## IDENTIFICATION

Product Code: DEC-08-PMP0-D

Product Name: Readin-Mode (RIM) Punch

Date Created: November 22, 1966

Maintainer: Software Services Group

# 1. ABSTRACT

The RIM Punch program provides a means of punching out information contained in selected blocks of core memory as RIM-coded tape via the ASR 33 Perforated Tape Punch or 75E High Speed Punch. The punch program may occupy either low or high memory depending on the version used.

# 2. PRELIMINARY REQUIREMENTS

## 2.1 Equipment

PDP-8® with its associated ASR 33 or 75E punch.

## 2.2 Storage

This program requires 61 (decimal) memory locations.

# 3. LOADING OR CALLING PROCEDURE

## 3.1 Loading

This routine is loaded using the Binary Loader. See DEC-08-LBAA for a complete description of the Binary Loader.

## 3.2 Calling Sequence

None. This routine cannot be called as a subroutine.

# 4. USING THE PROGRAM OR ROUTINES

## 4.1 Switch Settings

The SWITCH REGISTER is used to enter the initial and final address of each block of core memory to be punched.

## 4.2 Start Up/Entry

a. Make sure ASR 33 or 75E punch is on.

b. Set the starting address 0041 (or 7441 if using the high-memory version) into the SWITCH REGISTER and press the LOAD ADDRESS key. Next press the START key.

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c. The computer halts. Set the initial address of the block to be punched into the SWITCH REGISTER and press the CONTINUE key.

d. The computer halts. Set the final address of the block to be punched into SWITCH REGISTER and press the CONTINUE key.

Note that the final address must be larger than the initial address.

e. A block of leader (code 200) is punched followed by the selected block of data in RIM format.

f. The computer halts. Steps c and d may now be repeated to punch as many blocks of data as desired. To terminate the tape, proceed as follows.

g. Set the terminating address 0074 (7474) into the SWITCH REGISTER and press the LOAD ADDRESS key. Next press the START key and a block of trailer is punched.

## 5. DETAILS OF OPERATION AND STORAGE

Reference to section 7.1, Flow Chart, will illustrate the following discussion.

After entry, a short subroutine is entered to punch a block of leader. Next the initial address is picked up and the six most significant bits are rotated right, masked out, added to 0100 (in order to punch channel 7), and punched. The least-significant six bits of the address are next masked out and punched.

A similar process is followed to punch the data associated with the corresponding address except 0100 is not added before the first character is punched.

This process is repeated until the final address is reached; then the computer halts at the starting address. If more blocks of data are to be punched, this is done as explained in step f above.

The routine is entered at a different address to punch the final trailer.

### 5.1 Execution Time

This routine is output limited with respect to speed.

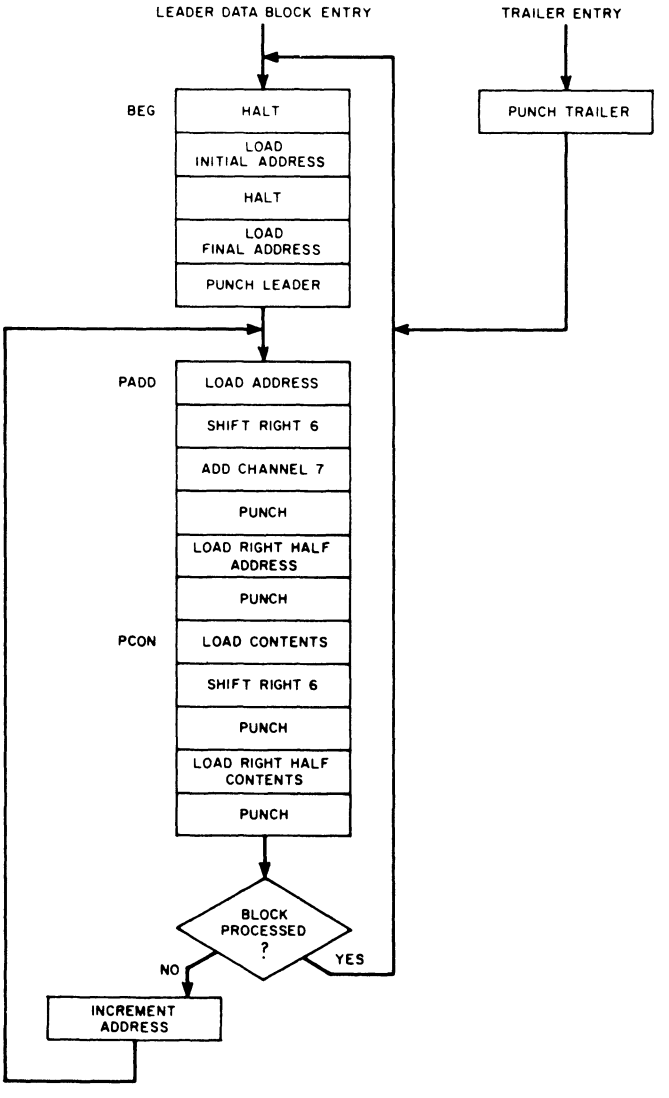
## 6. SPECIAL FORMATS

### 6.1 External Data

See Digital-8-2-U for a description of RIM paper tape format.

# 7. FLOW CHARTS AND LISTINGS

## 7.1 Flow Chart



## 7.2 Listings

```
                /DIGITAL-8-4-U-RIM
                /RIM PUNCH 33 LOW MEMORY
                *41
0041   7402     BEG,    HLT          /ENTRY FOR LEADER DATA BLOCK
0042   7604             LAS          /SET INITIAL ADDRESS
0043   3122             DCA IA
0044   7402             HLT
0045   7604             LAS          /SET FINAL ADDRESS
0046   3123             DCA FA
0047   4076             JMS LTS      /GO TO L/T SUBROUTINE
0050   1122     PADD,   TAD IA       /PUNCH ADDRESS
0051   4106             JMS SHFT
0052   1126             TAD CH7
0053   4114             JMS PUN
0054   1122             TAD IA
0055   0125             AND SL6
0056   4114             JMS PUN
0057   1522     PCON,   TAD I IA     /PUNCH CONTENTS
0060   4106             JMS SHFT
0061   4114             JMS PUN
0062   1522             TAD I IA
0063   0125             AND SL6
0064   4114             JMS PUN
0065   1122             TAD IA
0066   7041             CIA
0067   1123             TAD FA
0070   7650             SNA CLA      /TEST FOR END
0071   5075             JMP .+4
0072   2122             ISZ IA
0073   5050             JMP PADD
0074   4076             JMS LTS      /ENTRY FOR L/T
0075   5041             JMP BEG
0076   0000     LTS,    0            /L/T SUBROUTINE
0077   1127             TAD M101
0100   3124             DCA CTR
0101   1130     MORE,   TAD C200
0102   4114             JMS PUN
0103   2124             ISZ CTR
0104   5101             JMP MORE     /MORE L-T CODES
0105   5476             JMP I LTS
0106   0000     SHFT,   0            /SHIFT RIGHT
0107   7012             RTR
0110   7012             RTR
0111   7012             RTR
0112   0125             AND SL6
0113   5506             JMP I SHFT
0114   0000     PUN,    0            /PUNCH SUBROUTINE
0115   6046             TLS
0116   6041             TSF
0117   5116             JMP .-1
0120   7200             CLA
0121   5514             JMP I PUN
0122   0000     IA,     0
0123   0000     FA,     0
0124   0000     CTR,    0
0125   0077     SL6,    77
0126   0100     CH7,    100
0127   7677     M101,   -101
0130   0200     C200,   200
```

```
BEG     0041
CH7     0126
CTR     0124
C200    0130
FA      0123
IA      0122
LTS     0076
MORE    0101
M101    0127
PADD    0050
PCON    0057
PUN     0114
SHFT    0106
SL6     0125


0121  5514   00530          JMP I PUN
0122  0000   00540   IA,    0
0123  0000   00550   FA,    0
0124  0000   00560   CTR,   0
0125  0077   00570   SL6,   77
0126  0100   00580   CH7,   100
0127  7677   00590   M101,  -101


0130  0200   00600   C200,  200
             00610
```



SYMBOL TABLE

```
BEG     0041
CH7     0126
CTR     0124
C200    0130
FA      0123
IA      0122
LTS     0076
MORE    0101
M101    0127
PADD    0050
PCON    0057
PUN     0114
SHFT    0106
SL6     0125

BEG     7441
CH7     7526
CTR     7524
C200    7530
FA      7523
```

```
IA      7522
LTS     7476
MORE    7501
M101    7527
PADD    7450
PCON    7457
PUN     7514
SHFT    7506
SL6     7525
```

```
                /DIGITAL-8-4-U-RIM
                /RIM PUNCH 33 HIGH MEMORY
                *7441
7441  7402  BEG,      HLT          /ENTRY FOR LEADER DATA BLOCK
7442  7604            LAS          /SET INITIAL ADDRESS
7443  3322            DCA IA
7444  7402            HLT
7445  7604            LAS          /SET FINAL ADDRESS
7446  3323            DCA FA
7447  4276            JMS LTS      /GO TO L/T SUBROUTINE
7450  1322  PADD,     TAD IA       /PUNCH ADDRESS
7451  4306            JMS SHFT
7452  1326            TAD CH7
7453  4314            JMS PUN
7454  1322            TAD IA
7455  0325            AND SL6
7456  4314            JMS PUN
7457  1722  PCON,     TAD I IA     /PUNCH CONTENTS
7460  4306            JMS SHFT
7461  4314            JMS PUN
7462  1722            TAD I IA
7463  0325            AND SL6

7464  4314            JMS PUN
7465  1322            TAD IA
7466  7041            CIA
7467  1323            TAD FA
7470  7650            SNA CLA      /TEST FOR END
7471  5275            JMP .+4
7472  2322            ISZ IA
7473  5250            JMP PADD
7474  4276            JMS LTS      /ENTRY FOR L/T
7475  5241            JMP BEG
7476  0000  LTS,      0            /L/T SUBROUTINE
7477  1327            TAD M101
7500  3324            DCA CTR
7501  1330  MORE,     TAD C200
7502  4314            JMS PUN
7503  2324            ISZ CTR
7504  5301            JMP MORE     /MORE L-T CODES
7505  5676            JMP I LTS
7506  0000  SHFT,     0            /SHIFT RIGHT
7507  7012            RTR
7510  7012            RTR
7511  7012            RTR
7512  0325            AND SL6
7513  5706            JMP I SHFT
7514  0000  PUN,      0            /PUNCH SUBROUTINE
```

```
7515  6046            TLS
7516  6041            TSF
7517  5316            JMP .-1
7520  7200            CLA
7521  5714            JMP I PUN
7522  0000  IA,        0
7523  0000  FA,        0
7524  0000  CTR,       0
7525  0077  SL6,       77
7526  0100  CH7,       100
7527  7677  M101,      -101
7530  0200  C200,      200

BEG     7441
CH7     7526
CTR     7524
C200    7530
FA      7523
IA      7522
LTS     7476
MORE    7501
M101    7527
PADD    7450
PCON    7457
PUN     7514
SHFT    7506
SL6     7525

@

BEG     7441
CH7     7526
CTR     7524
C200    7530


FA      7523
IA      7522
LTS     7476
MORE    7501
M101    7527
PADD    7450
PCON    7457
PUN     7514
SHFT    7506
SL6     7525



            /DIGITAL-8-4-U-RIM
            /RIM PUNCH 75 HIGH MEMORY
            *7441
7441  7402  BEG,       HLT         /ENTRY FOR LEADER DATA BLOCK
7442  7604              LAS         /SET INITIAL ADDRESS
7443  3322              DCA IA
7444  7402              HLT
7445  7604              LAS         /SET FINAL ADDRESS
7446  3323              DCA FA
7447  4276              JMS LTS     /GO TO L/T SUBROUTINE
7450  1322  PADD,      TAD IA      /PUNCH ADDRESS
```

```
7451  4326            JMS SHFT
7452  1326            TAD CH7
7453  4314            JMS PUN
7454  1322            TAD IA
7455  0325            AND SL6
7456  4314            JMS PUN
7457  1722  PCON,     TAD I IA    /PUNCH CONTENTS
7460  4326            JMS SHFT
7461  4314            JMS PUN
7462  1722            TAD I IA
7463  0325            AND SL6
7464  4314            JMS PUN
7465  1322            TAD IA
7466  7041            CIA
7467  1323            TAD FA
7470  7650            SNA CLA     /TEST FOR END
7471  5275            JMP .+4
7472  2322            ISZ IA
7473  5250            JMP PADD
7474  4276            JMS LTS     /ENTRY FOR L/T
7475  5241            JMP BEG
7476  0000  LTS,      0           /L/T SUBROUTINE
7477  1327            TAD M101
7500  3324            DCA CTR
7501  1330  MORE,     TAD C200
7502  4314            JMS PUN
7503  2324            ISZ CTR
7504  5301            JMP MORE    /MORE L-T CODES
7505  5676            JMP I LTS
7506  0000  SHFT,     0           /SHIFT RIGHT
7507  7012            RTR
7510  7012            RTR
7511  7012            RTR
7512  0325            AND SL6
7513  5716            JMP I SHFT
7514  0000  PUN,      0           /PUNCH SUBROUTINE
7515  6026            PLS
7516  6021            PSF
7517  5316            JMP .-1
7520  7200            CLA
7521  5714            JMP I PUN
7522  0000  IA,       0
7523  0000  FA,       0
7524  0000  CTR,      0
7525  0077  SL6,      77
7526  0100  CH7,      100
7527  7677  M101,     -101
7530  0200  C200,     200
```

```
BEG     7441
CH7     7526
CTR     7524
C200    7530
FA      7523
IA      7522
LTS     7476
MORE    7501
M101    7527
PADD    7450
PCON    7457
PUN     7514
SHFT    7506
SL6     7525

BEG     0041
CH7     0126
CTR     0124
C200    0130
FA      0123
IA      0122
LTS     0076
MORE    0101
M101    0127
PADD    0050
PCON    0057
PUN     0114
SHFT    0106
SL6     0125


        /DIGITAL-8-4-U-RIM
        /RIM PUNCH 75 LOW MEMORY
        *41
0041  7402  BEG,    HLT          /ENTRY FOR LEADER DATA BLOCK
0042  7604          LAS          /SET INITIAL ADDRESS
0043  3122          DCA IA
0044  7402          HLT
0045  7604          LAS          /SET FINAL ADDRESS
0046  3123          DCA FA
0047  4076          JMS LTS      /GO TO L/T SUBROUTINE
0050  1122  PADD,   TAD IA       /PUNCH ADDRESS
0051  4106          JMS SHFT
0052  1126          TAD CH7
0053  4114          JMS PUN
0054  1122          TAD IA
0055  0125          AND SL6
0056  4114          JMS PUN
0057  1522  PCON,   TAD I IA     /PUNCH CONTENTS
0060  4106          JMS SHFT
0061  4114          JMS PUN
0062  1522          TAD I IA
0063  0125          AND SL6
0064  4114          JMS PUN
0065  1122          TAD IA
0066  7041          CIA
0067  1123          TAD FA
0070  7650          SNA CLA      /TEST FOR END
```

```
0071  5075            JMP .+4
0072  2122            ISZ IA
0073  5050            JMP PADD
0074  4076            JMS LTS     /ENTRY FOR L/T
0075  5041            JMP BEG
0076  0000  LTS,      0           /L/T SUBROUTINE
0077  1127            TAD M101
0100  3124            DCA CTR
0101  1130  MORE,     TAD C200
0102  4114            JMS PUN
0103  2124            ISZ CTR
0104  5101            JMP MORE    /MORE L-T CODES
0105  5476            JMP I LTS
0106  0000  SHFT,     0           /SHIFT RIGHT

0107  7012            RTR
0110  7012            RTR
0111  7012            RTR
0112  0125            AND SL6
0113  5506            JMP I SHFT
0114  0000  PUN,      0           /PUNCH SUBROUTINE
0115  6026            PLS
0116  6021            PSF
0117  5116            JMP .-1
0120  7200            CLA
0121  5514            JMP I PUN
0122  0000  IA,       0
0123  0000  FA,       0
0124  0000  CTR,      0
0125  0077  SL6,      77
0126  0100  CH7,      100
0127  7677  M101,     -101
0130  0200  C200,     200
```

```
BEG     0041
CH7     0126
CTR     0124
C200    0130
FA      0123
IA      0122
LTS     0076
MORE    0101
M101    0127
PADD    0050
PCON    0057
PUN     0114
SHFT    0106
SL6     0125
```