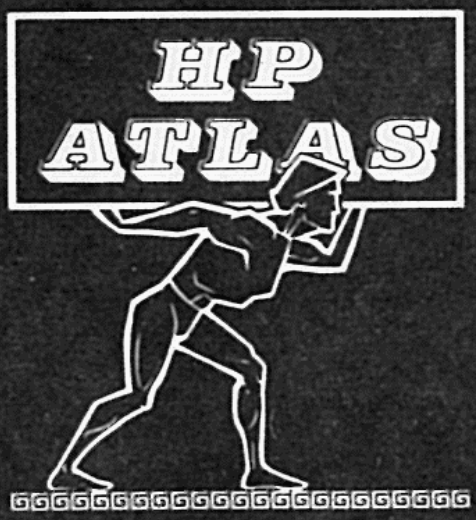


hp atlas quick reference guide

HP P/N 92105-90003

hp atlas
quick reference guide

This Quick Reference Guide is for the test engineer or programmer who has read the HP ATLAS Compilation System Manual and the HP ATLAS Language Manual. There are two parts. Part 1 describes the Compiler, ATE and A/I Processors; Part 2 describes the HP implementation of the ATLAS language.

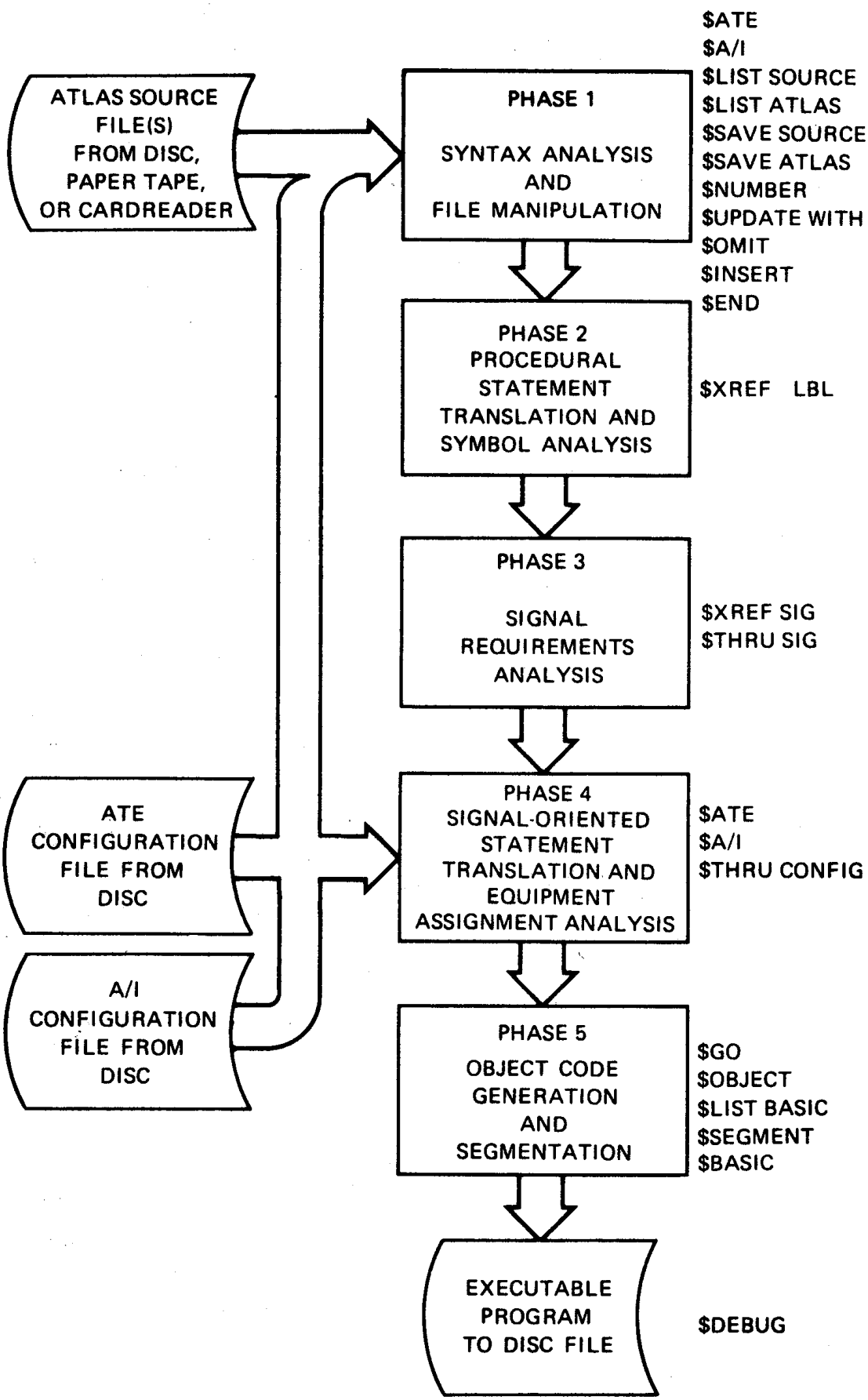
Use this book with:

HP ATLAS Compilation System Manual
P/N 92100-93001

HP ATLAS Language Manual
P/N 92100-93005

HP PART NO. 92100-93007 **Printed December, 1975.**

COMPILER BLOCK DIAGRAM



ATLAS DISC FILE USAGE

ATLAS Compiler A/I Configuration Processor ATE Configuration Processor	A A A	60 61 62
ATLAS Compiler, A/I and ATE Source Files	S	1000-32767
Executable Program output from Compiler	B	1000-32767
Data files output by Compiler, A/I and ATE Processors	D	1000-32767
Standard ATE Configuration File (Processed) (five files)	D	315-319
Standard A/I Configuration File (Processed) (two files)	D	313, 314
Standard A/I Configuration File (Source)	S	Defined at System Generation
Standard ATE Configuration File (Source) (consisting of Inserts for Device and Switch Descriptions, all Target ATE Declarations, and Insert for System Wire List)		
BASIC Source Code merged into every ATLAS Object Segment	S	60
Standard Executable ATLAS Debug Routine Standard Execution Environment Error Messages Standard System Clear Routine	B B B	63 64 66
S, B, and D type file names consist of the letter followed by a number within the range shown in the table. The letter is required when referencing a disc file.		

CONTROL STATEMENT DEFINITIONS

[ ] enclose optional elements of the control statement.

Where a comma is shown, a comma and space or a space can be used.

range term can consist of a statement number or beginning and ending statement numbers.

Sfile name of an ATLAS, ATE, A/I, or BASIC language source-type disc file.

Bfile name of a BASIC executable-type disc file.

Dfile name of an ATE or A/I data-type disc file.

file dev. mnemonic for file device:

TTY = *keyboard*	**MT** = *magnetic tape (positioned file)*
CRD = *cardreader*	**PUN** = *paper tape punch*
RDR = *paper tape photoreader*	**LP** = *line printer*

The **$** should be in column 1; no blanks may appear between **$** and control statement name.

The @ symbol displayed on the operator output device indicates that the processor will accept a control or language statement.

SOURCE INPUT

$INSERT Sfile/file dev. [,range] *name source file*
$UPDATE WITH Sfile/file dev. *name update file*
$OMIT range *omit statement(s) from Insert file*
$END *force end-of-file*

Accepts input until TERMINATE $, then proceeds with compilation.

TARGET SYSTEM CONFIGURATION

$A/I Dfile *name target A/I configuration*
$ATE Dfile *name target ATE configuration*

Compiler: If both not included, default to $A/I D313, $ATE D315.
If only $A/I, $ATE default to file referenced in A/I Configuration.
If only $ATE, switching allocation not performed.
A/I Processor: Default to $A/I D313, $ATE D315.
ATE Processor: Default to $ATE D315.

LISTING

$LIST option [,Sfile/file dev.] *default $LIST Preferred LP*
$LIST option OFF *disables default or selected listing*
option = **ATLAS** *list Preferred ATLAS form*
= **BASIC** *list ATLAS/BASIC Interleaved*
= **SOURCE** *list source as input*
= **A/I** *list Preferred form*
= **ATE** *list Preferred form*
$XREF option [,option]
option = **LBL** *list all ATLAS, ATE, and A/I programmer symbols*
= **SIG** *list summary of requested signals*
$NUMBER [test increment [,step increment]] *default $NUMBER 1, 1*

OUTPUT

$SAVE option Sfile/file dev.
$SAVE option OFF *disable selected save operation*
option = **ATLAS** *save Preferred ATLAS form*
= **SOURCE** *save as input*
= **A/I** *save Preferred form*
= **ATE** *save Preferred form*
$OBJECT Bfile *output BASIC executable code; names first designation file*
$GO Bfile *output BASIC executable code, then executes test program*
$THRU option [,MAX = no. of errors]
option = **SIG** *stop after signal requirements analysis, phase 3*
= **CONFIG** *stop after equipment assignment analysis, phase 4*
= **MAX = n** *stop at end of phase when total number of errors detected*
$BASIC Sfile *output BASIC in source form; names first designation file*
$SEGMENT [percent file fill] *default $SEGMENT 90*
$SEGMENT OFF
$DEBUG [OFF] *during execution, print values of M, GO, HI, LO, NOGO,statno each time HI, LO, GO, NOGO tested or changed.*

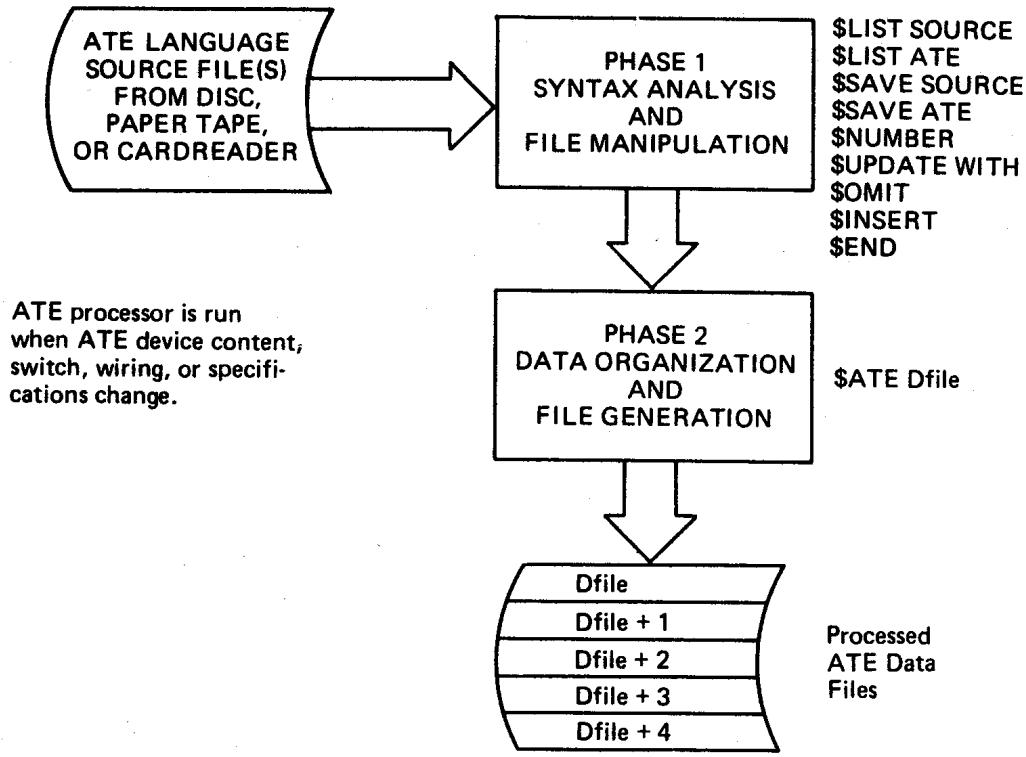
ATLAS BATCH

Execute the Compiler, enter **$BATCH** to execute ATLAS Batch Processor, then enter Sfile name of Batch Control File. Unique control statements for ATLAS Batch Processor are:

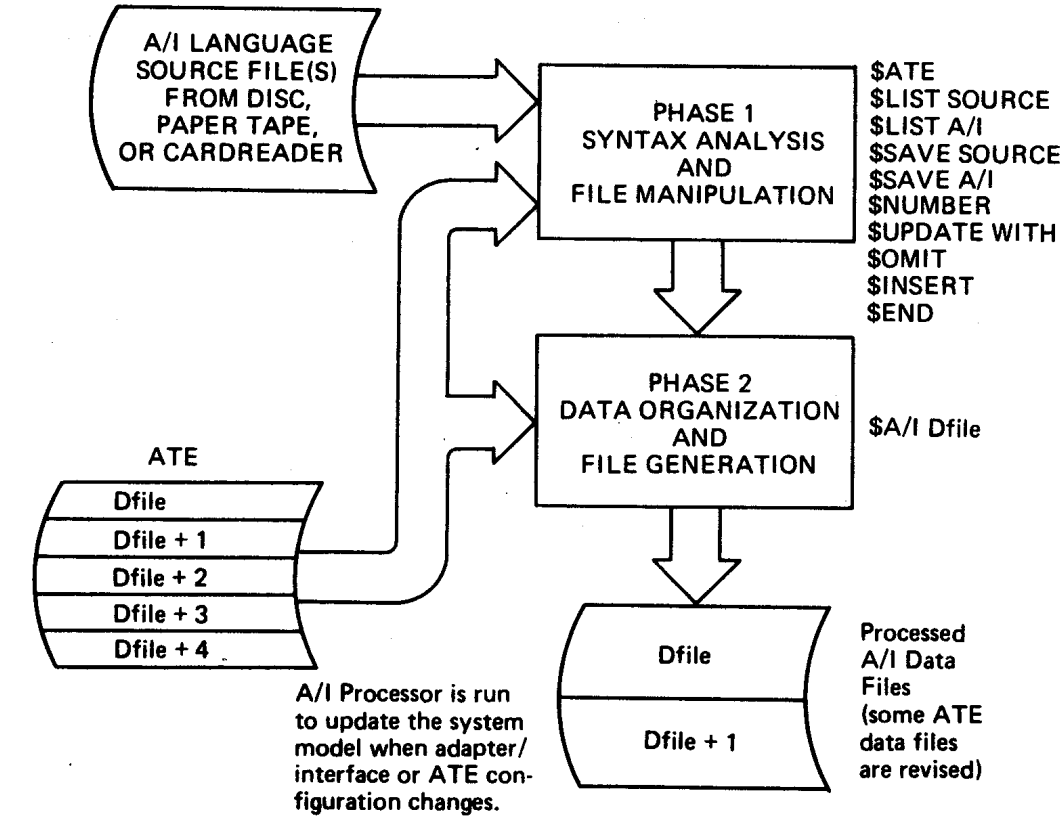
$ATE Sfile/file dev. *name ATE Configuration source, execute ATE Processor*
$A/I Sfile/file dev. *name A/I Configuration source, execute A/I Processor*
$ATLAS Sfile/file dev. *name ATLAS source, execute Compiler*
$END *end of Batch Control File*

All other control statements operate as described above.

ATE CONFIGURATION PROCESSOR OPERATION



A/I CONFIGURATION PROCESSOR OPERATION



CONTROL STATEMENT SUMMARY

CONTROL STATEMENT	USAGE			STATUS UPON OUTPUT			
				SAVE		LIST	
	ATLAS	A/I	ATE	Source	Preferred	Source	Preferred
$ATE	●	●	●	Y	Y	Y	Y
$A/I	●	●		Y	Y	Y	Y
$BASIC	●			Y	Y	Y	Y
$BATCH	●			N	N	N	N
$DEBUG	●			Y	N	Y	Y
$END	●	●	●	N	N	Y	N
$GO	●			Y	Y	Y	Y
$INSERT	●	●	●	N	N	Y	N
$LIST	●	●	●	Y	N	Y	N
$NUMBER	●	●	●	N	N	Y	N
$OBJECT	●			Y	Y	Y	Y
$OMIT	●	●	●	N	N	Y	N
$SAVE	●	●	●	N	N	Y	Y
$SEGMENT	●			Y	Y	Y	Y
$THRU	●			Y	N	Y	Y
$UPDATE WITH	●	●	●	N	N	Y	N
$XREF	●			Y	N	Y	N

COMPILER ERROR MNEMONICS

AJ ADJUST RATE FIELD MISSING OR IN WRONG PLACE
BG BEGIN STATEMENT OUT OF SEQUENCE
CC ERROR IN COMPILER COMMAND
CH DUPLICATE STATEMENT CHARACTERISTIC
CM STATEMENT HAS NO CNX FIELD
CN MULTIPLE CNX IN COMBINED FUNCTION/STATEMENT
CX CONTEXT ERROR
DE ILLEGAL DEVICE NAME USAGE
DD DOUBLY DEFINED SYMBOL
DI MULTIPLE DIMENSIONS FOR A CHARACTERISTIC
DM ILLEGAL DIMENSION FOR MODIFIER
DU ILLEGAL DIGITAL USAGE
EF DEFINED EVALUATION FIELD NEEDS MEAS CHAR & NOUN
EV EVALUATION FIELD ERROR
FC ILLEGAL FLAG CHARACTER
FM DEFINED CHARACTERISTIC REPEATED IN STATEMENT

FN	ILLEGAL FILE NAME USAGE
FS	SYNTAX OF COMBINED STMT/FUNC IS INCORRECT
IC	ILLEGAL CHARACTER
ID	STATEMENT HAS NO OR INCORRECT DIMENSION
IE	'ELSE' STATEMENT OUT OF CONTEXT
IN	INITIAL/BY VALUE INCOMPATIBLE WITH RANGE
IO	I/O ERROR IN COMPILER COMMAND
IS	ILLEGAL LIST SIZE OR REFERENCE
IT	ILLEGAL TOKEN GENERATED
IU	ILLEGAL STEP/CONN CONTEXT
MD	MISSING DELIMITER
ME	ILLEGAL MODIFIER COMBINATION
MF	MULTIPLE FUNCTIONS IN ONE STATEMENT
MM	STATEMENT HAS NO CHARACTERISTIC FIELDS
MR	MEASURED CHARACTERISTIC IS NOT RANGED
MS	MULTIPLE 'START'
NI	SYNTAX NOT IMPLEMENTED
NL	PROGRAMMER SYMBOL MUST BE A LIST
NM	ILLEGAL MODIFIER FOR NOUN
NN	STATEMENT HAS NO NOUN
OV	SYMBOL TABLE OVERFLOW
PD	PARAMETER MISSING DIMENSION
PI	PIN ILLEGALLY USED
PL	INCORRECT TYPE OR NUMBER OF PARAMETERS
PM	PROCEDURE DEF'N MUST OCCUR IN MAIN PREAMBLE
PR	SYMBOL REF'D BY A PERFORM IS NOT A PROCEDURE
PS	PROGRAMMER SYMBOL ERROR
RN	VARIABLE MUST BE RANGED
RP	RECURSIVE PERFORMS OF A PROCEDURE NOT ALLOWED
SE	SYNTAX ERROR
SF	PREVIOUS STMT DOESN'T REFERENCE 'SYNC WHEN'
SN	STATEMENT NUMBER ERROR
SR	'SYNC FIELD' MUST REFERENCE NEXT STATEMENT
ST	NO SIGNAL AT REFERENCED STEP
SV	SYNC FIELD ONLY VALID WITH APPLY OR ADJUST
TA	TOO MANY ARGUMENTS
TI	CNX ILLEGAL WITH TIME INTERVAL
TM	'START' OR 'STOP' WITH NO 'MEASURE' OR 'VERIFY'
TV	TIME INTERVAL/EVENTS VALID ONLY WITH MEAS/VERIF
TY	DEFINED FUNCTION TYPE & VERB ARE INCOMPATIBLE
UF	UNDEFINED FUNCTION
UK	UNRECOGNIZED KEYWORD
UR	UNDEFINED STEP REFERENCE
UV	UNRECOGNIZED VERB
VS	TO STATEMENT NOT PRECEDED BY ADJUST STATEMENT
VT	DEFINED FUNCTION TYPE & VERB ARE INCOMPATIBLE
XE	END STATEMENT OUT OF SEQUENCE
XR	ILLEGAL EXTERNAL REFERENCE

ATE ERROR MNEMONICS

AS	MUST OCCUR AFTER DEF SW OR MACRO
BC	MUST OCCUR IN SW DEF OR WIRE
DØ	NO DEVICE NAMES DEFINED YET
DD	DOUBLY DEFINED SYMBOL
DS	MUST OCCUR AFTER SPEC CON OR MACRO
DV	MUST BE ASSOCIATED WITH DEVICE
IK	ILLEGAL KEYWORD IN CONTEXT
IM	ILLEGAL MACRO VARIABLE REFERENCE
KY	CAN ONLY APPEAR IN DEVICE MACRO
MØ	NO MACROS DEFINED YET
MA	MUST OCCUR AFTER SPECIFY OR ANOTHER MACRO
MC	MUST OCCUR IN MACRO
MN	MACRO NAME NOT DEFINED YET
MP	NO MATCHING PIN NAME
ND	DECLARED DEVICE NOT FOUND
NP	CNX PIN NAME NOT FOUND IN SPECIFY CONTACTS LIST
PE	DECLARE DEVICE PIN COUNT #SPECIFY CONTACTS COUNT
SC	MUST OCCUR AFTER DEFINE DEVICE
SL	FUNCTION TYPE CONFLICTS BETWEEN SPECIFY DEVICES
SM	MUST OCCUR AFTER SPECIFY AND BEFORE MACRO
SQ	SEQ ERR:DEFINE(DEV,SW), DECLARE(DEV,SW,PANL),WIRE
SW	MUST BE ASSOCIATED WITH SWITCH
UD	DECLARED/DEFINED DEVICE NAME NOT UNIQUE
UM	DEFINED MACRO NAME NOT UNIQUE FOR DEVICE
UP	DECLARED/SPECIFIED PIN NAME NOT UNIQUE

A/I ERROR MNEMONICS

DP	PIN NAME NOT PREVIOUSLY DECLARED
IP	INSTRUMENT PIN NAME NOT DECLARED
IT	ILLEGAL TOKEN IN THIS CONTEXT
NA	NAME IN END NOT THE SAME AS IN THE DEFINE
NC	MORE THAN 16 CHARACTERS IN NAME
NS	NO SWITCH BY THAT NAME WAS DECLARED
OV	HASH TABLE OVERFLOW
PB	PIN NAME LONGER THAN 16 CHARACTERS
PN	MUST HAVE EVEN NUMBER OF PIN NAMES
PU	PIN NAME NOT PREVIOUSLY DECLARED
SØ	NO SWITCHES DEFINED YET
SD	DEVICE NAME NOT PREVIOUSLY DECLARED
SI	ILLEGAL SYMBOL
US	NON-UNIQUE USE OF SYMBOL

NOTE: Some error mnemonics for ATE and A/I Processors are found in the Compiler Error Mnemonic List.

ATLAS VERB INDEX

fstatno represents the flag and statement number fields.

If included, the flag character must appear in column 1. If no flag, column 1 must be first digit of statement number or blank.

statno = statement number = XXXXYY, where XXXX is the test number and YY is the step number. If the test number is the same as previous statement, the statement number can be shortened to YY. The step number may be input as YY.YY to insert a numbered statement between consecutively numbered statements.

All HP ATLAS verbs are listed in the above index and described by syntax diagrams in the following pages. The main diagram is named for the verb(s) it describes.

Terms enclosed in single quotes, as **'label'** represent a programmer defined label or name that consists of up to 16 alphanumeric and special characters.

UUT pin names are up to 16 characters not enclosed by quotes. Legal characters are letters, numbers, and . + - * =. A pin name must begin with a letter, and if more letters follow, the string cannot duplicate an ATLAS keyword.

 in diagrams represents an HP ATLAS subdiagram that expands statement elements which can be used in that location. All HP ATLAS subdiagrams are listed in the above index.

 represents a branch in the diagram. Any branch can be taken depending upon statement requirements.

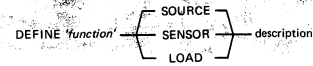
A conditional branch in the diagram is noted by **(1)** or **(2)** . . . near the branch path and explained in note below diagram.

 indicates a branch which may be taken for programmer convenience to allow omission of a term. The statement is reconstructed to include the term in the Preferred outputs.

 represents an HP extension to ARINC ATLAS. Statements using these features are noted with an EX message in the Preferred listing.

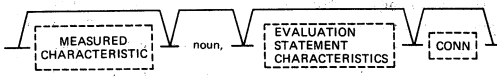
 represents a loop in the diagram. The portion between the origin and destination of the arrow can be repeated as many times as necessary to complete the statement.

------ dashed lines in the diagram represent constructions legal only in defined procedures.



'function' can be any programmer symbol

description can consist of



The sequence

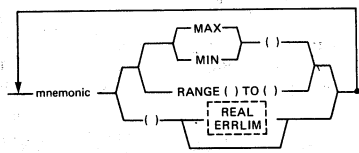
```
(1)  DEFINE 'ACOUT' SENSOR, AC SIGNAL, VOLTAGE MAX 10V $
       :
(2)  MEASURE (FREQ) 'ACOUT' FREQ RANGE 5 KHZ TO 8 KHZ
            CNX HI J2 LO J3 $
```

will be compiled as

```
(3)  MEASURE (FREQ), AC SIGNAL, VOLTAGE MAX 10V,
          FREQ RANGE 5 KHZ TO 8 KHZ,
            CNX HI J2 LO J3 $
```

Strict character substitution occurs. The resulting signal-oriented statement must be syntactically correct.

CONSTANTS IN SIGNAL-ORIENTED STATEMENT



( ) indicate that constant dim will be contained in the signal-oriented statement. No ( ) allowed in Real Errlim.

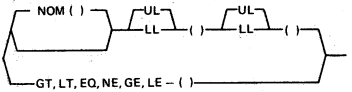
( ) indicate that uut pin name will be contained in the signal-oriented statement.

The sequence

```
(4)  DEFINE 'ACOUT' SENSOR, AC SIGNAL, FREQ RANGE ( ) TO ( )
                                       VOLTAGE MAX 10 V
       :                                  CNX HI ( ) LO ( ) $
(5)  MEASURE (FREQ) 'ACOUT' 5 KHZ, 8 KHZ, J2, J3 $
```

will be compiled same as (3) above. Constant dim terms not preceded by mnemonics in the signal-oriented statement are substituted for ( ) in the sequence they appear.

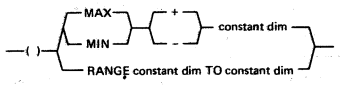
For the Evaluation Field Portion, if any



( ) indicate that a variable dim or a constant dim will be contained in the signal-oriented statement. The Evaluation Field must be in the above form when included in the description field.

VARIABLES IN SIGNAL-ORIENTED STATEMENT

If a variable is used for a signal value in a signal-oriented statement, the characteristic must be ranged. If a variable is supplied by the signal-oriented statement, use the following construction.



( ) indicate that variable dim or constant dim will be contained in the signal-oriented statement.

The sequence

```
DEFINE 'ACIN' SOURCE , AC SIGNAL, VOLTAGE ( ) MAX 10V,
                                  FREQ ( ) RANGE 5 KHZ TO 8 KHZ
                                    CNX HI ( ) LO ( ) $
   :
APPLY 'ACIN' 'X' V, 'Y' KHZ, J4-1, J4-2 $
```

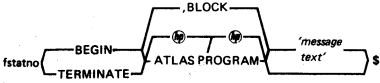
If **'X' = 5** and **'Y' = 7**, the statement will be compiled as:

```
APPLY VOLTAGE 5 V, FREQ 7 KHZ
  CNX HI J4-1 LO J4-2 $
```

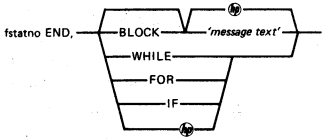
TO DESIGNATE A SIGNAL SITUATION

When an identical defined *'function'* programmer symbol appears in multiple signal-oriented statements, the compiler performs resource allocation based on the summary of the signal requirements of all these statements. If allocation is successful, a single set of ATE resources will be assigned for all signal-oriented statements that use an identical defined *'function'* programmer symbol.

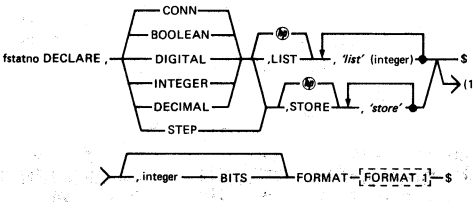
BEGIN-TERMINATE



END



DECLARE

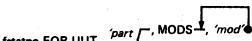


(1) Branch used for DIGITAL construct only.

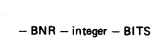
CONN construct Legal in Procedures and in preamble FILL statements.
STEP construct Legal in Procedures Only.

No arithmetic manipulation is allowed on CONN and STEP parameter.

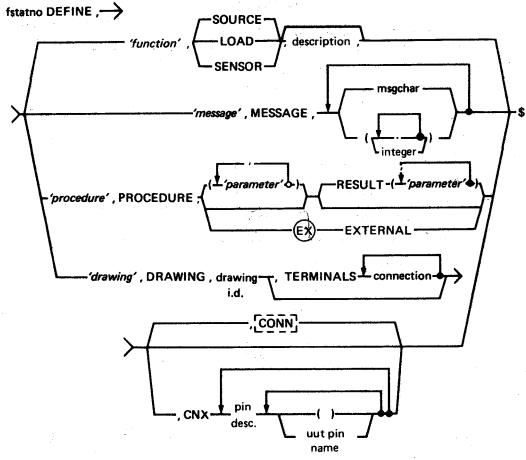
FOR UUT



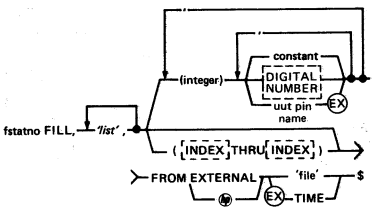
FORMAT 1



DEFINE



FILL



FINISH

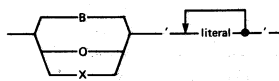
fstatno FINISH $

LEAVE-RESUME

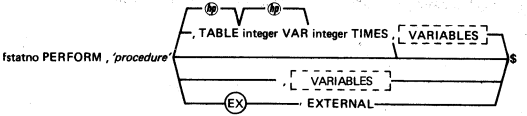
fstatno LEAVE ATLAS $

fstatno RESUME ATLAS $

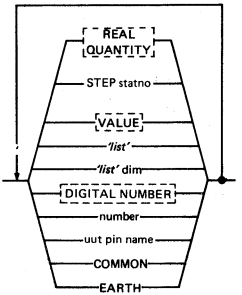
DIGITAL NUMBER



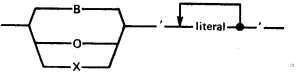
PERFORM



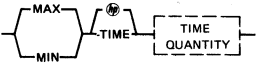
VARIABLES



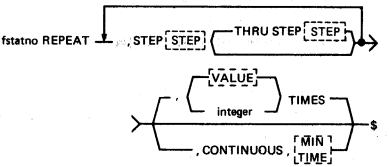
DIGITAL NUMBER



MAX-TIME MIN-TIME

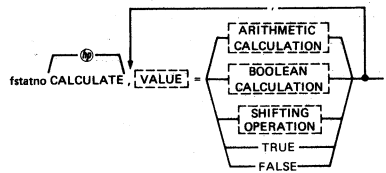


REPEAT

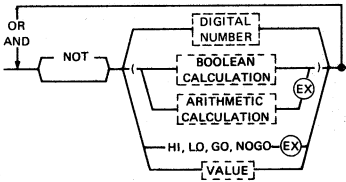


SAVE

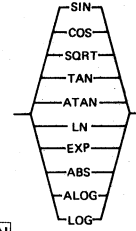
CALCULATE



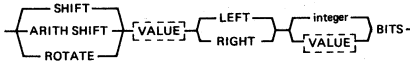
BOOLEAN CALCULATION



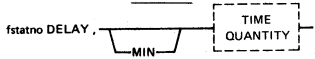
MATHEMATICAL FUNCTION



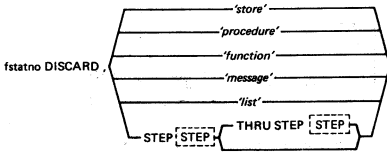
SHIFTING OPERATION



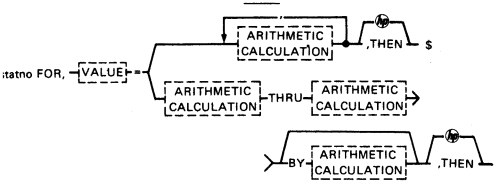
DELAY



DISCARD



FOR



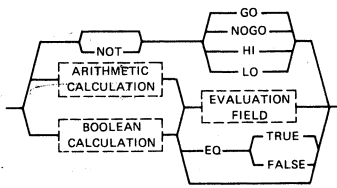
IF

ELSE

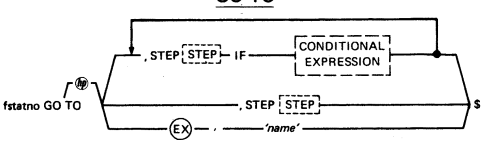
fstatno ELSE $

WHILE

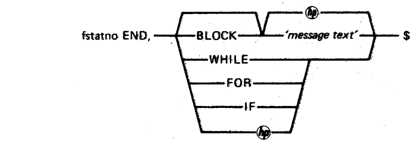
CONDITIONAL EXPRESSION



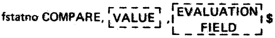
GO TO



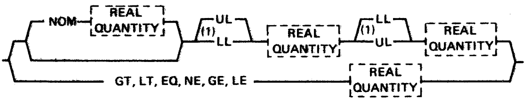
END



COMPARE



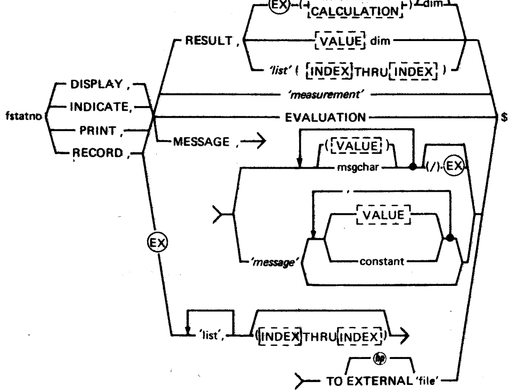
EVALUATION FIELD



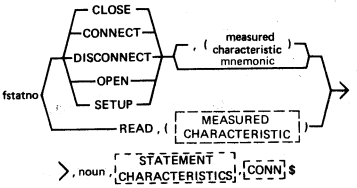
(1) Legal combinations are:

UL - LL
LL - UL

DISPLAY-INDICATE-PRINT-RECORD

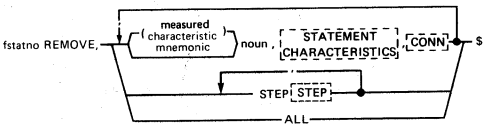


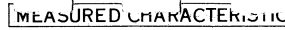
CLOSE-CONNECT-DISCONNECT
OPEN-SETUP-READ



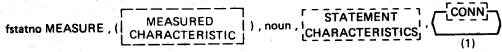
APPLY

REMOVE



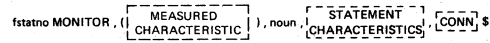


MEASURE

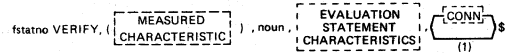


(1) Time only

MONTOR

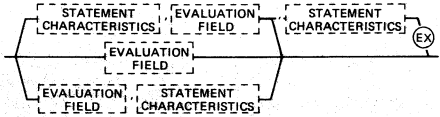


VERIFY

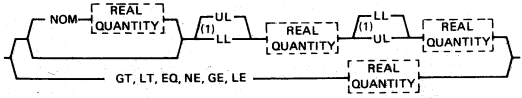


(1) Time only

EVALUATION STATEMENT CHACTERISTICS



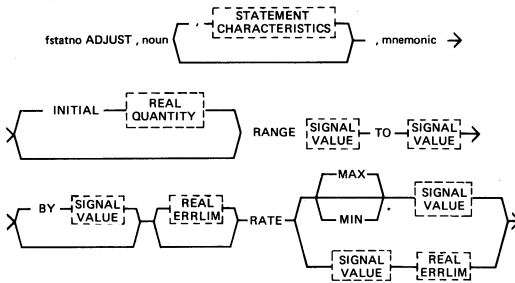
EVALUATION FIELD



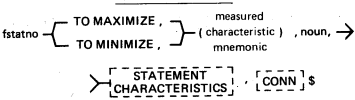
(1) Legal combinations are:.

UL - LL
LL - UL

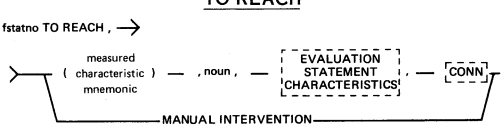
ADJUST



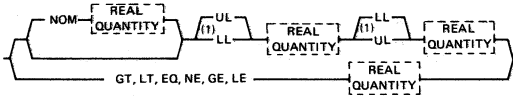
TO MAXIMIZE
TO MINIMIZE



TO REACH



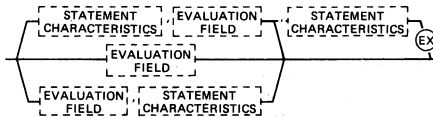
EVALUATION FIELD



(1) Legal combinations are:

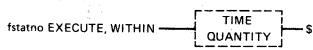
UL - LL
LL - UL

EVALUATION STATEMENT CHACTERISTICS

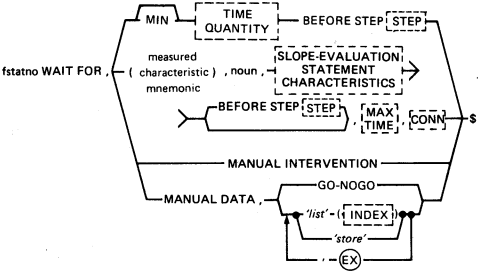


PREPARE

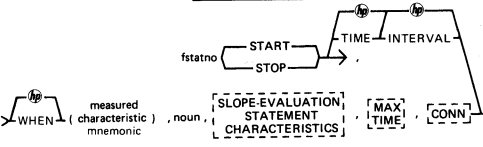
EXECUTE



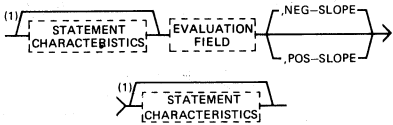
WAIT FOR



START-STOP

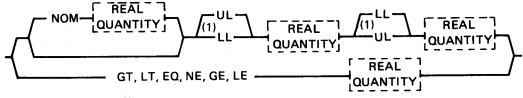


SLOPE-EVALUATION STATEMENT CHARACTERISTICS



(1) If used, specify statement characteristics only once.

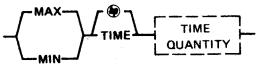
EVALUATION FIELD



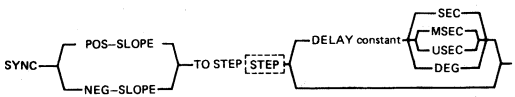
(1) Legal combinations are:

UL - LL
LL - UL

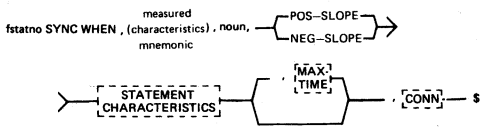
MAX-TIME MIN-TIME



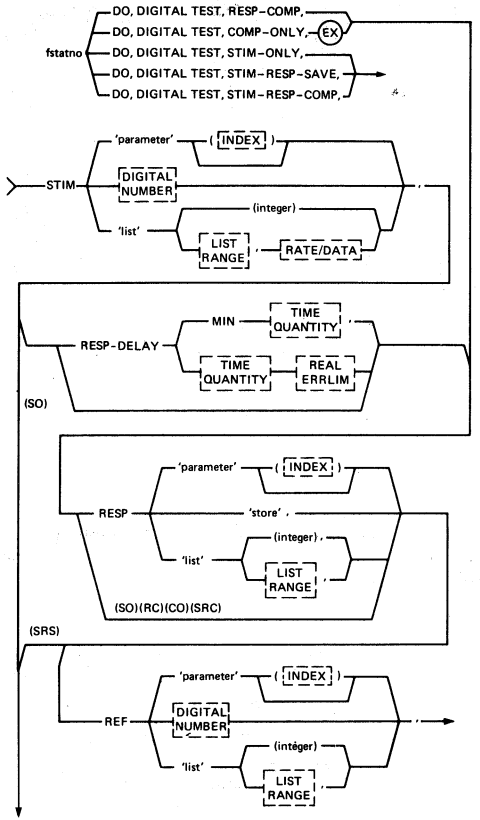
SYNC SUBFIELD

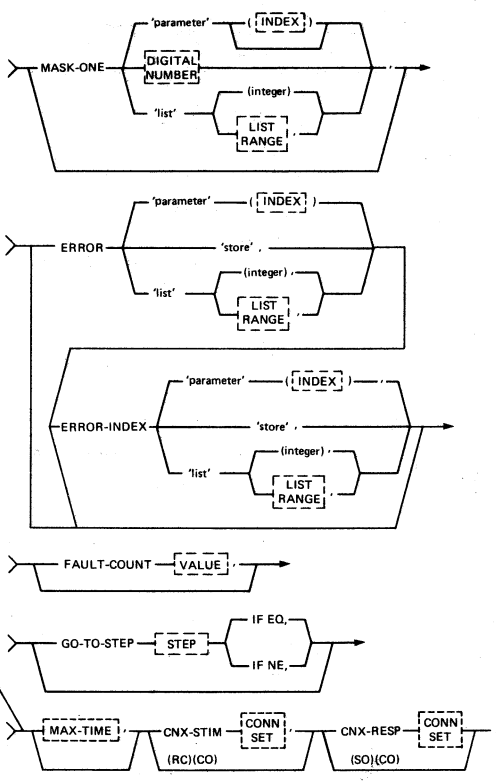


SYNC WHEN



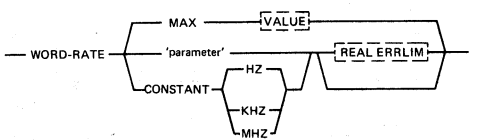
DO


fstatno
DO, DIGITAL TEST, RESP-COMP,
DO, DIGITAL TEST, COMP-ONLY,
EX
DO, DIGITAL TEST, STIM-ONLY,
DO, DIGITAL TEST, STIM-RESP-SAVE,
DO, DIGITAL TEST, STIM-RESP-COMP,
STIM
'parameter'
INDEX
DIGITAL NUMBER
'list'
(integer)
LIST RANGE
RATE/DATA
RESP-DELAY
MIN
TIME QUANTITY
REAL ERRLIM
(SO)
RESP
'store'
(SO)(RC)(CO)(SRC)
(SRS)
REF

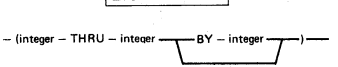


(SO) Path used for STM-ONLY
(SRS) Path used for STM-RESP-SAVE
(RC) Path used for RESP-COMP
(CO) Path used for COMP-ONLY
(SRC) Path used for STM-RESP-COMP

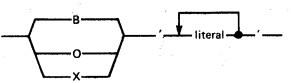
RATE/DATA



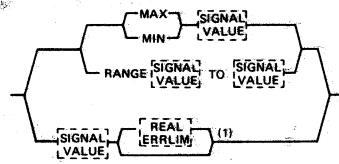
LIST RANGE



DIGITAL NUMBER

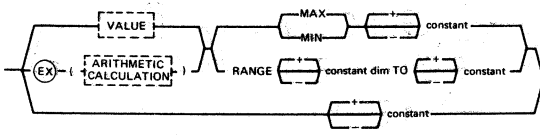


REAL CHARACTERISTIC SUBFIELD

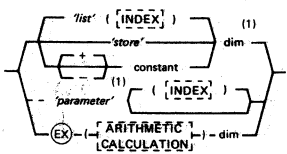


(1) Used to describe source characteristics

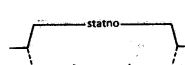
SIGNAL VALUE



REAL QUANTITY
TIME QUANTITY

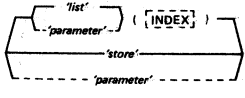


STEP

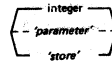


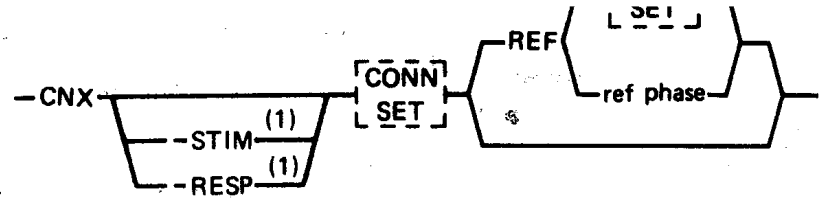
(1) For time quantity dim must be positive SEC,MSEC,USEC.

VALUE



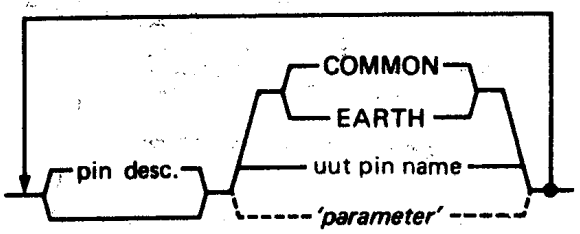
INDEX





(1) Used only with DO, DIGITAL.

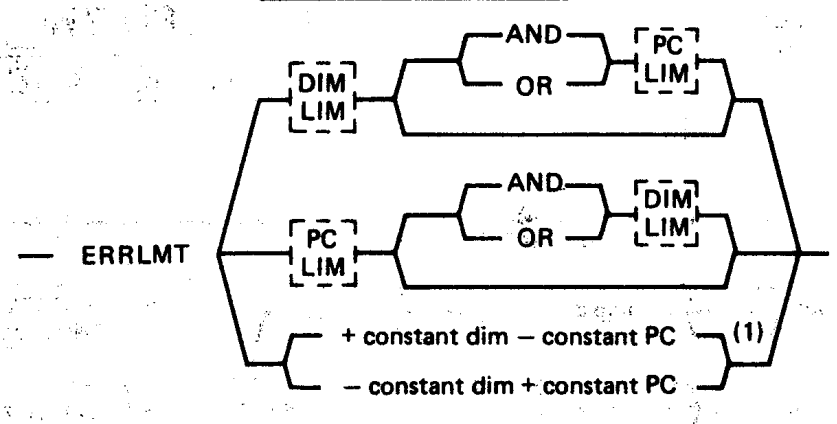
CONN SET



ATLAS PIN DESCRIPTORS

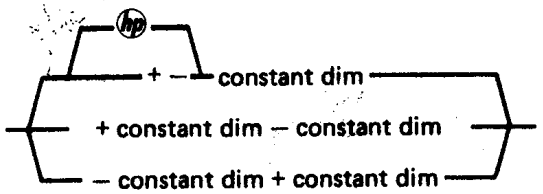
HI, LO
VIA
A, B, C, N
X, Y, Z
S1, S2, S3, S4
R1, R2, R3, R4
TRUE, COMPL

REAL ERRLIM



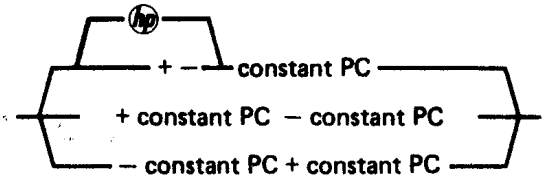
(1) Order of dim and PC can be reversed

DIM LIM



dim cannot be PC

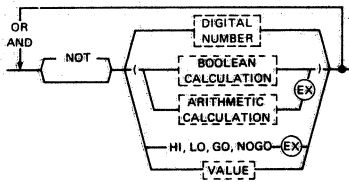
PC LIM



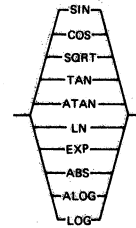
HP ATLAS KEYWORD LIST

A
ABS
AB
AC
ADJUST
ALL
ALT
ALTER
ALOG
AM
AMPL
AND
ANGLE
APPLY
ARITH
ASCII
ASYM
ATAN
ATLAS
AV
B
BANDWIDTH
BCD
BEFORE
BEGIN
BIP
BIT
BITS
BLOCK
BNR
BOOLEAN
BSM
BY
B1C
B2C
BA
BC
C
CALCULATE
CAP
CAR
CA
CB
CHAR
CLASS
CLOSE
CNX
COMMON
COMP
COMPARE
COMPL
CONN
CONNECT
CONTINUOUS
CONTROL
COUNT
COS
CURRENT
CYCLE
D
DATA
DAY
DB
DBK
DBM
DBW
DC
DECIMAL
DECLARE
DECREASING
DEFINE
DEG
DEGEN
DELAY
DENS
DEV
DEVICE
DIGITAL
DIGITS
DISCARD
DISCONNECT
DISPLAY
DISS
DIST
DISTORTION
DO
DRAWING
DROOP
DUTY
E
EARTH
ELSE
END
EQ
EQUIP
ERRLMT
ERROR
EVALUATION
EVENTS
EXECUTE
EXP
EXTERNAL
F
FACTOR
FALL
FALSE
FAULT
FD
FILL
FINISH
FIRST
FM
FOR
FORMAT
FREQ
FROM
G
GE
GHZ
GO
GROUND
GT
H
HARMONICS
HI
HR
HZ
I
IF
IMP
IMPEDANCE
IN
INCREASING
IND
INDEX
INDICATE
INHG
INITIAL
INTEGER
INTERVAL
INTERVENTION
INTO
J
JIT
K
KHZ
KOHM
KPPS
KV
KW
L
LE
LEAVE
LEFT
LENGTH
LIN
LIST
LL
LMT
LN
LO
LOAD
LOG
LOGIC
LSB
LT
M
MA
MANOMETRIC
MANUAL
MASK
MAX
MAXIMIZE
MB
MEASURE
'MEASUREMENT'
MESSAGE
MH
MMHG
MHZ

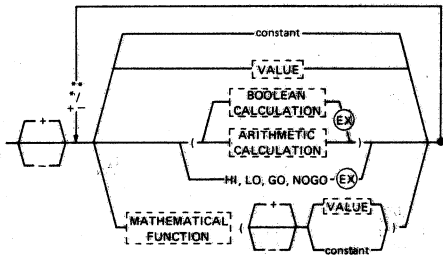
BOOLEAN CALCULATION



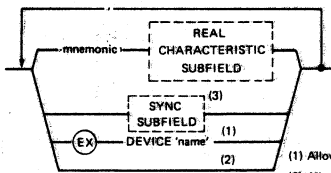
MATHEMATICAL FUNCTION



ARITHMETIC CALCULATION



STATEMENT CHARACTERISTICS



(1) Allowed only in DEFINE statements.

(2) Allowed only with nouns COMMON, EARTH, SHORT.

(3) SYNC SUBFIELD used only in APPLY.

MIN	PRINT	SETUP	UV
MINIMIZE	PROCEDURE	SHIFT	UW
MOD	PROGRAM	SHORT	V
MODS	PSEC	SIGNAL	VALUE
MOHM	PULSE	SIN	VAR
MONITOR	PULSED	SKEW	VERIFY
MRAD	PULSES	SLOPE	VIA
MSB	PWR	SOURCE	VOLT
MSEC	Q	SP	VOLTAGE
MSGCHAR	QUAD	SPECIFY	VOLTS
MV	QUIES	SQRT	W
MW	R	SQUARE	WAIT
N	RAD	START	WAVE
NAME	RAMP	STEP	WHEN
NE	RANDOM	STIM	WHILE
NEG	RANGE	STOP	WIDTH
NFD	RATE	STORE	WITHIN
NOISE	RATIO	SUP	WORD
NOGO	REACH	SYNC	X
NOM	READ	SYNCHRO	XOR
NON	RECORD	S1	Y
NOT	REF	S2	Z
NRZ	REFERENCE	S3	ZERO
NSEC	REMOVE	S4	0
O	REPEAT	T	1
OFFSET	RES	TABLE	2
OHM	RESP	TAN	3
OMIT	RESID	TERMINALS	4
ONE	RESOLVER	TERMINATE	5
ONLY	RESULT	TEST	6
OPEN	RESUME	THEN	7
OR	RIGHT	THRU	8
OVERSHOOT	RINGING	TIME	9
P	RISE	TIMES	*
PAM	RMS	TO	=
PARALLEL	ROTATE	TRANS	+
PC	ROTATION	TRANSITION	-
PEAK	ROUNDING	TRIANGULAR	$
PERFORM	RZ	TRIG	/
PERIOD	R1	TRMS	(
PFD	R2	TRUE	)
PHASE	R3	TYPE	[
POS	R4	U	]
POWER	S	UA	**
PP	SAMPLE	UFD	+-
PPS	SAVE	UH	.
PREPARE	SEC	UL	,
PRESHOOT	SENSOR	UNDERSHOOT	(blank)
PRESS	SERIAL	USEC	%
PRF	SETTLE	UUT	

MATHEMATICAL FUNCTION VALUES

Name	Argument (A) Range	Function (F) Range
ABS	-X<A<X	0<F<X
ALOG	-X<A<X	0<F<X
ATAN	-X<A<X	-90<F<90, degrees
COS	-X<A<X, degrees	-1<=F<=1
EXP	-X<A<X	0<F<X
LN	0<A<X	-X<F<X
LOG	0<=A<X	-X<F<X
SIN	-X<A<X, degrees	-1<=F<=1
SQRT	0<=A<X	0<=F
TAN	-X<A<X, degrees	-X<F<-X

X equals largest possible value, 1.6E+-38

Fold out for page 32.

LANGUAGE — NOUN MODIFIER DIMENSION COMBINATIONS

HP ATLAS NOUN-MODIFIER-DIMENSION COMBINATIONS