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1401 GENERAL PROGRAM LIBRARY

Modified 1401 Dump

1.4.124

```
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DISCLAIMER

Although each program has been tested by its contributor, no warranty, express or implied, is made by the contributor, as to the accuracy or functioning of the program and related program material, sor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the contributor, in connection therewith.

Notes from the Transcriber

(Van Snyder -- vsnyder@math.jpl.nasa.gov)
(1 May 2002)

The original cover page had a logo that looked something like what's on the previous page -- but it wasn't faked with ASCII. The title was down the right side of the page, in landscape mode, not centered.

Word marks are added under each card image in the listing of the deck, to assist studying. You'll need to remove the word mark lines in order to run the deck. 1 means a word mark in the read area. 2 means a word mark that gets set where the text in the read area gets moved. 3 serves both purposes (the word mark gets copied by an L instruction).

The program has been tested in simh_9.2 (http://simh.trailing-edge.com). It appears to work.

Modified 1401 Dump

William A. Delchamps
General Electric Company
Apollo Support Department
P.O. Box 294
Huntsville, Alabama

Deck Key

1. Program Deck - 24 Cards

MODIFIED 1401 DUMP

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P.O. Box 294
Huntsville, Alabama

Purpose: This routine is the standard IBM 1401 Dump modified to provide the following additional conveniences:

1. Logic indicators included in the printout.

2. All Group Marks are changed to Lozenges.

3. Blank blocks of memory (x00-x99) are not printed.

Method: Does not apply.

Restrictions: None.

Storage Requirements: Positions 1-80 initially and 81-399 after contents have been printed.

Equipment Specifications: Any model or size memory.

MODIFIED 1401 DUMP

This routine is the Standard IBM 1401 Dump Program modified to provide the following additional conveniences:

1. Logic indicators are included in the printout.

2. All Group Marks (12-7-8) are changed to lozenges (12-4-8).

3. All memory blocks x00-x99 which are blank and do not contain Word Marks are not printed.

The recommended procedure for dumping is as follows:

1. Restore carriage.

2. Record I address, A address, B address, Op register, instruction length and 'd' character.

3. Manually storage print 00 area.

4. Place dump deck in reader and press card load.

The contents of memory above positions 400 are not modified by this routine and program operation may be resumed after dumping if previous contents of 000-399 are not critical.

This routine consists of 24 self-loading cards which must be in their proper sequence. The basic deck will dump for a 1.4K machine; however, alterations for other size memory are as follows:

1. Different memory size:

   Card 22 columns 56-60 is memory size, 01400, 02000, etc.

2. Over 4K memory requires Modify Address instruction, replacing add:

   Card 16, column 72, punch #.

   Card 21, column 70, punch #.

   Card 23, column 49, punch #.

This routine has been thoroughly tested on a 4K machine with both modulus 4 and 16 addressing for all three memory sizes and on a 16K machine with modulus 16 addressing for all six memory sizes.

If another utility routine is to follow the dump, such as a tape print: change card 22 column 53 to a / and discard card 24. This will clear 0-80, set a word mark at 1, read card replacing card 24 and branch to 1.

MODIFIED 1401 DUMP

```
,008015,023030N0000000,038042N0000000,049,053057,059,063N0,067,0711001
1      1      1       1      1       1   1      1   1   1 1   1   1   1
M055021M055048B042XXX"A067055B0570534B001M071XXXB023081 FK/059,0011001)
1      1      1       1      1       1   1      1   1   1 1   1   1   1
,008012,016,023,030034,041048,049,056063,022072,,074076,080067)023,02922)N01012N
1      1   1   1      1      1   1      1      11      1      1   1   11 1 1   1
.......210 /332N0000NL010210L)048A077010B0673300A077028L002332B022)0292N0FJ1012
1      1   1   1    11      11   1      1       1      1      1   1   11 1 1   1
M080067B034,017N/332NV0011011,101L101201B0670383A076037A076040B034)20122)N01012N
1      1   1   11   11       1   1      1       1      1      1   1   11 1 1   1
.......110 /300N,029NL010210LN000A077010B0673000A077028N000000B022)0292N0FJ1017N
1      1   1   11   11      11   1      1       1      1      1   1   11 1 1   1
M080067B034     /300/V0010811,081L081281B0670383A076037A076040B034)28122)N01030N
1      1   1   11   11       1   1      1       1      1      1   1   11 1 1   1
......*1*..*2*..*3*.         ,048)008012)022017)L020300,0230161049
1              1      1      1   1      1      11      1      1   1   11 1 1   1
SENSE SWS   ON               OFF                L014214L032234)074)067N,0111011
1              1      1      1   1      1      11      1      1   1   11   1   1
2         B034BM080236A001022B049M080216A001040NA076015A076080B076080HNB0111034B
1         1    1      1      1   1      1      11      1      1       11   1   1
   UNEQUALEQUAL HIGH  LOW        L010110L015115NL020120L025125N0000000NN0001011
1         1    1      1      1   1      1      11      1      1       11   1   1
5003      B041/N000000N000000B049       M110256NA076015A004047B076015VNB0111011
1         1    1      1      1   1      1      11      1      1       11   1   1
OVFLO OFF B041ZN 00000N000000B049       M017009NM009277N000000N0000000NN0001034
1         1    1      1      1   1      1      11      1      1       11   1   1
/299/080,0011001                 ,067074)011016)L016116,117113,109,1052FLFKB101
3   2   2   2   2     1      1   1      1      11      1      1   1   11 1 1   1
,008015,022023,027031N,038,042L0782001001)078N080,0011001........4900333-AREA
1      1      1      11   1   1      1   3   2   2   2   2       2 2
L080163,190188,156156,,180,176,1721681001)2A2B1410-0"B148M1252A2A176099AB1060970
1      1      1      11   1   1      1   3   2       2   2      2      22
L079124,148141,101106,,137,129,1171101001X00FF333010332/332/,2A2M0-02A2V1290-01
1      1      1      11   1   1      1   3  2 2  2    22   22   2      2
,045049,056060L068086N)042)027,095092,0900831001              1/B168
1      1      1      11   1   1      1      1   1      1   1    2            1
Z200211M071194L189261LB0491889A176188A176020B015L066251B100.....3900400
1      1      1      11       1      1      1   1      1   1                 1
)056060L080364,340347NN0000000,354358)0310311001D173188D014019M094089,323C0’9332
1      1      1      11       1      1      1   3      2      2      2   2
L080396,030056,370378N,386393N0000000,0780781001B100/V1000’01B0490889A097089B358
1      1      1      11       1      1      1   3    2       2       2      2
,060062,064071M053168MD173188N0000000L05839911642060N  01400  CORE SIZE
1      1      1      11       1      1      1   1      1   1 1 1      1      1
Z200211A176192L189221LA176020B3331889A176188B015A178094B0712)FJD173097C399192B00
1      1      1      11       1      1      1   1      1   1 1 1      1      1
,031054)060071,036064,)062078N/332/N0L080213,068B063AN0M0912142.064SENSE SW A ON
1      1      1      11      11   11 1      1   1    1 1      11   1
```

ANNOTATED MODIFIED 1401 DUMP

Notes provided by Van Snyder (vsnyder@math.jpl.nasa.gov) 30 April 2002.

==

1. Set word marks for the next card.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
,008015,023030N0000000,038042N0000000,049,053057,059,063N0,067,0711001
1      1      1       1      1       1   1      1   1   1 1   1   1   1
```

2. Replace group marks in 81-399 by).

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
M055021M055048B042XXX"A067055B0570534B001M071XXXB023081 FK/059,0011001)
1      1      1       1      1       1   1      1   1   1 1   1   1   1
```

3. Set word marks for the next card, print the 201-332 area, then print the word marks.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
,008012,016,023,030034,041048,049,056063,022072,,074076,080067)023,02922)N01012N
1      1   1   1      1      1   1      1      11      1      1   1   11 1 1   1
```

4. Clear 300-332 to make sure 330 isn't a zero. Fill in the dots and numbers 210-330, print them.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
.......210 /332N0000NL010210L)048A077010B0673300A077028L002332B022)0292N0FJ1012
1      1   1   1    11      11   1      1       1      1      1   1   11 1 1   1
```

5. Clear 300-332. Remember whether 101 had a word mark. Set one. Load 101-200 and its word marks to 201-300. Clear (or don't clear) the word mark in 201. Print. Print word marks.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
M080067B034,017N/332NV0011011,101L101201B0670383A076037A076040B034)20122)N01012N
1      1   1   11   11       1   1      1       1      1      1   1   11 1 1   1
```

6. Clear 300 to make sure it isn't zero. Fill in the dots and numbers 110-200. Print them.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
.......110 /300N,029NL010210LN000A077010B0673000A077028N000000B022)0292N0FJ1017N
1      1   1   11   11      11   1      1       1      1      1   1   11 1 1   1
```

7. Clear 300. Remember whether 81 had a word mark. Set one. Load 81-99 and its word marks to 281-299. Clear (or don't clear) the word mark in 281. Print. Print word marks.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
M080067B034     /300/V0010811,081L081281B0670383A076037A076040B034)28122)N01030N
1      1   1   11   11       1   1      1       1      1      1   1   11 1 1   1
```

8. Load index register identification to 281-300.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
......*1*..*2*..*3*.         ,048)008012)022017)L020300,0230161049
1                     1      1   1      1      11      1      1   1   11 1 1   1
```

9. Load sense switch identifiers to 201-234.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
SENSE SWS   ON               OFF                L014214L032234)074)067N,0111011
```

```
1              1      1      1   1      1      11      1      1   1   11   1   1
```

10. Put list of on and off sense switches in 236... (on) or 216... (off).

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
2         B034BM080236A001022B049M080216A001040NA076015A076080B076080HNB0111034B
1         1    1      1      1   1      1      11      1      1       11   1   1
```

11. Save comparison indicators in 100..125.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
   UNEQUALEQUAL HIGH  LOW        L010110L015115NL020120L025125N0000000NN0001011
1         1    1      1      1   1      1      11      1      1       11   1   1
```

12. Move appropriate comparison indicators to 247..265.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
5003      B041/N000000N000000B049       M110256NA076015A004047B076015VNB0111011
1         1    1      1      1   1      1      11      1      1       11   1   1
```

13. Construct overflow off (or on) indicator. Move it to 268..277.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
OVFLO OFF B041ZN 00000N000000B049       M017009NM009277N000000N0000000NN0001034
1         1    1      1      1   1      1      11      1      1       11   1   1
```

14. Move clear routines for 200-299 and 0-80 to 101-116. Print indicators. Clear 200-299 and 0-80. Set word mark in 1, read a card and branch to 1.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
/299/080,0011001                 ,067074)011016)L016116,117113,109,1052FLFKB101
1                     1      1   1      1      11      1      1   1   11 1 1   1
```

15. Set word marks, move some code to 164-200.

```
                                         ....170.......180.......190.......200
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
,008015,022023,027031N,038,042L0782001001)078N080,0011001........4900333-AREA
1      1      1      11   1   1      1   1
```

16. Move some code to 125-163, set some word marks.

```
                                         ...130.......140.......150.......160...
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
L080163,190188,156156,,180,176,1721681001)2A2B1410-0"B148M1252A2A176099AB1060970
1      1      1      11   1   1      1   1
```

17. Move some code to 87-124, set some word marks.

```
                                         ..90.......100.......110.......120....
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
L079124,148141,101106,,137,129,1171101001X00FF333010332/332/,2A2M0-02A2V1290-01
1      1      1      11   1   1      1   1
```

18. Set some word marks, move some code to 78-86 (actually part of an instruction)

```
                                                           .80...85.
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
,045049,056060L068086N)042)027,095092,0900831001              1/B168
1      1      1      11   1   1      1      1   1      1   1                 1
```

19. Move "00333-AREA " with zero suppression to 201-211. Update "xxxxx-AREA " to 00400. Put .....39 - ....99 in print area. Go to print it and to set up to print 333-399 area.

```
                                                           .....190....
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
Z200211M071194L189261LB0491889A176188A176020B015L066251B100.....3900400
1      1      1      11       1      1      1   1      1   1                 1
```

20. Move some code to 333-364. Set some word marks.

```
                                                .....340.......350.......360....
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
)056060L080364,340347NN0000000,354358)0310311001D173188D014019M094089,323C0'9332
1      1      1      11       1      1      1   1
```

21. Move some code to 365-396. Set some word marks.

```
                                                ...370.......380.......390......
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
L080396,030056,370378N,386393N0000000,0780781001B100/V1000'01B0490889A097089B358
1      1      1      11      1       1      1   1
```

22. Set some word marks. Change)078N to 2060N at 164-168
Change first ....x9 to ....09. Move the core size to 396-399.

```
                                                .....  ...
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
,060062,064071M053168MD173188N0000000L05839911642060N  01400  CORE SIZE
1      1      1      11      1       1      1   1      1   1 1 1      1      1
```

23. Move "xxxxx-AREA " with zero supression to 201-211. Update xxxxx by 100.
Put ....09 - ....99 to 212-311. Go put data and word marks in the
print area and print the data. Print the word marks on return.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
Z200211A176192L189221LA176020B3331889A176188B015A178094B0712)FJD173097C399192B00
1      1      1      11      1       1      1   1      1   1 1 1      1      1
```

24. Print whether Sense switch A is on.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
,031054)060071,036064,)062078N/332/N0L080213,068B063AN0M0912142.064SENSE SW A ON
1      1      1      11      11   11 1      1   1    1 1      11   1
```

==

Alternate (untested) two-card sequence for cards 12-14

12. Move appropriate comparison indicators to 247..265.
Load 'Read a card and branch to 1' to 89-92

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
5003      B041/L033092B049   1001       M110256NA076015A004047B076015VNB0111011
1         1    1      1      1   1      1      11      1      1       11   1   1
```

13. Construct overflow off (or on) indicator. Move it to 268..277.
Move clear routine 0-80 to 81-88. Set word marks for it. Print indicators.
Clear 200-299 and 0-80. Set word mark in 1, read a card and branch to 1.

```
....5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
OVFLO ON  B023ZM057009M009277,074L070088,085093NB071   FF     /080,0012FLFK/299N
1         1    1      1      1   1      1      11      1      1       11 1 1   1
```