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Supermap for Cray Fortran: A User's Guide.

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Supermap for Cray Fortran:
A User's Guide.

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SECTION 1

INTRODUCTION

1.1 PURPOSE

The purpose of this program is to produce a map which gives the user an overall view of all components and attributes of a FORTRAN program unit run on the CRAY. Unlike the maps produced by the CRAY FORTRAN compiler, which relates only to a single module, this map relates to the entire program unit. It maps the usage of all variables and all commons used within a FORTRAN program. It also maps the alignment of subprograms CALLed with the arguments and the dummy arguments of the subprogram which is CALLed.

1.2 SPECIFIC FEATURES

SUPERMAP produces the following:

- Table of all modules contained within the program. Specifies the module name, type, arguments, and length.

- Table of references to systems routines. Specifies the CALLed routine and dummy arguments, the CALLing module with arguments and the line reference number.

- Table of references to modules which are not members of the program or system libraries. Specifies the CALLed routine and dummy arguments, the CALLing module with arguments and the line reference number.

- Table of references by called modules, Specifies the CALLed routine and dummy arguments, the CALLing module with arguments and the line reference number.

- Table of references by calling modules. Specifies the CALLing module, arguments, and line reference number, the CALLed module with dummy arguments.

- List of undefined variables. Specifies variables used but not defined with the name of the module which contains the variable.

- Table of variables grouped by name. Specifies the variable name along with the names of all modules using the variable, its type, relocation (common), and size. It also shows a frequency of how the variable is used in each module. As an example it shows the number of times a variable is used as an argument in a CALL, number of times it is stored, number of times it is used in calculations, etc.

- Table of commons grouped by name. Specifies the common name along with the names of all modules using the common, variable names within the common, along with the variables type, size and how it is used in each module. A total length is shown for the common each time the module name changes.

- Table of variables with respect to modules. Simply a quick cross reference chart showing the names of the variables with the module names.

- Table of variables with respect to modules. Simply a quick cross reference chart showing the names of the variables with the module names.

- Table of contents for SUPERMAP.

SECTION 2

DATA FILE STRUCTURES

2.1 INPUT DATA FILE STRUCTURE

The main input file for SUPERMAP is logical unit number one and its contents are the compiler generated listable CFT FORTRAN source code and maps for each module of the program set. See examples of how to prepare this file. (Section 4.2.1).

The secondary input to SUPERMAP is logical unit number five which can be a terminal or a card reader. Options for the formatting of SUPERMAPs output are input on this device. See Usage, section 4.1, for the options.

2.2 OUTPUT FILE STRUCTURE

Printed lists and tables are the only forms of output from this program. The output files may be formatted for either a line printer or terminal (CRT), see OPTIONS section 4.1. Should the option for a terminal be selected the width of the output is 80 print positions; the width of printout is formatted to 132 print positions when a line printer is selected.

2.3 OTHER DATA FILES

SUPERMAP uses FORTRAN logical units 1,2,5,6, and 9 during a run. Logical unit 1, as noted above, is the main input file. Units 5 and 6 are used for INPUT and OUTPUT respectively. Units 2 and 9 are used internally by the program for binary data and are transparent to the user.

SECTION 3

LIMITATIONS, TIMING and RESTRICTIONS

3.1 LIMITATIONS OF TABLES

SUPERMAP stores most of its information in internal tables. The limitations of these tables limits the amount of information which can be processed by SUPERMAP.

The current limitations are:

The table of variable names has space for 20,000 unique entries. The appearance of a variable name in each unique module requires a unique entry into this table. The entry to the table consists of the variable name associated with the module name and other information. Therefore, 20,000 unique variable names can be stored.

Maximum of 100 undefined variables.

Maximums for the tables which contain information about CALLs will vary with the number of arguments used in CALLs to sub-programs or system library routines. The following table illustrates the maximums for the average number of arguments per CALL.

no. of args.	maximum
1	4000
2	3333
3	2857
4	2222
5	2000
10	1333
15	1000
20	500

3.2 TIMING CONSIDERATIONS

No absolute benchmarks for timing SUPERMAP have been established. However, using the CRAY default of eight seconds should under normal conditions, be adequate for most small programs. The sample case, shown in appendix A, has approximately 280 FORTRAN statements required roughly 5 seconds to complete. A larger test case with approximately 4850 FORTRAN statements required 16 seconds.

3.3 RESTRICTIONS

- o Input program set must be free of compiler errors.
- o Input must be a compiled listing of a program set with CFT ON=CNPQRSTX, OFF=ABDEFHIJLMOV option.
- o An END statement must be the last statement of each FORTRAN module and the END statement must be on one line only.
- o END FILE and END IF statements must not be broken into two or more lines.
- o No assembly programs or maps of assembly programs are allowed.

SECTION 4

USAGE

4.1 OPTIONS

SUPERMAP defaults it output to a terminal or cathode-ray tube, CRT, with a maximum of twenty lines per page. The user may input data to alter the output to be formatted for a line printer and alter the number of lines per page. If the user selects the line printer as the output device but does not select the number of lines per page, the system will default to fifty lines per page.

The options are input as:

- PRINTER for line printer.
- CRT for cathode-ray tube or terminal.
- MAXLINES=n where: n is number of lines desired per page.

These options may be in any order on one or more lines of input. If more than one option per line is input, then the options must be separated by commas. The input may be terminated by a period or left blank.

Should there be any misspellings of an option, that option input ignored. Embedded blanks in the options or between options are ignored.

It is advisable to include a DISPOSE statement in the job control when the PRINTER option is selected.

Example of option input:

```
MAXLINES=30,PRINTER.      output is formatted for a line
                          printer and thirty lines per page.

or
PRINTER
MAXLINES = 30
```

4.2 EXAMPLES OF JOB CONTROL LANGUAGE

The following examples of job control are only suggested as a means of preparing data for and running SUPERMAP. The user may setup his job control as he sees fit for his use of the program.

However, it is required that on the CFT statement the ON option be set to CNPQRSTX and the OFF option be set to ABDEFHIJLMOV. Also, SUPERMAP needs its input file be ASSIGNed to FT01.

In the following examples of CRAY JOB CONTROL LANGUAGE the user must supply the following information when using the SUPERMAP program.

- compstop - computer mail stop. (DISPOSE STATEMENT)
- ident - user identification name.
  (SAVE AND ACCESS STATEMENTS)
- jobname - name of job. (JOB STATEMENT)
- time - estimation of time for run. (JOB STATEMENT)
- useracc - user account number. (ACCOUNT STATEMENT)
- userfile - name of users file.
  (SAVE AND ACCESS STATEMENTS)
- userid - user identification number. (ACCOUNT STAT)
- userpass - user password. (ACCOUNT STATEMENT)
- all information in lower case letters throughout the JCL.

4.2.1 Example 1.

Job control language to generate and SAVE input for SUPERMAP.

```
JOB,JN=jobname,T=time.   SAMPLE CRAY JOB CONTROL LANGUAGE
ACCOUNT,AC=useracc,US=userid,UPW=userpass.
*COMMENT:  + - - - - - - - - - - - - - - - - - - - - +
*COMMENT:  + JOB CONTROL TO PREPARE INPUT FOR A RUN +
*COMMENT:  + OF SUPERMAP                            +
*COMMENT:  + - - - - - - - - - - - - - - - - - - - - +
CFT,ON=CNPQRSTX,OFF=ABDEFHIJLMOV,L=CFTOUT.
REWIND,DN=CFTOUT.
SAVE,DN=CFTOUT,PDN=userfile,ID=ident.  SAVE DATA FOR INPUT.
/EOF
Source code program and subprograms to be input to SUPERMAP.
/EOF
```

4.2.2 Example 2

Job control language to run SUPERMAP when the input was generated by another job and SAVEd as a permanent file. This example is set up for output going to the line printer with fifty five lines per page.

```
JOB,JN=jobname,T=time.   SAMPLE CRAY JOB CONTROL LANGUAGE
ACCOUNT,AC=useracc,US=userid,UPW=userpass.
*COMMENT:  + - - - - - - - - - - - - - - - - - - - - - +
*COMMENT:  + JOB CONTROL TO RUN THE SUPERMAP PROGRAM +
*COMMENT:  + WHEN INPUT WAS PREPARED BY ANOTHER RUN. +
*COMMENT:  + - - - - - - - - - - - - - - - - - - - - - +
DISPOSE,DN=$OUT,MF=AA,TID=compstop,DC=PR,DEFER.
ACCESS,DN=TAPE1,PDN=userfile,ID=ident.  INPUT DATA IS ON THIS
FILE.
ASSIGN,DN=TAPE1,A=FT01.
ACCESS,DN=SUPER,PDN=SUPERMAP,ID=SOFTLIB.
LDR,DN=SUPER,MAP=OFF.
/EOF
          PRINTER,  MAXLINES = 55.
/EOF
```

4.2.3 Example 3

Job control language to generate input for SUPERMAP and to run SUPERMAP. In this example the output will default to the CRT with a maximum of twenty lines per page.

```
JOB,JN=jobname,T=time.   SAMPLE CRAY JOB CONTROL LANGUAGE
ACCOUNT,AC=useracc,US=userid,UPW=userpass.
*COMMENT:  + - - - - - - - - - - - - - - - - - - -  +
*COMMENT:  + JOB CONTROL TO GENERATE INPUT AND RUN  +
*COMMENT:  + THE SUPERMAP PROGRAM.                  +
*COMMENT:  + - - - - - - - - - - - - - - - - - - -  +
CFT,ON=CNPQRSTX,OFF=ABDEFHIJLMOV,L=TAPE1.  GENERATE INPUT FOR
SUPERMAP.
REWIND,DN=TAPE1.
ASSIGN,DN=TAPE1,A=FT01.  INPUT DATA IS ON THIS FILE.
ACCESS,DN=SUPER,PDN=SUPERMAP,ID=SOFTLIB.
LDR,DN=SUPER,MAP=OFF.
/EOF
  Source code program and subprograms to be input to SUPERMAP.
/EOF
/EOF
```

SECTION 5

ERROR MESSAGES

PREMATURE END OF FILE HAS BEEN READ.

Program aborts. An unexpected END OF FILE was read. Correct the data on input file and restart the program.

END STATEMENT ONLY NO OTHER FORTRAN.

Processing continues. Warning only.

FIRST LINE IS A CONTINUATION.

Program aborts. First line of FORTRAN source has a continuation in column six. Correct the data on input file and restart the program.

MODULE IS ONLY A TWO STATEMENT ROUTINE.

Processing continues. Warning only.

MODULE WITHOUT A NAME. ASSIGNED PROG.INV AS NAME.

Processing continues. Warning only. Used an invented name for module.

DISAGREEMENT IN NAME OF MODULE.

When a source module does not have a name the FORTRAN compiler will assign it a name. The name assigned by the compiler may not be the same as the invented name given to the module when the message MODULE WITHOUT A NAME. ASSIGNED PROG.INV AS NAME was issued. Processing continues. Informational only.

TABLE AGOOFS IS FULL. RESULTS WILL BE INCOMPLETE.

Processing continues. Not all undefined variable names will be reported.

TABLE ABLOCK IS FULL. RESULTS WILL BE INCOMPLETE.

Warning. The output of variable information is incomplete.* Processing continues.

TABLE ALLMODLS IS FULL.

Table overflow. Program aborts.*

TABLE ALLCALLS IS FULL.

Table overflow. Program aborts.*

TABLE CALLINFO IS FULL.

Table overflow. Program aborts.*

TABLE SUBINFO IS FULL.

Table overflow. Program aborts.*

*When the tables overflow the user may elect to divide the input file into segments and run each segment to obtain the desired map.

SECTION 6

GENERAL REMARKS ON READING THE OUTPUT

6.1 ABBREVIATIONS USED IN THE OUTPUT

Abbreviations for column entitled DIMENSND.

SIMPLE	not dimensioned
DUM. ARG	dummy argument for function or subroutine
1D	single dimension
2D	double dimension
3D	triple dimension
4D	quadruple dimension
5D	quintuple dimension
6D	sextuple dimension
7D	septuple dimension

When EQV. follows any of the dimensions this implies that named variable is used in an EQUIVALENCE statement.

Abbreviations for column entitled COMMON.

DUM.ARG.	dummy argument in a calling sequence.
LOCAL.	variable is local to named module only.
//	blank common
name	name of the common

Abbreviations for column entitled TYPE.

CHAR	specified as CHARACTER variable
COMPLX	specified as COMPLEX variable
DOUBLE	specified as DOUBLE PRECISION variable
INTEGER	specified as INTEGER variable
LOGICAL	specified as LOGICAL variable
PARM	specified as PARAMETER variable
REAL	specified as REAL variable

Definition of abbreviations for columns entitled USAGE:

AG - used in CALL, function as an argument or array definition.
AS - used in an ASSIGN statement.
DD - defined in declarative.
DP - used as DO loop parameter.
EQ - used in EQUIVALENCE statement.
IX - index of a DO statement.
ST - stored and contents may change.

UN - declared or defined but not used.
XS - used in executable statement.

Note: under the USAGE heading a frequency distribution of how the variable is used is output. Should any one frequency exceed 99 then >C is output. Also, an * in the column entitled UN does not imply that variable is not used; it only implies it is set but not used otherwise. This parallels the CRAY FORTRAN maps.

6.2 EXCEPTIONS TO ARGUMENTS

Since SUPERMAP aligns the arguments when it produces the maps of references by called modules and references by calling modules, it is necessary to remove subscripts of an argument in a CALLING sequence. Also, expressions, library functions, functions, constants, and alpha strings are removed from the CALLing sequence. When SUPERMAP removes any of these arguments, it substitutes a name for them. These substituted names are prefixed with question mark (?) followed by EXPRnnn, LIBRnnn, or ALFAnnn. Where nnn can range from 0 to 999.

Should any of these substitutions be made, a list of them is output. The list contains the name of the module where the substitution took place along with the line number, the CALL statement name, the assigned name and the string or expression which was replaced.

6.3 MISCELLANEOUS REMARKS

The number, which is shown to the left of the columns entitled CALLING MODULE, is the line reference number to the FORTRAN source program.

Should a CALL be made to a module which is not a member of the program unit or one of the CRAY libraries, SUPERMAP will insert in its output the statement REQUIRED ARGUMENTS UNKNOWN for the list of arguments. This is done because SUPERMAP has no way of knowing the required arguments for the CALLed module.

APPENDIX A

SAMPLE PRINTOUT FORMATTED FOR A LINE PRINTER

The next several pages contain the sample output of SUPERMAP for the CRAY X-MP computer system. This sample was generated with the option input parameters set as:

```
PRINTER
MAXLINES=40
```

ABBREVIATIONS FOR COLUMN ENTITLED
—DIMENSND—

1D	SINGLE DIMENSION.
2D	DOUBLE DIMENSION.
3D	TRIPLE DIMENSION.
4D	QUADRUPLE DIMENSION.
5D	QUINTUPLE DIMENSION.
6D	SEXTUPLE DIMENSION.
7D	SEPTUPLE DIMENSION.
1D EQV.	EQUIVALENCED SINGLE DIMENSION.
2D EQV.	EQUIVALENCED DOUBLE DIMENSION.
3D EQV.	EQUIVALENCED TRIPLE DIMENSION.
4D EQV.	EQUIVALENCED QUADRUPLE DIMENSION.
5D EQV.	EQUIVALENCED QUINTUPLE DIMENSION.
6D EQV.	EQUIVALENCED SEXTUPLE DIMENSION.
7D EQV.	EQUIVALENCED SEPTUPLE DIMENSION.
SIMPLE	NOT DIMENSIONED.
PARAMETR	SPECIFIED AS PARAMETER.
ST.FUNCT	DECLARED AS STATEMENT FUNCTION.

ABBREVIATIONS FOR COLUMNS ENTITLED
—USAGE—

AG:	USED IN A CALL OR FUNCTION AS AN ARGUMENT.
AS:	USED IN AN ASSIGN STATEMENT.
DD:	DEFINED IN DECLARATIVE.
DP:	USED AS DO LOOP PARAMETER.
EQ:	USED IN EQUIVALENCE STATEMENT.
IX:	INDEX OF A DO STATEMENT.
ST:	STORED AND CONTENTS MAY CHANGE.
UN:	DECLARED OR DEFINED—NOT USED.
XS:	USED IN EXECUTABLE STATEMENT.

ABBREVIATIONS FOR COLUMN ENTITLED
—TYPE—

CHAR	SPECIFIED AS CHARACTER VARIABLE.
COMPLX	SPECIFIED AS COMPLEX VARIABLE.
REAL	SPECIFIED AS REAL VARIABLE.
INTEGER	SPECIFIED AS INTEGER VARIABLE.
LOGICAL	SPECIFIED AS LOGICAL VARIABLE.
DOUBLE	SPECIFIED AS DOUBLE PRECISION VARIABLE.

ABBREVIATIONS FOR COLUMN ENTITLED
—COMMON—

DUM.ARG.	DUMMY ARGUMENT SUBPROGRAM.
LOCAL.	LOCAL TO SUBPROGRAM.
//	UNLABELED COMMON.
———	NAME OF COMMON.

ORIGINAL PAGE IS
OF POOR QUALITY

```
                      EXCEPTIONS TO ARGUMENTS
MODULE       LINE CALL TO  SUBSTITUTE
NAME       NUMBER MODULE   NAME         STRING OR EXPRESSION
--------   ------ -------  ----------   ------------------------------
APROG          21 ESUBRT   ?EXPR000     5.0
APROG          26 FSUBRT   ?LIBR000     SQRT(10.)
APROG          35 CSUBRT   ?EXPR001     1+2
APROG          37 CSUBRT   ?EXPR002     (1+2)
APROG          42 KSUBRT   ?EXPR003     5.0
APROG          45 LSUBRT   ?ALFA000     'ABCDEFGHIJ'
APROG          46 FSUBRT   ?LIBR001     SQRT(10.)
APROG          47 FSUBRT   ?LIBR002     SQRT(10.)
APROG          47 FSUBRT   ?EXPR004     XX*YY
APROG          48 FSUBRT   ?LIBR003     SQRT(10.)
APROG          48 FSUBRT   ?EXPR005     1.2
APROG          49 FSUBRT   ?LIBR004     SQRT(10.)
APROG          49 FSUBRT   ?EXPR006     +0.5E-02
APROG          49 FSUBRT   ?EXPR007     YY/ZZ+.00008
APROG          26 SQRT     ?EXPR008     10.
APROG          46 SQRT     ?EXPR009     10.
APROG          47 SQRT     ?EXPR010     10.
APROG          48 SQRT     ?EXPR011     10.
APROG          49 SQRT     ?EXPR012     10.
ASUBRT          8 VSUBRT   ?ALFA001     "XYZ"
ASUBRT          8 VSUBRT   ?ALFA002     "ABCDEFG"
OSUBRT         20 FUNCTA   ?EXPR013     1.0
A TOTAL OF   22 EXCEPTIONS.
```

```
                            MODULES CONTAINED WITHIN THIS PROGRAM

MODULE    MODULE     DECIMAL
NAME      TYPE       LENGTH   ARGUMENTS
_______   ________   _______  _______  _______  _______  _______  _______  _______  _______  _______  _______  _______  _______
AFUNCTN   (FUNCT)         13  VAR
APROG     (PROGRM)       185  NO ARGUMENTS REQUIRED.
ASUBRT    (SUBRT)         56  NO ARGUMENTS REQUIRED.
BENTRY    (ENTPNT)            NO ARGUMENTS REQUIRED.
BLKDAT    (BLKDAT)        10  NO ARGUMENTS REQUIRED.
BSUBRT    (SUBRT)         31  NO ARGUMENTS REQUIRED.
CSUBRT    (SUBRT)         37  A        B        C
FSUBRT    (SUBRT)         19  A        B        C
ISUBRT    (SUBRT)         18  A        B        C
MSUBRT    (SUBRT)        333  ARGP     ARGQ     ARGR     ARGS     ARGT     ARGU     ARGV     ARGW     ARGX     ARGY     ARGZ
NSUBRT    (SUBRT)         17  ZZFUN    ZZRAD    ZZRESULT
OSUBRT    (SUBRT)        375  NO ARGUMENTS REQUIRED.
QSUBRT    (SUBRT)         16  ZZFUN    ZZRAD    ZANSWER
XENTRYA   (ENTPNT)            ZETA
XENTRYB   (ENTPNT)            THREE    ONE      TWO
XSUBRT    (SUBRT)         50  ONE      TWO      THREE
YSUBRT    (SUBRT)        296  NO ARGUMENTS REQUIRED.
ZSUBRT    (SUBRT)         37  NO ARGUMENTS REQUIRED.
```

```
                  REFERENCES TO SYSTEMS ROUTINES

CALLED    CALLING
MODULE    MODULE    ARGUMENTS
--------  --------  --------  --------  --------  --------
AND       (SYSTEM)  DUM.ARG.  DUM.ARG.
       20 APROG     IONE      ITWO
EXIT      (SYSTEM)  NO ARGUMENTS REQUIRED.
       52 APROG
SORT      (SYSTEM)  DUM.ARG.
       26 APROG     ?EXPR008
       46 APROG     ?EXPR009
       47 APROG     ?EXPR010
       48 APROG     ?EXPR011
       49 APROG     ?EXPR012
```

```
REFERENCES TO MODULES WHICH ARE NOT MEMBERS OF THIS PROGRAM OR A SYSTEM LIBRARY

CALLED   CALLING
MODULE   MODULE    ARGUMENTS
------   -------   ------- ------- ------- ------- ------- ------- -------
DSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      22 APROG     Z        X         Y

ESUBRT             REQUIRED ARGUMENTS UNKNOWN.
      21 APROG     X        Y         ?EXPR000

FUNCTA             REQUIRED ARGUMENTS UNKNOWN.
      20 OSUBRT    ?EXPR013 YARG
      23 OSUBRT    Z4       A4

GSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      25 APROG     SIN      XCHI      ZZTRASH

HSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      39 APROG

JSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      41 APROG     Z        X         0

KSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      42 APROG     X        Y         ?EXPR003

LSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      45 APROG     ?ALFA000

RSUBRT             REQUIRED ARGUMENTS UNKNOWN.
      32 OSUBRT    X        Y         Z

USUBRT             REQUIRED ARGUMENTS UNKNOWN.
      21 OSUBRT    A1       A2        A3        A4
      22 OSUBRT    Z4       Z3        Z2        Z1

VSUBRT             REQUIRED ARGUMENTS UNKNOWN.
       8 ASUBRT    ?ALFA001 ?ALFA002

ZZFUN              REQUIRED ARGUMENTS UNKNOWN.
        **NOTE: ZZFUN    ITSELF IS A DUMMY EXTERNAL IN MODULE QSUBRT
        **NOTE: ZZFUN    ITSELF IS A DUMMY EXTERNAL IN MODULE NSUBRT
       2 QSUBRT    ZZRAD
```

```
REFERENCES TO MODULES WHICH ARE NOT MEMBERS OF THIS PROGRAM OR A SYSTEM LIBRARY

CALLED   CALLING
MODULE   MODULE   ARGUMENTS
-------- -------- -------- -------- -------- -------- -------- -------- -------- --------
       2 NSUBRT   ZZRAD
```

```
                         REFERENCES BY CALLED MODULES

CALLED   CALLING
MODULE   MODULE   ARGUMENTS
-------- -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- -----
AFUNCTN  (FUNCT)  VAR
       7 XSUBRT   TWO
                   1 REFERENCES TO MODULE AFUNCTN

ASUBRT   (SUBRT)  NO ARGUMENTS REQUIRED.
      14 APROG    NO ARGUMENTS SUBMITTED.
                   1 REFERENCES TO MODULE ASUBRT

BENTRY   (ENTPNT) NO ARGUMENTS REQUIRED.
                  NO REFERENCES TO MODULE BENTRY

BSUBRT   (SUBRT)  NO ARGUMENTS REQUIRED.
      24 APROG    NO ARGUMENTS SUBMITTED.
                   1 REFERENCES TO MODULE BSUBRT

CSUBRT   (SUBRT)  A        B        C
      23 APROG    X        Y        Z
      35 APROG    ?EXPR001 Y        Z
      37 APROG    ?EXPR002 Y        Z
                   3 REFERENCES TO MODULE CSUBRT

FSUBRT   (SUBRT)  A        B        C
      26 APROG    X        Y        ?LIBR000
      46 APROG    X        Y        ?LIBR001
      47 APROG    ?EXPR004 YY       ?LIBR002
      48 APROG    X        ?EXPR005 ?LIBR003
      49 APROG    ?EXPR006 ?EXPR007 ?LIBR004
                   5 REFERENCES TO MODULE FSUBRT

ISUBRT   (SUBRT)  A        B        C
      40 APROG    X        Y        Z
                   1 REFERENCES TO MODULE ISUBRT

MSUBRT   (SUBRT)  ARGP     ARGQ     ARGR     ARGS     ARGT     ARGU     ARGV     ARGW     ARGX     ARGY     ARGZ
      36 APROG    ARGP     ARGQ     ARGR     ARGS     ARGT     ARGU     ARGV     ARGW     ARGX     ARGY     ARGZ
       3 CSUBRT   ARGP     ARGQ     ARGR     ARGS     ARGT     ARGU     ARGV     ARGW     ARGX     ARGY     ARGZ
       9 ASUBRT   ARGP     ARGQ     ARGR     ARGS     ARGT     ARGU     ARGV     ARGW     ARGX     ARGY     ARGZ
                   3 REFERENCES TO MODULE MSUBRT
```

```
                    REFERENCES BY CALLED MODULES

CALLED   CALLING
MODULE   MODULE   ARGUMENTS
-------- -------- -------- -------- -------- -------- -------- -------- -------- --------
NSUBRT   (SUBRT)  ZZFUN    ZZRAD    ZZRESULT
                  NO REFERENCES TO MODULE NSUBRT

OSUBRT   (SUBRT)  NO ARGUMENTS REQUIRED.
       3 NSUBRT   NO ARGUMENTS SUBMITTED.
                   1 REFERENCES TO MODULE OSUBRT

QSUBRT   (SUBRT)  ZZFUN    ZZRAD    ZANSWER
      22 MSUBRT   TAN      ZZRAD    ZANSWER
                   1 REFERENCES TO MODULE QSUBRT

XENTRYA  (ENTPNT) ZETA
                  NO REFERENCES TO MODULE XENTRYA

XENTRYB  (ENTPNT) THREE    ONE      TWO
                  NO REFERENCES TO MODULE XENTRYB

XSUBRT   (SUBRT)  ONE      TWO      THREE
      44 APROG    ONE      TWO      THREE
      50 APROG    ONE      TWO      THREE
                   2 REFERENCES TO MODULE XSUBRT

YSUBRT   (SUBRT)  NO ARGUMENTS REQUIRED.
                  NO REFERENCES TO MODULE YSUBRT

ZSUBRT   (SUBRT)  NO ARGUMENTS REQUIRED.
                  NO REFERENCES TO MODULE ZSUBRT
```

```
                    REFERENCES BY CALLING MODULES

CALLING   REFERNCE CALLED
MODULE    LINE NO. MODULE   ARGUMENTS
--------  -------- ------   ---------------------------------------------------------------------------------------------
APROG          14  ASUBRT   NO ARGUMENTS SUBMITTED.

               24  BSUBRT   NO ARGUMENTS SUBMITTED.

               23  CSUBRT   X         Y         Z
               35  CSUBRT   ?EXPR001  Y         Z
               37  CSUBRT   ?EXPR002  Y         Z

               22  DSUBRT   Z         X         W

               21  ESUBRT   X         Y         ?EXPR000

               26  FSUBRT   X         Y         ?LIBR000
               46  FSUBRT   X         Y         ?LIBR001
               47  FSUBRT   ?EXPR004  YY        ?LIBR002
               48  FSUBRT   X         ?EXPR005  ?LIBR003
               49  FSUBRT   ?EXPR006  ?EXPR007  ?LIBR004

               25  GSUBRT   SIN       XCHI      ZZTRASH

               39  HSUBRT   NO ARGUMENTS SUBMITTED.

               40  ISUBRT   X         Y         Z

               41  JSUBRT   Z         X         Y

               42  KSUBRT   X         W         ?EXPR003

               45  LSUBRT   ?ALFA000

               36  MSUBRT   ARGP      ARGQ      ARGR      ARGS      ARGT      ARGU      ARGV      ARGW      ARGX      ARGY      ARGZ

               44  XSUBRT   ONE       TWO       THREE
               50  XSUBRT   ONE       TWO       THREE
```

ORIGINAL PAGE IS
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```
                        REFERENCES BY CALLING MODULES

CALLING   REFERNCE CALLED
MODULE    LINE NO. MODULE   ARGUMENTS
--------  -------- -------  --------  --------  --------  --------  --------  --------  --------  --------  --------  --------  --------
ASUBRT           9 MSUBRT   ARGP      ARGQ      ARGR      ARGS      ARGT      ARGU      ARGV      ARGW      ARGX      ARGY      ARGZ

                 8 VSUBRT   ?ALFA001  ?ALFA002

CSUBRT           3 MSUBRT   ARGP      ARGQ      ARGR      ARGS      ARGT      ARGU      ARGV      ARGW      ARGX      ARGY      ARGZ

MSUBRT          22 QSUBRT   TAN       ZZRAD     ZANSWER

NSUBRT           3 OSUBRT   NO ARGUMENTS SUBMITTED.

                 2 ZZFUN    ZZRAD

OSUBRT          20 FUNCTA   ?EXPR013  YARG
                23 FUNCTA   Z4        A4

                32 RSUBRT   X         Y         Z

                21 USUBRT   A1        A2        A3        A4
                22 USUBRT   Z4        Z3        Z2        Z1

QSUBRT           2 ZZFUN    ZZRAD

XSUBRT           7 AFUNCTN  TWO
```

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```
                        UNDEFINED VARIABLES GROUPED BY NAME
                         THESE VARIABLES SHOULD BE CHECKED
VARIABLE -MODULE- -COMMON- DIMENSND ---SIZE--- -TYPE---      USAGE (FREQUENCY)
  NAME     NAME     NAME                                AG AS DD DP EQ IX ST XS UN
-------- -------- -------- -------- ---------- -------- -- -- -- -- -- -- -- -- --
ARGBA    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGBB    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGBC    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGBD    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGCA    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGCB    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGCC    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
ARGCD    MSUBRT   LOCAL.   UNDEFIND            REAL                          1
```

```
                          VARIABLES GROUPED BY NAME

VARIABLE  -MODULE-  -COMMON-  DIMENSND  --SIZE--  -TYPE--      USAGE (FREQUENCY)
  NAME      NAME      NAME                                 AG AS DD DP EQ IX ST XS UN
--------  --------  --------  --------  --------  -------  -- -- -- -- -- -- -- -- --
A         APROG     //        1D              10  REAL            2                 •
          CSUBRT    DUM.ARG.  SIMPLE              REAL            1           1     •
          FSUBRT    DUM.ARG.  SIMPLE              REAL            1           2  1
          ISUBRT    DUM.ARG.  SIMPLE              REAL            1           2  2
          MSUBRT    LOCAL.    1D              25  REAL            1           1  1
          YSUBRT    LOCAL.    1D              25  REAL            1           1  1

A1        OSUBRT    LOCAL.    SIMPLE              REAL      1

A2        OSUBRT    LOCAL.    SIMPLE              REAL      1

A3        OSUBRT    LOCAL.    SIMPLE              REAL      1

A4        OSUBRT    LOCAL.    SIMPLE              REAL      2

ALPHA     MSUBRT    LOCAL.    SIMPLE              REAL                        2  1
          YSUBRT    CCOMMON   SIMPLE              REAL            1           2  1

ARGBA     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGBB     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGBC     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGBD     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGCA     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGCB     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGCC     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGCD     MSUBRT    LOCAL.    UNDEFIND            REAL                           1

ARGP      APROG     LOCAL.    SIMPLE              REAL      1
```

VARIABLES GROUPED BY NAME

VARIABLE NAME	-MODULE- NAME	-COMMON- NAME	DIMENSND	—SIZE—	-TYPE—	USAGE (FREQUENCY) AG	AS	DD	DP	EQ	IX	ST	XS	UN
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1				1		
ARGQ	APROG	LOCAL.	SIMPLE		REAL	1								
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
ARGR	APROG	LOCAL.	SIMPLE		REAL	1								
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
ARGS	APROG	LOCAL.	SIMPLE		REAL	1								
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
ARGT	APROG	LOCAL.	SIMPLE		REAL	1								
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
ARGU	APROG	LOCAL.	SIMPLE		REAL	1								
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
ARGV	APROG	LOCAL.	SIMPLE		REAL	1								
	CSUBRT	LOCAL.	SIMPLE		REAL	1								
	ASUBRT	LOCAL.	SIMPLE		REAL	1								
	MSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
ARGW	APROG	LOCAL.	SIMPLE		REAL	1								

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```
                    VARIABLES GROUPED BY NAME

VARIABLE -MODULE- -COMMON- DIMENSND --SIZE-- -TYPE--     USAGE (FREQUENCY)
 NAME      NAME     NAME                              AG AS DD DP EQ IX ST XS UN
-------- -------- --------  -------- -------- -------  -- -- -- -- -- -- -- -- --
         CSUBRT   LOCAL.    SIMPLE            REAL     1
         ASUBRT   LOCAL.    SIMPLE            REAL     1
         MSUBRT   DUM.ARG.  SIMPLE            REAL           1              1

ARGX     APROG    LOCAL.    SIMPLE            REAL     1
         CSUBRT   LOCAL.    SIMPLE            REAL     1
         ASUBRT   LOCAL.    SIMPLE            REAL     1
         MSUBRT   DUM.ARG.  SIMPLE            REAL           1              1

ARGY     APROG    LOCAL.    SIMPLE            REAL     1
         CSUBRT   LOCAL.    SIMPLE            REAL     1
         ASUBRT   LOCAL.    SIMPLE            REAL     1
         MSUBRT   DUM.ARG.  SIMPLE            REAL           1              1

ARGZ     APROG    LOCAL.    SIMPLE            REAL     1
         CSUBRT   LOCAL.    SIMPLE            REAL     1
         ASUBRT   LOCAL.    SIMPLE            REAL     1
         MSUBRT   DUM.ARG.  SIMPLE            REAL           1              1

ARGZA    MSUBRT   LOCAL.    SIMPLE            REAL                       1     •

ARGZB    MSUBRT   LOCAL.    SIMPLE            REAL                       1     •

ARGZC    MSUBRT   LOCAL.    SIMPLE            REAL                       1     •

ARGZD    MSUBRT   LOCAL.    SIMPLE            REAL                       1     •

B        APROG    //        1D             25 REAL           2                 •
         CSUBRT   DUM.ARG.  SIMPLE            REAL           1              1
         FSUBRT   DUM.ARG.  SIMPLE            REAL           1              3
         ISUBRT   DUM.ARG.  SIMPLE            REAL           1              2
         MSUBRT   LOCAL.    1D             50 REAL           1           1  1
         YSUBRT   LOCAL.    1D             50 REAL           1           1  1

BETA     YSUBRT   CCOMMON   2D        1000000 REAL           1              1
```

VARIABLES GROUPED BY NAME

VARIABLE NAME	MODULE NAME	COMMON NAME	DIMENSND	SIZE	TYPE	USAGE (FREQUENCY)								
						AG	AS	DD	DP	EQ	IX	ST	XS	UN
C	APROG	//	1D	50	REAL			2						•
	CSUBRT	DUM.ARG.	SIMPLE		REAL			1					1	
	FSUBRT	DUM.ARG.	SIMPLE		REAL			1					2	
	ISUBRT	DUM.ARG.	SIMPLE		REAL			1					2	
	MSUBRT	LOCAL.	1D	100	REAL			1				1	1	
	YSUBRT	LOCAL.	1D	100	REAL			1				1	1	
CHAR5	OSUBRT	LOCAL.	SIMPLE		CHAR			1				1		•
CHAR8	OSUBRT	LOCAL.	1D	10	CHAR			1						•
CHI	XSUBRT	ECOMMON	1D	64	REAL			1						•
	YSUBRT	ECOMMON	1D	64	REAL			1						•
COMPLXA	OSUBRT	LOCAL.	SIMPLE		COMPLEX			1						•
COMPLXB	OSUBRT	LOCAL.	3D	100	COMPLEX			1						•
COS	APROG	LOCAL.	EXTERN		REAL			1						
D	ISUBRT	LOCAL.	SIMPLE		REAL							1	1	
DBLX	OSUBRT	DCOMMON	1D	5	DOUBLE			2						•
DBLZ	OSUBRT	DCOMMON	SIMPLE		DOUBLE			2						•
DELTA	APROG	ACOMMON	SIMPLE		REAL			1						•
	ASUBRT	ACOMMON	SIMPLE		REAL			1					1	
	BSUBRT	ACOMMON	SIMPLE		REAL			1					1	
EPSILON	APROG	ACOMMON	SIMPLE		REAL			1						•
	ASUBRT	ACOMMON	SIMPLE		REAL			1					1	
	BSUBRT	ACOMMON	SIMPLE		REAL			1					1	
EYE	OSUBRT	//	2D	200	INTEGER			2						•

VARIABLES GROUPED BY NAME

```
VARIABLE -MODULE- -COMMON- DIMENSND --SIZE-- -TYPE--     USAGE (FREQUENCY)
 NAME      NAME     NAME                              AG AS DD DP EQ IX ST XS UN
-------- -------- -------- -------- -------- -------- -- -- -- -- -- -- -- -- --
FALSE    OSUBRT   LOCAL.   SIMPLE            LOGICAL         1                 •

GAMMA    APROG    ACOMMON  SIMPLE            REAL            1                 •
         ASUBRT   ACOMMON  SIMPLE            REAL            1           1  1
         BSUBRT   ACOMMON  SIMPLE            REAL            1           1  1

GEORGE   OSUBRT   LOCAL.   SIMPLE            REAL                        1     •

I        APROG    LOCAL.   SIMPLE            INTEGER                  1    10
         ASUBRT   LOCAL.   SIMPLE            INTEGER                  1     3
         BSUBRT   LOCAL.   SIMPLE            INTEGER                  1     3
         MSUBRT   LOCAL.   SIMPLE            INTEGER                  1     6
         XSUBRT   LOCAL.   SIMPLE            INTEGER                  1     3
         YSUBRT   LOCAL.   SIMPLE            INTEGER                  1     6
         ZSUBRT   LOCAL.   SIMPLE            INTEGER                  1     2
         OSUBRT   LOCAL.   SIMPLE            INTEGER                  1     1

II       OSUBRT   LOCAL.   1D             10 INTEGER         1                 •

IONE     APROG    LOCAL.   SIMPLE            INTEGER   1                 2

ITWO     APROG    LOCAL.   SIMPLE            INTEGER   1                 1

J        MSUBRT   LOCAL.   SIMPLE            INTEGER                  1
         YSUBRT   LOCAL.   SIMPLE            INTEGER                  1     1
         OSUBRT   LOCAL.   SIMPLE            INTEGER                  1     1

JAY      OSUBRT   //       3D            600 INTEGER         2                 •

JJ       OSUBRT   LOCAL.   1D             20 INTEGER         1                 •

K        MSUBRT   LOCAL.   SIMPLE            INTEGER                  1
         YSUBRT   LOCAL.   SIMPLE            INTEGER                  1     1
         ZSUBRT   LOCAL.   SIMPLE            INTEGER                  1     2
         OSUBRT   LOCAL.   SIMPLE            INTEGER                  1     1
```

VARIABLES GROUPED BY NAME

VARIABLE NAME	-MODULE- NAME	-COMMON- NAME	DIMENSND	--SIZE--	-TYPE-	AG	AS	DD	DP	EQ	IX	ST	XS	UN
LG100	APROG	LOCAL.	PARAMETR		INTEGER	1						1		
NOTTRUE	OSUBRT	LOCAL.	1D	5	LOGICAL			1						•
OMEGA	ZSUBRT	FCOMMON	1D	100	REAL			1						•
	BLKDAT	FCOMMON	1D	200	REAL			1						•
OMICRON	APROG	ACOMMON	SIMPLE		REAL			1						•
	ASUBRT	ACOMMON	SIMPLE		REAL			1					1	
	BSUBRT	ACOMMON	SIMPLE		REAL			1					1	
ONE	APROG	LOCAL.	SIMPLE		REAL	2								
	XSUBRT	DUM.ARG.	1D	?	REAL			3					2	
PAR1	OSUBRT	LOCAL.	PARAMETR		REAL	5			1			1	1	
PAR2	OSUBRT	LOCAL.	PARAMETR		REAL	2			1			1	1	
PAR3	OSUBRT	LOCAL.	PARAMETR		REAL	2			1			1	1	
PHI	XSUBRT	ECOMMON	1D	100	REAL			1						•
	YSUBRT	ECOMMON	1D	100	REAL			1						•
PSI	XSUBRT	ECOMMON	1D	64	REAL			1						•
	YSUBRT	ECOMMON	1D	64	REAL			1						•
PUPPIES	OSUBRT	LOCAL.	EQUIV.		REAL			1		1				•
PUPS	OSUBRT	LOCAL.	EQUIV.		REAL			1		1				•
SAM	APROG	LOCAL.	SIMPLE		REAL							5	4	
	OSUBRT	LOCAL.	SIMPLE		REAL							4	5	
SAMBO	OSUBRT	LOCAL.	SIMPLE		REAL							1		•
SIGMA	ZSUBRT	FCOMMON	1D	100	REAL			1						•

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```
                      VARIABLES GROUPED BY NAME

VARIABLE -MODULE- -COMMON- DIMENSND --SIZE-- -TYPE--      USAGE (FREQUENCY)
  NAME     NAME     NAME                             AG AS DD DP EQ IX ST XS UN
-------- -------- -------- -------- -------- -------  -- -- -- -- -- -- -- -- --
         BLKDAT   FCOMMON  1D            100 REAL           1                 •
SIN      APROG    LOCAL.   EXTERN            REAL     1     1
TAN      MSUBRT   LOCAL.   EXTERN            REAL     1     1
THREE    APROG    LOCAL.   SIMPLE            REAL     2
         XSUBRT   DUM.ARG. 1D              ? REAL           3           2  1
TRUE     OSUBRT   LOCAL.   SIMPLE            LOGICAL        1                 •
TWO      APROG    LOCAL.   SIMPLE            REAL     2
         XSUBRT   DUM.ARG. 1D              ? REAL     1     3           1  1
VAR      AFUNCTN  DUM.ARG. SIMPLE            REAL           1              2
VARA     OSUBRT   NCOMMON  SIMPLE            REAL           1                 •
VARB     OSUBRT   NCOMMON  SIMPLE            REAL           1                 •
VARC     OSUBRT   NCOMMON  1D              7 REAL           1                 •
VARD     OSUBRT   NCOMMON  SIMPLE            REAL           1                 •
VARE     OSUBRT   NCOMMON  1D              5 REAL           1                 •
VARF     OSUBRT   NCOMMON  SIMPLE            REAL           1                 •
VARX     OSUBRT   MCOMMON  1D              8 REAL           1                 •
VARY     OSUBRT   MCOMMON  1D              8 REAL           1                 •
VARZ     OSUBRT   MCOMMON  SIMPLE            REAL           1                 •
X        APROG    BCOMMON  1D            100 REAL     9     2           5  3
```

VARIABLES GROUPED BY NAME

VARIABLE NAME	-MODULE- NAME	-COMMON- NAME	DIMENSND	—SIZE—	-TYPE—	USAGE (FREQUENCY) AG	AS	DD	DP	EQ	IX	ST	XS	UN
	ASUBRT	BCOMMON	1D	100	REAL			1					1	
	BSUBRT	BCOMMON	1D	100	REAL			1					1	
	MSUBRT	LOCAL.	1D	10	REAL			1				2		•
	YSUBRT	LOCAL.	1D	10	REAL			1				2		•
	OSUBRT	LOCAL.	1D	10	REAL	1		1						
X1	APROG	BCOMMON	1D EQV.	100	REAL			2		1				•
XALPHA	ZSUBRT	CCOMMON	SIMPLE		REAL			1						•
XBETA	ZSUBRT	CCOMMON	2D	1000000	REAL			1				1		•
XCHI	APROG	LOCAL.	SIMPLE		REAL	2						1		
XPHI	APROG	LOCAL.	SIMPLE		REAL	1						1		
XPSI	APROG	LOCAL.	SIMPLE		REAL	1						1		
XX	APROG	LOCAL.	SIMPLE		REAL	1						1		
	OSUBRT	//	3D	400	REAL			3				1		•
XXX	OSUBRT	//	3D EQV.	1200	REAL			2		1				•
Y	APROG	BCOMMON	1D	100	REAL	10		2				1	3	
	ASUBRT	BCOMMON	1D	100	REAL			1					1	
	BSUBRT	BCOMMON	1D	100	REAL			1					1	
	MSUBRT	LOCAL.	1D	20	REAL			1				2		•
	YSUBRT	LOCAL.	1D	20	REAL			1				2		•
	OSUBRT	LOCAL.	1D	10	REAL	1		1						
Y1	APROG	BCOMMON	1D EQV.	150	REAL			2		1				•
YARG	OSUBRT	LOCAL.	SIMPLE		REAL	1								
YY	APROG	LOCAL.	SIMPLE		REAL	2						1	1	

VARIABLES GROUPED BY NAME

VARIABLE NAME	-MODULE- NAME	-COMMON- NAME	DIMENSND	—SIZE—	-TYPE—	AG	AS	DO	DP	EQ	IX	ST	XS	UN
	OSUBRT	//	2D	200	REAL			2						•
YYY	OSUBRT	//	2D EQV.	800	REAL			2		1				•
Z	APROG	BCOMMON	1D	50	REAL	6		1					2	
	ASUBRT	BCOMMON	1D	50	REAL			1				1		•
	BSUBRT	BCOMMON	1D	50	REAL			1				1		•
	MSUBRT	LOCAL.	1D	30	REAL			1				2		•
	YSUBRT	LOCAL.	1D	30	REAL			1				2		•
	OSUBRT	LOCAL.	1D	10	REAL	1		1						
Z1	OSUBRT	LOCAL.	SIMPLE		REAL	1								
Z2	OSUBRT	LOCAL.	SIMPLE		REAL	1								
Z3	OSUBRT	LOCAL.	SIMPLE		REAL	1								
Z4	OSUBRT	LOCAL.	SIMPLE		REAL	2								
ZANSWER	MSUBRT	LOCAL.	SIMPLE		REAL	1								
	OSUBRT	DUM.ARG.	SIMPLE		REAL			1				1		•
ZCHAR	BLKDAT	WCOMMON	1D	2	CHAR			2				1		•
ZCMPLX	BLKDAT	ZCOMMON	5D	96	COMPLEX			2				1		•
ZDBPR	BLKDAT	ZCOMMON	1D	10	DOUBLE			2				1		•
ZETA	XSUBRT	DUM.ARG.	SIMPLE		REAL			1				1		•
ZINT	BLKDAT	ZCOMMON	3D	27	INTEGER			2				1		•
ZLOGIK	BLKDAT	ZCOMMON	4D	625	LOGICAL			2				1		•
ZREEL	BLKDAT	ZCOMMON	2D	4	REAL			2				1		•

```
                            VARIABLES GROUPED BY NAME

VARIABLE -MODULE- -COMMON- DIMENSND --SIZE-- -TYPE--      USAGE (FREQUENCY)
  NAME     NAME     NAME                              AG AS DD DP EQ IX ST XS UN
-------- -------- -------- -------- -------- -------- -- -- -- -- -- -- -- -- --
ZZ       APROG    LOCAL.   SIMPLE            REAL                       1  1
         OSUBRT   //       3D            600 REAL           3                 *

ZZFUN    QSUBRT   DUM.ARG. EXTERN            REAL           1                1
         NSUBRT   DUM.ARG. EXTERN            REAL           1                1

ZZRAD    MSUBRT   LOCAL.   SIMPLE            REAL      1
         QSUBRT   DUM.ARG. SIMPLE            REAL      1    1
         NSUBRT   DUM.ARG. SIMPLE            REAL      1    1

ZZRESULT NSUBRT   DUM.ARG. SIMPLE            REAL           1           1     *

ZZTRASH  APROG    LOCAL.   SIMPLE            REAL      1
```

```
                           COMMONS GROUPED BY NAME
-COMMON- -MODULE- VARIABLE DIMENSND --SIZE-- -TYPE-    USAGE (FREQUENCY)
  NAME     NAME     NAME                              AG AS DD DP EQ IX ST XS UN
-------- -------- -------- -------- -------- ------- -- -- -- -- -- -- -- -- --
//       APROG    A        1D             10 REAL           2                    *
         APROG    B        1D             25 REAL           2                    *
         APROG    C        1D             50 REAL           2                    *
                            LENGTH=       85

         OSUBRT   EYE      2D            200 INTEGER        2                    *
         OSUBRT   JAY      3D            600 INTEGER        2                    *
         OSUBRT   XX       3D            400 REAL           3              1     *
         OSUBRT   XXX      3D EQV.      1200 REAL           2        1           *
         OSUBRT   YY       2D            200 REAL           2                    *
         OSUBRT   YYY      2D EQV.       800 REAL           2        1           *
         OSUBRT   ZZ       3D            600 REAL           3                    *
                            LENGTH=     2000

ACOMMON  APROG    DELTA    SIMPLE            REAL           1                    *
         APROG    EPSILON  SIMPLE            REAL           1                    *
         APROG    GAMMA    SIMPLE            REAL           1                    *
         APROG    OMICRON  SIMPLE            REAL           1                    *
                            LENGTH=        4

         ASUBRT   DELTA    SIMPLE            REAL           1                 1
         ASUBRT   EPSILON  SIMPLE            REAL           1                 1
         ASUBRT   GAMMA    SIMPLE            REAL           1              1  1
         ASUBRT   OMICRON  SIMPLE            REAL           1                 1
                            LENGTH=        4

         BSUBRT   DELTA    SIMPLE            REAL           1                 1
         BSUBRT   EPSILON  SIMPLE            REAL           1                 1
         BSUBRT   GAMMA    SIMPLE            REAL           1              1  1
         BSUBRT   OMICRON  SIMPLE            REAL           1                 1
                            LENGTH=        4

BCOMMON  APROG    X        1D            100 REAL     9     2              5  3
         APROG    X1       1D EQV.       100 REAL           2        1           *
         APROG    Y        1D            100 REAL    10     2              1  3
```

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COMMONS GROUPED BY NAME

-COMMON- NAME	-MODULE- NAME	VARIABLE NAME	DIMENSND	—SIZE—	-TYPE—	USAGE (FREQUENCY) AG	AS	DD	DP	EQ	IX	ST	XS	UN
	APROG	Y1	1D EQV.	150	REAL			2		1				•
	APROG	Z	1D	50	REAL	6		1					2	
			LENGTH=	250										
	ASUBRT	X	1D	100	REAL			1					1	
	ASUBRT	Y	1D	100	REAL			1					1	
	ASUBRT	Z	1D	50	REAL			1				1		•
			LENGTH=	250										
	BSUBRT	X	1D	100	REAL			1					1	
	BSUBRT	Y	1D	100	REAL			1					1	
	BSUBRT	Z	1D	50	REAL			1				1		•
			LENGTH=	250										
CCOMMON	YSUBRT	ALPHA	SIMPLE		REAL			1				2	1	
	YSUBRT	BETA	2D	1000000	REAL			1					1	
			LENGTH=	1000001										
	ZSUBRT	XALPHA	SIMPLE		REAL			1						•
	ZSUBRT	XBETA	2D	1000000	REAL			1				1		•
			LENGTH=	1000001										
DCOMMON	OSUBRT	DBLX	1D	5	DOUBLE			2						•
	OSUBRT	DBLZ	SIMPLE		DOUBLE			2						•
			LENGTH=	6										
ECOMMON	XSUBRT	CHI	1D	64	REAL			1						•
	XSUBRT	PHI	1D	100	REAL			1						•
	XSUBRT	PSI	1D	64	REAL			1						•
			LENGTH=	228										
	YSUBRT	CHI	1D	64	REAL			1						•
	YSUBRT	PHI	1D	100	REAL			1						•
	YSUBRT	PSI	1D	64	REAL			1						•
			LENGTH=	228										

```
                              COMMONS GROUPED BY NAME
-COMMON- -MODULE- VARIABLE DIMENSND —SIZE— -TYPE—      USAGE (FREQUENCY)
  NAME     NAME     NAME                            AG AS DD DP EQ IX ST XS UN
________ ________ ________ ________ ________ ________ __ __ __ __ __ __ __ __ __
FCOMMON  BLKDAT   OMEGA    1D            200 REAL           1                 •
         BLKDAT   SIGMA    1D            100 REAL           1                 •
                            LENGTH=      300

         ZSUBRT   OMEGA    1D            100 REAL           1                 •
         ZSUBRT   SIGMA    1D            100 REAL           1                 •
                            LENGTH=      200

MCOMMON  OSUBRT   VARX     1D              8 REAL           1                 •
         OSUBRT   VARY     1D              8 REAL           1                 •
         OSUBRT   VARZ     SIMPLE            REAL           1                 •
                            LENGTH=       17

NCOMMON  OSUBRT   VARA     SIMPLE            REAL           1                 •
         OSUBRT   VARB     SIMPLE            REAL           1                 •
         OSUBRT   VARC     1D              7 REAL           1                 •
         OSUBRT   VARD     SIMPLE            REAL           1                 •
         OSUBRT   VARE     1D              5 REAL           1                 •
         OSUBRT   VARF     SIMPLE            REAL           1                 •
                            LENGTH=       16

WCOMMON  BLKDAT   ZCHAR    1D              2 CHAR           2           1     •
                            LENGTH=        2

ZCOMMON  BLKDAT   ZCMPLX   5D             96 COMPLEX        2           1     •
         BLKDAT   ZDBPR    1D             10 DOUBLE         2           1     •
         BLKDAT   ZINT     3D             27 INTEGER        2           1     •
         BLKDAT   ZLOGIK   4D            625 LOGICAL        2           1     •
         BLKDAT   ZREEL    2D              4 REAL           2           1     •
                            LENGTH=      762
```

VARIABLES WITH RESPECT TO MODULES

```
         A A A B B B C F I M N O Q X X X Y Z
         F P S E L S S S S S S S S E E S S S
         U R U N K U U U U U U U U N N U U U
         N O B T D B B B B B B B B T T B B B
         C G R R A R R R R R R R R R R R R R
         T   T Y T T T T T T T T T Y Y T T T
VARIABLE N                         A B
NAME     - - - - - - - - - - - - - - - - - -
A          X         X X X X             X
A1                             X
A2                             X
A3                             X
A4                             X
ALPHA                      X             X
ARGBA                      X
ARGBB                      X
ARGBC                      X
ARGBD                      X
ARGCA                      X
ARGCB                      X
ARGCC                      X
ARGCD                      X
ARGP       X X       X     X
ARGQ       X X       X     X
ARGR       X X       X     X
ARGS       X X       X     X
ARGT       X X       X     X
ARGU       X X       X     X
ARGV       X X       X     X
ARGW       X X       X     X
ARGX       X X       X     X
ARGY       X X       X     X
ARGZ       X X       X     X
ARGZA                      X
ARGZB                      X
ARGZC                      X
ARGZD                      X
B          X         X X X X             X
```

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VARIABLES WITH RESPECT TO MODULES

VARIABLE NAME	AFUNCTN	APROG	ASUBRT	BENTRY	BLKDAT	BSUBRT	CSUBRT	FSUBRT	ISUBRT	MSUBRT	NSUBRT	OSUBRT	QSUBRT	XENTRYA	XENTRYB	XSUBRT	YSUBRT	ZSUBRT
BETA																	X	
C		X					X	X	X	X							X	
CHAR5												X						
CHAR8												X						
CHI																X	X	
COMPLXA												X						
COMPLXB												X						
D									X									
DBLX												X						
DBLZ												X						
DELTA		X	X			X												
EPSILON		X	X			X												
EYE												X						
FALSE												X						
GAMMA		X	X			X												
GEORGE												X						
I		X	X			X				X		X				X	X	X
II												X						
IONE		X																
ITWO		X																
J										X		X					X	
JAY												X						
JJ												X						
K										X		X					X	X
LG100		X																
NOTTRUE												X						
OMEGA					X													X
OMICRON		X	X			X												
ONE		X														X		
PAR1												X						

VARIABLES WITH RESPECT TO MODULES

```
         A A A B B B C F I M N O Q X X X Y Z
         F P S E L S S S S S S S S E E S S S
         U R U N K U U U U U U U U N N U U U
         N O B T D B B B B B B B B T T B B B
         C G R R A R R R R R R R R R R R R R
         T   T Y T T T T T T T T T Y Y T T T
VARIABLE N                         A B
NAME     - - - - - - - - - - - - - - - - - -
PAR2                           X
PAR3                           X
PHI                                    X X
PSI                                    X X
PUPPIES                        X
PUPS                           X
SAM        X                   X
SAMBO                          X
SIGMA            X                         X
THREE      X                           X
TRUE                           X
TWO        X                           X
VAR      X
VARA                           X
VARB                           X
VARC                           X
VARD                           X
VARE                           X
VARF                           X
VARX                           X
VARY                           X
VARZ                           X
X          X X     X       X   X         X
X1         X
XALPHA                                     X
XBETA                                      X
XCHI       X
XPHI       X
XPSI       X
XX         X                   X
```

VARIABLES WITH RESPECT TO MODULES

VARIABLE NAME	AFUNCTN	APROG	ASUBRT	BENTRY	BLKDAT	BSUBRT	CSUBRT	FSUBRT	ISUBRT	MSUBRT	NSUBRT	OSUBRT	QSUBRT	XENTRYA	XENTRYB	XSUBRT	YSUBRT	ZSUBRT
XXX												X						
Y		X	X			X				X		X					X	
Y1		X																
YARG												X						
YY		X										X						
YYY												X						
Z		X	X			X				X		X					X	
Z1												X						
Z2												X						
Z3												X						
Z4												X						
ZANSWER										X			X					
ZCHAR					X													
ZCMPLX					X													
ZDBPR					X													
ZETA																X		
ZINT					X													
ZLOGIK					X													
ZREEL					X													
ZZ		X										X						
ZZRAD										X	X		X					
ZZRESULT											X							
ZZTRASH		X																

APPENDIX B

SAMPLE DAYFILE FROM RUN OF SUPERMAP

Abbreviated dayfile from the run of the sample output in Appendix A.

```
09:21:02 0.0006 CSP    CRAY X-MP SERIAL-103  Zero One-AMES RESEARCH CENTER
09:21:02 0.0006 CSP
09:21:02 0.0006 CSP    CRAY OPERATING SYSTEM  COS 1.14
09:21:02 0.0006 CSP
09:21:02 0.0006 CSP
09:21:03 0.0006 CSP   JOB,JN=TESTSMP,T=10.
09:21:03 0.0015 CSP   ACCOUNT,AC=,US=,UPW=.
09:21:06 0.0457 EXP   •  + - - - - - - - - - - - - - - - - - - - - +
09:21:06 0.0457 EXP   •  + JOB CONTROL TO RUN THE SUPERMAP PROGRAM +
09:21:06 0.0457 EXP   •  + WHEN INPUT WAS PREPARED BY ANOTHER RUN. +
09:21:06 0.0457 EXP   •  + - - - - - - - - - - - - - - - - - - - - +
09:21:06 0.0457 EXP   DISPOSE,DN=$OUT,MF=AA,TID=BOXO,DC=PR,DEFER.
09:21:06 0.0460 CSP   ACCESS,DN=TAPE1,PDN=TESTSUPER,ID=mine. INPUT DATA.
09:21:06 0.0461 PDM   PD000 - PDN = TESTSUPER        ID = mine    ED = n
09:21:06 0.0461 PDN   PD000 - ACCESS COMPLETE
09:21:06 0.0461 CSP   ASSIGN,DN=TAPE1,A=FT01.
09:21:06 0.0466 CSP   ACCESS,DN=SUPER,PDN=SUPERMAP,ID=SOFTLIB.
09:21:06 0.0467 PDM   PD000 - PDN = SUPERMAP         ID = SOFTLIB   ED = 1
09:21:06 0.0467 PDM   PD000 - ACCESS  COMPLETE
09:21:07 0.0472 CSP   LDR,DN=SUPER,MAP=OFF.
09:21:34 0.3227 USER  LD000 - BEGIN EXECUTION
09:21:38 2.3042 USER  UT010 -    STOP              IN SUPERMAP
09:21:38 2.3043 CSP   END OF JOB
```

APPENDIX C

SAMPLE INPUT FOR TEST CASE

This program is the program which became input data to the sample output shown in Appendix A.

```
      PROGRAM APROG (INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)

      PARAMETER (LG100=100)

      EXTERNAL SIN, COS
C
      DIMENSION A(10), B(25), C(50), X1(100), Y1(100)

      COMMON /ACOMMON/ GAMMA,DELTA,ESPILON,OMICRON
      COMMON /BCOMMON/ X(LG100),Y(100),Z(50)
      COMMON A,B,C

      EQUIVALENCE (X,X1), (Y,Y1)

      DATA X,Y/200*1.0/

C        STATEMENT FUNCTION
      SQAIROOT(ZPHI,ZCHI,ZPSI)=(ZPSI+ZCHI+ZPHI)**.5

      XPHI = 5.
      XCHI = 15.0
      XPSI = 29.0
      CALL ASUBRT
      XX = 2.0
      YY = 4.5
      IONE = 1
      ITWO = 2
      ZZ = 0.5
      IF(AND(IONE,ITWO) .EQ. O) IONE=1
      CALL ESUBRT (X,Y,5.0)
      CALL DSUBRT (Z(1),X(1),Y(2))
      CALL CSUBRT (X,Y,Z)
      CALL BSUBRT
COMMENT  :
      CALL GSUBRT(SIN, XCHI, ZZTRASH)
      CALL FSUBRT(X,Y,SQRT(10.))
      DO 100 I = 1,100
      X(I)=Y(I) + 10.
      X(I)=X(I) * Y(I)
      X(I)=Z(5) / X(I)
      X(I)=X(I)-Z(4)*Y(I)
 100  CONTINUE
```

```
C
      SAM = SQAIROOT (XPHI,XCHI,XPSI)
      SAM = 5.0

      CALL CSUBRT(1+2,Y,Z)
      CALL MSUBRT(ARGP,ARGQ,ARGR,ARGS,ARGT,ARGU,ARGV,ARGW,ARGX,
     +                   ARGY, ARGZ)
C
      CALL CSUBRT((1+2),Y,Z)
      SAM = 4.
      IF( SAM .EQ. 4.)CALL HSUBRT
      IF( SAM .EQ. 4.)CALL ISUBRT(X,Y,Z)
      IF( SAM .EQ. 4.)CALL JSUBRT(Z,X,Y(2))
      IF( SAM .EQ. 4.)
     +               CALL KSUBRT(X,Y,5.0)
      SAM = 3.
      CALL XSUBRT(ONE,TWO,THREE)

      CALL  LSUBRT('ABCDEFGHIJ')
      CALL  FSUBRT(X,Y,SQRT(10.))
      CALL  FSUBRT(XX*YY,YY,SQRT(10.))
      CALL  FSUBRT(X,1.2,SQRT(10.))
      CALL  FSUBRT(+0.5E-02,YY/ZZ+.00008,SQRT(10.))
      CALL  XSUBRT(ONE,TWO,THREE)

      SAM = 2.
      CALL EXIT
      END

      SUBROUTINE CSUBRT(A,B,C)
      A=B+C
      CALL MSUBRT(ARGP,ARGQ,ARGR,ARGS,ARGT,ARGU,ARGV,ARGW,ARGX,
     +                    ARGY,ARGZ)

      RETURN
      END

      SUBROUTINE FSUBRT(A,B,C)
      IF (A .EQ. B) THEN
      A=B-C
      ELSE
      A=B+C
      END IF
      RETURN
      END
      SUBROUTINE ISUBRT(A,B,C)
      A=B+C
      D=A+B+C
      IF(A .EQ. D) A=5.0
      RETURN
      END

      FUNCTION AFUNCTN (VAR)
C
      AFUNCTN = VAR * VAR
      RETURN
      END


      SUBROUTINE ASUBRT

      COMMON /ACOMMON/ GAMMA,DELTA,EPSILON,OMICRON

      COMMON /BCOMMON/ X(100), Y(100), Z(50)

      DO 10 I = 1, 25
         Z(I) = X(I) + Y(I)
   10 CONTINUE
      GAMMA = GAMMA + DELTA + EPSILON +OMICRON
      CALL VSUBRT ("XYZ", "ABCDEFG")
      CALL MSUBRT(ARGP,ARGQ,ARGR,ARGS,ARGT,ARGU,ARGV,ARGW,ARGX,
     +                    ARGY,ARGZ)

      RETURN
      END



      SUBROUTINE BSUBRT
      COMMON /ACOMMON/ GAMMA,DELTA,EPSILON,OMICRON
      COMMON /BCOMMON/ X(100), Y(100), Z(50)
      ENTRY BENTRY
      DO 10 I = 1, 25
         Z(I) = X(I) - Y(I)
   10 CONTINUE
      GAMMA = GAMMA - DELTA - EPSILON - OMICRON
      RETURN
      END


      SUBROUTINE MSUBRT(ARGP,ARGQ,ARGR,ARGS,ARGT,ARGU,ARGV,ARGW,
     +               ARGX,ARGY,ARGZ)
      EXTERNAL TAN
      DIMENSION A(25), B(50), C(100)
      DIMENSION X(10), Y(20), Z(30)
      DATA A,B,C/175*0./,X,Y,Z/60*5./
```

```
    ALPHA = 0.00
    DO 100 J = 1,1000
       DO 50 K = 1, 1000
          ALPHA = ALPHA + 1.0
 50    CONTINUE
100 CONTINUE
    DO 200 I = 1, 10
    X(I) = A(I)
    Y(I) = C(I)
    Z(I) = B(I)
200 CONTINUE

    ARGP=ARGQ-ARGR+ARGS*ARGT+ARGU+ARGV+ARGX+
   +                    ARGY-ARGZ
    ARGZA = ARGBA + ARGCA
    ARGZB = ARGBB + ARGCB
    ARGZC = ARGBC + ARGCC
    ARGZD = ARGBD + ARGCD
    CALL QSUBRT(TAN, ZZRAD, ZANSWER)
    RETURN
    END

    SUBROUTINE QSUBRT(ZZFUN, ZZRAD, ZANSWER)
    ZANSWER=          ZZFUN(ZZRAD)
    RETURN
    END

    SUBROUTINE XSUBRT(ONE,TWO,THREE)
    DIMENSION ONE(1),TWO(1),THREE(1)
    COMMON /ECOMMON / PHI(100), CHI(64), PSI(64)
    DO 10 I = 1, 50
       THREE(I) = TWO(I) + ONE(I)
 10 CONTINUE
    THREE(50) = AFUNCTN(TWO(50))
    GO TO 20
    ENTRY XENTRYB(THREE,ONE,TWO)
    TWO(1) = THREE(1)
    GO TO 20
    ENTRY XENTRYA(ZETA)
    ZETA = ONE(1) + 5.0
 20 CONTINUE
    RETURN
    END

    SUBROUTINE YSUBRT
    COMMON /CCOMMON/ ALPHA, BETA(1000,1000)
    COMMON /ECOMMON/ PHI(100), CHI(64), PSI(64)
    DIMENSION A(25), B(50), C(100)
    DIMENSION X(10), Y(20), Z(30)
    DATA A,B,C/175*0./,X,Y,Z/60*5./
    ALPHA = 0.00
```

```
      DO 100 J = 1,1000
         DO 50 K = 1,  1000
            ALPHA = ALPHA + BETA(J,K)
   50 CONTINUE
  100 CONTINUE
      DO 200 I = 1, 10
      X(I) = A(I)
      Y(I) = C(I)
      Z(I) = B(I)
  200 CONTINUE
      RETURN
      END

      SUBROUTINE ZSUBRT
      COMMON /CCOMMON/ XALPHA, XBETA(1000,1000)
      COMMON /FCOMMON/ OMEGA(100),SIGMA(100)
      DO 2 I=1, 1000
         DO 1 K = 1,1000
            XBETA(I,K) = I * K
    1    CONTINUE
    2 CONTINUE
      RETURN
      END

      BLOCK DATA BLKDAT
      INTEGER ZINT(3,3,3)
      REAL    ZREEL(2,2)
      LOGICAL ZLOGIK(5,5,5,5)
      CHARACTER*8 ZCHAR(2)
      DOUBLE PRECISION ZDBPR(10)
      COMPLEX ZCOMPLX(2,3,4,2,2)
      COMMON /ZCOMMON/ZINT,ZREEL,ZLOGIK,ZCMPLX,ZDBPR
      COMMON /WCOMMON/ ZCHAR
      COMMON /FCOMMON/ OMEGA(200),SIGMA(100)
      DATA ZINT/27*0/, ZREEL/4*0.0/, ZLOGIK/625*.TRUE./,
     +     ZCMPLX/96*(0.0,0.0)/, ZDBPR/10*0.0D1/
      DATA ZCHAR/2*'CHARACTR'/
      END

      SUBROUTINE NSUBRT(ZZFUN,ZZRAD,ZZRESULT)
      ZZRESULT=ZZFUN(ZZRAD)
      CALL OSUBRT
      RETURN
      END

      SUBROUTINE OSUBRT
      PARAMETER(PAR1=10, PAR2=20, PAR3=2)
      REAL X(PAR1), Y(PAR1), Z(PAR1)
      DIMENSION XX(PAR1,PAR2,PAR3)
      DIMENSION XXX(PAR1,PAR2,PAR3), YYY(10, 10)
      DIMENSION YY(10,20), ZZ(10,20,3)
      INTEGER EYE(10,20), JAY(10,20,3)
      DIMENSION II(10),JJ(20)
      LOGICAL TRUE, FALSE, NOTTRUE(5)
      COMPLEX COMPLXA, COMPLXB(5,10,2)
      DOUBLE PRECISION DBLX(5),DBLZ
      COMMON ZZ,YY,XX,JAY,EYE
      COMMON /MCOMMON/ VARX(8),VARY(8),VARZ
      COMMON /NCOMMON/ VARA, VARB,VARC(7),VARD,VARE(5),VARF
      COMMON /DCOMMON/DBLZ, DBLX
      CHARACTER*5 CHAR5
      CHARACTER*8 CHAR8(10)
      EQUIVALENCE(XX,XXX), (ZZ,YYY), (PUPPIES,PUPS)
    C
      DATA CGAR5/ 'CHAR5'/
    C
      SAM = FUNCTA(1.0,YARG)
      CALL USUBRT(A1, A2, A3, A4)
      CALL USUBRT(Z4, Z3, Z2, Z1)
      GEORGE = FUNCTA(Z4,A4)
      DO 15 I = 1,PAR1
      DO 10 J = 1,PAR2
      DO 5  K = 1,PAR3
          XX(I,J,K) = 0.0
    5 CONTINUE
   10 CONTINUE
   15 CONTINUE
      SAMBO = 1. + PAR1 -
     .        PAR2
     .       *PAR3
      CALL RSUBRT(X,Y,Z)
      SAM = 5.
      SAM = SAM - (SAM/2.)
      IF (SAM .NE. 0.0) THEN
      SAM = 300.0 * SAM
      END IF
      WRITE(93) SAM
      RETURN
      END
```

APPENDIX D

SAMPLE JOB CONTROL FOR TEST CASE

The following JOB CONTROL was used to generate the file which became input to SUPERMAP as a simple test case.

```
JOB,JN=TESTSM,T=2.
ACCOUNT,AC=,US=,UPW=.
DISPOSE,DN=$OUT,MF=AA,TID=,DC=PR,DEFER.
CFT,ON=CNPQRSTX,OFF=ABDEFHIJLMOV,L=OUT.
SAVE,DN=OUT,PDN=TESTSUPER,ID=.
/EOF
```

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15 Supplementary Notes

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16. Abstract

This program produces a map giving an overall view of all components and attributes of a Fortran program unit run on the Cray. Unlike the maps produced by the Cray Fortran compiler which relates only to a single module, this map relates to the entire program. It maps the usage of all variable and all commons used.

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