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IMPLEMENTATION PROCEDURES FOR IDPAC

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Implementation Procedures for IDPAC

The purpose of this document is to describe how to install the program package IDPAC in an arbitrary computer system. It will neither discuss how to use IDPAC, nor how its individual component subroutines function.

- 1) Introduction
- 2) Multiple Entry Points
- 3) Building a Binary Library File
- 4) Segmenting IDPAC
- 5) Implementation Order and Test Procedure
- 6) Subroutine Summaries
- 7) Subroutine Calls (Top-Down)
- 8) Subroutine Calls (Bottom-Up)
- 9) COMMON Block References
- 10) Referenced COMMON Blocks

1) Introduction

=====

IDPAC consists of about 300 subroutines, which with very few exceptions are written in standard FORTRAN IV and a limited number of system dependent interface routines.

To implement IDPAC, the following hardware/software requirements should be met:

- a) a fast mass storage device (disk)
- b) a visual display unit
- c) a keyboard unit
- d) a terminal printer unit
- e) a line printer
- f) at least about 64 kB of main memory (executive not counted)
- g) an overlay or virtual memory system, since straight linkage of IDPAC would require typically 1 MB
- h) the ability to handle sequential access files

b), c) and d) may be combined into a single graphical display unit.

The job of implementing IDPAC consists mainly of administrating all these routines and gathering insight into how they are related to each other, so that your computer system may be used in an efficient way. The job of supplying the system dependent interface routines is much more limited.

Before going any further in this text you are assumed to have read the following documents:

"Implementation Procedures for INTRAC", by Tomas Schönthal,
"Implementation Procedures, Plot Routines", by Tomas Schönthal,
"File Handling in Program Packages", by Tommy Essebo, and
"Character and String Handling in INTRAC", by Tommy Essebo.

2) Multiple Entry Points

=====

Below is a list of IDPAC routines with multiple entry points.
(See also the section on multiple entry points in
"Implementation Procedures for INTRAC", the same
reasoning applies also to IDPAC as a whole.)

<u>Collective Name</u>	<u>Entry Points</u>
LOGSNI	LDKON LGRAPH LTVON

3) Building a Binary Library File

=====

For a system with a linker that sequentially scans a library file, that library file should be sorted in the following order:

IDMAIN	IDTAB	PACTAB				
CONV	DELCO	the self-contained EDCOM				
FORMAT	FTEST	LIST	MOVID			
BODE	FHEAD	PLMAG	PLOTCO			
CONC	CUT	INSI	PICK	SCALOP	SLIDE	STAT
TREND	VECOP					
ACFSP	CCFSP	DFT	FROP	IDFT	SPTRF	
CORAN	RANPAR	DSIM	FILT	RESID		
LSID	MLID	MLCOMP	MLOUT	MLPAR	FUNC	STRUC
SQR						
GSFILE	LOGPRI	HCCOM	TURN			
LAGNAM	LAGFIN	LFNAME	LPHOLL	LPAREN	LSYNAM	LINTP
LARROW	ICOLUM					
NPOL	RMISO	GETPOL	RPOIM	GETSEC	LOOKUP	BUFIN
GCOEFF	IGPOWR	LTSAMP	LEOSB	SEARCH	TCHARS	NXTLIN
SECBEG	SECEND	MISOHD	WTSAMP	WRIPOL	WPOIM	
AKAIKE	MNODI	DESYM	SOLVS	ANORM	ASPEC	CSPEC
AUCOF	CCOF	PFFT	IPFFT	BFFT	BUTTER	BAND
CUTOFF	FIFACT	HZ	GS	POLS	POLAR	CMULT
CSGFT	FIND	EIGS	INPOL	SAVGET	MCNODI	MCREDI
POLMUL	SIM	PRE	PRBSTA	WINDOW		
APPNDZ	BPATRN	FIXUP	ISBIT	IGBIT	LITOK	ITSW
ITICKS	LOGSWI	LSPAR	MADD	MMOVE	MULT	PHOLLV
PHOLL2	RMOVE	RMULT	SAMFIL	SCAPRO	SECNDS	
NEWLIN	SRCH	TCHRS				
LAGRED	LAGWRI	LAGEND	AGENTR	AGSEEK	AGSKIP	AGCLOS
ERR10	...	ERR110	ERR120	ECHSEC	FICK	DEFIT
MATOUT	RESDIS	WRIBUF	MCBUF	WRMSG	WVALUE	PHOLLV
PHOLL2	WFBUFF					

Plot package

The self-contained INTRAC

4) Segmenting IDPAC

=====

To save memory, IDPAC may be segmented according to the table below. The slashes delimit segments that may overlay each other, i.e. execute in the same memory space. E.g. segments S101 and S102 are completely independent of each other. The sentence "Beyond .." delimit groups of segments that may not overlay each other. E.g. segments S101 and S102 may not overlay each other. However, segments S101 and S201 may overlay each other.

(See also "Implementation Procedures for INTRAC", the general reasoning also applies to IDPAC, with the reservation that its proposed segmentation might contradict that of IDPAC as a whole.)

Segment Relations

RESIDENT CODE

Beyond RESIDENT CODE:
S101/ S102/ .../ S123

Beyond max(S101, S102, ..., S123):
S201/ S202/ .../ S208/ S302/ S305

Beyond S202:
S301

Beyond max(S107, S108, S114, S202):
S304

Beyond S204:
S401/ S402/ S403/ S404/ S405

Segment Definitions

RESIDENT CODE

IDMAIN	IDTAB	PACTAB	INTTAB	PLCTAB	FILTAB
text string decoding/encoding routines					
file routines, plot interface routines					

S101

EDCOM

S102

	CONV	FHEAD	FTEST	LIST			
S103	DELCO	FORMAT	MOVID	TURN			
S104	PLOTCO						
S105	PLHAG						
S106	BODE						
S107	RESID						
S108	INSI						
S109	CONC	CUT	PICK	SLIDE			
S110	SCALOP	TREND	VECOP				
S111	ACFSP	STAT					
S112	FROP	SPTRF					
S113	FILT						
S114	CORAN						
S115	EIGS	MLID					
S116	STRUC						
S117	SQR						
S118	LSID						
S119	Reserved for the system dependent GSFIL routine						
S120	CCFSP						
S121	DSIM						
S123	DFT	IDFT					
S201	ERROR						
S202	MLCOMP						
S203	MLOUT	SECBEG	SECEND	WRIFOL			
S204	COMLIN	INTRAC	MACHDL	RECLIN	RESEX	SUBST	

S205

AGCLOS	LAGFIN	LAGNAM	LAGRED	LAGWRI
LFINAM	LFNAME	LINTP	LPHOLL	LSYNAM

S206

AREA	ARCORN	LINECM	LINETO	LINEXY	LINEY
MINMAX	MARGIN	MOVECM	MOVETO	OFNEF	PLINIT
PLRSET	PLSTOP	XAXIS	XCCORD	XSCAL	XSCORD
YAXIS	YCCORD	YSCAL	YSCORD		

S207

Reserved for the system dependent HCCOM routine

S208

BUFIN	GETPOL	MLPAR	NPOL	NXTLIN	SEARCH
-------	--------	-------	------	--------	--------

S301

FUNC

S302

FIXUP	LSPAR	MULT	SRCH
-------	-------	------	------

S304

CSGFT	DESYM	MCNODI	MCREDI	SOLVS
-------	-------	--------	--------	-------

S305

AUCOF	CCOF	SIM	WINDOW
-------	------	-----	--------

S401

WRITEX

S402

FORMAC	READX
--------	-------

S403

LET	MACEND
-----	--------

S404

FORNXT	IFGOLA
--------	--------

S405

FREE	RESUME	SWITCH
------	--------	--------

IDPAC's source code does in no way reflect the segmentation of the runnable program. E.g. when PROGR. IDMAIN calls upon SUBR. EDCOM, the segment where SUBR. EDCOM is allocated (which happens to be segment S101) will automatically be loaded by the system's overlay handler at L.D.C. Some systems do not supply this feature, but assume that a load request for segment S101 was programmed into PROGR. IDMAIN prior to the call to SUBR. EDCOM, perhaps in the form of a call to a system supplied SUBR. : CALL LINK('S101').

To adjust IDPAC to fulfill these requirements, proceed as follows:

Refer to section 8) Subroutine Calls (Bottom-Up).

For a given SUBR. XXX all SUBR. YYY1, ...,YYYN that reference SUBR. XXX are listed. There are four cases:

- a) SUBR. XXX is declared in the definition of a non-resident segment in the above table, say SEGXXX. It is assumed that SUBR. YYY1, ..., YYYN are not allocated to the resident area.
- b) SUBR. XXX is declared in the definition of the resident code.
- c) SUBR. XXX is not found at all in the segment definitions above.
- d) SUBR. YYY1, ..., YYYN are allocated to segment SEGXXX.

To ensure the correct loading of segments, procede as follows:

- a) Load requests for segment SEGXXX should be programmed into SUBR. YYY1, ...YYYN prior to the calls upon SUBR. XXX.
Be very careful to avoid redundant loadings, e.g. inside a loop. We do not assume any responsibility for the placing of the load requests, since they are deviations from the original source code delivered by us.
- b) No load requests are needed.
- c) SUBR. XXX is either implicitly resident or belongs implicitly to the same segments as SUBR. YYY1, ..., YYYN. No load requests are needed.
- d) No load requests are needed.

Examples:

- a) XXX = ERROR. Section 8) yields:
YYY1, ..., YYYN = BODE, FHEAD, IDMAIN, ..., STRUC.
The table of segment definitions yields: SEGXXX = S201.
- b) XXX = RIFF. Section 8) yields:
YYY1, ..., YYYN = COMLIN, CONV, ..., TCHRS.
The table of segment definitions yields:
SEGXXX = RESIDENT CODE (RIFF belongs to the group of text string routines).
- c) XXX = CSGFT. Section 8) yields: YYY=RESID.

The table of segment definitions yields:
SEGXXX = implicitly S107.

- d) XXX = OFREF. Section 8) yields: YYY1, YYY2 = LOGAX, XYAX.
The table of segment definitions yields: SEGXXX = S206.
It is seen that both LOGAX and XYAX (the latter implicitly)
are allocated to this segment as well.

5) Implementation Order and Test Procedure

=====

IDPAC consists roughly of two parts:

- a) A monitor consisting of the main program and INTRAC.
- b) Application modules.

In a) the command lines are received and tested. A decision is taken about where to pass control for further interpretation and execution, typically one of the application routines in b).

By application routines are meant the main routines for IDPAC's commands. They are with a few exceptions named after the corresponding IDPAC command. Although subroutines, they may be regarded as separate programs. IDPAC is strongly file oriented, because all the intercommand data exchange with very few exceptions take place by means of mass storage files. Thanks to this, it is possible to gradually build up a working IDPAC, command by command.

It is a reasonable approach to implement IDPAC in the following order:

- a) the self-contained INTRAC and the complete file handling package, plot routines
- b) argument decoding functions, ERROR, ..., ERR110, ECHSEC -> TURN -> IDMAIN, IDTAB, PACTAB

Provided that you supply dummies for the application routines, you are now able to run INTRAC's commands and the single IDPAC command TURN.

Next it is desirable to be able to enter a free format data file, convert it to IDPAC-format and inspect it.

- c) the self-contained EDCOM
- d) WRIBUF -> DISBUF -> CONV, FHEAD, FORMAT, FTEST, LIST

The following commands are general service commands. It is useful to implement them at this stage, since they provide input files to the higher level scientific commands. They require a limited number of subroutines.

- e) DELCO, MVID

- f) REMOVE, FICK -> CONC, CUT, PICK, SCALOP, SLIDE, VECOP
- g) IGRIT -> ISBIT -> MCREDI -> MCNODI, PRB, PRBSTA ->
INSI, STAT, TREND
- h) ITSW, PHOLLV -> BODE, PLMAG, PLOTCO

Spectral computations:

- i) POLAR, SCAPRO, WINDOW -> ASPEC, AUCOF, BFFT, CCOF, CSPEC,
IPFFT, PFFT -> ACFSP, CCFSP, DFT, FROP, IDFT

Model identification, analysis and simulation:

- j) BUTTER -> ... -> POLMUL, MISOHD, SECBEQ, SECEND, WRIPOL ->
WPOIM -> FILT
- k) NEWLIN, NXTLIN -> TCHARS -> SEARCH ->
BUFIN - GESTEC - LOOKUP ->
GCOEFF, IGPOWR -> GETPOL, NPOL -> RMISO, RPOIM, SIM -> DSIM
- l) REMOVE, DESYM, EIGS, INPOL, SOLVS -> FUNC ->
MLCOMP, MLOUT, MLPAR -> MLID
- m) TCHRS -> SRCH -> FIXUP, LSPAR, MULT -> LSID, SQR, STRUC
- n) CMULT -> POLS -> GS -> HZ, RANPAR, RESDIS ->
CORAN, RESID, SPTRF

To test IDPAC, please refer to the document:
"Idpac Commands - User's Guide", by Johan Wieslander.
It contains input/output pairs for most commands.

The results stated there should be reproducible except
for the sample values obtained from the random number
generators, who depend upon the word length of
the machine employed. (The statistical properties
of the random number generators should be
reproducible, though.)

6) Subroutine Summaries

=====

Some routines are marked by special signs meaning:

- + that routine is part of the system dependent interface
- although that routine is system independent, you are recommended to rewrite it in assembly code, to improve efficiency

Main Level

IDMAIN
main program

IDTAB
initializes IDPAC's reserved variables and COMMON /ML1/

PACTAB
initializes all the COMMONs shared by programs whose names end with 'PAC'

Input/Output Commands

CONV
decodes and performs the command CONV

DELCO
decodes and performs the command DELET

EDCOM
decodes the command EDIT

FORMAT
decodes and performs the command FORMAT

FTEST
decodes and performs the command FTEST

LIST
decodes and performs the command LIST

MOVID
decodes and performs the command MOVE

Display Commands

BODE
decodes and performs the command BODE

FHEAD
decodes and performs the command FHEAD

PLMAG
decodes and performs the command PLMAG
PLOTCO
decodes and performs the command PLOT

Data Operation Commands

CONC
decodes and performs the command CONC
CUT
decodes and performs the command CUT
INSI
decodes and performs the command INSI
PICK
decodes and performs the command PICK
SCALOP
decodes and performs the command SCLOP
SLIDE
decodes and performs the command SLIDE
STAT
decodes and performs the command STAT
TREND
decodes and performs the command TREND
VECOP
decodes and performs the command VECOP

Frequency Response Commands

ACFSP
decodes and performs the commands ACOF and ASPEC
CCFSP
decodes and performs the commands CCOF and CSPEC
DFT
decodes and performs the command DFT
FROP
decodes and performs the command FROP
IDFT
decodes and performs the command IDFT
SPTRF
decodes and performs the command SPTRF

Simulation and Model Analysis Commands

CURAN, RANPAR

decode and perform, respectively, the command RANPA
DSIM
decodes and performs the commands DETER and DSIM
FILT
decodes and performs the command FILT
RESID
decodes and performs the command RESID

Identification Commands

LSID
decodes and performs the command LS
MLID
decodes and administrates the command ML
SQR
decodes and performs the command SQR
STRUC
decodes and performs the command STRUC

Other Commands

GSFILE+
decodes and performs the file back-up
commands GETFIL and SAVFIL
HCCOM+
decodes and performs the command HCCOPY
TURN
decodes and performs the command TURN

Argument Decoding Routines

ICOLUM
returns a column number
LAGFIN
returns an [aggregate:]file name
with optional column numbers
LAGNAM
returns an [aggregate:]file name
LARROW
tests for left arrow
LFNAME
returns a file name with optional column numbers
LINTP
returns a parenthesized integer

string
TCHRS
 same as SUBR. TCHARS, but operates directly on a text file
WFDUFF
 writes a line buffer always using FORMAT(1X,20A4)
WPOIM, WRIPOL
 writes a polynomial (into a section of a system file)
WTSAMP
 writes the sample interval declaration

The Editor

CHANGE
 performs the CHANGE command
CLOSEF
 closes files
COMND
 reads commands for the editor
COMPAR
 compares two strings
DISPL
 writes current line on display
EDIT
 link to the editor
EDITOR
 main subroutine for the editor
EMESS
 writes messages for the editor
ERAS
 erases the display
EXTSUB
 called by the editor before the current line is saved
 on mass storage
FINLOC
 performs the FIND and LOCATE commands
ICOMNT
 tests for line terminator or comment
NARG
 fetches an integer argument from the command
ONESTR
 gets one string from the command
OPEN
 opens files
RCURL
 reads a new current line from mass storage
REINAP
 performs the RETYPE, INSERT and APPEND commands
TWOSTR

gets two strings from a command
WCURL
writes the current line on mass storage

Mathematical Subroutines

AKAIKE
evaluates Akaike's test criterion and
the noise standard deviation

ANORM
computes the mini-max norm of a square matrix

ASPEC
computes an autospectrum, given autocovariances

AUCOF
computes autocovariances of a column in a data file

BAND
computes a band pass/stop filter

BFFT
Basic Fast Fourier Transform

BUTTER
evaluates a Butterworth filter

CCOF
computes the cross covariances between two data vectors

CMILT
multiplies two complex numbers

CSGFT
checks if a vector contains independent Gaussian numbers

CSPEC
computes amplitude and phase of a cross spectrum,
given the cross covariances

CUTOFF
computes a high/low pass filter

DESYM
decomposes a positive (semi) definite real matrix

EIGS
computes eigenvalues and eigenvectors of a real,
symmetric matrix

FIFACT
evaluates a filter factor

FINO
evaluates the Gaussian distribution function

FUNC
evaluates the loss function in ML-estimation,
its gradient and second derivative matrix

GS
evaluates a given transfer function

HZ
special case of SUBR. GS, for the discrete case

INPOL
tests if all roots of a real polynomial lie inside
a circle of given radius

IPFFT
Inverse Packed Fast Fourier Transform

MCNODI
computes a Gaussian pseudo random number

MCREDI-
computes a pseudo random number with rectangular
distribution

MLCOMP
performs a maximum likelihood estimation

MNODI
computes a Gaussian pseudo random vector
with given covariance matrix

PFFT
Packed Fast Fourier Transform

POLAR
converts complex numbers Z:
(Re(Z),Im(Z)) \leftarrow \rightarrow (Abs(Z),Arg(Z))

POLMUL
polynomial multiplication routine

POLS
evaluates a polynomial (Horner's scheme)

PRB
PRBS generator (Pseudo Random Binary Sequence)

PRBSTA
start up routine for the PRBS generator

SIM
basic simulation routine

SOLVS
computes the solution of a symmetric system of
linear equations using the decomposition made by
SUBR. DESYM

WINDOW
evaluates a time window to be used with the D.F.T.

Input/Output in General

AGCLOS
closes an aggregate file

AGENTR
open an aggregate file for output

AGSEEK
opens an aggregate file for input

AGSKIP
skips a number of component files within
an aggregate file

DISBUF
makes a page eject, then writes the command line buffer
and an optional date/time message on the display
ERROR, ERRO4, ERR10, ..., ERR120
prints IDPAC's error messages (SUBR. ERR120 is not used)

FICK
checks the presence of a file on mass storage
and tests its file head

LAGFND
locates and opens a named component file within
an aggregate file that is open for input

LAGRED
opens an aggregate file for input, then opens a named
component file within it for input

LAGWRI
rewrites a component file within an aggregate file

NATOUT
writes a matrix

MLOUT
performs the output for the ML command

MLPAR
reads starting values for the ML estimates from a
given system file

RESDIS
display routine used by SUBR. RESID

WRIBUF
identical to SUBR. DISBUF, except that the page eject
is suppressed

WRMSG
writes warning messages

WVALUE
encodes and writes data items (free format)

Miscellaneous

APPNDZ
zero-appends a data vector in order to make its length
equal the nearest power of two

BPATRN
expands a bit-string into a vector of LOGICALs

DEFIT
initializes a file head vector

FIXUP
reads FIX parameters from an open STRUC file

ICBIT-
returns a specified bit of an integer

ISBIT-
defines the state of a specified bit of an integer

switch is set

ITICKS
converts a sample interval expressed in seconds into ticks

ITSW
returns the value of IDPAC's time switch

LITOK
tests the contents of a file head vector

LOGPRI+
log, print file and exception handler

LOGSWI
returns IDPAC's logical switches

LSPAR
reads parameters from an open STRUC file

MADD-
adds two matrices to each other

MCBUF
"remembers" the current main level command line

MMOVE-
copies one matrix into another

MULT-
multiplies two matrices by each other

PHOLLV, PHOLL2
packs a character string into a buffer

RMOVE-
copies one vector into another

RMULT-
multiplies a matrix by a scalar

SAMFIL
copies a data file specification (command level)

SAVGET
help routine to SUBR. INSI

SCAPRO-
returns the scalar product between two vectors

SECNDS
converts a sample interval expressed in ticks into seconds

7) Subroutine Calls (Top-Down)

=====

F.g. SUBR. MLPAR calls upon:

SUBR. FCLOSE, GETPOL, HSTORV, NPOL and SCAPRO

```

ACFSP : ASPEC  AUCOF  DREAL  FICK  FILDAT  FILES  FINT  FREAL
        HSTORV  ICOLUM  LFINAM  LFNAME  LHNAME  LHOLL  LINT  LOG10
        LPCOM  LTERM  RMACON  SECNDS  SQRT
AGCLOS: FILES
AGENTR: DEFIT  FILDAT  FILES
AGSEEK: FILDAT  FILES
AGSKIP: AGCLOS  FILES
AKAIKE: LOG    RMACON  SQRT
ANORM  :
APPNDZ:
ARCORN: XSCORD  YSCORD
AREA   :
ASPEC  : COS    SIN    WINDOW
ASPLIT: ARCORN  AREA  XAXIS  XSCAL  YAXIS  YSCAL
AUCOF  : FILDAT  FILES  REMOVE  SCAPRO
BAND   : CUTOFF  MADD  POLMUL
BFFT   : COS    SIN
BODE   : ARCORN  DISBUF  ERROR  FILDAT  FILES  HCCOM  HSTORV  ICOLUM
        INTRAC  LFNAME  LGRAPH  LINEXY  LOGAX  LOG10  LPCOM  LPHOLL
        LTERM  MARGIN  PLINIT  PLRSET  PLSTOP  RMACON  WRIBUF  WRMSG
        XSCAL  YAXIS  YSCAL
BPATRN:
BUFIN  : FCLOSE  GAC    HSTORV  LCOMPV  NEWLIN  NXTLIN  PAC    PTERM
        RFLQAT
BUTTER: BAND  CUTOFF
CCFSP  : CCOF  CSPEC  FICK  FILDAT  FILES  FINT  FREAL  HSTORV
        ICOLUM  LFINAM  LFNAME  LHOLL  LINT  LOG10  LPCOM  LTERM
        RMACON  SECNDS  SQRT
CCOF   : FILDAT  FILES  HSTORV  LCOMPV  REMOVE  SCAPRO
CHANGE: COMPAR  DISPL  EMESS  GAC    PAC    TWOSTR  WCURL
CLOSEF: FCLOSE
CLRSW  :
CMULT  :
COMLIN: FAC    HSTORV  IFAC  LCOMPV  RECLIN  RFLOAT  RIFF
COMND  : EMESS  IFAC  LFINAM  RIFF  WRLINE
COMPAR: GAC    LCOMPV
CONC   : FILDAT  FILES  HSTORV  LCOMPV  LFINAM  LPCOM
CONV   : CRENAM  DEFIT  FCHECK  FCLOSE  FDELET  FILDAT  FILES  FREAL
        FSEEK  HSTORV  ICOLUM  IFAC  ITICKS  LFINAM  LFNAME  LINT
        LNUMB  LPCOM  LTERM  RBUF  RIFF  SECBEG  SECEND  WRMSG
COPAN  : DINT  FINT  LPCOM  LSYNAM  LTERM  RANPAR
CRENAM: HSTORV  LENGTH  PINT
CSGFT  : FINO  SCAPRO  SQRT

```



```

CSPEC : COS      POLAR  SIN      WINDOW
CUT   : FILDAT  FILES  HSTORV  LFINAM  LINT    LPCOM
CUTOFF: COS      FIFACT  POLMUL  REMOVE  SIN
DEFIT : ITICKS  SECNDS  WRMSG
DELCO : FCHECK  FDELET  HSTORV  LFINAM  LPCOM   LPHOLL
DESYN : ANORM   RNACON  REMOVE  SCAPRO  SQRT
DFT   : APPNDZ  DEFIT   FILDAT  FILES   LFINAM  LINT    LINTP  LITOK
      : LPCOM   LPHOLL  LTERM   PFFT    POLAR   SQRT    WINDOW

DIGITS: FAC
DINT  : PUT      PFFLOAT
DISBUF: EJECT   WRIBUF
DISHDL: PLCURS  TPOS    TREAD   TWRITE
DISPL : WBUFF
DREAL : PUT
DSIM  : FICK     FILDAT  FILES   GETPOL  HSTORV  ICOLUM  ITICKS  LFNAME
      : LHOLLS  LINT    LPCOM   LSYNAM  LTERM   NPOL    SIM

ECHBUF: ERRPOS  WRLINE
ECHSEC: WBUFF   WRLINE
EDCOM  : EDIT    LFINAM  LPCOM
EDIT   : EDITOR
EDITOR: CHANGE  CLOSEF  COMND   DISPL   EMESS   ERAS    FCLOSE  FINLOC
      : HSTORV  ICOMNT  LCOMPV  NARG   OPEN    RBUFF   RCURL   REINAP
      : RIFF    WCURL

EIGS   : SCAPRO  SQRT
EMESS  :
ERAS   : EJECT
ERROR  : ECHBUF  ECHSEC  ERR04   ERR10   ERR100  ERR110  ERR120  ERR20
      : ERR30   ERR40   ERR50   ERR60   ERR70   ERR80   ERR90   INTERR
      : IWRITE  WBUFF

ERRPOS:
ERR04 :
ERR10 :
ERR100:
ERR110:
ERR20 :
ERR30 : IWRITE
ERR40 :
ERR50 :
ERR60 :
ERR70 :
ERR80 :
ERR90 :
EXTSUP:
FAC    : GAC      HSTORV
FCHECK:
FCLOSE: DELETE  FILCHK  LUFIND  RCLOSE  WCLOSE
FDELET: DELETE  FILCHK
FENTER: ENTER   FILCHK  HSTORV  LUFIND
FHEAD  : AGCLOS  DISBUF  ERROR   FILDAT  FILES   INTRAC  LAGNAM  LAGRED
      : LAGWRI  LHOLL   LINT    LPCOM   LTERM   SECNDS  WRMSG

```

```

FICK : FILES
FIFACT: COS
FILCHK: LCOMPV
FILDAT: LFIN D LUFIND RDREAL WRREAL
FILES : FCLOSE FENTER FSEEK LFIN D LUFIND RDINT RDREAL WRINT
FILT : BUTTER HSTORV LFINAM LFORML LHOLLS LINT LNUMB LPCOM
      LTERM MISOHD SECBEG SECEND WRIPOL
FILTAK:
FINLOC: COMPAR DISPL EMESS ONESTR RCURL WCURL
FIND :
FINT : GET IFIXR
FIXUP : NEWLIN RIFF SRGH
FORMAC: FENTER HSTORV LCOMPV LFIN D READIN RFLOAT
FORMAT: FILDAT FILES HSTORV ICOLUM LARROW LFINAM LFNAM LINT
      LPCOM LTERM SECBEG SECEND SECNDS WVALUE
FORNXT: COMLIN HSTORV IFIXR LCOMPV MACHDL RBUFF RFLOAT SUBST
FREAL : GET
FREE : FR2 HSTORV LCOMPV
FROP : CMULT DEFIT FDELETE FILDAT FILES HSTORV ICOLUM LCOMPV
      LFNAM LHOLLS LITOK LPCOM LTERM POLAR RMACON SQRT
FR2 : HSTORV LCOMPV
FSEEK : FILCHK HSTORV LUFIND SEEK
FTEST : DINT FCHECK LFINAM LPCOM LPHOLL LTERM
FUNC : AKAIKE FILDAT FILES RMACON REMOVE SCAPRO SQRT
GAC :
GCOEFF: FAC LCOMPV NXTLIN RIFF
GET : HSTORV IFIXR LCOMPV
GETPOL: LFIN D RPOIM
GETSEC: HSTORV LOOKUP
GS : CMULT POLAR POLS
GSFILE: ERRPOS IWRITE LHNAME LHOLL LHOLLS LPCOM LTERM
HCCOM : EJECT LHOLLS LNUMB LPCOM LTERM
HSTORV:
HZ : COS GS SIN
ICOLUM:
ICOMNT: FAC
IDFT : APPNDZ DEFIT FILDAT FILES HSTORV IPFFT ITICKS LFINAM
      LINTP LITOK LPCOM LTERM POLAR RMACON RMULT
IDMAIN: ACFSP BODE CCFSP CONC CONV CORAN CUT DELCO
      DFT DSIM EDCOM ERROR FHEAD FILT FORMAT FROP
      FTEST GSFILE HCCOM IDFT INSI INTINI INTRAC ISENSW
      LIST LOGPRI LSID MCBUF MLID MOVID PICK PLMAG
      PLOTCO RESID SCALOP SLIDE SPTRF SQR STAT STRUC
      TREND TURN VECOP
IDTAB :
IFAC : HSTORV
IFGOLA: COMLIN HSTORV IFIXR LCOMPV LFIN D MACHDL RBUFF SUBST
IFIXR :
IGBIT :
IGPOWR: LCOMPV RIFF TCHARS

```

```

IMACON:
INPOL : REMOVE
INSI  : DEFIT  DINT  DISBUF  ERROR  FICK  FILDAT  FILES  FINT
        FREAL  HSTORV ICOLUM  IMACON  INTRAC  ITICKS  LFNAME  LHOLLS
        LINT  LNUMB  LPCOM  LTERM  MCNODI  MCREDI  PRE  PRESTA
        SAVGET  SIN
INTERR: ECHBUF  IWRITE
INTINI:
INTR  : COMLIN  HSTORV  LCOMPV  LFIND  LOGBUF  RECLIN  SUBST  WBUF
        WRLINE
INTRAC: CLRSW  ECHBUF  INTR  ISENSW  LPCOM  MACHDL  RESEX
INTTAB:
IPFFT : BFFT  COS  SIN
ISBIT : IGBT
ISENSW:
ITICKS: SECNDS
ITSW  :
LAGFIN: HSTORV  LARROW  LFINAM  LFNAME  LHOLL
LAGFND: AGCLOS  AGSKIP  LCOMPV
LAGNAM: LAGFIN
LAGRED: AGSEEK  HSTORV  LAGFND
LAGWRI: AGCLOS  AGENTR  AGSEEK  AGSKIP  FILDAT  FILES  HSTORV  LCOMPV
LARG  : HSTORV  IFIXR
LARROW:
LCOMPV:
LENGTH: GAC  LCOMPV
LEOSB : NXTLIN
LET  : CRENAM  HSTORV  IFIXR  LCOMPV  LFIND  MACHDL  RFLOAT  SUBST
LFINAM: HSTORV  LHNAME  LTLONG
LFIND  : LCOMPV
LFNAME: LARROW  LFINAM  LFORML  LHOLL  LINT
LHOLL  : LCOMPV  LDELIM  LHNAME
LHOLLS: LHOLL
LINECM: PLMOVE
LINETO: PLMOVE
LINEXY: XYCURV
LINEY  : XYCURV
LINTP  : LARROW  LHOLL  LINT
LIST  : AGCLOS  EJECT  FCLOSE  FILDAT  FILES  FSEEK  HSTORV  ICOLUM
        IFAC  LAGFIN  LAGRED  LCOMPV  LINT  LOGBUF  LPCOM  LPHOLL
        LSYNAM  LTERM  RBUF  RIFF  WBUF  WRIBUF  WRMSG
LITOK  : ITICKS  SECNDS
LOGARG: LARG
LOGAX  : LINETO  MOVETO  OFNEF  PLSYME  XCCORD  XSCORD  YCCORD  YSCORD
LOGBUF: HSTORV  PAC  PINT  WRLINE
LOGPRI:
LOGSWI:
LOOKUP: BUFIN  FCLOSE  FSEEK  LCOMPV  NEWLIN  RIFF  TCHARS
LPAREN: LARROW  LHOLL  LHOLLS
LPCOM  : LOGBUF

```

LPHOLL: LPAREN
 LSID : AKAIKE DISBUF DREAL ERROR FCLOSE FILDAT FILES FINT
 FIXUP FREAL FSEEK HSTORV INTRAC ITICKS LFINAM LHNAME
 LHOLLS LPCOM LPHOLL LSPAR LSYNAM LTERM LTVON MATOUT
 MISOHD MULT NEWLIN RIFF RMULT SECBEQ SECEND SQRT
 SRCH WRIPOL
 LSPAR : NEWLIN RIFF SRCH
 LSYNAM: HSTORV LARROW LFINAM LHNAME LHOLL
 LTLONG: IMACON LENGTH
 LTSAMP: ITICKS LEOSB RIFF SEARCH TCHARS
 LUFIND:
 MACEND: FCLOSE FENTER FSEEK HSTORV IFAC LCOMPV MACHDL RBUFF
 RIFF WBUFF
 MACHDL: FCLOSE FSEEK HSTORV IFAC LCOMPV LFIND PUT RBUFF
 RFLOAT RIFF
 MADD :
 MARGIN: AREA
 MATOUT: WVALUE
 MCBUF : HSTORV
 MCNODI: MCREDI
 MCREDI: IMACON
 MINMAX:
 MISOHD: WTSAMP WVALUE
 MLCOMP: AKAIKE DESYM DISBUF EIGS FUNC INPOL ISENSW LTVON
 RMACON REMOVE SCAPRO SOLVS
 MLID : DISBUF DREAL ERROR FCHECK FILES FINT FREAL HSTORV
 INTRAC LCOMPV LFNAME LHNAME LHOLL LHOLLS LINT LNUMB
 LPCOM LPHOLL LSYNAM LTERM MLCOMP MLOUT MLPAR SECNDS
 MLOUT : AKAIKE CRENAM DISBUF EIGS LTVON MATOUT MISOHD MMOVE
 RMACON SCAPRO SECBEQ SECEND SQRT WRIPOL WRMSG
 MLPAR : FCLOSE GETPOL HSTORV NPOL SCAPRO
 MMOVE :
 MNODI : DESYM MCNODI RMACON SCAPRO
 MOVECK: PLMOVE
 MOVETO: PLMOVE
 MVID : AGCLOS FCLOSE FENTER FILDAT FILES FSEEK HSTORV ICOLUM
 LAGFIN LAGRED LAGWRI LCOMPV LPCOM LPHOLL LTERM RBUFF
 REMOVE SAMFIL WBUFF
 MULT : SCAPRO
 MARG : EMESS ICOMNT RIFF
 NEWLIN: FCLOSE IFAC LCOMPV RBUFF RIFF
 NPOL : RMISO
 NXTLIN: HSTORV IFAC IFIXR PTERM
 OFNEF : MOVECK PFLOAT PLSYMB
 ONESTR: EMESS GAC LCOMPV
 OPEN : FENTER FSEEK
 PAC :
 PACTAB:
 PFFT : DFFT COS SIN
 PFLOAT: GAC IMACON LCOMPV LOG10 PAC PINT

```

PHOLL : GAC      LCOMPV PAC
PHOLLV: GAC      PAC
PHOLL2: GAC      PAC      PSPACE
PICK   : FILDAT  FILES   LFINAM LINT   LPCOM
PINT   : PAC
PLCTAB:
PLDEV  :
PLINIT: PLDEV
PLMAG  : DISBUF  ERROR   FDELET  FILDAT  FILES   FINT   HCCOM  HSTORV
        ICOLUM  IFAC    INTRAC  LCOMPV  LFNAME  LFORML  LGRAPH  LINEY
        LINT    LPCOM   LTERM  MARGIN  MINMAX  PFLOAT  PHOLLV  PINT
        PLINIT  PLRSET  PLSTOP  PSPACE  PTERM  RIFF   RMOVE  WRLINE
        XAXIS  XSCAL  YAXIS  YSCAL

PLMOVE:
PLOTCO: ASPLIT  EJECT   ERROR   FILDAT  FILES   FINT   FREAL  HCCOM
        HSTORV  ICOLUM  INTRAC  ITSW   LCOMPV  LFNAME  LGRAPH  LHOLLS
        LINEXY  LINEY   LINT    LINTP  LNUMB   LPCOM   LPHOLL  LTERM
        PLINIT  PLRSET  PLSTOP  RMACON  RMOVE  SECNDS  WRIBUF

PLRSET:
PLSTOP:
PLSYMB:
POLAR  : ATAN2   COS      RMACON  SIN     SQRT
POLMUL: SCAPRO
POLS   : CMULT   RMACON  SQRT
PRB    : IGBIT   ISBIT
PRBSTA: IMACON  ISBIT
PSPACE: PAC
PTERM  : PAC
PUT    : HSTORV  IFIXR   LCOMPV  RFLOAT
RABC   : FAC     PAC
RANPAR: BUFIN    FCLOSE  GETPOL  HSTORV  MISOHD  MNODI  NPOL   NXTLIN
        RIFF     RMACON  SEARCH  SECBEG  SECEND  WRIPOL
RBUFF  : HSTORV  LENGTH  RDREAL
RCURL  : RBUFF
READIN: COMLIN  HSTORV  LCOMPV  WRLINE
READX  : HSTORV  LCOMPV  LFINDE  MACHDL  PUT     READIN  RFLOAT
RECLIN: GAC     HSTORV  IFIXR   LCOMPV  PAC     PFLOAT  PHOLL   PINT
        PSPACE  PTERM
REINAP: DISPL   EMESS   GAC     ONESTR  PAC     WCURL
RESDIS: EJECT   LTVON   WRIBUF
RESEX  : FORMAC  FORNXT  FREE    HSTORV  IFGOLA  LCOMPV  LET     LPCOM
        MACEND  READX   RESUME  SWITCH  WRITEX  WRLINE
RESID  : ARCORN  AUCCOF  CCOF    CRENAM  CSGFT   DEFIT   DESYM   DREAL
        ERROR   FCLOSE  FICK    FILDAT  FILES   FINT    FREAL   GETPOL
        HCCOM   HSTORV  ICOLUM  INTRAC  ITICKS  LFNAME  LGRAPH  LHNAME
        LINEY   LINT    LPCOM   LSYNAM  LTERM   MARGIN  MINMAX  NPOL
        PLINIT  PLRSET  PLSTOP  RESDIS  RMACON  SIM     SOLVS   SQRT
        XAXIS  XSCAL  YAXIS  YSCAL
RESUME: LCOMPV  MACHDL
RFLOAT:

```

```

BFP      : DIGITS  FAC      GAC      IMACON  LCOMPV  LOG10   RMACON  SIGN1
RIFF     : FAC      HSTORV  RABC     RFP
RMACON:
RMISO    : BPATRN  BUFIN    ECHSEC  FCLOSE  GETSEC  HSTORV  LCOMPV  LTLONG
          LTSAMP  NXTLIN  RIFF
REMOVE   :
RMULT    :
RPOIM    : BUFIN    ECHSEC  FCLOSE  GCOEFF  GETSEC  HSTORV  ICPOWR  LCOMPV
          NXTLIN  RIFF     SEARCH  TCHARS
SAMFIL:  HSTORV
SAVGET:  MCNODI  MCREDI
SCALE    : RMACON
SCALOP:  DEFIT   FICK     FILDAT  FILES   HSTORV  ICOLUM  LCOMPV  LFNAME
          LHOLLS  LNUMB   LPCOM   LTERM   RMACON  REMOVE  SECNDS  SQRT
SCAPRO:
SEARCH:  NXTLIN  RIFF     TCHARS
SECDEG:  DISBUF  FCLOSE  FENTER  FSEEK   HSTORV  LCOMPV  LDKON   LOGBUF
          MCBUF
SECEND:  FCLOSE  RBUFF   WBUFF
SECNDS:  FREAL   RMACON  SQRT
SIGN1   : FAC     LCOMPV
SIM      : FILDAT  SCAPRO
SLIDE   : FILDAT  FILES   HSTORV  LFINAM  LINT    LPCOM   LTERM   REMOVE
SOLVS   : SCAPRO
SPTFF   : DEFIT   FDELET  FILDAT  FILES   FINT    FREAL   GETPOL  HSTORV
          HZ      ICOLUM  LCOMPV  LFNAME  LHOLL   LHOLLS  LINTP   LPCOM
          LPHOLL  LSYNAM  LTERM   NPOL    RMACON  SQRT
SQR     : FCLOSE  FENTER  FILDAT  FILES   FSEEK   HSTORV  LCOMPV  LFINAM
          LFNAME  LPCOM   LSPAR   LTERM   NEWLIN  RIFF    SECNDS  SQRT
          WBUFF   WTSAMP
SRCH    : NEWLIN  RIFF     TCHRS
STAT    : DISBUF  DREAL   FILDAT  FILES   FINT    FREAL   HSTORV  ICOLUM
          LFNAME  LHNAME  LPCOM   LTERM   LTVON   SQRT
STRUC   : ERROR   FCLOSE  FIXUP   FSEEK   HSTORV  INTRAC  LFINAM  LHOLL
          LHOLLS  LINT    LNUMB   LPCOM   LSPAR   LTERM   RBUFF   SECDEG
          SECEND  WBUFF   WVALUE
SUBST   : GET     HSTORV  IFIXR   LCOMPV
SWITCH:  LFINO   SUBST
TCHARS:  LCOMPV  NXTLIN  RIFF
TCHRS   : LCOMPV  NEWLIN  RIFF
TREND   : FICK    FILDAT  FILES   FINT    HSTORV  ICOLUM  LFNAME  LINT
          LPCOM   LTERM
TURN    : LHOLLS  LPCOM
TWOSTR:  EMESS   GAC     LCOMPV
VECOP   : FILDAT  FILES   HSTORV  ICOLUM  LCOMPV  LFNAME  LHOLLS  LPCOM
          LTERM
WBUFF   : IWRITE  LUFIND  PSPACE  WRHDL   WRREAL
WCURL   : EXTSUB  WBUFF
WBUFF:
WINDOW:  COS

```

```

WPOIM : PAC      PFLOAT PHOLLV PINT   PTERM  WFBUFF
WRIBUF: LOGBUF  LTVON  MCBUF  MOVECM PLSYMB
WRIPOL: WPOIM
WRITEX: EJECT  LCOMPV LPCOM  SUBST  WBUFF  WRT    WRT2
WRLINE: GAC    HSTORV PAC    PSPACE PTERM  RBUF   TRHDL  WBUFF
        WRHDL
WRMSG  : ECHBUF ERRPOS IWRITE
WRT    : GAC    HSTORV IFIXR  LCOMPV PAC    PFLOAT PHOLL  PINT
        PSPACE PTERM  SUBST
WRT2   : EJECT IFIXR  IBACON PAC    PFLOAT PHOLL  PINT  PSPACE
        PTERM  WBUFF
WTSAMP: WVALUE
WVALUE: PFLOAT PHOLLV PHOLL2 PSPACE PTERM  WFBUFF
XAXIS  : XYAX
XCCORD:
XSCAL  : XSCORD XYSC
XSCORD:
XYAX   : LINECM MOVECM OFNEF  PLSYMB XCCORD XSCORD YCCORD YSCORD
XYCURV: CRENAM LINETO MOVETO PLSYMB XSCORD YSCORD
XYSC   : RMACON SCALE  SQRT
YAXIS  : XYAX
YCCORD:
YSCAL  : XYSC   YSCORD
YSCORD:

```

8) Subroutine Calls (Bottom-Up)

=====

E.g. SUBR. GETPOL is called by:
 SUBR. DSIM, MLPAR, RANPAR, RESID and SPTRF

```

ACFSP : IDMAIN
AGCLOS: AGSKIP FHEAD LAGFND LAGWRI LIST MOVID
AGENTR: LAGWRI
AGSEEK: LAGRED LAGWRI
AGSKIP: LAGFND LAGWRI
AKAIKE: FUNC LSID MLCOMP MLOUT
ANORM : DFSYM
APPNDZ: DFT IDFT
ARCORN: ASPLIT BODE RESID
AREA : ASPLIT MARGIN
ASPEC : ACFSP
ASPLIT: PLOTCO
ATAN2 : POLAR
AUCOF : ACFSP RESID
BAND : BUTTER
BFFT : IPFFT PFFT
BODE : IDMAIN
BPATRN: RMISO
BUFIN : LOOKUP RANPAR RMISO RPOIM
BUTTER: FILT
CCFSP : IDMAIN
CCOF : CCFSP RESID
CHANGE: EDITOR
CLOSEF: EDITOR
CLRSW : INTRAC
CMULT : FROP GS POLS
COMLIN: FORMXT IFGOLA INTR READIN
COMND : EDITOR
COMPAR: CHANGE FINLOC
CONC : IDMAIN
CONV : IDMAIN
CORAN : IDMAIN
COS : ASPEC BFFT CSPEC CUTOFF FIFACT HZ IPFFT PFFT
      POLAR WINDOW
CRENAM: CONV LET MLOUT RESID XYCURV
CSGFT : RESID
CSPEC : CCFSP
CUT : IDMAIN
CUTOFF: BAND BUTTER
DEFIT : AGENTR CONV DFT FROP IDFT INSI RESID SCALOP
      SPTRF
DELCO : IDMAIN
DELETE: FCLOSE FDELET

```



```

DESYM : MLCOMP MNODI RESID
DFT   : IDMAIN
DIGITS: RFP
DINT  : CORAN FTEST INSI
DISBUF: BODE FHEAD INSI LSID MLCOMP MLID MLOUT PLMAG
      SECDEG STAT
DISPL : CHANGE EDITOR FINLOC REINAP
DREAL : ACFSP LSID MLID RESID STAT
DSIM  : IDMAIN
ECHBUF: ERROR INTERR INTRAC WRMSG
ECHSEC: ERROR RMISO RPOIM
EDCOM : IDMAIN
EDIT  : EDCOM
EDITOR: EDIT
EIGS  : MLCOMP MLOUT
EJECT : DISBUF ERAS HCCOM LIST PLOTCO RESDIS WRITEX WRT2
EMESS : CHANGE COMND EDITOR FINLOC NARG ONESTR REINAP TWOSTR
ENTER : FENTER
ERAS  : EDITOR
ERROR : BODE FHEAD IDMAIN INSI LSID MLID PLMAG PLOTCO
      RESID STRUC
ERRPOS: ECHBUF GSFILR WRMSG
ERR04 : ERROR
ERR10 : ERROR
ERR100: ERROR
ERR110: ERROR
ERR120: ERROR
ERR20 : ERROR
ERR30 : ERROR
ERR40 : ERROR
ERR50 : ERROR
ERR60 : ERROR
ERR70 : ERROR
ERR80 : ERROR
ERR90 : ERROR
EXTSUB: WCURL
FAC    : COMLIN DIGITS GCOEFF ICOMNT RABC RFP RIFF SIGN1
FCHECK: CONV DELCO FTEST MLID
FCLOSE: BUFIN CLOSEF CONV EDITOR FILES LIST LOOKUP LSID
      MACEND MACHDL MLPAR MOVID NEWLIN RANPAR RESID RMISO
      RPOIM SECDEG SECEND SQR STRUC
FDELET: CONV DELCO FROP PLMAG SPTRF
FENTER: FILES FORMAC MACEND MOVID OPEN SECDEG SQR
FHEAD  : IDMAIN
FICK   : ACFSP CCFSP DSIM INSI RESID SCALOP TREND
FIFACT: CUTOFF
FILCHK: FCLOSE FDELET FENTER FSEEK
FILDAT: ACFSP AGENTR AGSEEK AUCOF BODE CCFSP CCOF CONC
      CONV CUT DFT DSIM FHEAD FORMAT FROP FUNC
      IDFT INSI LAGWRI LIST LSID MOVID PICK PLMAG

```

	PLOTCO	RESID	SCALOP	SIM	SLIDE	SPTRF	SQR	STAT
	TREND	VECOP						
FILES :	ACFSP	AGCLOS	AGENTR	AGSEEK	AGSKIP	AUCOF	BODE	CCFSP
	CCOF	CONC	CONV	CUT	DFT	DSIM	FHEAD	FICK
	FORMAT	FROP	FUNC	IDFT	INSI	LAGWRI	LIST	LSID
	MLID	MOVID	PICK	PLMAG	PLOTCO	RESID	SCALOP	SLIDE
	SPTRF	SQR	STAT	TREND	VECOP			
FILT :	IDMAIN							
FINLOC:	EDITOR							
FINO :	CSGFT							
FINT :	ACFSP	CCFSP	CORAN	INSI	LSID	MLID	PLMAG	PLOTCO
	RESID	SPTRF	STAT	TREND				
FIXUP :	LSID	STRUC						
FORMAC:	RESEX							
FORMAT:	IDMAIN							
FORNXT:	RESEX							
FREAL :	ACFSP	CCFSP	CONV	INSI	LSID	MLID	PLOTCO	RESID
	SECNDS	SPTRF	STAT					
FREE :	RESEX							
FROP :	IDMAIN							
FR2 :	FREE							
FSEEK :	CONV	FILES	LIST	LOOKUP	LSID	MACEND	MACHDL	MOVID
	OPEN	SECBEG	SQR	STRUC				
FTEST :	IDMAIN							
FUNC :	MLCOMP							
GAC :	BUFIN	CHANGE	COMPAR	FAC	LENGTH	ONESTR	PFLOAT	
	PHOLL	PHOLLV	PHOLLZ	RECLIN	REINAP	RFP	TWOSTR	WRLINE
	WRT							
GCOEFF:	RPOIM							
GET :	FINT	FREAL	SUBST					
GETPOL:	DSIM	MLPAR	RANPAR	RESID	SPTRF			
GETSEC:	RMISO	RPOIM						
GS :	HZ							
GSFILE:	IDMAIN							
HCCOM :	BODE	IDMAIN	PLMAG	PLOTCO	RESID			
HSTORV:	ACFSP	BODE	BUFIN	CCFSP	CCOF	COMLIN	CONC	CONV
	CRENAM	CUT	DELCO	DSIM	EDITOR	FAC	FENTER	FILT
	FORMAC	FORMAT	FORNXT	FREE	FROP	FR2	FSEEK	GET
	GETSEC	IDFT	IFAC	IFGOLA	INSI	INTR	LAGFIN	LAGRED
	LAGWRI	LARG	LET	LFINAM	LIST	LOGBUF	LSID	LSYNAM
	MACEND	NACHDL	MCBUF	MLID	MLPAR	MOVID	NXTLIN	PLMAG
	PLOTCO	PUT	RANPAR	RBUFF	READIN	READX	RECLIN	RESEX
	RESID	RIFF	RMISO	RPOIM	SAMFIL	SCALOP	SECBEG	SLIDE
	SPTRF	SQR	STAT	STRUC	SUBST	TREND	VECOP	WRLINE
	WRT							
HZ :	SPTRF							
ICOLUM:	ACFSP	BODE	CCFSP	CONV	DSIM	FORMAT	FROP	INSI
	LIST	MOVID	PLMAG	PLOTCO	RESID	SCALOP	SPTRF	STAT
	TREND	VECOP						
ICOMNT:	EDITOR	NARG						

```

IDFT : IDMAIN
IFAC : COMLIN COMND CONV LIST MACEND MACHDL NEWLIN NXTLIN
      PLMAG
IFGOLA: RESEX
IFIXR : FINT FORNXT GET IFGOLA LARG LET NXTLIN PUT
      RECLIN SUBST WPT WRT2
IGBIT : ISBIT PRE
IGPOWR: RPOIM
IMACON: INSI LTLONG MCREDI PFLOAT PRBSTA RFP WRT2
INPOL : MLCOMP
INSI : IDMAIN
INTERR: ERROR
INTINI: IDMAIN
INTRK : INTRAC
INTRAC: BODE FHEAD IDMAIN INSI LSID MLID PLMAG PLOTCO
      RESID STRUC
IPFFT : IDFT
ISBIT : PRB PRBSTA
ISENSW: IDMAIN INTRAC MLCOMP
ITICKS: CONV DEFIT DSIM IDFT INSI LITOK LSID LTSAMP
      RESID
ITSW : PLOTCO
IWRITE: ERROR ERR30 GSFILE INTERR WBUFF WRMSG
LAGFIN: LAGNAM LIST MOVID
LAGFND: LAGRED
LAGNAM: FHEAD
LAGRED: FHEAD LIST MOVID
LAGWRI: FHEAD MOVID
LARG : LOGARG
LARROW: FORMAT LAGFIN LFNAME LINTP LPAREN LSYNAM
LCOMPV: BUFIN CCOF COMLIN COMPAR CONC EDITOR FILCHK FORMAC
      FORNXT FREE FROP FR2 GCoeff GET IFGOLA IGPOWR
      INTR LAGFND LAGWRI LENGTH LET LFIND LHOLL
      LIST LOOKUP MACEND MACHDL MLID MOVID NEWLIN ONESTR
      PFLOAT PHOLL PLMAG PLOTCO PUT READIN READX RECLIN
      RESEX RESUME RFP RMISO RPOIM SCALOP SECBEQ SIGN1
      SPTRF SQR SUBST TCHARS TCHRS TWOSTR VECOP WRITEX
      WRT
LDELIM: LHOLL
LDBON : SFCBEG
LENGTH: CRENAM LTLONG RBUFF
LEOSB : LTSAMP
LET : RESEX
LFINAM: ACFSP CCFSP CONC CONV CUT DELCO DFT EDCOM
      FILT FORMAT FTEST IDFT LAGFIN LFNAME LSID LSYNAM
      PICK SLIDE SQR STRUC
LFIND : COMND FILDAT FILES FORMAC GETPOL IFGOLA INTR LET
      MACHDL READX SWITCH
LFNAME: ACFSP BODE CCFSP CONV DSIM FORMAT FROP INSI
      LAGFIN MLID PLMAG PLOTCO RESID SCALOP SPTRF SQR

```

```

STAT      TREND  VECOP
LFORML:  FILT   LFNAME  PLMAG
LGRAPH:  BODE   PLMAG   PLOTCO  RESID
LHNAME:  ACFSP  GSFILE  LFINAM  LHOLL   LSID    LSYNAM  MLID    RESID
        STAT
LHOLL :  ACFSP  CCFSP   FHEAD   GSFILE  LAGFIN  LFNAME  LHOLLS  LINTP
        LPAREN  LSYNAM  MLID    SPTRF   STRUC
LHOLLS:  DSIM   FILT    FROP    GSFILE  HCCOM   INSI    LPAREN  LSID
        MLID   PLOTCO  SCALOP  SPTRF   STRUC   TURN    VECOP
LINECH:  XYAX
LINETO:  LOGAX  XYCURV
LINEXY:  BODE   PLOTCO
LINEY :  PLMAG  PLOTCO  RESID
LINT :  ACFSP  CCFSP   CONV    CUT     DFT     DSIM    FHEAD   FILT
        FORMAT INSI    LFNAME  LINTP   LIST    MLID    PICK    PLMAG
        PLOTCO RESID   SLIDE   STRUC   TREND
LINTP :  DFT    IDFT    PLOTCO  SPTRF
LIST :  IDMAIN
LITOK :  DFT    FROP    IDFT
LNUMB :  CONV   FILT    HCCOM   INSI    MLID    PLOTCO  SCALOP  STRUC
LOG :  AKAIKE
LOGAX :  BODE
LOGBUF:  INTR   LIST    LPCOM   SECEEG  WRIBUF
LOGPRI:  IDMAIN
LOG10 :  ACFSP  BODE    CCFSP   PFLOAT  RFP
LOOKUP:  GETSEC
LPAREN:  LPHOLL
LPCOM :  ACFSP  BODE    CCFSP   CONC    CONV    CORAN   CUT     DELCO
        DFT    DSIM    EDCOM   FHEAD   FILT    FORMAT  FROP    FTEST
        GSFILE HCCOM   IDFT    INSI    INTRAC  LIST    LSID    MLID
        MOVID  PICK    PLMAG   PLOTCO  RESEX   RESID   SCALOP  SLIDE
        SPTRF  SQR    STAT    STRUC   TREND   TURN    VECOP   WRITEX
LPHOLL:  BODE   DELCO   DFT     FTEST   LIST    LSID    MLID    MOVID
        PLOTCO  SPTRF
LSID :  IDMAIN
LSPAR :  LSID   SQR     STRUC
LSYNAM:  CORAN  DSIM    LIST    LSID    MLID    RESID   SPTRF
LTERN :  ACFSP  BODE    CCFSP   CONV    CORAN   DFT     DSIM    FHEAD
        FILT   FORMAT  FROP    FTEST   GSFILE  HCCOM   IDFT    INSI
        LIST   LSID    MLID    MOVID   PLMAG   PLOTCO  RESID   SCALOP
        SLIDE  SPTRF  SQR     STAT    STRUC   TREND   VECOP
LTLONG:  LFINAM  RMISO
LTSAMP:  RMISO
LTVON :  LSID   MLCOMP  MLOUT   RESDIS  STAT    WRIBUF
LUFIND:  FCLOSE  FENTER  FILDAT  FILES   FSEEK   WBUF
MACEND:  RESEX
MACHDL:  FORNXT  IFGOLA  INTRAC  LET     MACEND  READX   RESUME
MADD :  BAND
MARGIN:  BODE   PLMAG   RESID
MATOUT:  LSID   MLOUT

```

```

MCBUF : IDMAIN SECDEG WRIBUF
MCNODI: INSI NNODI SAVGET
MCREDI: INSI MCNODI SAVGET
MINMAX: PLMAG RESID
MISCHD: FILT LSID MLOUT RANPAR
MLCOMP: MLID
MLID : IDMAIN
MLOUT : MLID
MLPAR : MLID
MMOVE : MLOUT
MNODI : RANPAR
MOVECM: OFNEF WRIBUF XYAX
MOVETO: LOGAX XYCURV
MOVID : IDMAIN
MULT : LSID
NARG : EDITOR
NEWLIN: BUFIN FIXUP LOOKUP LSID LSPAR SQR SRCH TCHRS
NPOL : DSIM MLPAR RANPAR RESID SPTRF
NXTLIN: BUFIN GCOEFF LEOSB RANPAR RMISO RPOIM SEARCH TCHARS
OFNEF : LOGAX XYAX
ONESTR: FINLOC REINAP
OPEN : EDITOR
PAC : BUFIN CHANGE LOGBUF PFLOAT PHOLL PHOLLV PHOLL2 PINT
      PSPACE PTERM RADC RECLIN REINAP WPOIM WRLINE WRT
      WRT2
PFFT : DFT
PFLOAT: OFNEF PLMAG RECLIN WPOIM WRT WRT2 WVALUE
PHOLL : RECLIN WRT WRT2
PHOLLV: PLMAG WPOIM WVALUE
PHOLL2: WVALUE
PICK : IDMAIN
PINT : CRENAM LOGBUF PFLOAT PLMAG RECLIN WPOIM WRT WRT2
PLCURS: DISHDL
PLDEV : PLINIT
PLINIT: BODE PLMAG PLOTCO RESID
PLMAG : IDMAIN
PLMOVE: LINECM LINETO MOVECM MOVETO
PLOTCO: IDMAIN
PLRSET: BODE PLMAG PLOTCO RESID
PLSTOP: BODE PLMAG PLOTCO RESID
PLSYMB: LOGAX OFNEF WRIBUF XYAX XYCURV
POLAR : CSPEC DFT FROP GS IDFT
POLMUL: BAND CUTOFF
POLS : GS
PRB : INSI
PRBSTA: INSI
PSPACE: PHOLL2 PLMAG RECLIN WBUFF WRLINE WRT WRT2 WVALUE
PTERM : BUFIN NXTLIN PLMAG RECLIN WPOIM WRLINE WRT WRT2
      WVALUE
PUT : DINT DREAL MACHDL READX

```

RADC : RIFF
 RANPAR: CORAN
 RBUFF : CONV EDITOR FORNXT IFGOLA LIST MACEND MACHDL MOVID
 NEWLIN RCURL SECEND STRUC WRLINE
 RCLOSE: FCLOSE
 RCURL : EDITOR FINLOC
 RDINT : FILES
 RDREAL: FILDAT FILES RBUFF
 READIN: FORMAC READX
 READX : RESEX
 RECLIN: COMLIN INTR
 REINAP: EDITOR
 RESDIS: RESID
 RESEX : INTRAC
 RESID : IDMAIN
 RESUME: RESEX
 RFLGAT: BUFIN COMLIN DINT FORMAC FORNXT LET MACHDL PUT
 READX
 RFP : RIFF
 RIFF : COMLIN COMND CONV EDITOR FIXUP GCOEFF IGPOWR LIST
 LOOKUP LSID LSPAR LTSAMP MACEND MACHDL NARG NEWLIN
 PLMAG RANPAR RMISO RPOIM SEARCH SQR SRCH TCHRS
 TCHRS
 RMACON: ACFSP AKAIKE BODE CCFSP DESYM FROP FUNC IDFT
 MLCOMP MLOUT MNODI PLOTCO POLAR POLS RANPAR RESID
 RFP SCALE SCALOP SECNDS SPTRF XYSC
 RMISO : NPOL
 REMOVE: AUCOF CCOF CUTOFF DESYM FUNC INPOL MLCOMP MOVID
 PLMAG PLOTCO SCALOP SLIDE
 RMULT : IDFT LSID
 RPOIM : GETPOL
 SANFIL: MOVID
 SAVGET: INSI
 SCALE : XYSC
 SCALOP: IDMAIN
 SCAPRO: AUCOF CCOF CSGFT DESYM EIGS FUNC MLCOMP MLOUT
 MLPAR MNODI MULT POLMUL SIM SOLVS
 SEARCH: LTSAMP RANPAR RPOIM
 SECBEG: CONV FILT FORMAT LSID MLOUT RANPAR STRUC
 SECEND: CONV FILT FORMAT LSID MLOUT RANPAR STRUC
 SECNDS: ACFSP CCFSP DEFIT FHEAD FORMAT ITICKS LITOK MLID
 PLOTCO SCALOP SQR
 SEEK : FSEEK
 SIGN1 : RFP
 SIN : DSIN RESID
 SIN : ASPEC BFFT CSPEC CUTOFF HZ INSI IPFFT PFFT
 POLAR
 SLIDE : IDMAIN
 SOLVS : MLCOMP RESID
 SPTRF : IDMAIN

```

SQR      : IDMAIN
SQR     : ACFSP  AKAIKE  CCFSP  CSGFT  DESYM  DFT    EIGS   FROP
        : FUNC   LSID   MLOUT  POLAR  POLS   RESID  SCALOP SECNDS
        : SPTRF  SQR    STAT   XYSC
SRCH    : FIXUP  LSID   LSPAR
STAT    : IDMAIN
STRUC   : IDMAIN
SUBST   : FORNXT IFGOLA INTR   LET    SWITCH WRITEX WRT
SWITCH: RESEX
TCHARS : IGPOWR LOOKUP LTSAMP RPOIM  SEARCH
TCHRS  : SRCH
TPOS   : DISHDL
TREAD  : DISHDL
TREND  : IDMAIN
TRHDL  : WRLINE
TURN   : IDMAIN
TWOSTR: CHANGE
TWRITE: DISHDL
VECOP  : IDMAIN
WBUFF  : DISPL  ECHSEC  ERROR  INTR   LIST   MACEND MOVID  SECEND
        : SQR    STRUC  WCURL  WRITEX WRLINE WRT2
WCLOSE: FCLOSE
WCURL  : CHANGE  EDITOR  FINLOC  REINAP
WFBUFF: WPOIM   WVALUE
WINDOW: ASPEC   CSPEC   DFT
WPOIM  : WRIPOL
WRHDL  : WBUFF  WRLINE
WRIBUF: BODE   DISBUF  LIST   PLOTCO RESDIS
WRINT  : FILES
WRIPOL: FILT   LSID   MLOUT  RANPAR
WRITEX: RESEX
WRLINE: COMND  ECHBUF  ECHSEC  INTR   LOGBUF  PLMAG  READIN  RESEX
WRMSG  : BODE   CONV   DEFIT  FHEAD  LIST   MLOUT
WRREAL: FILDAT WBUFF
WRT    : WRITEX
WRT2   : WRITEX
WTSAMP: MISOHD  SQR
WVALUE: FORMAT  MATOUT  MISOHD  STRUC  WTSAMP
XAXIS  : ASPLIT PLMAG  RESID
XCCORD: LOGAX  XYAX
XSCAL  : ASPLIT BODE   PLMAG  RESID
XSCORD: ARCORN  LOGAX  XSCAL  XYAX  XYCURV
XYAX   : XAXIS  YAXIS
XYCURV: LINEXY  LINEY
XYSC   : XSCAL  YSCAL
YAXIS  : ASPLIT BODE   PLMAG  RESID
YCCORD: LOGAX  XYAX
YSCAL  : ASPLIT BODE   PLMAG  RESID
YSCORD: ARCORN  LOGAX  XYAX  XYCURV  YSCAL

```


9) COMMON Block References

=====

E.g. SUBR. ACFSP references the following COMMON blocks:
COMINF, DEVICE, ERRMSG AND WORK

```

ACFSP : COMINF DEVICE ERRMSG WORK
ARCORN: PLC025
AREA  : PLC025
ASPLIT: PLC025
CODE  : COMINF DEVICE ERRMSG WORK
BUFIN : SEC005
CCFSP : COMINF DEVICE ERRMSG WORK
CCOF  : ERRMSG
CHANGE: COMPOW CURLIN FLAGS  PNTERS
CLOSEF: DEVICE
COMND : COMROW DEVICE FLAGS  PNTERS
COMPAR: COMROW CURLIN FLAGS  PNTERS
CONC  : COMINF DEVICE ERRMSG
CONV  : COMINF DEVICE ERRMSG
CORAN : COMINF DEVICE ERRMSG
CUT   : COMINF DLVICE ERRMSG
DEFIT : COMINF
DELCO : COMINF DEVICE ERRMSG
DFT   : COMINF DEVICE ERRMSG WORK
DIGITS: CRANK  RFPO03
DISDUF: DEVICE
DISHDL: DEVICE DISCOM
DISPL : CURLIN DEVICE FLAGS  PNTERS
DSIM  : COMINF DEVICE ERRMSG WORK
ECHBUF: COMINF DEVICE LINBUF MACINF
ECHSEC: DEVICE SEC002 SEC005
EDCOM : COMINF
EDITOR: COMROW CURLIN DEVICE FILEN  FLAGS  PNTERS
EMESS : DEVICE FILEN  FLAGS
ERAS  : DEVICE FLAGS
ERROR : COMINF DEVICE ERRMSG
ERR04 : ERRMSG
ERR10 : ERRMSG
ERR100: ERRMSG
ERR110: ERRMSG
ERR20 : ERRMSG
ERR30 : ERRMSG
ERR40 : ERRMSG
ERR50 : ERRMSG
ERR60 : ERRMSG
ERR70 : ERRMSG
ERR80 : ERRMSG
ERR90 : ERRMSG

```

FAC : CRANK IFACOM
FCLOSE: FCTAB
FDELET: DEVICE
FENTER: DEVICE FCTAB
FHEAD : COMINF DEVICE ERRMSG WORK
FILCHK: FCTAB
FILDAT: DEVICE FCTAB
FILES : DEVICE FCTAB
FILT : COMINF DEVICE ERRMSG
FILTAP: FCTAB
FINLOC: FLAGS PNTERS
FORMAC: COMINF LINBUF MACINF
FORMAT: COMINF DEVICE ERRMSG
FORNXT: COMINF LINBUF MACINF
FREE : COMINF GLOBAL LINBUF MACINF
FROP : COMINF DEVICE ERRMSG
FR2 : GLOBAL
FSEEK : DEVICE FCTAB
FTEST : COMINF DEVICE
FUNC : ML1
GAC : CRANK
GCOEFF: SECO05
GET : GLOBAL
GETPOL: NPOL01
GETSEC: ERRMSG
GSFILE: COMINF DEVICE LPR001
HCCOM : COMINF DEVICE
IDFT : COMINF DEVICE ERRMSG WORK
IDMAIN: COMINF DEVICE DEVMAC
IDTAB : GLOBAL ML1 NPOL01
IFAC : IFACOM
IFGOLA: COMINF LINBUF MACINF SUS001
IGPOWR: SECO05
INSI : COMINF DEVICE ERRMSG WORK
INTERP: COMINF DEVICE
INTINI: COMINF MACINF SWI001
INTR : COMINF DEVICE LINBUF MACINF SWI001
INTRAC: COMINF MACINF
INTTAB: COMINF DAT001 DEVICE DEVMAC DISCOM LINBUF MACINF SUS001
SWI001
ITSW : SWICOM
LAGFIN: COMINF
LAGRED: ERRMSG
LAGWRI: ERRMSG
LARG : COMINF LINBUF
LARROW: COMINF
LEOSB : SECO05
LET : COMINF LINBUF MACINF
LFINAM: COMINF
LFNAME: COMINF

LINECM: PLCC25
LINETO: PLCC25
LIST : COMINF DEVICE ERRMSG
LOGAX : PLCC25
LOGBUF: DAT001 DAT002 LINBUF
LOGPKI: LPRO01
LOGSWI: DEVICE SWICOM
LOOKUP: SECC05
LPCOM : COMINF DEVICE MACINF SWI001
LSID : COMINF DEVICE ERRMSG WORK
LTSAMP: SECC05
LUFIND: FCTAB
MACEND: COMINF LINBUF MACINF
MACHDL: COMINF LINBUF MACINF SUS001
MARGIN: PLCC25
MCBUF : LINBUF MCC002
MLCOMP: DEVICE ML1
MLID : COMINF DEVICE ERRMSG ML1 WORK
MLOUT : DEVICE ML1
MLPAR : DEVICE ERRMSG ML1
MOVECM: PLCC25
MOVETO: PLCC25
MOVID : COMINF DEVICE ERRMSG
NARG : PNTERS
NPOL : NPOL01
NXTLIN: SECC02 SECC05
OFNEF : PLCC25
ONESTR: COMPOW PNTERS
OPEN : DEVICE FLAGS
PACTAB: ERRMSG MCC002 SECC02 SECC05 SWICOM
PICK : COMINF DEVICE ERRMSG
PLCTAB: PLCC01 PLCC02 PLCC25
PLINIT: PLCC01 PLCC02 PLCC25
PLMAG : COMINF DEVICE ERRMSG WORK
PLMOVE: PLCC25
PLOTCO: COMINF DEVICE ERRMSG WORK
PLRSET: PLCC25
PLSTOP: PLCC01 PLCC25
PLSYMB: PLCC25
PUT : GLOBAL
RANPAR: SECC05 WORK
RCURL : CURLIN DEVICE FLAGS PNTERS
READIN: DEVICE LINBUF
READX : COMINF LINBUF MACINF
RECLIN: COMINF LINBUF
REINAP: COMROW CURLIN FLAGS PNTERS
RESDIS: DEVICE
RESEX : COMINF DEVICE LINBUF MACINF SWI001
RESID : COMINF DEVICE ERRMSG WORK
RESUME: COMINF LINBUF MACINF SUS001

RFP : CRANK RFP003
RMISO : SECO05
RPOIM : ERRMSG SECO05
SCALOP: COMINF DEVICE ERRMSG
SEARCH: SECO05
SECBEG: DEVICE ERRMSG
SECFND: DEVICE
SLIDE : COMINF DEVICE ERRMSG WORK
SPTRF : COMINF DEVICE ERRMSG WORK
SQR : COMINF DEVICE ERRMSG WORK
STAT : COMINF DEVICE ERRMSG
STRUC : COMINF DEVICE ERRMSG WORK
SUBST : COMINF LINBUF MACINF
SWITCH: COMINF DAT001 LINBUF MACINF SWI001
TCHARS: SECO05
TREND : COMINF DEVICE ERRMSG
TURN : COMINF DEVICE SWICOM
TWOSTR: COMROW PNTERS
VECOP : COMINF DEVICE ERRMSG
WBUFF : DEVICE FCTAB
WCUPL : CURLIN DEVICE FLAGS PNTERS
WRIBUF: DAT001 DAT002 DEVICE LINBUF PLC001 PLC025
WRITEX: COMINF DEVICE LINBUF MACINF
WRLINE: DEVICE
WRMSG : DEVICE
WRT : COMINF LINBUF MACINF
WRT2 : COMINF GLOBAL MACINF
XCCORD: PLC025
XSCAL : PLC025
XSCORD: PLC025
XYAX : PLC025
XYCURV: PLC002 PLC025 XYC019
YCCORD: PLC025
YSCAL : PLC025
YSCORD: PLC025

10) Referenced COMMON Blocks

=====

E.g. COMMON /GLOBAL/ is referenced by:
 SUBR. FREE, FR2, GET, PUT, WRT2, PROGR. IDMAIN
 and BLOCK DATA IDTAB

```

CONINF: ACFSP  BODE  CCFSP  CONC  CONV  CORAN  CUT  DEFIT
        DELCO  DFT   DSIM   ECHBUF  EDCOM  ERROR  FHEAD  FILT
        FORMAC  FORMAT  FORNXT  FREE  FROP  FTEST  GSFIL  HCCOM
        IDFT   IDMAIN  IFGOLA  INSI  INTERR  INTINI  INTR  INTRAC
        INTTAB  LAGFIN  LARG   LARROW  LET   LFINAM  LFNAME  LIST
        LPCOM  LSID   MACEND  MACHDL  MLID  MOVID  PICK  PLMAG
        PLOTCO  READX  RECLIN  RESEX  RESID  RESUME  SCALOP  SLIDE
        SPTRF  SQR   STAT   STRUC  SUBST  SWITCH  TREND  TURN
        VECOP  WRITEX  WRT    WRT2

COMROW: CHANGE  COMND  COMPAR  EDITOR  ONESTR  REINAP  TWOSTR
CRANK  : DIGITS  FAC    GAC    RFP
CURLIN: CHANGE  COMPAR  DISPL  EDITOR  RCURL  REINAP  WCURL
DAT001: INTTAB  LOGBUF  SWITCH  WRIBUF
DAT002: LOGBUF  WRIDUF
DEVICE: ACFSP  BODE  CCFSP  CLOSEF  COMND  CONC  CONV  CORAN
        CUT   DELCO  DFT   DISBUF  DISHDL  DISPL  DSIM  ECHBUF
        ECHSEC  EDITOR  EMESS  ERAS  ERROR  FDELET  FENTER  FHEAD
        FILDAT  FILES  FILT  FORMAT  FROP  FSEEK  FTEST  GSFIL  LIST
        HCCOM  IDFT  IDMAIN  INSI  INTERR  INTR  INTTAB  LIST
        LOGSWI  LPCOM  LSID  MLCOMP  MLID  MLOUT  MLPAR  MOVID
        OPEN   PICK  PLMAG  PLOTCO  RCURL  READIN  RESDIS  RESEX
        RESID  SCALOP  SECBEG  SECEND  SLIDE  SPTRF  SQR   STAT
        STRUC  TREND  TURN  VECOP  WBUFF  WCURL  WRIBUF  WRITEX
        WRLINE  WRMSG

DEVMAC: IDMAIN  INTTAB
DISCOM: DISHDL  INTTAB
ERRMSG: ACFSP  BODE  CCFSP  CCOF  CONC  CONV  CORAN  CUT
        DELCO  DFT   DSIM  ERROR  ERRO4  ERR10  ERR100  ERR110
        ERR20  ERR30  ERR40  ERR50  ERR60  ERR70  ERR80  ERR90
        FHEAD  FILT  FORMAT  FROP  GETSEC  IDFT  INSI  LAGRED
        LAGWRI  LIST  LSID  MLID  MLPAR  MOVID  PACTAB  PICK
        PLMAG  PLOTCO  RESID  RPOIM  SCALOP  SECBEG  SLIDE  SPTRF
        SQR   STAT  STRUC  TREND  VECOP

FCTAB  : FCLOSE  FENTER  FILCHK  FILDAT  FILES  FILTAB  FSEEK  LUFIND
        WBUFF

FILEN  : EDITOR  EMESS
FLAGS  : CHANGE  COMND  COMPAR  DISPL  EDITOR  EMESS  ERAS  FINLOC
        OPEN   RCURL  REINAP  WCURL
GLOBAL: FREE  FR2  GET  IDTAB  PUT  WRT2
IFACOM: FAC  IFAC
LINBUF: ECHBUF  FORMAC  FORNXT  FREE  IFGOLA  INTR  INTTAB  LARG
        LET  LOGBUF  MACEND  MACHDL  MCBUF  READIN  READX  RECLIN

```

```

RESEX RESUME SUBST SWITCH WRIBUF WRITEX WRT
LPR001: GSFIL  LOGPRI
MACINF: ECHBUF FORMAC FORNXT FREE IFGOLA INTINI INTR INTRAC
        INTTAB LET LPCOM MACEND MACHDL READX RESEX RESUME
        SUBST SWITCH WRITEX WRT WRT2
MC0002: MCBUF PACTAB
ML1 : FUNC IDTAB MLCOMP MLID MLOUT MLPAR
NPOL01: GETPOL IDTAB NPOL
PLC001: PLCTAB PLINIT PLSTOP WRIBUF
PLC002: PLCTAB PLINIT XYCURV
PLC025: ARCORN AREA ASPLIT LINECM LINETO LOGAX MARGIN MOVECM
        NOVETO OFNEF PLCTAB PLINIT PLMOVE PLRSET PLSTOP PLSYMB
        WRIBUF XCCORD XSCAL XSCORD XYAX XYCURV YCCORD YSCAL
        YSCORD
PNTERS: CHANGE COMND COMPAR DISPL EDITOR FINLOC NARG ONESTR
        RCURL REINAP TWOSTR WCURL
RFP003: DIGITS RFP
SECC02: ECHSEC NXTLIN PACTAB
SECC05: BUFIN ECHSEC GCOEFF IGPOWR LEOSB LOOKUP LTSAMP NXTLIN
        PACTAB RANPAR RMISO RPOIM SEARCH TCHARS
SUS001: IFGOLA INTTAB MACHDL RESUME
SWICOM: ITSW LOGSWI PACTAB TURN
SWI001: INTINI INTR INTTAB LPCOM RESEX SWITCH
WORK : ACFSP BODE CCFSP DFT DSIM FHEAD IDFT INSI
        LSID MLID PLMAG PLOTCO RANPAR RESID SLIDE SPTRF
        SQR STRUC
XYC019: XYCURV

```