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PROGRAM DESCRIPTION

IDENTIFICATION: 810A Paper Tape Reproducer/Verifier (From Memory)

AUTHOR: S. R. Brandt, SEL

PURPOSE: To reproduce and verify paper tapes

COMPUTER CONFIGURATION: 810A with High Speed Paper Tape Unit

SUBROUTINES REQUIRED: None

STORAGE: The amount of memory used depends upon the size of the tape being copied. The program itself uses 501_8 locations (relocatable) and there are no inter-map references.

TIMING: N/A

USE:

1. Load with relocating loader (Catalog No. 300002A).

2. Program types out (one-time) the required control information.

3. Options:
   a. SNS 0 - Leader and trailer option
      On to output extra long (11 ft.) leaders and trailers for paper tape units with automatic spoolers.
   b. The amount of memory being made available to the program for storing the original tape must be initially specified with an "SX" entry. This parameter may be subsequently changed at any time by another "SX" entry.
   c. Once the original tape is stored in memory and verified, any number of copies may be punched out, nine continuous copies per "PX" entry.
   d. Any number of copies may be verified, nine consecutive copies per "VX" entry.
   e. All control communication between program and operator is through the ASR-33 keyboard, except for sense switch 0.

4. It is a requirement of this program that the original tape must contain a stop code consisting of three (3) immediately consecutive colon characters (ASCII-272) at the logical end of tape.

5. Operating Procedure:

   a. Load the program with the relocating loader; since the program fits in one map and there are no inter-map references it can be loaded in MAP 0 or at the start of any other map. However, the program will read and store "original" tapes immediately following its last location, so this must be considered when deciding where to locate the program. If there is no concern for destroying resident programs there is no problem. If, however, preserving resident programs is a consideration, they may be protected by locating the copy/verify program far enough away and limiting the amount of memory made available to it by the "SX" entry.
   b. When the loading operation is completed, press START to begin program exeuction. A summary of the control parameters will be typed out initially, followed by a request for memory size.
   c. Satisfy the memory size request by typing "SX", where X is the number of 4K modules of memory the program may use, i.e., a number from 1 to 4. If there is not enough memory to copy a particular tape, the computer will type "SIZE" and wait for a command key from the keyboard. If it is possible, make more memory available by increasing X in another "SX" entry.
   d. Whenever an operation that was commanded is completed (read, punch or verify) the computer types "ENTER..." and waits for another command key from the keyboard. The only acceptable command keys are:

      SX - for entering or changing available memory
      R - to read and store an "original" tape.
      PX - to punch X number of copies continuously, where X ranges from 1 to 9.
      VX - to verify X number of copies where X ranges from 1 to 9.

e. Proper procedure for accurately reproducing tapes then, is as follows:

1. read and store the "original" tape with an "R" entry.
2. verify the "original" with a "V1" entry; this step is extremely important and should not be eliminated! If the reader misreads the original this step should catch it.
3. punch desired number of copies with a "PX" entry.
4. verify the copies just made with a "VX" entry. The computer types "OK" and halts at the end of each copy so that it may be cut and removed. Press START to verify the next copy.

Note - If an error is detected during verification the computer types "ERROR" and halts at that point. If there are more copies to be verified, press START to advance the tape through the reader to the end of the copy with an error. Remove that copy and verify the next. When verification is complete, re-verify any copies that caused an error halt. They may go through the second time, the error being due to dirt in the reader. Also, note that "original" tapes with a Stop Code punched less than seven inches from the physical end of the tape will read out of the reader. This happens because the verification routine after reaching the Stop Code, reads and ignores another 75 frames to advance the copy far enough out of the reader so that it may be cut and removed. If this does happen, it is only necessary to replace the end of the tape in the reader so that it may complete the reading of 75 frames.

METHOD: The master tape is read and stored, two characters per word, and a word count maintained. This operation is terminated by a Stop Code consisting of three consecutive colon characters (ASCII-272). If the "V" command key is typed in, the tape is read and compared, word for word, against the stored master until the master word count is exhausted.

If an error is detected, there is immediate notification and a halt. Upon continuation, the tape is read through to the end without further comparison.

If the "P" command key is typed in, the stored master tape is punched out, including the Stop Code.

```
1
 0001  00000 00000000 *
 0002  00000 00000000 *          CATALØG NØ. 310004B
 0003  00000 00000000 *          810A PAPER TAPE CØPY/VERIFY (FRØM MEMØRY)
 0004  00000 00000000 *          AUTHØR- S.R.BRANDT
 0005  00000 00000000 *          ASSEMBLED  JULY 24, 1967     * * * * * * * * * * * * * * * * * *
 0006  00000 00000000 *
 0007  00000 00000000 *
 0008  00000 00000000       REL
 0009  00000 00130101 ACPT  CEU  1,W
 0010  00001 00002000       DATA '2000          ENABLE KEYBØARD
 0011  00002 12100307       SPB  CRLF
 0012  00003 11100024 SWA   BRU  INIT           ØNE-TIME BRANCH
 0013  00004 12100275       SPB  IN             ACCEPT KEY-LETTER AND ANALYZE
 0014  00005 15100477       CMA  SCØN
 0015  00006 11100010       BRU  *+2
 0016  00007 11100040       BRU  SIZE
 0017  00010 15100463       CMA  RCØN
 0018  00011 11100013       BRU  *+2
 0019  00012 11100056       BRU  RMST
 0020  00013 15100464       CMA  VCØN
 0021  00014 11100016       BRU  *+2
 0022  00015 11100212       BRU  VRFY
 0023  00016 15100465       CMA  PCØN
 0024  00017 11100021       BRU  *+2
 0025  00020 11100146       BRU  PNCH
 0026  00021 00170501       MØP  1,W
 0027  00022 00127640       DATA ''/ ''
 0028  00023 11100000       BRU  ACPT
 0029  00024 01100350 INIT  LAA  NØP            TURN ØFF ØNE-TIME SWITCH
 0030  00025 03100003       STA  SWA
 0031  00026 02100444       LBA  DAC2           TYPE ØUT PRØGRAM CØNTRØL INFØ
 0032  00027 01100446       LAA  KM36
 0033  00030 12100315       SPB  TYP
 0034  00031 02100453       LBA  DAC8
 0035  00032 01100454       LAA  KM4
 0036  00033 12100315       SPB  TYP
 0037  00034 12100275       SPB  IN             GØ ACCEPT CHARACTER      S.R.B.  7/24/67    *B
 0038  00035 06100477       SMA  SCØN           LØØK FØR "S"             S.R.B.  7/24/67    *B
 0039  00036 00000022       SAZ
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```
0040  00037 11100034        BRU   *-3
0041  00040 12100275 SIZE    SPB   IN              ACCEPT # ØF 4K MØDULES   S.R.B.  7/24/67    *B
0042  00041 12100332        SPB   CHK
0043  00042 15100466        CMA   KØ5
0044  00043 11100050        BRU   *+5
0045  00044 00000033 ERR3    NØP
0046  00045 00170501        MØP   1,W
0047  00046 00127640        DATA  '?/ '
0048  00047 11100276        BRU   IN+1
0049  00050 00000005        TAB
0050  00051 01500472        LAA   FCTR-1,1        FIX PRØG FØR SPECIFIED MEMØRY SIZE
0051  00052 03100342        STA   LIM
0052  00053 01500466        LAA   DAC1-1,1
0053  00054 03100343        STA   BUFR
0054  00055 11100132        BRU   A4
0055  00056 00000000 *             INSTRUCS FR RMST TØ PNCH-1 WILL READ AND STØRE AWAY THE
S3S6  0056  00056 00000000 *       MASTER TAPE (2 CHAR/WD) AND CHK FØR A STØP CØDE (3 CØLØNS)
-0057 00056 00130102 RMST  CEU   2,W
-0058 00057 00001000       DATA  '1000
0059  00060 00170302        AIP   2,W             GET RID ØF PØSSIBLE LEFT-øVER CHARAC FR BUFFER
0060  00061 03100344        STA   TMP1            RESET WD CØUNT
-0061 00062 00170302        AIP   2,W             READ LEADER
0062  00063 00000022        SAZ
0063  00064 11100066        BRU   *+2
0064  00065 11100061        BRU   *-4
-0065 00066 00001016        LSL   8
0066  00067 00174302        AIP   2,W,R
0067  00070 02100342        LBA   LIM
0068  00071 11100073        BRU   *+2
0069  00072 12100302 AO      SPB   READ
0070  00073 03300343        STA*  BUFR            STØRE AWAY IN MEMØRY
0071  00074 14100344        IMS   TMP1
0072  00075 00000033 SWX     NØP
0073  00076 00000033 SWY     NØP
0074  00077 15100361        CMA   CØN1            CHECK FØR 2 CØLØNS
0075  00100 11100102        BRU   *+2
0076  00101 11100114        BRU   A1
0077  00102 00001016        LSL   8
0078  00103 15100345        CMA   CØN2            CHECK FØR A SINGLE CØLØN
0079  00104 11100106        BRU   *+2
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0080  00105 11100117       BRU  A2
0081  00106 00000026 A3     IBS
0082  00107 11100072       BRU  A0
0083  00110 02100450       LBA  DAC4          TYPE MESSAGE "SIZE"
0084  00111 01100455       LAA  KM2
0085  00112 12100315       SPB  TYP
0086  00113 11100000       BRU  ACPT
0087  00114 01100346 A1     LAA  BRU1
0088  00115 03100075       STA  SWX
0089  00116 11100106       BRU  A3
0090  00117 01100347 A2     LAA  BRU2
0091  00120 03100076       STA  SWY
0092  00121 11100106       BRU  A3
0093  00122 03100362 CHK1   STA  HLD1
0094  00123 01100350       LAA  NØP
0095  00124 03100075       STA  SWX
0096  00125 01100362       LAA  HLD1
0097  00126 15100345       CMA  CØN2          CHECK FØR A SINGLE CØLØN
0098  00127 11100106       BRU  A3
0099  00130 11100132       BRU  A4
0100  00131 11100106       BRU  A3
0101  00132 02100447 A4     LBA  DAC3          TYPE MSG "ENTER..."
0102  00133 01100454       LAA  KM4
0103  00134 12100315       SPB  TYP
0104  00135 11100000       BRU  ACPT
0105  00136 03100362 CHK2   STA  HLD1
0106  00137 01100350       LAA  NØP
0107  00140 03100076       STA  SWY
0108  00141 01100362       LAA  HLD1
0109  00142 15100361       CMA  CØN1          CHECK FØR 2 CØLØNS
0110  00143 11100106       BRU  A3
0111  00144 11100132       BRU  A4
0112  00145 11100106       BRU  A3
0113  00146 00000000 *            INSTRUCS FR PNCH TØ VRFY-1 WILL PUNCH ØUT X NØ. ØF CØPIES
0114  00146 12100275 PNCH   SPB  IN
0115  00147 12100332       SPB  CHK
0116  00150 00000002 ØK1    NEG
0117  00151 03100365       STA  CPYS
0118  00152 00130102       CEU  2,A
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0120  00154 00000003 PN1   CLA
0121  00155 02100367       LBA   K400
0122  00156 00130400       SNS   0                 SENSE SW 0 ØN FØR 11FT LEADER AND TRAILER
0123  00157 02100370       LBA   LØTS
0124  00160 00170102       AØP   2,W
0125  00161 00000026       IBS
0126  00162 11100160       BRU   *-2
0127  00163 02100342       LBA   LIM
0128  00164 01100344       LAA   TMP1
0129  00165 00000002       NEG
0130  00166 03100366       STA   TMP2
0131  00167 01300343 PN2    LAA*  BUFR
0132  00170 00170102       AØP   2,W
0133  00171 00001016       LSL   8
0134  00172 00170102       AØP   2,W
0135  00173 00000026       IBS
0136  00174 14100366       IMS   TMP2
0137  00175 11100167       BRU   PN2
0138  00176 02100371       LBA   M150
0139  00177 00130400       SNS   0
0140  00200 02100370       LBA   LØTS
0141  00201 00000003       CLA
0142  00202 00170102       AØP   2,W
0143  00203 00000026       IBS
0144  00204 11100202       BRU   *-2
0145  00205 14100365       IMS   CPYS
0146  00206 11100154       BRU   PN1
0147  00207 00130102       CEU   2,W
0148  00210 00002000       DATA  '2000
0149  00211 11100132       BRU   A4
0150  00212 00000000 *            INSTRUCS FR VRFY TØ IN-1 WILL VERIFY X NØ. ØF TAPES, HALTING
0151  00212 00000000 *            AT END ØF EACH ØNE ØR IMMEDIATELY UPØN ERRØR DETECTIØN
0152  00212 12100275 VRFY  SPB   IN
0153  00213 12100332       SPB   CHK
0154  00214 00000002 ØK2   NEG
0155  00215 03100365       STA   CPYS
0156  00216 00130102 VRFO  CEU   2,W
0157  00217 00001000       DATA  '10004000
0158  00220 02100342       LBA   LIM
0159  00221 01100344       LAA   TMP1
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0160  00222 00000002        NEG
0161  00223 03100366        STA   TMP2
0162  00224 00170302        AIP   2,W
0163  00225 00000022        SAZ
0164  00226 11100230        BRU   *+2
0165  00227 11100224        BRU   *-3
0166  00230 00001016        LSL   8
0167  00231 00174302        AIP   2,W,R
0168  00232 11100234        BRU   *+2
0169  00233 12100302 VRF1   SPB   READ
0170  00234 15300343        CMA*  BUFR          CØMPARE AGAINST NXT STØRED CHARACTER
0171  00235 11100237        BRU   *+2
0172  00236 11100251        BRU   VRF2
0173  00237 01100373        LAA   BRU3
0174  00240 03100262        STA   SWZ
0175  00241 02100451        LBA   DAC5          TYPE ERRØR MSG, RING BELL
0176  00242 01100454        LAA   KM4
0177  00243 12100315        SPB   TYP
0178  00244 00000000        HLT
0179  00245 12100302        SPB   READ
0180  00246 14100366        IMS   TMP2
0181  00247 11100245        BRU   *-2
0182  00250 11100254        BRU   VRF6
0183  00251 00000026 VRF2   IBS
0184  00252 14100366        IMS   TMP2          INCREMENT NEG WD CØUNT
0185  00253 11100233        BRU   VRF1
0186  00254 00000000 *            FØLLØWING 6 INSTRUCS MERELY ADVANCE TAPE SØ CØPY MAY BE CUT
0187  00254 00000000 *            AND REMØVED. . .
0188  00254 02100457 VRF6   LBA   KM75
0189  00255 00130400        SNS   0
0190  00256 02100460        LBA   LTS1
0191  00257 00170302        AIP   2,W
0192  00260 00000026        IBS
0193  00261 11100257        BRU   *-2
0194  00262 00000033 SWZ    NØP                 THIS LØCN CØNTAINS A BRU IF THERE WAS AN ERRØR
0195  00263 02100452        LBA   DAC6          TYPE MESSAGE "Ø.K."
0196  00264 01100455        LAA   KM2
0197  00265 12100315        SPB   TYP
0198  00266 01100350 VRF5   LAA   NØP
0199  00267 03100262        STA   SWZ
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```
0200  00270 14100365       IMS   CPYS
0201  00271 11100273       BRU   **+2
0202  00272 11100132       BRU   A4
0203  00273 00000000       HLT
0204  00274 11100216       BRU   VRFO
0205  00275 25400000 IN     DAC   **          ACCEPT CHAR FR KB AND TYPE BACK
0206  00276 00170301       AIP   1,W
0207  00277 00001016       LSL   8
0208  00300 00170101       AØP   1,W
0209  00301 11300275       BRU*  IN
0210  00302 25400000 READ   DAC   **          READ AND MERGE 2 CHARACTERS
0211  00303 00170302       AIP   2,W
0212  00304 00001016       LSL   8
0213  00305 00174302       AIP   2,W,R
0214  00306 11300302       BRU*  READ
0215  00307 25400000 CRLF   DAC   **          ØUTPUT A CARRIAGE-RETURN, LINE-FEED
0216  00310 00170501       MØP   1,W
0217  00311 00106400       DATA  '106400
0218  00312 00170501       MØP   1,W
0219  00313 00105000       DATA  '105000
0220  00314 11300307       BRU*  CRLF
0221  00315 25400000 TYP    DAC   **          B-REG MUST CØNTAIN MESSG START ADDPESS
0222  00316 03100445       STA   CNTR        A-REG MUST CØNTAIN NEG WD CØUNT
0223  00317 12100307       SPB   CRLF
0224  00320 01400000 TYP1   LAA   0,1
0225  00321 00170101       AØP   1,W
0226  00322 00001016       LSL   8
0227  00323 00170101       AØP   1,W
0228  00324 00000026       IBS
0229  00325 00000033       NØP
0230  00326 14100445       IMS   CNTR
0231  00327 11100320       BRU   TYP1
0232  00330 12100307       SPB   CRLF
0233  00331 11300315       BRU*  TYP         EXIT
0234  00332 25400000 CHK    DAC   **          CHK FØR NUMERIC FR 1 TØ 9
0235  00333 00001015       RSL   8
0236  00334 06100372       SMA   Ø260
0237  00335 15100364       CMA   KØ12
0238  00336 00000021       SAS
0239  00337 11100044       BRU   ERR3
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0240  00340 11100044       BRU  ERR3
0241  00341 11300332       BRU* CHK
0242  00342 00144520 LIM   DATA -14000
0243  00343 35633760 BUFR  DAC  BUFF+14000,1
0244  00344 00000000 TMP1  DATA 0
0245  00345 00135000 CØN2  DATA '135000
0246  00346 11100122 BRU1  BRU  CHK1
0247  00347 11100136 BRU2  BRU  CHK2
0248  00350 00000033 NØP   NØP
0249  00351 00142716 MSG1  DATA ''ENTER...''
0249  00352 00152305
0249  00353 00151256
0249  00354 00127256
0250  00355 00146705        DATA ''MEM ''
0250  00356 00146640
0251  00357 00151711 MSG2  DATA ''SIZE''
0251  00360 00155305
0252  00361 00135272 CØN1  DATA ''::''
0253  00362 00000000 HLD1  DATA 0
0254  00363 00000000 HLD2  DATA 0
0255  00364 00000012 KØ12  DATA '12
0256  00365 00000000 CPYS  DATA 0
0257  00366 00000000 TMP2  DATA 0
0258  00367 00177160 K400  DATA -400
0259  00370 00175126 LØTS  DATA -1450
0260  00371 00177552 M150  DATA -150
0261  00372 00000260 Ø260  DATA '260
0262  00373 11100266 BRU3  BRU  VRF5
0263  00374 00142722 MSG3  DATA ''ERRØ'',''151207,''103607
0263  00375 00151317
0263  00376 00151207
0263  00377 00103607
0264  00400 00151730 MS6   DATA ''SX- X MØDS ØF 4K MEM'',''106612
0264  00401 00126640
0264  00402 00154240
0264  00403 00146717
0264  00404 00142323
0264  00405 00120317
0264  00406 00143240
0264  00407 00132313
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0264  00410 00120315
0264  00411 00142715
0264  00412 00106612
0265  00413 00151255        DATA ''R- RD MSTR'','106612
0265  00414 00120322
0265  00415 00142240
0265  00416 00146723
0265  00417 00152322
0265  00420 00106612
0266  00421 00153330        DATA ''VX-VERIFY X CØPIES'','106612
0266  00422 00126726
0266  00423 00142722
0266  00424 00144706
0266  00425 00154640
0266  00426 00154240
0266  00427 00141717
0266  00430 00150311
0266  00431 00142723
0266  00432 00106612
0267  00433 00150330        DATA ''PX- PUNCH X CØPIES''
0267  00434 00126640
0267  00435 00150325
0267  00436 00147303
0267  00437 00144240
0267  00440 00154240
0267  00441 00141717
0267  00442 00150311
0267  00443 00142723
0268  00444 35400400 DAC2  DAC   MS6
0269  00445 00000000 CNTR  DATA  0
0270  00446 00177734 KM36  DATA  -36
0271  00447 35400351 DAC3  DAC   MSG1
0272  00450 35400357 DAC4  DAC   MSG2
0273  00451 35400374 DAC5  DAC   MSG3
0274  00452 35400461 DAC6  DAC   MSG4
0275  00453 35400355 DAC8  DAC   MSG2-2
0276  00454 00177774 KM4   DATA  -4
0277  00455 00177776 KM2   DATA  -2
0278  00456 00000000 SAVE  DATA  0
0279  00457 00177665 KM75  DATA  -75
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0280   00460 00175241 LTS1 DATA -1375
0281   00461 00147656 MSG4 DATA ''0.K.''
0281   00462 00145656
0282   00463 00151000 RC0N DATA '151000      R
0283   00464 00153000 VC0N DATA '153000 ---> LETTER(V)
0284   00465 00150000 PC0N DATA '150000      P
0285   00466 00000005 K05  DATA '5
0286   00467 35606306 DAC1 DAC  BUFF+2950,1
0287   00470 35616146      DAC  BUFF+6950,1
0288   00471 35626006      DAC  BUFF+10950,1
0289   00472 35635646      DAC  BUFF+14950,1
0290   00473 00172172 FCTR DATA -2950,-6950,-10950,-14950
0290   00474 00162332
0290   00475 00152472
0290   00476 00142632
0291   00477 00151400 SC0N DATA '151400      X
0292   00500 00000001 BUFF BSS  1
0293   00501 70400000      END  ACPT
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