TECHNICAL MEMORANDUM
(TM Series)

ASTIA AVAILABILITY NOTICE
Qualified requesters may obtain copies of this report from ASTIA.

This document was produced by SDC in performance of contract AF 19(628)-1648, Space Systems Division Program, for Space Systems Division, AFSC.

Utility Program Descriptions
Milestone 11
Symbolic Dump Routine (SYMDUMP)

By
F. J. LaChapelle
R. L. Kinkead
14 March 1963
Approved
J. B. Munson

SYSTEM
DEVELOPMENT
CORPORATION
2500 COLORADO AVE.
SANTA MONICA
CALIFORNIA

The views, conclusions or recommendations expressed in this document do not necessarily reflect the official views or policies of agencies of the United States Government.

Permission to quote from this document or to reproduce it, wholly or in part, should be obtained in advance from the System Development Corporation.

Although this document contains no classified information it has not been cleared for open publication by the Department of Defense. Open publication, wholly or in part, is prohibited without the prior approval of the System Development Corporation.
SUBROUTINE IDENTIFICATION

A. Title: Symbolic Dump Routine (SYMDUMP) - Ident A48, Mod AB

B. Programmed and Documented: 14 July 1962
   F. J. LaChapelle, System Development Corporation

C. Revised: 14 February 1963, documented: 14 March 1963
   R. L. Kinkead, System Development Corporation

PURPOSE

To provide octal, symbolic, floating point decimal, or BCD dumps of COPII routines using their names to define the areas in core to be dumped.

USAGE

A. Calling Sequence

   L   RTJ  SYMDUMP
   L+1 Normal Return
       ZRO  N
   L+2 BCD  1XXXXXXXX
   L+3 DEC  T
   L+4 BCD  1PROG1
   L+5 BCD  1PROG2
   ...  ...
   L+K BCD  1PROG(LAST)

Where:

   N = the total number of parameters
   T = the logical tape or printer to write dump on (2 ≤ T ≤ 13).
   PROG1 ... PROG(LAST) = the names of the specific routines to dump
                            (left adjusted with trailing blanks).
B. The Parameter XXXXXXXX is optional and if it is present, the result will be that the routines will be dumped in the specified format. The possible values of XXXXXXXX are:

1. SYMBOLIC - mnemonic format
2. FLOATDEC - floating point decimal format, and
3. BCD - BCD format.

If absent, the dump will be in octal.

C. When called by a function card:

* SYMDUMP XXXXXXXX T PROG1 ... PROG(LAST)

where all parameters are defined as above with XXXXXXXX again optional.

RESTRICTIONS

A. SYMDUMP uses the TTTT table, LCOUNT, LINFO, and LNAMEs.

B. SYMDUMP uses the subroutine CORE, (TM-(L)-715/016/01A).

C. A page eject follows the dump of each program and no end of file is written following a dump.

D. A maximum of twenty routines may be dumped with one call to SYMDUMP.

E. Only those routines defined previously by a DEFINES card or those routines which have been loaded by MTCII at execution time may be dumped by SYMDUMP.

F. It is possible to call six selected areas of core by six special names. These areas and their mnemonics are: COMMON (06438 - 071068), POOL (047008 - 071068), COP (000008 - 077778 and 700008 - 777778), ZEROTEN (000008 - 000108), INOUT (000008 - 077778), and ALLCOP (000008 - 077778 and 700008 - 777778). Note that COP and ALLCOP are
the same areas and consist of two separate parts. INOUT is everything below 100000 since the I/O routines and buffers are scattered throughout this area.

G. If a routine is requested which is not a special name or has not been loaded or defined, a one-line record to this effect is written on the output tape. The normal dumping of the remaining routines then resumes.

H. If an absolute program is requested, a dump beginning with the first cell of the program and extending through 76432 is made.

I. If the logical tape is illegal, a normal return is made with no error message.

J. Output is called into core by CORE using the ADDROF feature in MTCII if FLOATDEC or BCD formats are selected.

TIMING
SYMDUMP takes a maximum of one minute to dump "32K" core.

STORAGE
2338 cells total.
1218 cells are instruction cells.
158 cells for a table defining the special areas of core.
258 cells contain messages.
158 cells are constants.
338 cells are temporary storage.

VALIDATION TESTS
SYMDUMP was tested by the use of function cards. It was tested for dumping defined routines, routines called from the master tape, and the special areas of core (in all of the possible formats). Tests were made which printed on tape and the on-line printer. Multiple dumps were tested, as
was SYMDUMP's response to illegal tape numbers and to subroutines not in core.

See Appendix A for the function card inputs and the dump results of these tests.

REFERENCES

A. "1604 Systems Manual", Lockheed Missiles and Space Division
   LMSC - 44758, 1 January 1962, P. 50.12.01.

B. Computer Program Library Catalog No. 75048.
SYMDUMP

SAVE CONSOLE REGISTERS

SET TYPE OF DUMP INDICATED INTO LINKAGE FOR CORE

SAVE ALL PARAMETERS

IS LOGICAL TAPE NUMBER LEGAL

NO

RESTORE

RESTORE CONSOLE REGISTERS

YES

EDIT TTIT INFO. FOR THIS TAPE NUMBER INTO LINKAGE FOR CORE

SET WRITE SUB-Routine TO OUTPUT COMMENTS ON THIS UNIT

LOOPIT

EXIT
LOOPIT

GET NAME OF NEXT ROUTINE TO BE DUMPED FROM PARAMETERS

IS THIS ROUTINE IN MEMORY

NO

IS THIS A SPECIAL NAME

NO

NOROUT

YES

SET LENGTH INFO FROM LINK TABLE INTO RANGE

SET TWO PART FLAG TO NO

FIXIT

YES

SET LENGTH INFO FROM THE SPECIAL TABLE INTO RANGE

IS NAME COP OR ALLOCOP

NO

YES

SET TWO PART FLAG TO YES
FIXIT

COMPUTE LIMITS FROM INFO IN RANGE

EDIT NAME, START ADDRESS, AND END ADDRESS INTO COMMENT

SET UPPER AND LOWER LIMITS INTO LINKAGE FOR CORE

WRITE (OUTPUT COMMENT USING MTCII I/O)

RESET CONSOLE REGISTERS

SET RANGE FOR PART TWO

SET TWO PART FLAG TO NO

CORE (DUMP THIS ROUTINE)

ARE THERE TWO PARTS TO THIS DUMP

YES

NO

IS DONE

FIXIT
14 March 1963

-8-

TM-(L)-715/019/01

**Diagram:**

1. Set name in error comment
2. Write (output comment using MTCII I/O)
3. Is done?
4. Have all routines been processed?
   - Yes: Restore
   - No: Loop it
15 March 1963

**STORAGE ANALYSIS**

<table>
<thead>
<tr>
<th>NAME</th>
<th>ADDRESS</th>
<th>NAME</th>
<th>ADDRESS</th>
<th>NAME</th>
<th>ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINE</td>
<td>+ 10751</td>
<td>SYRUMP</td>
<td>+ 11272</td>
<td>UNPACK</td>
<td>+ 11242</td>
</tr>
<tr>
<td>FLOATIN</td>
<td>+ 10754</td>
<td>EXP</td>
<td>+ 10164</td>
<td>SIN</td>
<td>+ 10100</td>
</tr>
</tbody>
</table>

**SYRUMP SYMBOLIC 4 SIN ZEROTEN**
**SYRUMP FLOATDEC 12 EXP**
**SYRUMP 4D 4 ALPHA 60U**

**DUMP OF THE SIN ROUTINE: RANGE IS FROM 10160 TO 10164**

<table>
<thead>
<tr>
<th>ACCUMULATOR</th>
<th>OPEL 16TH</th>
<th>I-1</th>
<th>I-2</th>
<th>I-3</th>
<th>I-4</th>
<th>I-5</th>
<th>I-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>10160</td>
<td>75 0 7777</td>
<td>56 1 1013</td>
<td>42 0 10136</td>
<td>20 0 10153</td>
<td>22 2 10108</td>
<td>42 0 10136</td>
<td>92 1 10100</td>
</tr>
<tr>
<td>10164</td>
<td>79 0 10137</td>
<td>51 1 00003</td>
<td>97 1 10133</td>
<td>69 0 10140</td>
<td>75 0 10116</td>
<td>13 0 10133</td>
<td>75 0 10133</td>
</tr>
<tr>
<td>10119</td>
<td>09 0 10125</td>
<td>51 1 10137</td>
<td>51 0 00003</td>
<td>50 1 00003</td>
<td>22 2 10134</td>
<td>42 0 10136</td>
<td>61 0 10114</td>
</tr>
<tr>
<td>10120</td>
<td>10 0 08000</td>
<td>03 0 7777</td>
<td>27 0 10114</td>
<td>42 0 10136</td>
<td>36 0 10153</td>
<td>14 0 10154</td>
<td>44 0 10140</td>
</tr>
<tr>
<td>10121</td>
<td>61 0 10152</td>
<td>44 0 11046</td>
<td>22 0 10153</td>
<td>75 0 10777</td>
<td>15 0 10142</td>
<td>75 0 10129</td>
<td>42 0 10130</td>
</tr>
<tr>
<td>10122</td>
<td>19 0 10142</td>
<td>42 0 11036</td>
<td>20 0 10153</td>
<td>26 0 10153</td>
<td>26 0 10153</td>
<td>14 1 10146</td>
<td>26 0 10152</td>
</tr>
<tr>
<td>10123</td>
<td>59 1 10127</td>
<td>14 0 10145</td>
<td>26 0 10153</td>
<td>63 0 08044</td>
<td>75 4 10154</td>
<td>50 0 08000</td>
<td>50 1 7777</td>
</tr>
<tr>
<td>10124</td>
<td>69 0 10125</td>
<td>10 0 08040</td>
<td>07 0 7777</td>
<td>75 0 10115</td>
<td>77 7 7777</td>
<td>77 7 7777</td>
<td>20 5 7777</td>
</tr>
<tr>
<td>10146</td>
<td>17 0 24000</td>
<td>60 0 08040</td>
<td>20 0 14000</td>
<td>00 0 00000</td>
<td>31 1 87755</td>
<td>24 2 10242</td>
<td>77 7 7777</td>
</tr>
<tr>
<td>10147</td>
<td>77 0 77777</td>
<td>85 0 36752</td>
<td>00 0 17777</td>
<td>77 7 77775</td>
<td>72 5 25745</td>
<td>40 0 08164</td>
<td>21 0 26751</td>
</tr>
<tr>
<td>10148</td>
<td>77 7 77777</td>
<td>70 4 82096</td>
<td>00 0 08000</td>
<td>61 3 27443</td>
<td>00 0 08000</td>
<td>00 0 08000</td>
<td>00 0 08000</td>
</tr>
<tr>
<td>10154</td>
<td>**********</td>
<td>00 0 08000</td>
<td>00 0 08000</td>
<td>**********</td>
<td>00 0 08000</td>
<td>00 0 08000</td>
<td>00 0 08000</td>
</tr>
<tr>
<td>10164</td>
<td>75 0 77777</td>
<td>95 1 10127</td>
<td>65 0 19230</td>
<td>75 0 10164</td>
<td>92 1 10164</td>
<td>97 1 10100</td>
<td>69 0 10231</td>
</tr>
</tbody>
</table>

**APPENDIX A**
### Dump of the Exp Routine

**Range is from 10164 to 10291**

<table>
<thead>
<tr>
<th>Accumulator</th>
<th>Register</th>
<th>1-1</th>
<th>1-2</th>
<th>1-3</th>
<th>1-4</th>
<th>1-5</th>
<th>1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>10164</td>
<td>225320629</td>
<td>-25</td>
<td>-36</td>
<td>-45</td>
<td>-56</td>
<td>-67</td>
<td>-78</td>
</tr>
<tr>
<td>10170</td>
<td>1000002120</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10174</td>
<td>2321021100</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10204</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10210</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10214</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10220</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10224</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10230</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10234</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10244</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
<tr>
<td>10250</td>
<td>2010212010</td>
<td>123</td>
<td>134</td>
<td>145</td>
<td>156</td>
<td>167</td>
<td>178</td>
</tr>
</tbody>
</table>

### Dump of the Alpha Routine

**Range is from 10000 to 10199**

<table>
<thead>
<tr>
<th>Accumulator</th>
<th>Register</th>
<th>1-1</th>
<th>1-2</th>
<th>1-3</th>
<th>1-4</th>
<th>1-5</th>
<th>1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000</td>
<td>ABCDEFGH</td>
<td>IJKLMNO</td>
<td>PQRSTUWX</td>
<td>YZ12345</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10004</td>
<td>01234567</td>
<td>.1234567</td>
<td>ABCDFG</td>
<td>HJGACDEF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10010</td>
<td>********</td>
<td>ABCDEFGH</td>
<td>********</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10020</td>
<td>01234567</td>
<td>ABCDEFGH</td>
<td>********</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10030</td>
<td>********</td>
<td>********</td>
<td>********</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10040</td>
<td>23456789</td>
<td>123456789</td>
<td>3456789</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The routine was such is not in cori. Check your function card for an error.
DISTRIBUTION LIST

External

Space Systems Division
(Contracting Agency)
Major C. R. Bond (SSOCD)

6594th Aerospace Test Wing
(Contracting Agency)
Lt. Col. A. W. Dill (TWRD)
Lt. Col. M. S. McDowell (TWRU) (2)
TWACS (6)
V. Thomas

PIR-E1 (Lockheed)
N. N. Epstein
C. H. Finnie
H. R. Miller
H. F. Grover
W. E. Moorman (5)
461 Program Office
698BK Program Office

PIR-E2 (Philco)
J. A. Bean
J. A. Isaacs
R. Morrison
S. M. Stanley

PIR-E3 (LFE)
D. F. Criley
K. B. Williams (5)

PIR-E8 (Mellonics)
F. Drudgin

PIR-E5 (Aerospace)
F. M. Adair
R. V. Bigelow
R. D. Brandsberg
L. H. Garcia
G. J. Hansen
C. S. Hoff
L. J. Kreisberg
T. R. Parkin
E. E. Retzlaff
H. M. Reynolds
D. Saadhe

PIR-E6 (STL)
A. J. Carlson (3)

PIR-E4 (GE-Sunnyvale)
J. Farrentine
N. Kirby

PIR-E4 (GE-Santa Clara)
D. Alexander

PIR-E4 (GE-Box 8555)
J. S. Brainard
R. J. Katucki
J. D. Selby

PIR-E4 (GE-Box 3198 Chestnut)
J. F. Butler
H. D. Gilman

PIR-E4 (GE-Bethesda)
W. L. Massey

PIR-E4 (GE-Box 8661)
J. D. Rogers
DISTRIBUTION LIST

INTERNAL

<table>
<thead>
<tr>
<th>NAME</th>
<th>ROOM</th>
<th>NAME</th>
<th>ROOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Busch, R. E.</td>
<td>22088B</td>
<td>Munson, J. B.</td>
<td>22087</td>
</tr>
<tr>
<td>Champaign, M. E.</td>
<td>22152</td>
<td>Myers, G. L.</td>
<td>14056A</td>
</tr>
<tr>
<td>Dobbs, G. H.</td>
<td>22116B</td>
<td>Polk, T. W.</td>
<td>24113</td>
</tr>
<tr>
<td>LaChapelle, F.</td>
<td>22093</td>
<td>Seiden, H. R.</td>
<td>22126B</td>
</tr>
<tr>
<td>Greenwald, I. D.</td>
<td>22094A</td>
<td>Stone, E. S.</td>
<td>24058B</td>
</tr>
<tr>
<td>Kinkead, R. L.</td>
<td>22093</td>
<td>Tennant, T. C.</td>
<td>27029</td>
</tr>
<tr>
<td>Kneemeyer, J. A.</td>
<td>22088A</td>
<td>Vorhaus, A. H.</td>
<td>24074</td>
</tr>
<tr>
<td>Knight, R. D.</td>
<td>22119</td>
<td>Wong, J. P.</td>
<td>Sunnyvale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFCPL (5)</td>
<td>14059</td>
</tr>
</tbody>
</table>
System Development Corporation,
Santa Monica, California
UTILITY PROGRAM DESCRIPTIONS
MILESTONE 11 SYMBOLIC DUMP ROUTINE
(SYMDUMP)
Scientific rept., TM(L)-715/019/01,
by F. J. LaChapelle, R. L. Kinkead.
14 March 1963, 12p., 2 refs.
(Contract AF 19(628)-1648, Space
Systems Division Program, for Space
Systems Division, AFSC)

Unclassified report

DESCRIPTORS: Programming (Computers).
Satellite Networks.

States that the Symbolic Dump
Routine (SYMDUMP) provides octal,
symbolic, floating point decimal,
or BCD dumps of COPII (Control for
Operational Programs) routines using
their names to define the areas in
core to be dumped.