**Action Grammar**

**Constants**

NumConst -> DecNum

-> HexNum

-> Char

DecNum -> Digit

-> DecNum Digit

HexNum -> ‘$’ HexDigit

-> HexNum HexDigit

HexDigit -> Digit

-> ‘A’

-> ‘B’

-> ‘C’

-> ‘D’

-> ‘E’

-> ‘F’

Digit -> ‘0’

->’1’

->’2’

->’3’

->’4’

->’5’

->’6’

->’7’

->’8’

->’9’

Char -> ‘’’ <any printable character>

Sting Constants

StrConst -> ‘”’ String

String -> StrChar

->String StrChar

StrChar -> <all characters except “>

Compiler Constants

CompConst -> BaseCompConst

->CompConst ‘+’ BaseCompConst

BaseCompConst -> Ident

-> NumConst

-> PtrRef

-> ‘\*’

Operators

SpecialOps -> AND

-> OR

-> ‘&’

-> ‘%’

RelOps -> XOR

->’!’

-> ‘=’

-> ‘#’

-> ‘>’

-> ‘<’

-> ‘<>’

-> ‘>=’

-> ‘<=’

AddOp -> ‘+’

-> ‘-‘

MultOp -> ‘\*’

-> ‘/’

-> ‘/’

-> MOD

-> LSH

-> RSH

Urinary -> ‘@’

-> ‘-‘

Fundamental Data Types

FundType -> CHAR

->BYTE

->CARD

->INT

ACTION! Program Structure

Program -> Program MODULE ProgModule

-> MODULE ProgModule

-> ProgModule

ProgModule -> SysDecls RoutineList

Declarations

SysDecls -> SysDecl

-> SysDecls SysDecl

SysDecl -> DefineDecl

-> TypeDecl

-> FundDecl

-> PointerDecl

-> ArrayDecl

-> RecordDecl

Define Directive

DefineDecl ->DEFINE DefList

DefList -> Def

-> DefList ‘,’ Def

Def -> Identfier ‘=’ Constant

TYPE Declaration (for Record)

TypeDecl -> TYPE RecIdentList

RecIdentList ->RecIdentList RecIdent

->RecIdent

RecIdent

-> RecName ‘=’ ‘[‘ FieldInit ‘]’

RecName -> Ident

FieldInit -> FundVarDecl

Variable Declarations

VarDecl -> VarDecl BaseVarDecl

-> VarDecl ‘,’ BaseVarDecl

-> BaseVarDecl

BaseVarDecl -> FundDecl

-> PointerDecl

-> RecordDecl

-> ArrayDecl

Variable Declarations for Fundamental Data types

FundDecl -> FundType FundIdentList

FundType -> CARD

-> INT

-> BYTE

-> CHAR

FundIdentList

-> FundIdent

-> FundIdentList ‘,’ FundIdent

FundIdent -> Ident ‘=’ InitOpts

-> Ident

InitOpts -> Address

-> ‘[‘ Value ‘]’

Address -> CompConst

Value -> NumConst

Variable declartions for Pointers

PointerDec

-> PtrType POINTER PtrIdentList

PtrType -> FundType

->RecName

PtrIdentList

-> PtrIdent

-> PtrIdentList ‘,’ PtrIdent

PtrIdent -> Ident

-> Ident ‘=’ Value

Variable Declarations for Arrays

ArrayDecl ->FundType ARRAY ArrList

ArrIdentList -> ArrIdent

-> ArrIdentList ‘,’ ArrIden

ArrIdent

-> Ident

-> Ident ‘(‘ Dim ‘)’

-> Ident ‘=’ ArrInitOps

-> Ident ‘(‘ Dim ‘)’ ‘=’ ArrInitOps

Dim -> NumConst

ArrInitOpts -> Address

-> ‘[‘ ValueList ‘]’

-> StrConst

ValueList -> Value

-> ValueList Value

Value -> CompConst

Variable Declarations for Records

RecordDecl -> Ident RecIdentLst

RecIdentLst -> RecIdent

-> RecIdentLst ‘,’ RecIdent

RecIdent -> Ident

-> Ident ‘=’ Address

Address -> CompConst

Variable References

Memory References

MemRef -> MemContents

-> ‘@’ Ident

MemContents -> FundRef

-> ArrRef

-> PtrRef

-> RecRef

Fundref ->Ident

ArrRef -> Ident ‘(‘ ArithExpr ‘)’

PtrRef -> Ident ‘^’

RecRef -> Ident ‘.’ Ident

Action Routines

RoutineList -> Routine

-> RoutineList Routine

Routine -> ProcRoutine

-> FuncRoutine

Proceedure Structure

ProcRoutine

-> ProcDecl LocVar Statements Return

LocalVar -> SysDecls

-> e

Statements -> StmList

-> e

Return ->RETURN

-> e

ProcDecl

->PROC Ident ProcInit ‘(‘ Params ‘)’

ProcInit -> ‘=’ Address

-> e

Params -> ParamDecl

-> e

Address -> CompConst

Function Struture