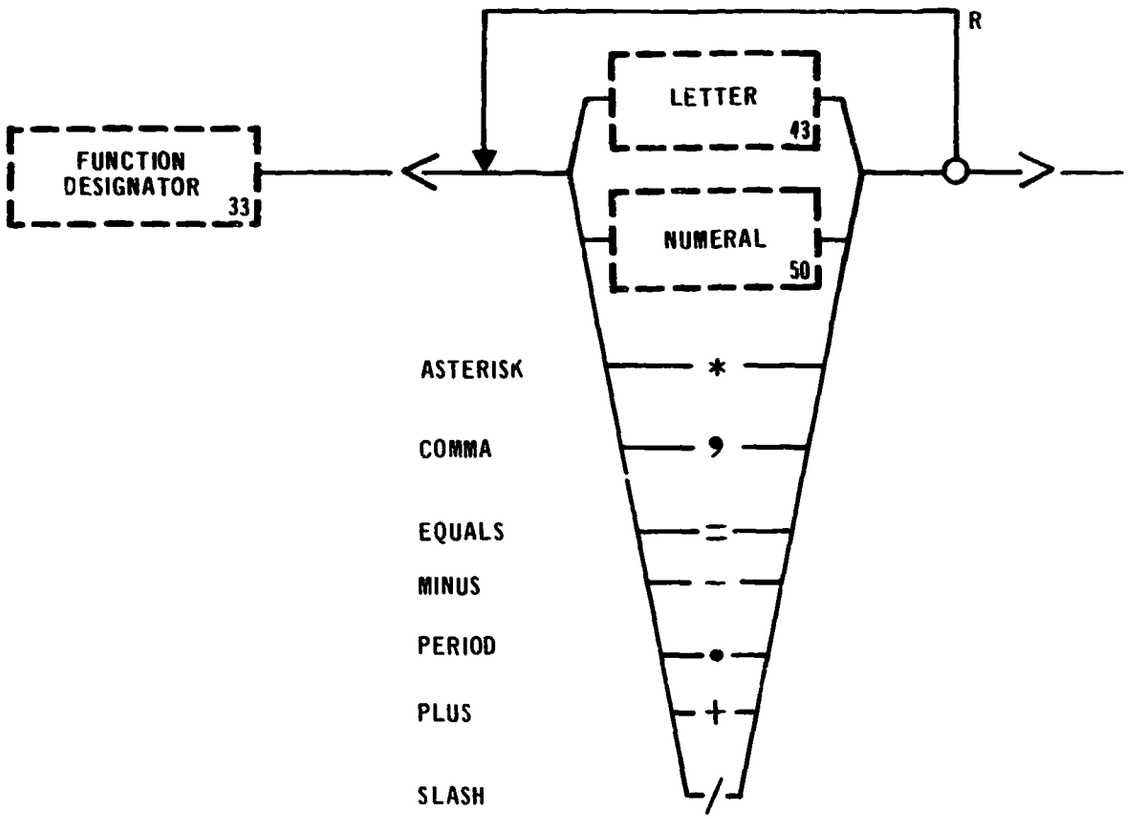
32 REV 0

FREE DATA BANK STATEMENT



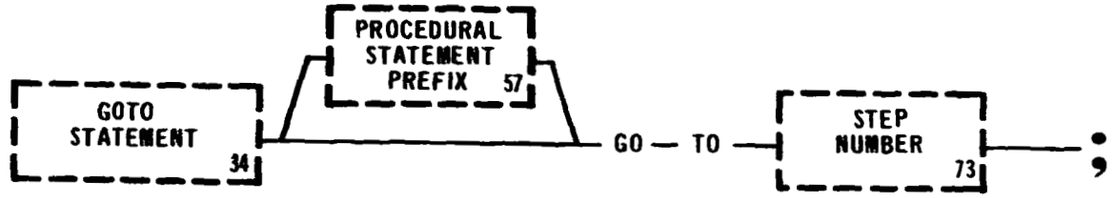
33 REV 0

FUNCTION DESIGNATOR



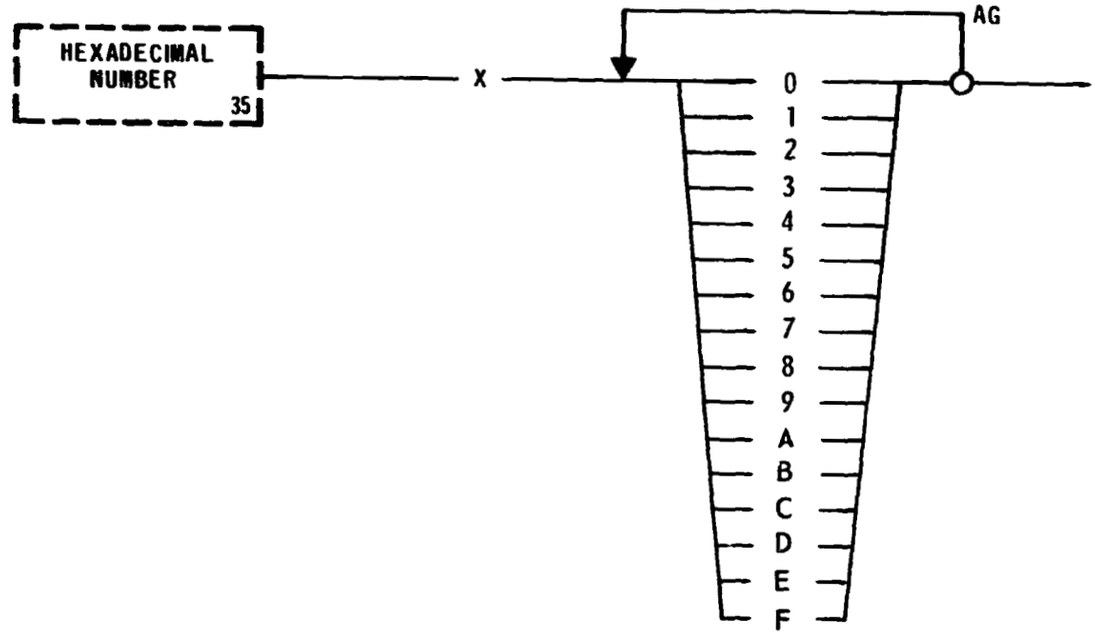
34 REV 0

GOTO STATEMENT



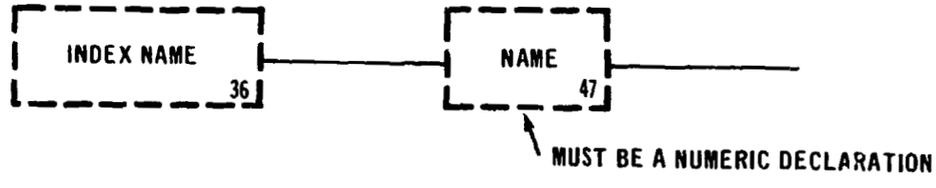
35 REV 0

HEXADECIMAL NUMBER



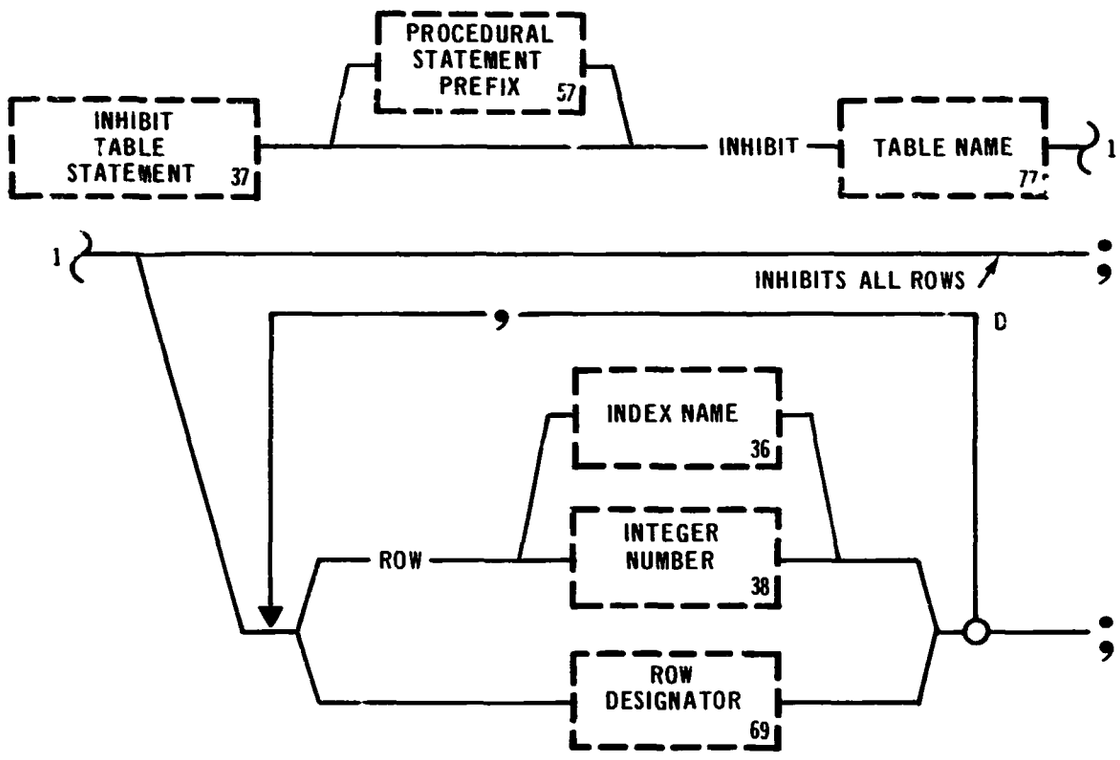
36 REV 0

INDEX NAME



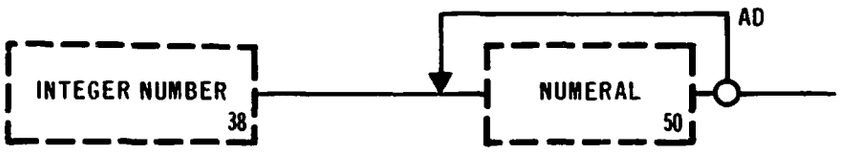
37 REV 0

INHIBIT TABLE STATEMENT

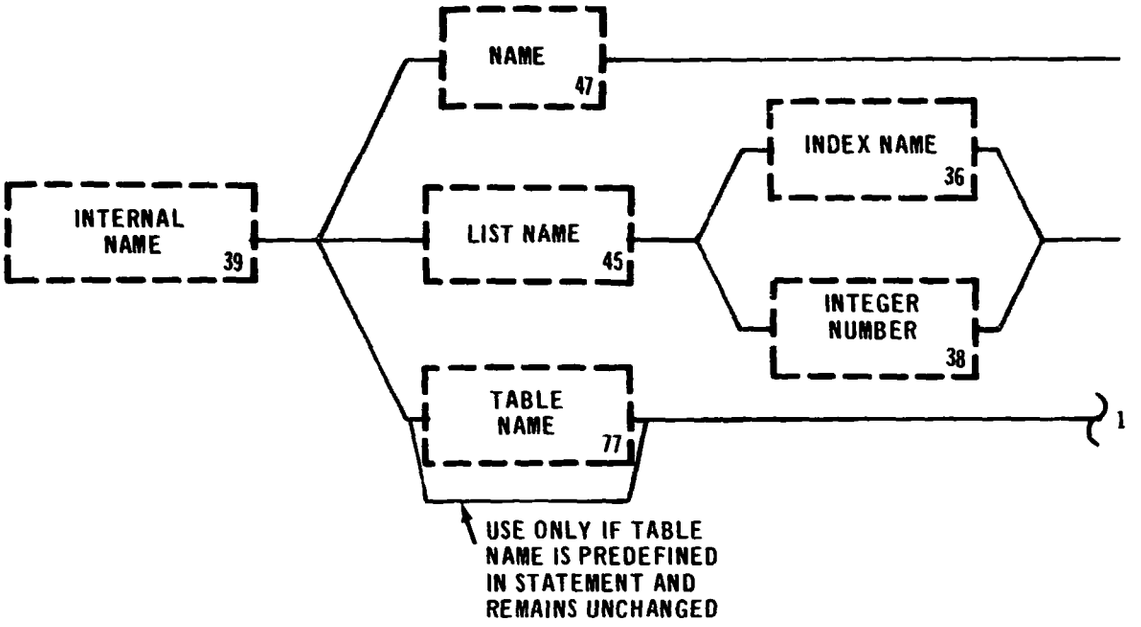


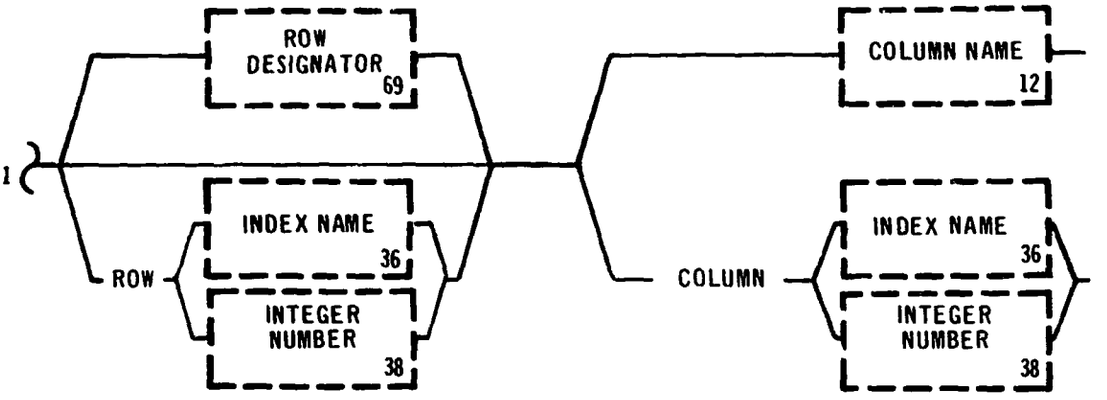
38 REV 0

INTEGER NUMBER



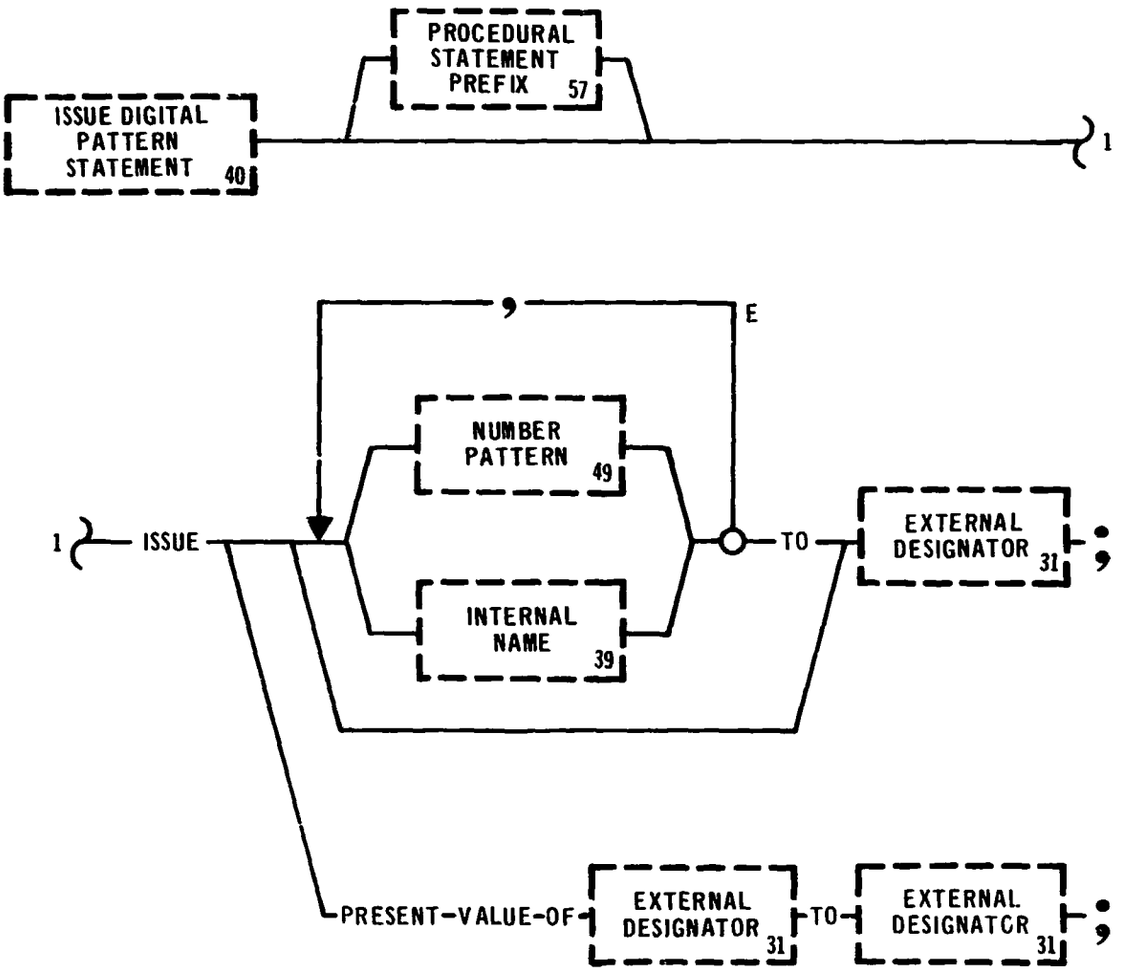
39 REV 1 INTERNAL NAME





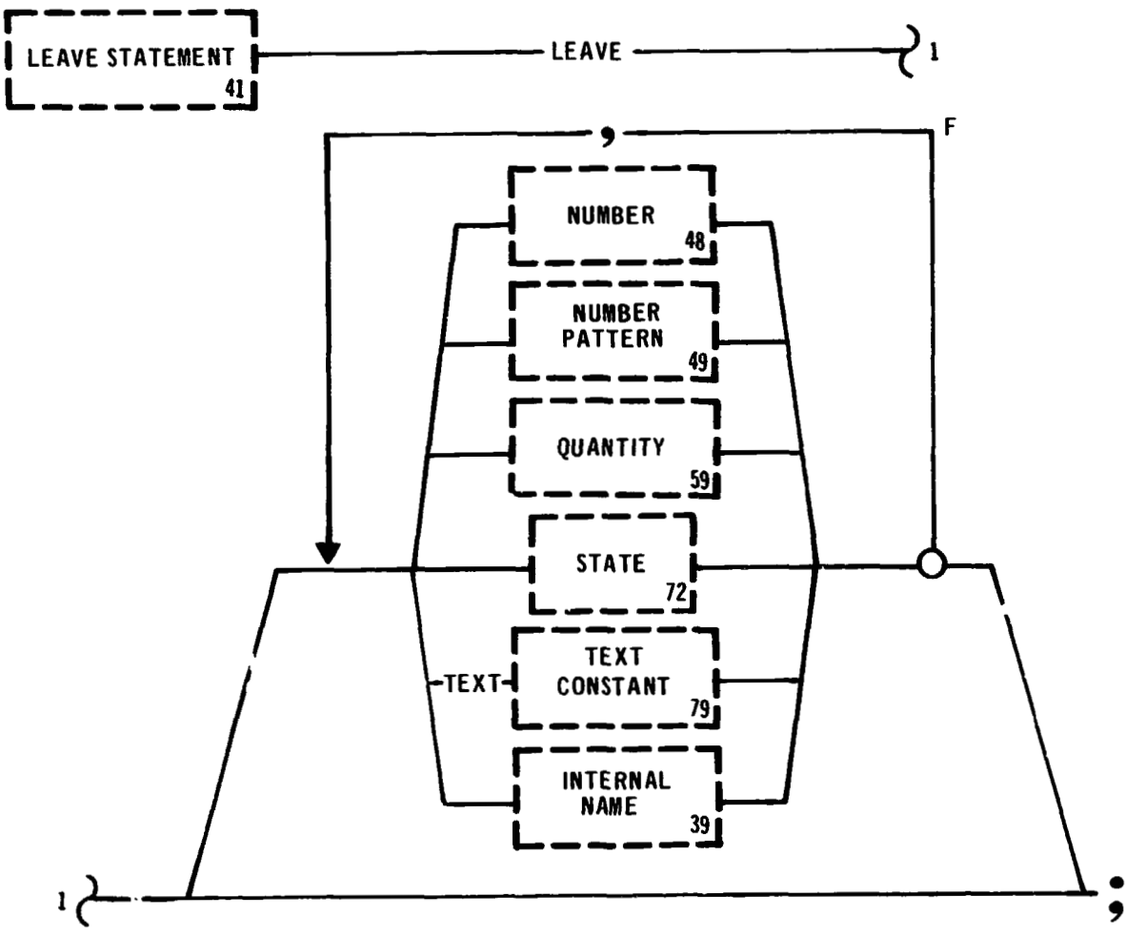
40 REV 0

ISSUE DIGITAL PATTERN STATEMENT



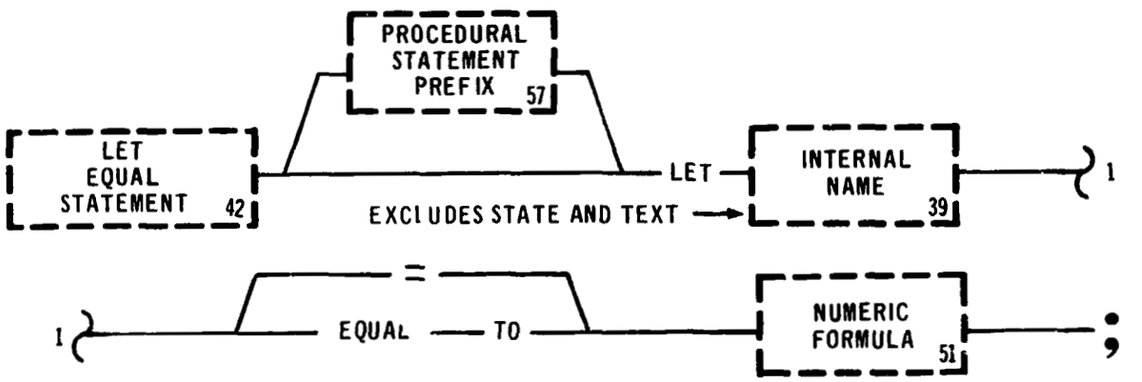
41 REV 1

LEAVE STATEMENT

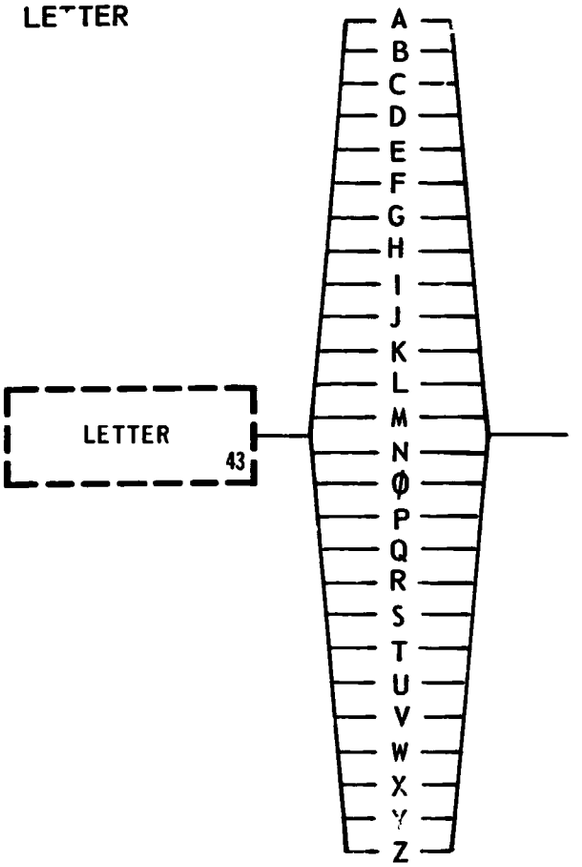


42 REV 0

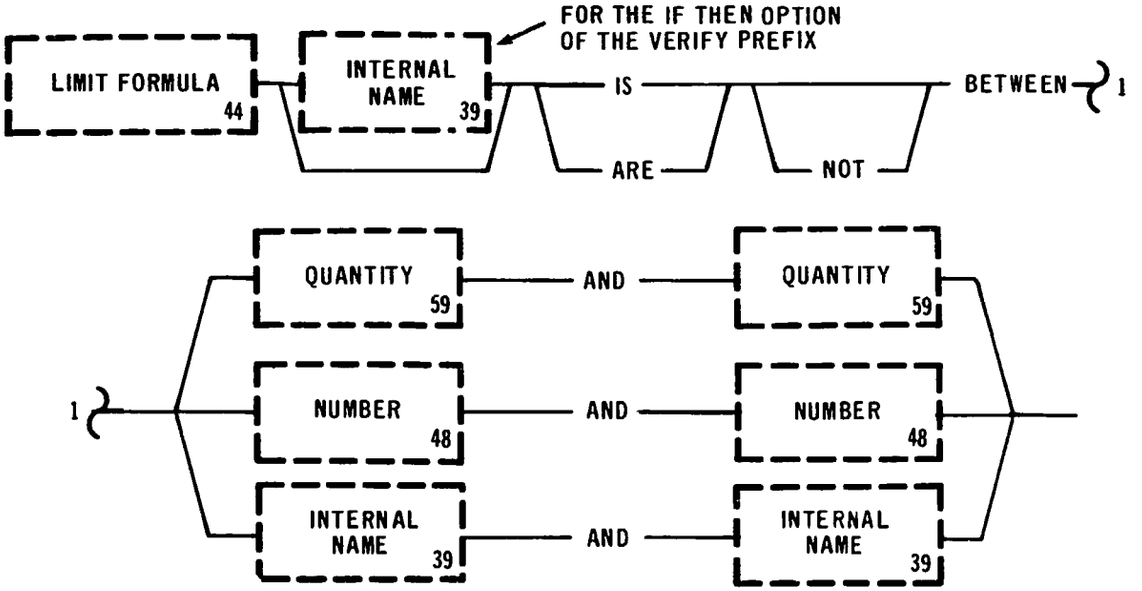
LET EQUAL STATEMENT



43 REV 0 LETTER

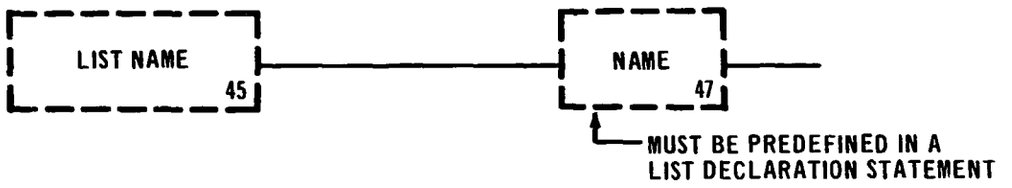


44 REV 0 LIMIT FORMULA



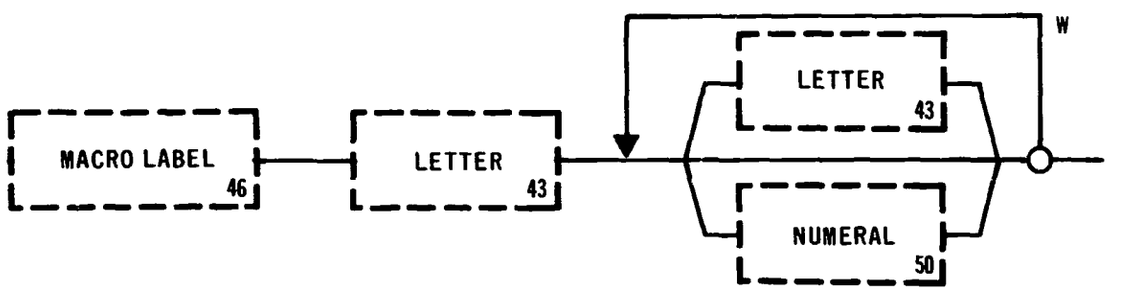
45 REV 0

LIST NAME



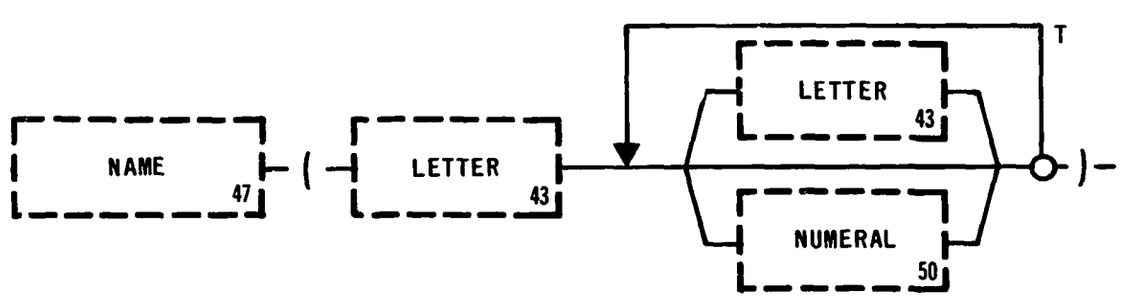
46 REV 0

MACRO LABEL



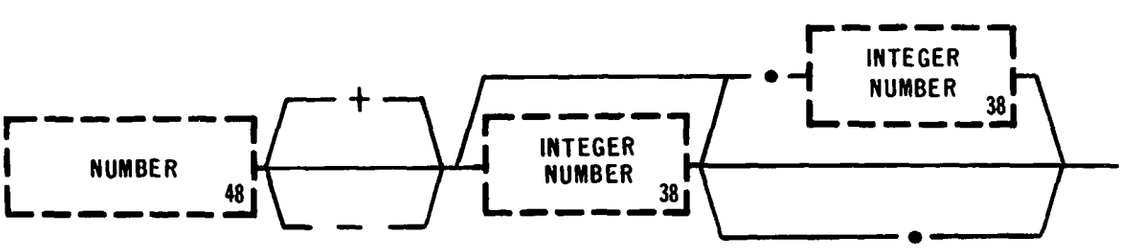
47 REV 0

NAME



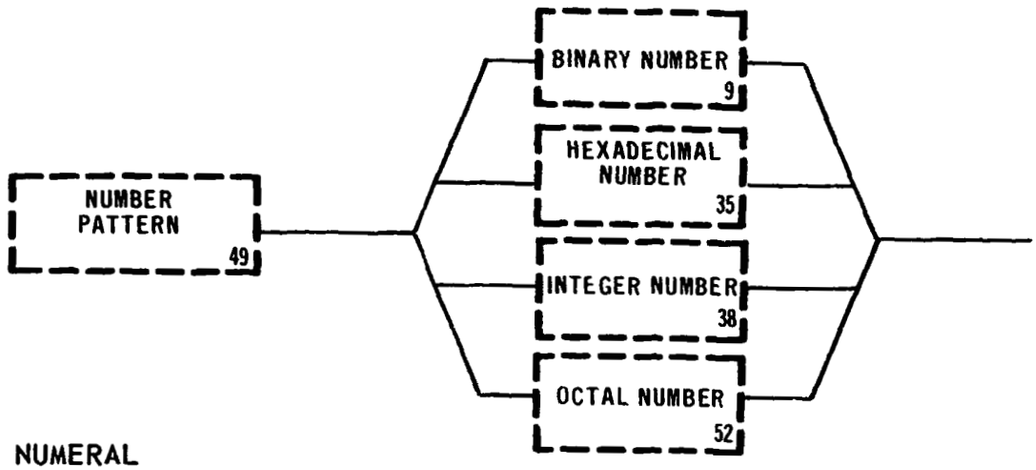
48 REV 1

NUMBER



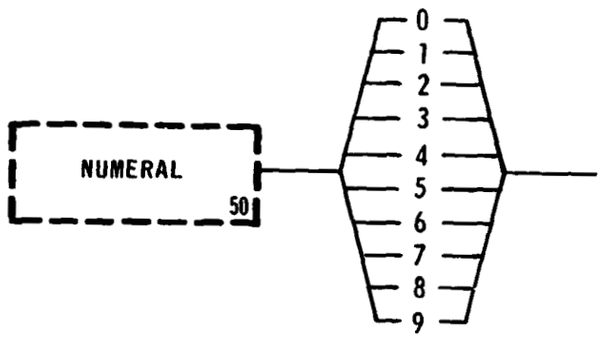
49 REV 0

NUMBER PATTERN



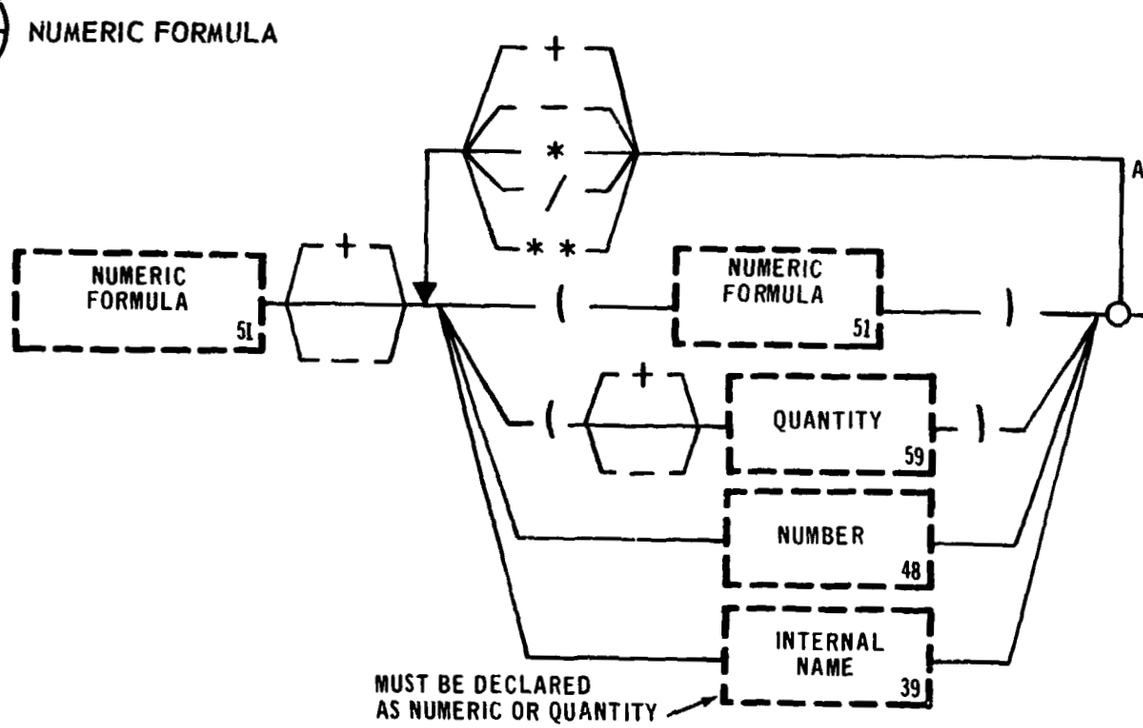
50 REV 0

NUMERAL



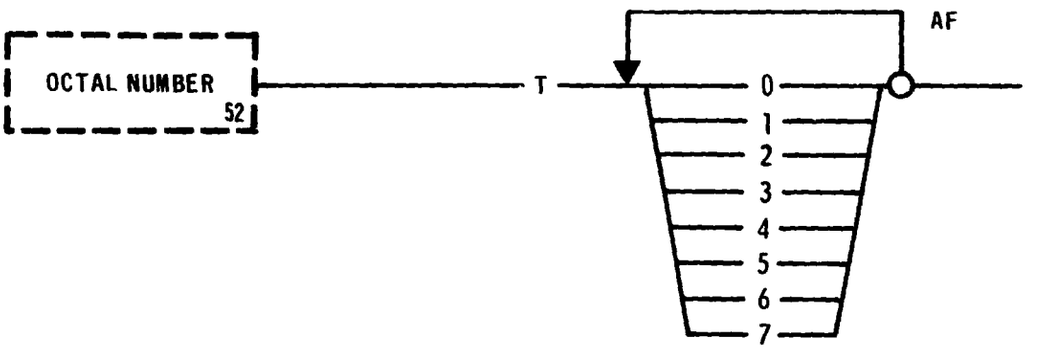
51 REV 0

NUMERIC FORMULA



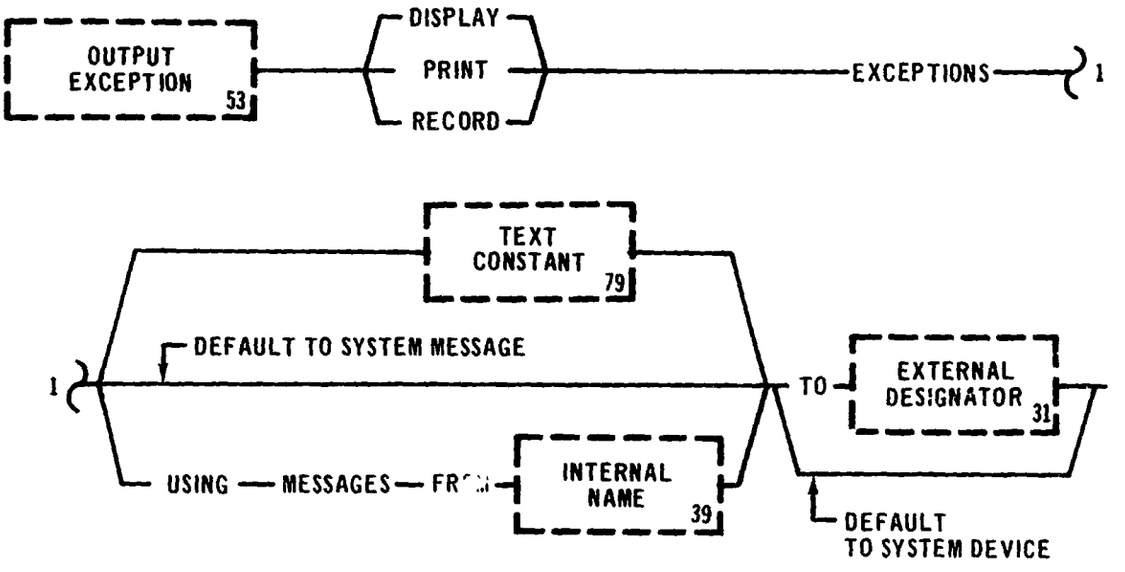
52 REV 1

OCTAL NUMBER



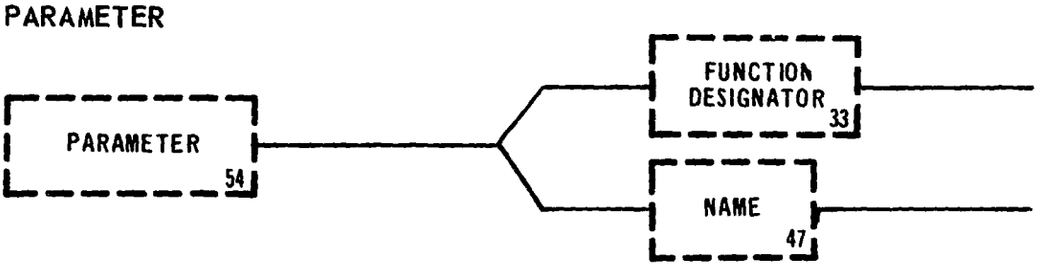
53 REV 1

OUTPUT EXCEPTION



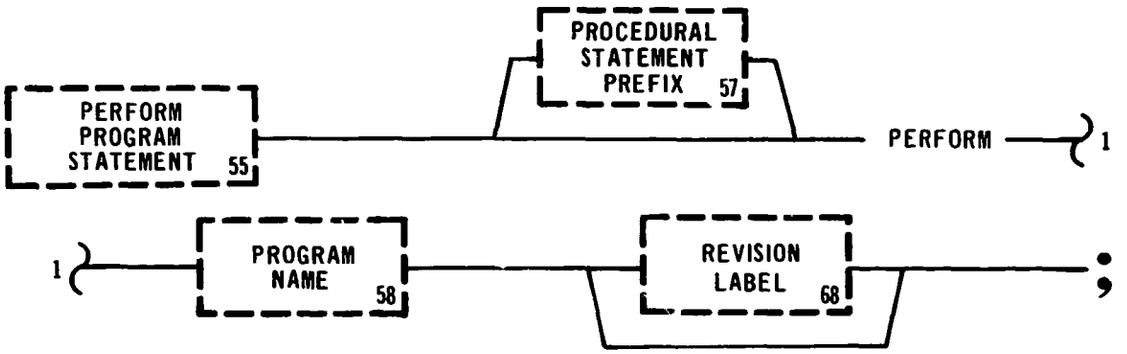
54 REV 1

PARAMETER



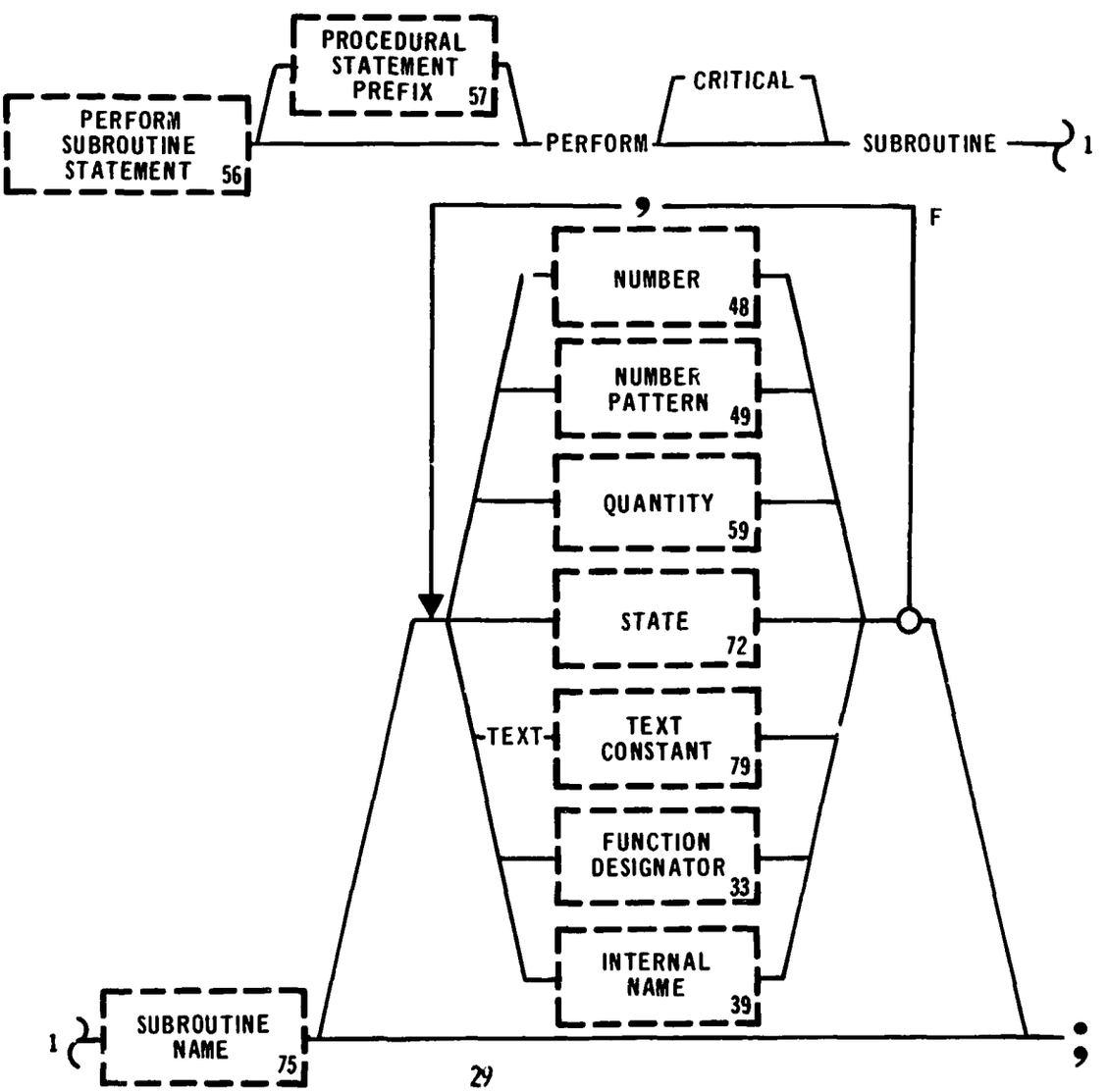
55 REV 0

PERFORM PROGRAM STATEMENT



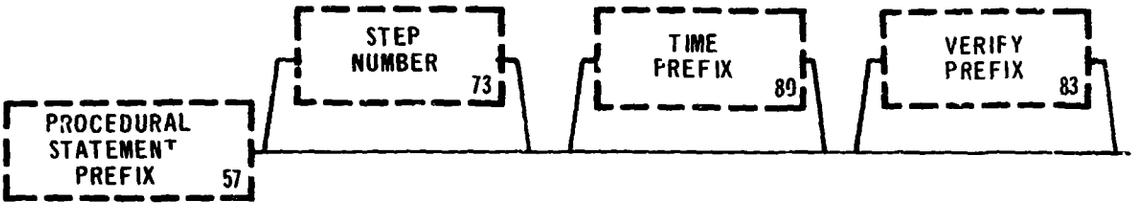
56 REV 0

PERFORM SUBROUTINE STATEMENT



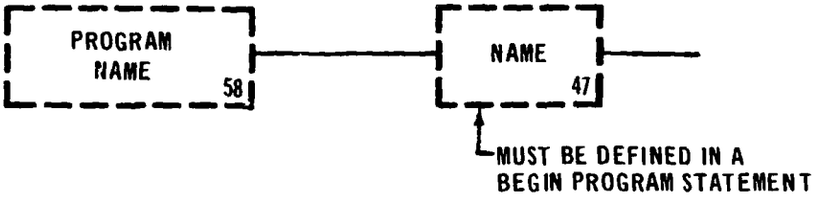
57 REV 1

PROCEDURAL STATEMENT PREFIX



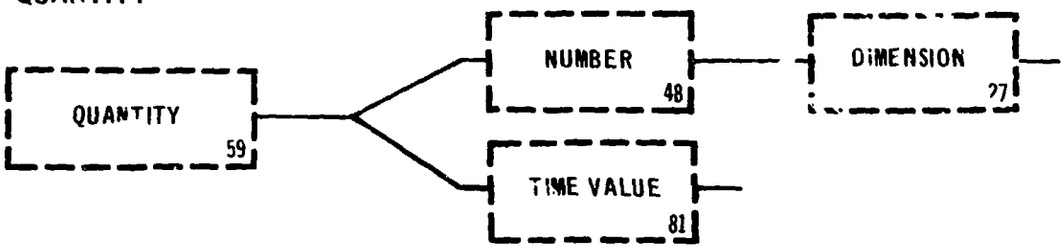
58 REV 0

PROGRAM NAME



59 REV 0

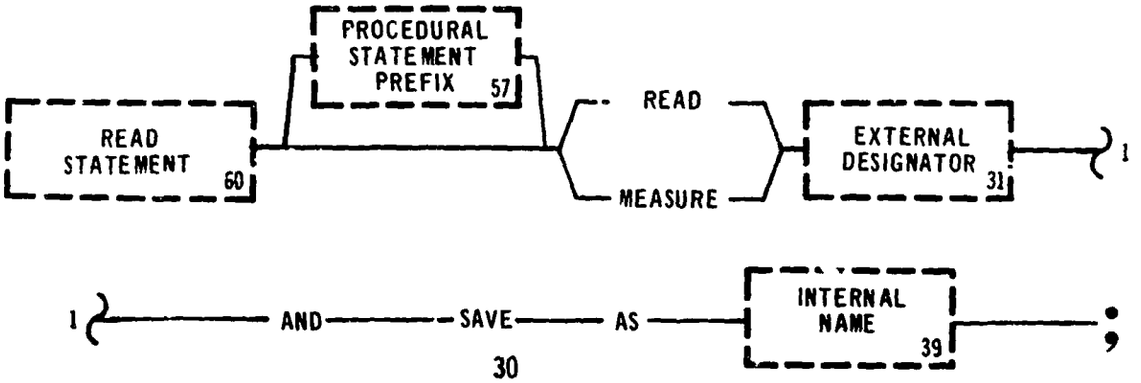
QUANTITY



60 REV 0

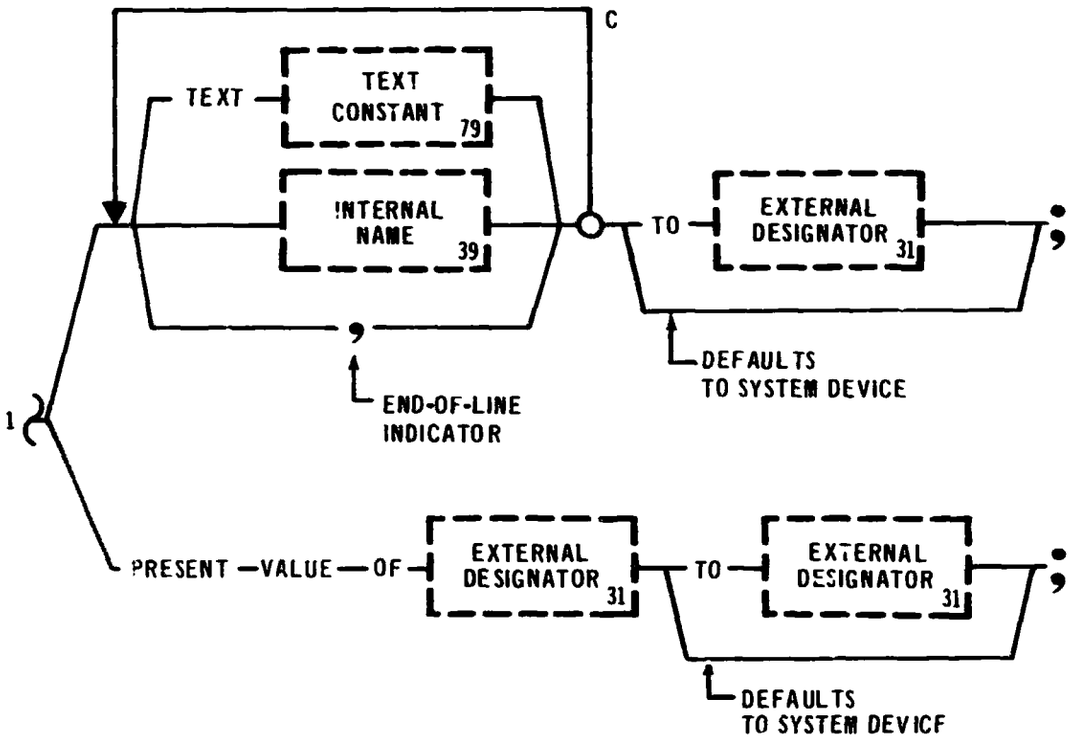
READ STATEMENT

READ



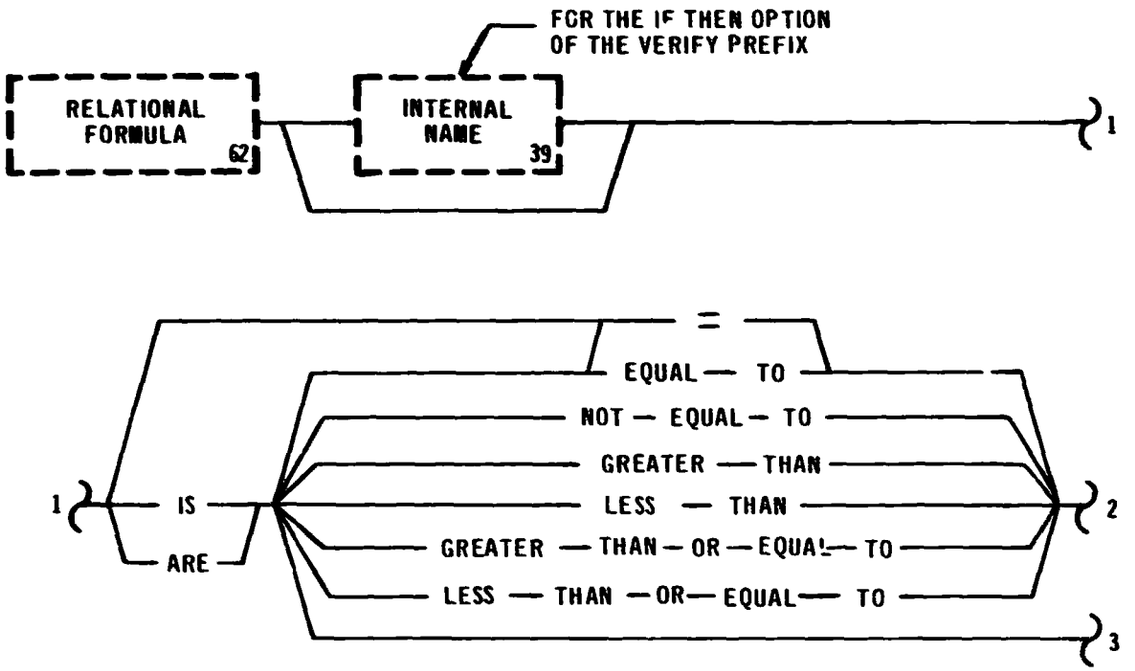
61 REV 0

RECORD DATA STATEMENT



62 REV 0

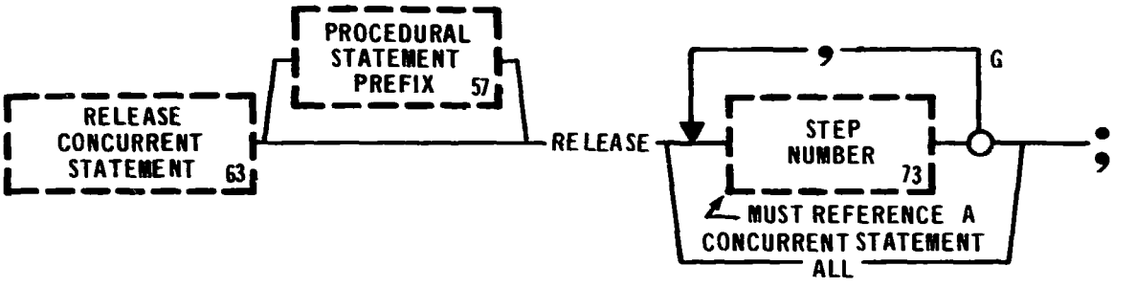
RELATIONAL FORMULA



RELEASE

63 REV 0

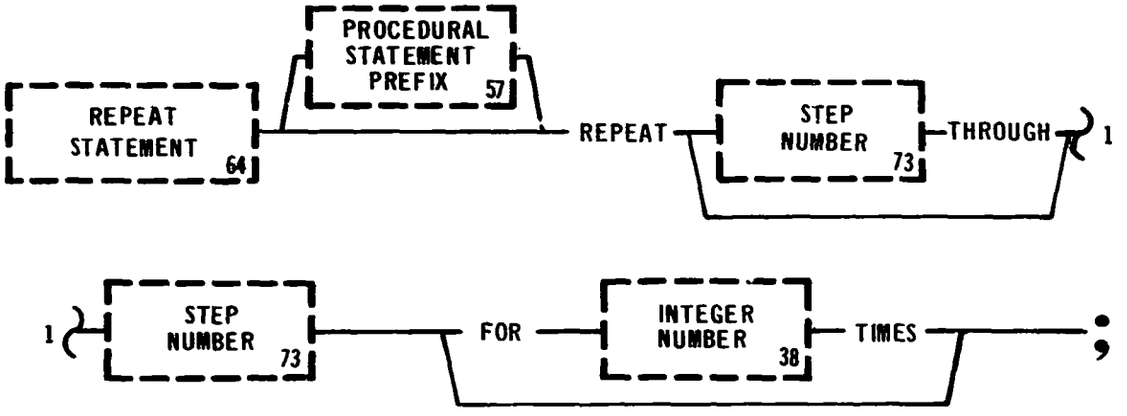
RELEASE CONCURRENT STATEMENT



REPEAT

64 REV 0

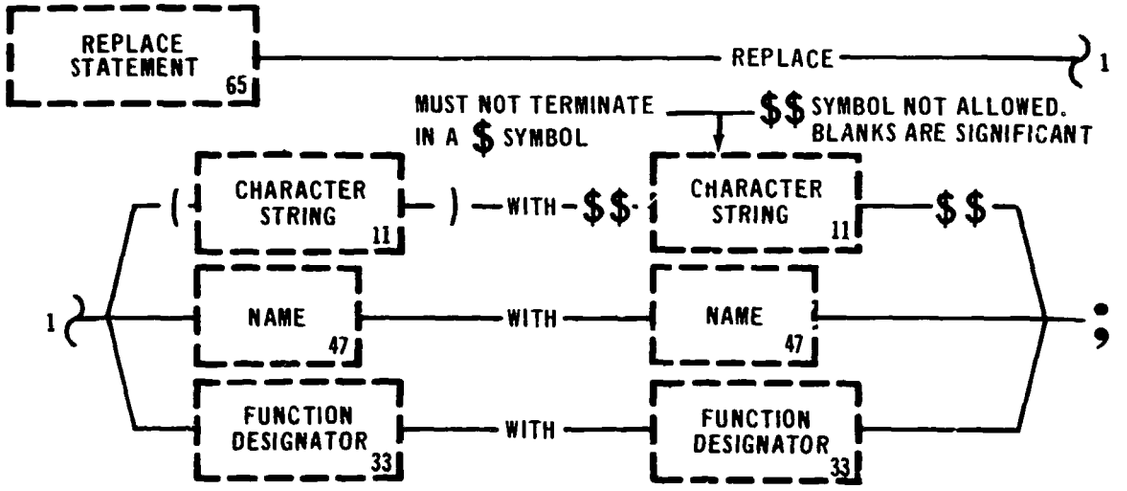
REPEAT STATEMENT



REPLACE

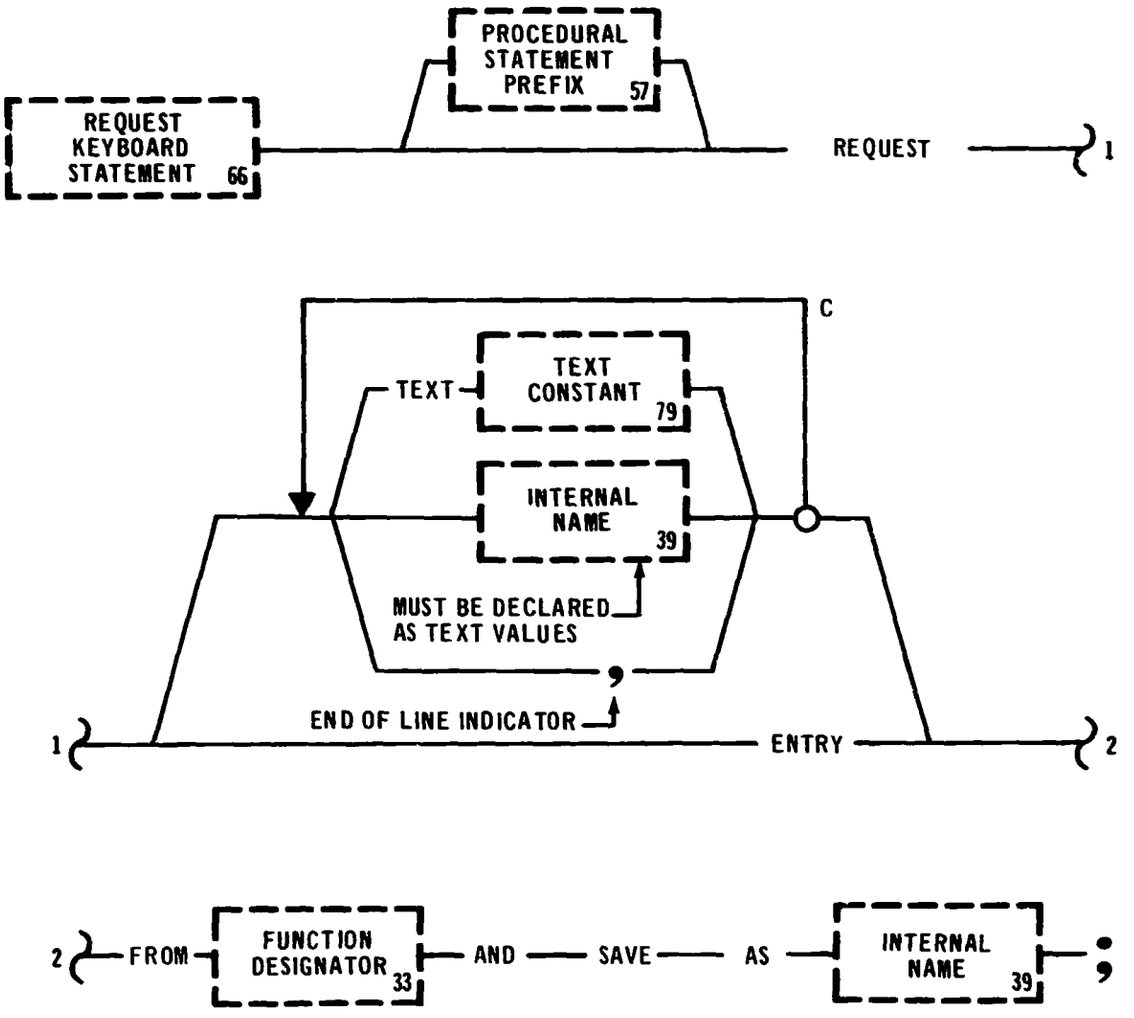
65 REV 0

REPLACE STATEMENT



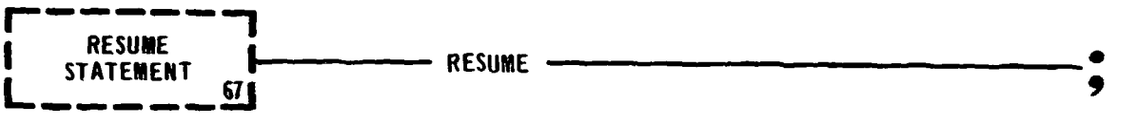
66 REV 0

REQUEST KEYBOARD STATEMENT



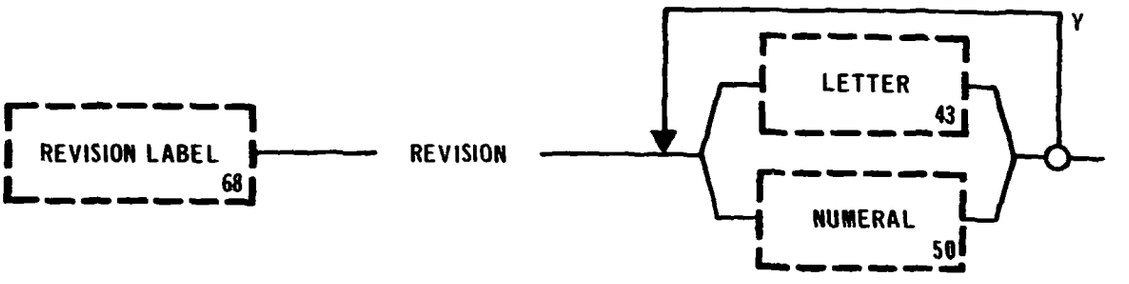
67 REV 1

RESUME STATEMENT



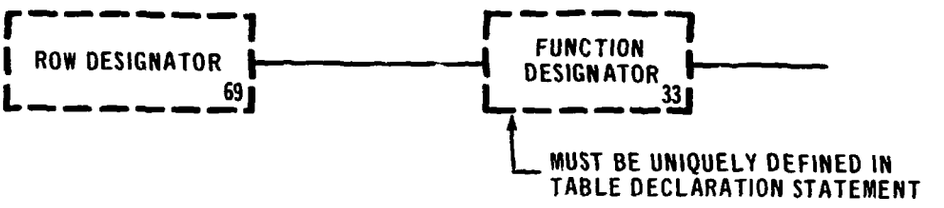
68 REV 0

REVISION LABEL



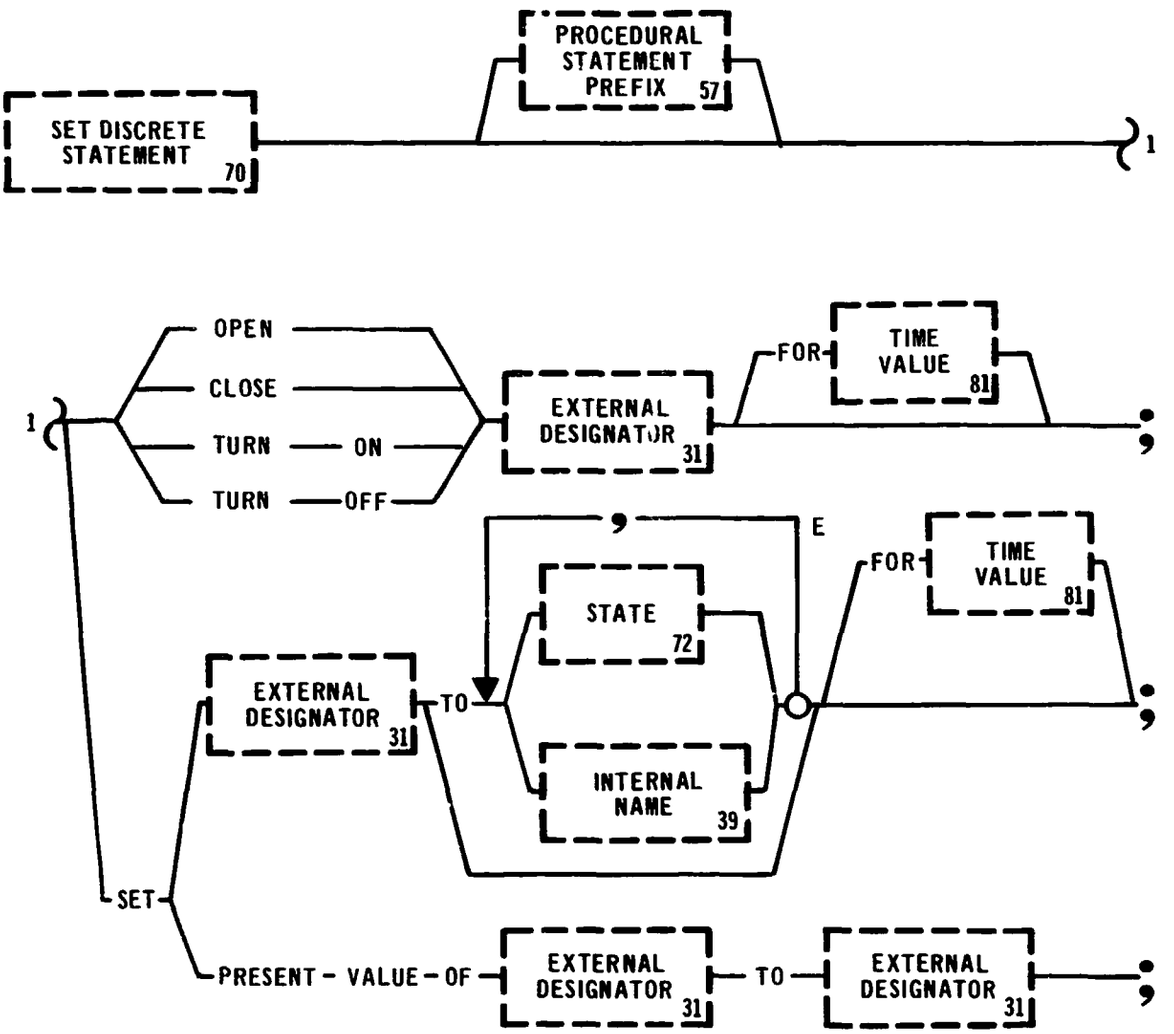
69 REV 0

ROW DESIGNATOR



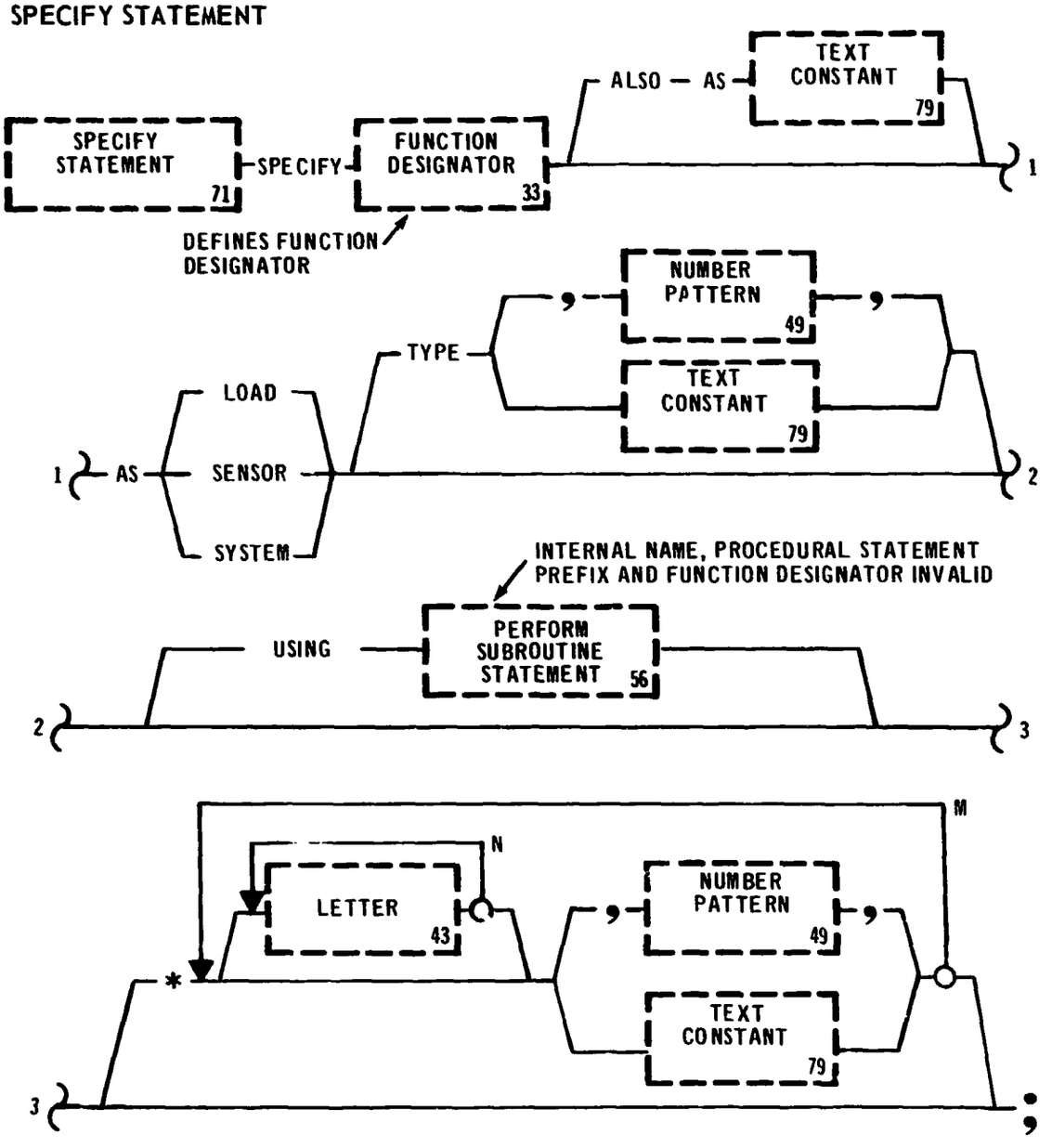
70 REV 0

SET DISCRETE STATEMENT



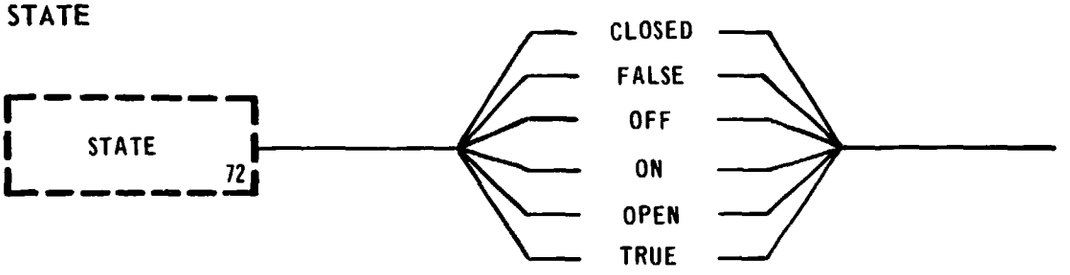
71 REV 0

SPECIFY STATEMENT

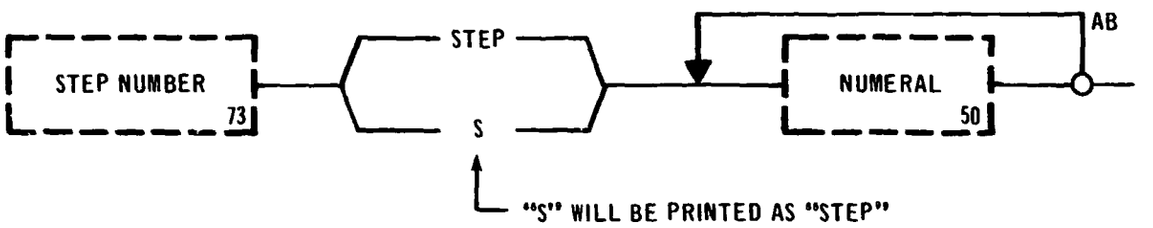


72 REV 1

STATE

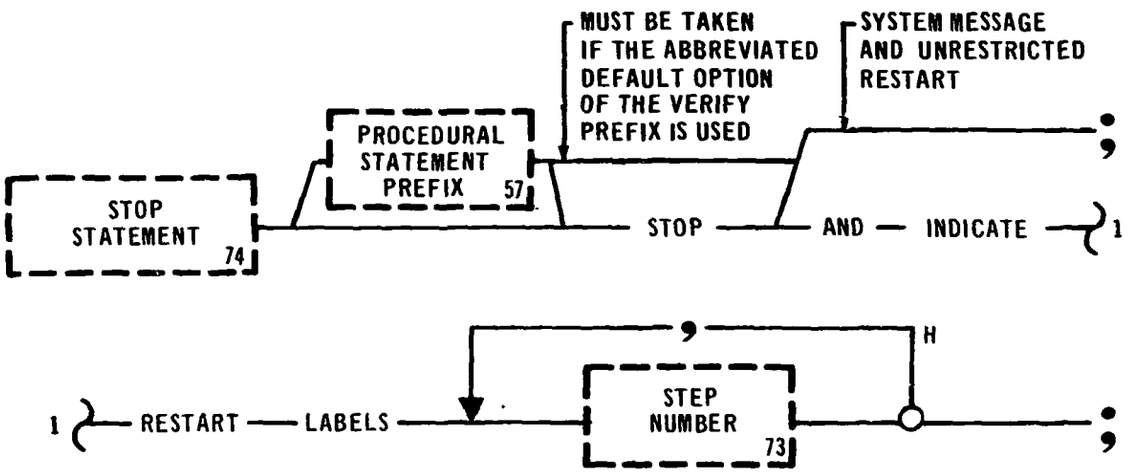


73 REV 1 STEP NUMBER

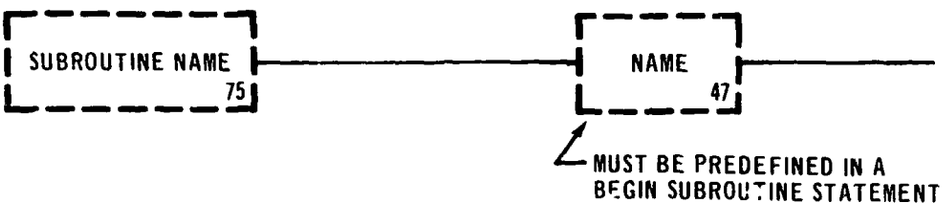


74 REV 1 STOP STATEMENT

STOP

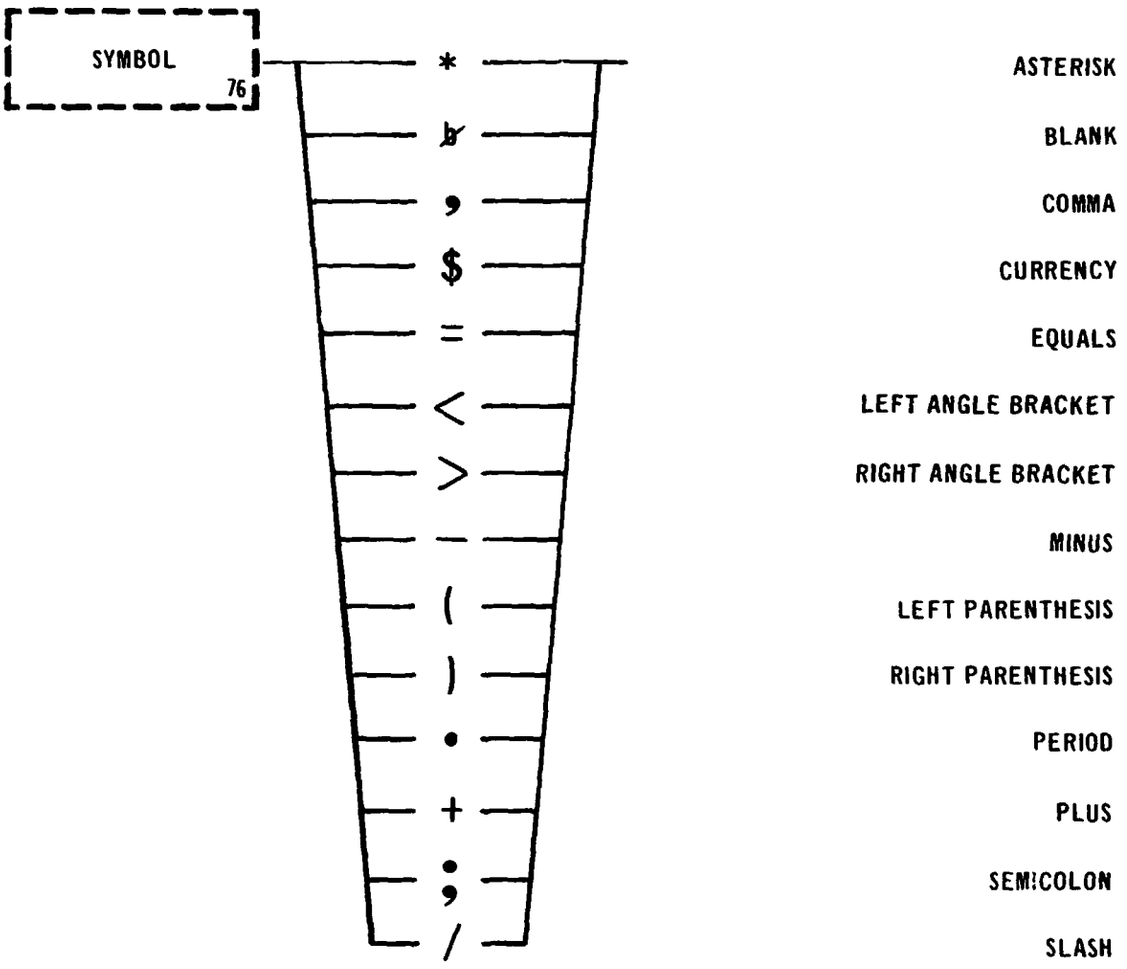


75 REV 0 SUBROUTINE NAME



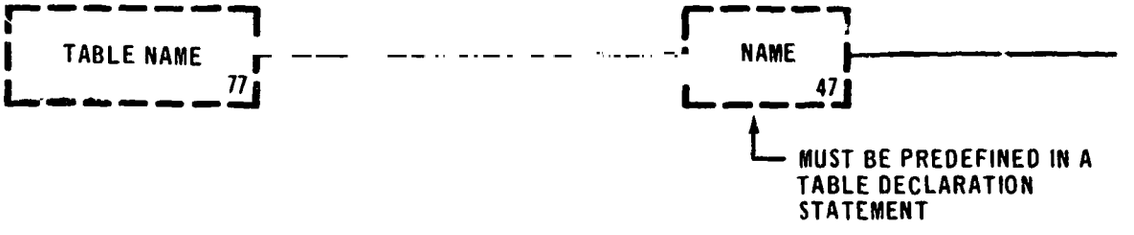
76 REV 0

SYMBOL



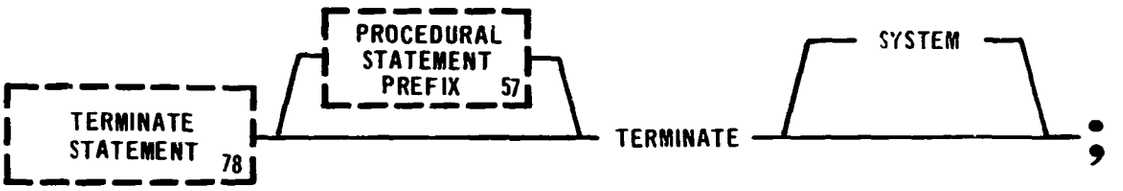
77 REV 0

TABLE NAME



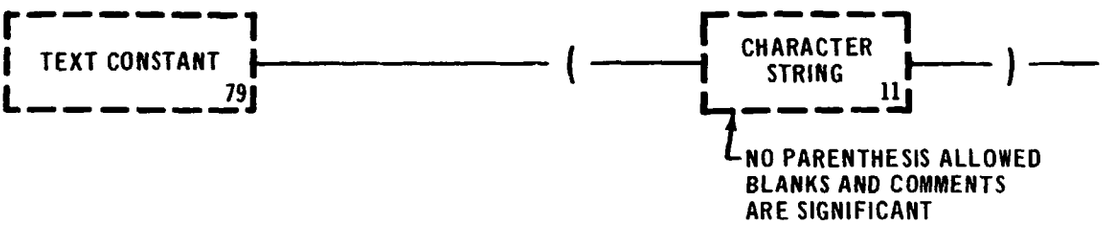
78 REV 0

TERMINATE STATEMENT



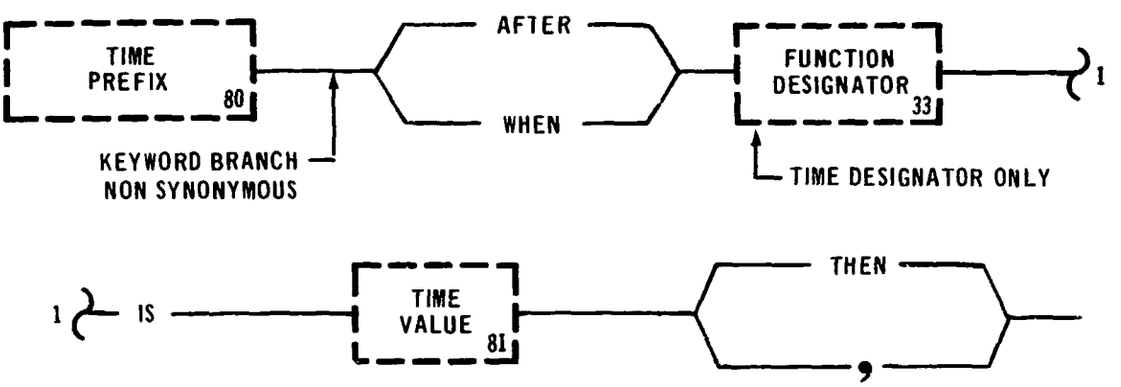
79 REV 0

TEXT CONSTANT

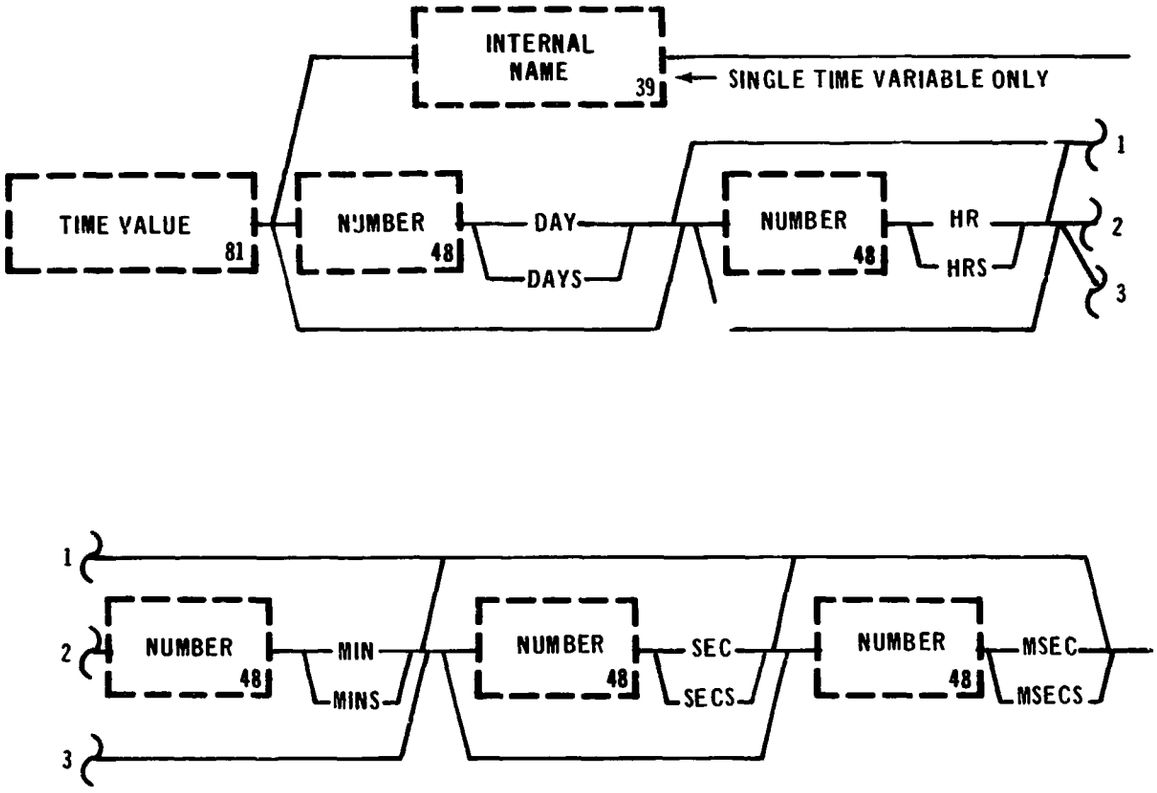


80 REV 2

TIME PREFIX

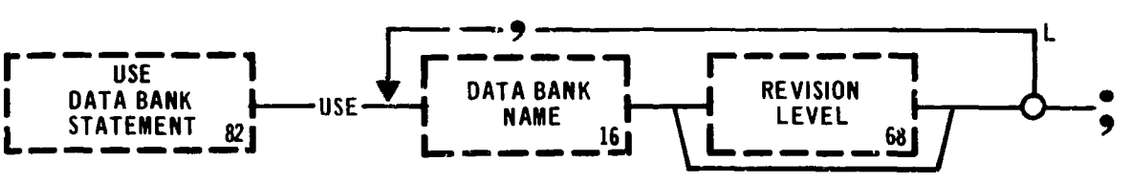


81 REV 1 TIME VALUE

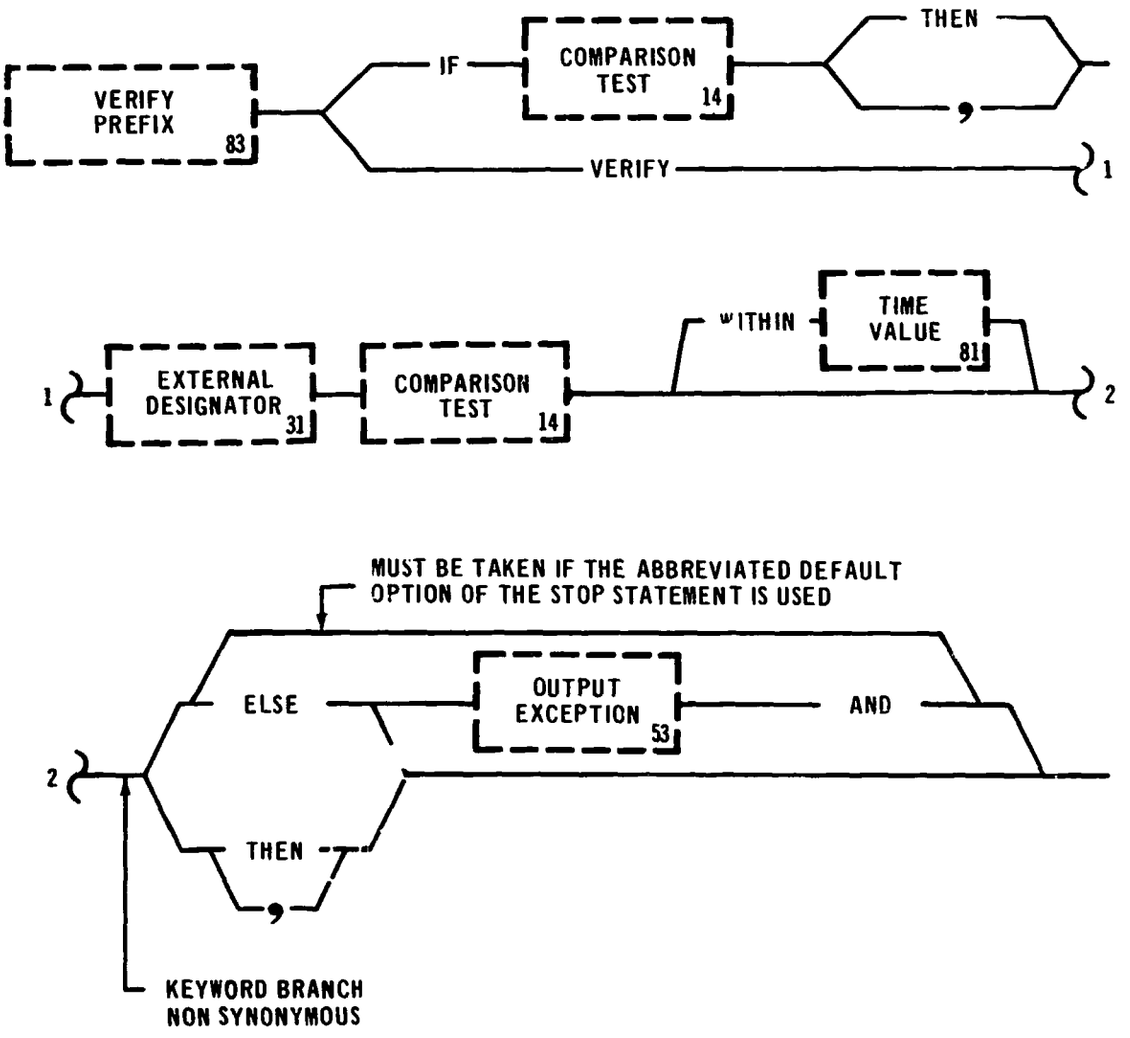


82 REV 0 USE DATA BANK STATEMENT

USE



83 REV 1 VERIFY PREFIX



84 REV 1

WHEN INTERRUPT STATEMENT