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DECUS NO.	8-464b
TITLE	MTA: TRØ2 MAGNETIC TAPE HANDLER
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SOURCE LANGUAGE	PAL

MTA

ABSTRACT:

A TWO PAGE HANDLER WHICH ALLOWS THE USE OF A 7 OR 9 TRACK TYPE TR02 INCREMENTAL MAGNETIC TAPE IN A MANNER SIMILAR TO DECTAPE. TAPE MOTION HAS BEEN REDUCED TO A MINIMUM TO INCREASE SPEED. EACH BLOCK OF DATA (256 WORDS) IS CONTAINED IN ONE TAPE BLOCK ALONG WITH PARITY BITS AND BLOCK NUMBER IDENTIFICATION. PARITY CHECKING IS DONE TWICE FOR EVERY WORD READ AND STATUS TESTS ARE PERFORMED BEFORE AND AFTER EACH READ, WRITE, AND POSITIONING OPERATION. IN CASE OF PARITY ERROR, THREE ADDITIONAL READS ARE ATTEMPTED BEFORE A FATAL ERROR EXIT IS TAKEN. UP TO 2047 BLOCKS ARE AVAILABLE, DEPENDING ON THE LENGTH OF TAPE. ALL INTERRUPT FLAGS ARE LEFT DOWN AT EXIT. TAPE MUST BE FORMATTED PRIOR TO USE WITH "MTAMRK" AND MUST BE INITIALIZED AT EACH LOADING WITH "INIT". UNLOADING IS ACCOMPLISHED BY "UNLOAD".

PROGRAM DESCRIPTION:

1. TAPE FORMAT

THE TAPE FORMATTER "MTAMRK" WRITES 2047 BLOCKS ON 7 OR 9 TRACK TAPE. EACH BLOCK CONSISTS OF THREE SECTIONS;

(A) 1000(8) 6 BIT BYTES OF DATA
(B) 300(8) UPPER 6 BITS OF BLOCK #
(C) 300(8) LOWER 6 BITS OF BLOCK #

BLOCKS ARE SEPARATED BY INTER-RECORD GAPS. DATA IS STORED AS THE UPPER AND LOWER 6 BITS OF EACH 12 BIT WORD SEQUENTIALLY, I.E. BYTE #0 = UPPER 6 BITS OF WORD #0, BYTE #1 = LOWER 6 BITS OF WORD #0, BYTE #2 = UPPER 6 BITS OF WORD #1 AND SO ON.

2. POSITIONING ALGORITHM

UPON LOADING AND STARTING THE MTA HANDLER, ONE BLOCK IS READ AND THE 1100TH AND 1400TH BYTES ARE ASSEMBLED TO FORM A BLOCK #. THIS IS A ONE TIME OPERATION. WHILE MTA REMAINS IN CORE, ALL SUBSEQUENT REQUESTS UTILIZE THE LAST POSITION AS A BASE FOR BLOCK RETRIEVAL CALCULATIONS. AFTER DETERMINING THE DIRECTION AND NUMBER OF BLOCKS IN ERROR, READ FORWARD OR BACKSPACE COMMANDS ARE ISSUED, WHILE COUNTING THE IRG GAPS PASSED UNTIL THE ERROR IS ZERO.
THE BLOCK NUMBER READ AT 'FIRST RUN' TIME IS THE NEGATIVE NUMBER OF THE FOLLOWING BLOCK; I.E. IF THE TAPE IS AT REST AT THE BEGINNING OF BLOCK #5, THEN THE IDENTIFICATION NUMBER READ WILL BE -6 (77+72,7772), AND WILL COME TO REST AT THE BEGINNING OF BLOCK #6.

AFTER DETERMINING THE BLOCK # ERROR, 6 POSSIBILITIES EXIST.

(A) ZERO ERROR
(B) NEGATIVE ERROR (DESIRED BLOCK IS BEHIND)
(C) POSITIVE ERROR (DESIRED BLOCK IS AHEAD)

EACH IS POSSIBLE FOR EITHER A READ OR WRITE REQUEST, A TOTAL OF 6. IN ALL CASES EXCEPT ONE, IT IS ONLY NECESSARY TO POSITION THE TAPE TO THE BEGINNING OF THE BLOCK DESIRED EITHER FROM AHEAD OR BEHIND. IN ONE CASE, HOWEVER, A PROBLEM EXISTS. A WRITE REQUEST WILL RESULT IN THIS SEQUENCE OF OPERATIONS.

(A) POSITION TAPE
(B) CHANGE TO WRITE MODE
(C) WRITE

THE MODE CHANGE COMMAND CAUSES A CERTAIN TAPE MOVEMENT TO TAKE PLACE ALONG WITH ERASING OF THE TAPE, THUS RESULTING IN AN INCREASE OF THE PHYSICAL LENGTH OF THE GAP IF THE MOVEMENT PASSES THE ORIGINAL GAP BOUNDARY. IF THE GAP WAS REACHED BY FORWARD MOTION, THEN THE AMOUNT OF GAP 'STRETCHING' IS CONTROLLED, AND NEVER EXCEEDS A FIXED LENGTH. IF THE GAP WAS REACHED BY A BACKSPACE MOTION, HOWEVER, THEN EACH SEQUENCE OF THESE MOVEMENTS;

(A) BACKSPACE
(B) SET UP TO WRITE
(C) WRITE
(D) READ FORWARD TO NEXT GAP

WILL RESULT IN ADDITIONAL STRETCHING OF THE GAP UNTIL THE DATA BLOCK DISAPPEARS. IN ORDER TO AVOID THIS PROBLEM, IF A NEGATIVE ERROR IS INDICATED ALONG WITH A WRITE REQUEST, THEN THE TAPE IS POSITIONED BACKWARD ONE EXTRA BLOCK, THEN FORWARD ONE BLOCK. THIS INSURES THAT ALL BLOCKS TO BE WRITTEN INTO WILL BE APPROACHED FROM THE LOW SIDE, THUS SETTING AN ABSOLUTE LIMIT ON THE RESULTING GAP LENGTH.

AFTER A PERIOD OF USE, GAP LENGTHS WILL INCREASE SOMEWHAT AND THE BLOCK IDENTIFICATION NUMBER WILL BE READ FROM A LOCATION HIGHER THAN THE ORIGINAL SPECIFICATION. THIS IS THE REASON FOR WRITING SUCH A LARGE NUMBER OF BLOCK IDENTIFICATION RECORDS.

3. ERROR DETECTION AND RECOVERY

THE STATUS REGISTER AND TELETYPE BUFFER ARE TESTED BEFORE AND AFTER EACH READ, WRITE AND POSITIONING OPERATION. ^C FROM THE TELETYPE CAUSES AN ABORT TO THE KEYBOARD MONITOR, BAD STATUS CAUSES A FATAL ERROR RETURN. EACH 6 BIT BYTE IS TESTED FOR PROPER PARITY WHEN READ. IF AN ERROR IS FOUND, THAT BLOCK IS BACKSPACED AND REREAD A MAXIMUM OF THREE TIMES BEFORE THE FATAL ERROR EXIT IS TAKEN. THE ACCUMULATOR IS CLEARED UPON ENTRY AND IS CLEAR AT EXITS. SPECIFYING A NEGATIVE BLOCK # RESULTS IN A FATAL ERROR EXIT. SPECIFYING ZERO PAGES IS THE EQUIVALENT OF 40(8).

4. READ AND WRITE METHOD

THE READING AND WRITING TECHNIQUES ARE STRAIGHTFORWARD ACCORDING TO THE TAPE FORMAT DESCRIBED. THE WORD COUNT IN A WRITE OPERATION IS INCREASED BY THREE TO PREVENT BAD DATA AND/OR PARITY ERRORS DURING SUBSEQUENT READS. THIS HAPPENS BECAUSE OF A SMALL AMOUNT OF VARIATION IN THE ABSOLUTE TAPE POSITION FROM ONE WRITE OPERATION TO ANOTHER. A ONE PAGE OR ODD PAGE WRITE REQUEST CAUSES AN EXTRA PAGE TO BE WRITTEN. THIS PREVENTS ERRORS WHEN A LATER READ OF THAT BLOCK IS EVEN. INTERRUPT FLAGS ARE CLEARED BEFORE EVERY EXIT TO PREVENT INTERFERENCE TO PROGRAMS USING INTERRUPTS.

RESTRICTIONS:

NONE.

OPERATING INSTRUCTIONS:
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1. USING OS8 "BUILD", LOAD AND INSERT MTA AS AN ACTIVE HANDLER.
2. GET "PIP" AND CHANGE LOCATION 13620 TO 4051.
3. LOAD AND RUN "MTAMRK".
4. LOAD, SAVE AND RUN "INIT"
5. LOAD AND SAVE "UNLOAD".

LOADING AND UNLOADING TAPE:
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1. TO LOAD TAPE, THREAD THE TAPE PROPERLY, THEN PRESS 'LOAD FORWARD' ONCE MOMENTARILY TO TENSION THE TAPE. THEN RUN "INIT".
2. TO UNLOAD TAPE, RUN "UNLOAD". THE DRIVE IS LEFT IN MANUAL MODE.

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                        /TR02 MAGTAPE HANDLER FOR OS8/
                6701            IRS=6701
                6702            ISR=6702
                6703            IWS=6703
                6704            IMC=6704
                6705            IGS=6705
                6706            IRW=6706
                6707            IRD=6707
                        FIXTAB
                0000    *0
00000           7777            -1                      /1 DEVICE
00001           2422            DEVICE  TR02
00002           6062
00003           1524            DEVICE. MTA
00004           0100
00005           4200            4200                    /FILE STRUCTURED DEVICE
00006           4000            4000                    /TWO PAGES
00007           0000            ZBLOCK  2
                0200    *200
00200           0000    MTA,    0
00201           7600    USTOP,  7600                    /CLA
00202           6214            RDF
00203           1230            TAD     MTCDIF          /MAKE FIELD INST.
00204           3340            DCA     MTSTOP
00205           4206            JMS     PAD             /WHERE ARE WE?
00206           0000    PAD,    0
00207           1364            TAD     OFFSET
00210           1206            TAD     PAD
00211           3206            DCA     PAD             /NEXT PAGE, 1ST LOCATION
00212           1600            TAD I   MTA             /GET FUNCTION WORD
00213           7510            SPA                     /IS IT WRITE ?
00214           2371            ISZ     BFLAG           /YES
00215           3357            DCA     FUNC
00216           1363            TAD     N70
00217           0357            AND     FUNC            /GET DATA FIELD
00220           1335            TAD     DFI
00221           3330            DCA     FELD            /MAKE CDF INST.
00222           2200            ISZ     MTA
00223           1600            TAD I   MTA             /GET BUFFER ADDRESS
00224           3362            DCA     TEMP1
00225           2200            ISZ     MTA
00226           1600            TAD I   MTA             /GET BLOCK NO.
00227           2200            ISZ     MTA             /SET UP ERROR RETURN
00230           6203    MTCDIF, CDF CIF                 /CHANGE TO FIELD 0
00231           7510            SPA                     /NEG. BLOCK NO.?
00232           5355            JMP     ERROUT          /YES
00233           3360            DCA     DRN
00234           1362            TAD     TEMP1
00235           3606            DCA I   PAD             /CORE ADDRESS TO NEXT PAGE
00236           2206            ISZ     PAD             /SET UP LINK TO NEXT PAGE
00237           4342            JMS     STATUS
00240           1367            TAD     LOCATE          /FIRST TIME THROUGH?
00241           7700            SMA CLA
00242           5271            JMP     MTRL            /NO
00243           1306            TAD     MOVE
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   56   00244   6704            IMC
   57   00245   6701  RAD,      IRS                 /FIND OUR PLACE
   58   00246   5245            JMP     RAD
   59   00247   2367            ISZ     LOCATE
   60   00250   5245            JMP     RAD
   61   00251   6707            IRD
   62   00252   7510            SPA
   63   00253   5355            JMP     ERROUT      /CHECK PARITY
   64   00254   7106            CLL RTL;RTL;RTL     /FORM TAPE BLOCK NO.
   65   00255   7006
   66   00256   7006
   67   00257   3361            DCA     CRN
   68   00260   6701  BAD,      IRS
   69   00261   5260            JMP     BAD
   70   00262   2370            ISZ     LOCO
   71   00263   5260            JMP     BAD
   72   00264   6707            IRD
   73   00265   7510            SPA
   74   00266   5355            JMP     ERROUT
   75   00267   6705  GLOP,     IGS
   76   00270   5267            JMP     GLOP
   77   00271   1361  MTRL,     TAD     CRN         /HERE WE ARE
   78   00272   1360            TAD     DRN
   79   00273   7041            CIA                 /-BLOCK NO. ERROR
   80   00274   7450            SNA
   81   00275   5324            JMP     OUT         /0 ERROR
   82   00276   7510            SPA
   83   00277   5320            JMP     FWD         /AHEAD
   84   00300   7040            CMA
   85   00301   3362            DCA     TEMP1
   86   00302   1371            TAD     BFLAG       /PROBLEM?
   87   00303   7650            SNA CLA
   88   00304   2362            ISZ     TEMP1       /NO
   89   00305   1201            TAD     USTOP       /GO BACK
   90   00306   6704  MOVE,     IMC
   91   00307   6705  GWATE,    IGS
   92   00310   5307            JMP     GWATE
   93   00311   2362            ISZ     TEMP1       /COUNT GAPS
   94   00312   5306            JMP     MOVE
   95   00313   7200            CLA
   96   00314   1371            TAD     BFLAG
   97   00315   7650            SNA CLA
   98   00316   5324            JMP     OUT         /OK
   99   00317   7040            CMA
  100   00320   3362  FWD,      DCA     TEMP1
  101   00321   3371            DCA     BFLAG       /CLEAR FLAG
  102   00322   1306            TAD     MOVE
  103   00323   5306            JMP     MOVE
  104   00324   7200  OUT,      CLA
  105   00325   3371            DCA     BFLAG
  106   00326   4342            JMS     STATUS
  107   00327   1357            TAD     FUNC
  108   00330   0000  FELD,     0
  109   00331   4606            JMS I   PAD         /PERFORM READ/WRITE
  110   00332   1360  NORMAL,   TAD     DRN         /NORMAL RETURN
```

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111   00333  7041          CIA
112   00334  3361          DCA     CRN       /FIX BLOCK NO.
113   00335  6201  DFI,    CDF 0
114   00336  4342          JMS     STATUS
115   00337  2200          ISZ     MTA       /SET UP NORMAL RETURN
116   00340  0000  MTSTOP,  0                 /RESET FIELD
117   00341  5600          JMP I   MTA       /ALL DONE
118   00342  0000  STATUS,  0
119   00343  6031          KSF               /KEYBOARD FLAG?
120   00344  5351          JMP     STAT      /NO
121   00345  6036          KRB
122   00346  1365          TAD     M203
123   00347  7650          SNA CLA
124   00350  5601          JMP I   USTOP     /YES, QUIT
125   00351  6702  STAT,   ISR
126   00352  1366          TAD     M4010     /BAD STATUS?
127   00353  7650          SNA CLA
128   00354  5742          JMP I   STATUS    /NO
129   00355  7130  ERROUT,  CLL CML RAR      /SET BAD RETURN BIT
130   00356  5340          JMP     MTSTOP    /AND STOP
131   00357  0000  FUNC,    0
132   00360  0000  DRN,     0
133   00361  0000  CRN,     0
134   00362  0000  TEMP1,   0
135   00363  0070  N70,     70
136   00364  0172  OFFSET,  WAD-PAD
137   00365  7575  M203,    -203
138   00366  3770  M4010,   -4010
139   00367  6730  LOCATE,  -1050
140   00370  7500  LOCO,    -300
141   00371  0000  BFLAG,   0
142          0400  *400
143   00400  0000  WAD,     0
144   00401  0000  EXIT,    0
145   00402  7004          RAL               /PUT WRITE BIT IN LINK
146   00403  0257          AND     AGAIN     /SAVE WORD COUNT
147   00404  7041          CIA
148   00405  3362  WAR,     DCA     TEMP
149   00406  3363          DCA     BCNT      /CLEAR BLOCK COUNTER
150   00407  1364          TAD     M03
151   00410  3361          DCA     ERRCNT    /RETRY COUNTER
152   00411  7430          SZL               /READ OR WRITE?
153   00412  5253          JMP     WRIT
154   00413  1200  READ,    TAD     WAD       /SAVE CORE ADDRESS AND
155   00414  3366          DCA     ESAV1     /WORD COUNT IN CASE OF
156   00415  1362          TAD     TEMP      /READ ERRORS
157   00416  3367          DCA     ESAV2
158   00417  1255  TRY,     TAD     WARF
159   00420  6704          IMC
160   00421  6701  REDE,    IRS
161   00422  5221          JMP     REDE
162   00423  6707          IRD               /READ UPPER BYTE
163   00424  7510          SPA               /CHECK PARITY
164   00425  5336          JMP     ERROR     /OH OH
165   00426  7106          CLL RTL;RTL;RTL   /SHIFT UP AND SAVE
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 166   00427  7006
 167   00430  7006
 168   00431  3600          DCA I   WAD
 169   00432  6701  REED,   IRS
 170   00433  5232          JMP     REED
 171   00434  6707          IRD                     /LOWER BYTE
 172   00435  7510          SPA
 173   00436  5336          JMP     ERROR
 174   00437  1600          TAD I   WAD             /COMPLETE WORD
 175   00440  3600          DCA I   WAD
 176   00441  2200          ISZ     WAD
 177   00442  7000          NOP                     /WATCH OUT FOR SUPER LONG TRANSFERS!
 178   00443  2362          ISZ     TEMP            /LESS THAN A BLOCK?
 179   00444  5247          JMP     REDMOR
 180   00445  4327          JMS     GAP
 181   00446  5323          JMP     ROUT            /YES
 182   00447  2360  REDMOR, ISZ     RCNT
 183   00450  5221          JMP     REDE            /REPEAT
 184   00451  4327          JMS     GAP
 185   00452  5213          JMP     READ            /ANOTHER BLOCK
 186   00453  1205  WRIT,   TAD     WAR
 187   00454  6704          IMC
 188   00455  6703  WARF,   IWS                     /CHANGE MODE
 189   00456  5255          JMP     WARF
 190   00457  7600  AGAIN,  7600                    /CLA
 191   00460  1600          TAD I   WAD
 192   00461  7012          RTR; RTR; RTR           /SHIFT DOWN
 193   00462  7012
 194   00463  7012
 195   00464  0370          AND     N77             /SKIM OFF UPPER BITS(9 TRACK)
 196   00465  6706          IRW                     /WRITE UPPER BYTE
 197   00466  6703  IWSF,   IWS
 198   00467  5266          JMP     IWSF
 199   00470  7300          CLA CLL
 200   00471  1600          TAD I   WAD
 201   00472  0370          AND     N77
 202   00473  6706          IRW                     /LOWER BYTE
 203   00474  2200          ISZ     WAD             /NEXT ADDRESS
 204   00475  7000          NOP
 205   00476  6703  LWSF,   IWS
 206   00477  5276          JMP     LWSF
 207   00500  2362          ISZ     TEMP
 208   00501  5304          JMP     RANT
 209   00502  7240          CLA CMA
 210   00503  3366          DCA     ESAV1
 211   00504  2360  RANT,   ISZ     RCNT
 212   00505  5257          JMP     AGAIN
 213   00506  6706  RITE,   IRW
 214   00507  6703  WITE,   IWS
 215   00510  5307          JMP     WITE
 216   00511  2361          ISZ     ERRCNT
 217   00512  5306          JMP     RITE
 218   00513  7200          CLA
 219   00514  1255          TAD     WARF
 220   00515  6704          IMC
```

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221   00516  7346          CLA CLL CMA RTL
222   00517  3361          DCA     ERRCNT
223   00520  4327          JMS     GAP
224   00521  2366          ISZ     ESAV1
225   00522  5253          JMP     WRIT
226   00523  6701  ROUT,   IRS
227   00524  7000          NOP
228   00525  1363          TAD     BCNT
229   00526  5601          JMP I   EXIT
230   00527  0000  GAP,    0
231   00530  1357          TAD     RCNTR
232   00531  3360          DCA     RCNT
233   00532  2363          ISZ     BCNT
234   00533  6705  GRIP,   IGS
235   00534  5333          JMP     GRIP
236   00535  5727          JMP I   GAP     /WAIT FOR GAP TO COME BY
237   00536  6705  ERROR,  IGS
238   00537  5336          JMP     ERROR
239   00540  7200          CLA
240   00541  1257          TAD     AGAIN
241   00542  6704          IMC             /BACK TO START OF BLOCK
242   00543  7200          CLA
243   00544  4327          JMS     GAP
244   00545  1366          TAD     ESAV1   /RESTORE CONDITIONS
245   00546  3200          DCA     WAD     /BEFORE ERROR
246   00547  1367          TAD     ESAV2
247   00550  3362          DCA     TEMP
248   00551  2361          ISZ     ERRCNT
249   00552  5217          JMP     TRY     /THREE PASSES
250   00553  1365          TAD     ERRDIF
251   00554  1201          TAD     EXIT
252   00555  3201          DCA     EXIT
253   00556  5601          JMP I   EXIT    /FATAL ERROR RETURN
254   00557  7400  RCNTR,  -400
255   00560  7400  RCNT,   -400
256   00561  0000  ERRCNT, 0
257   00562  0000  TEMP,   0
258   00563  0000  BCNT,   0
259   00564  7775  M03,    -3
260   00565  0023  ERRDIF, ERROUT-NORMAL
261   00566  0000  ESAV1,  0
262   00567  0000  ESAV2,  0
263   00570  0077  N77,    77
264                $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
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AGAIN  0457      WAD    0400
BAD    0260      WAR    0405
BCNT   0563      WARF   0455
BFLAG  0371      WITE   0507
CRN    0361      WRIT   0453
DFI    0335
DRN    0360
ERRCNT 0561
ERRDIF 0565
ERROR  0536
ERROUT 0355
ESAV1  0566
ESAV2  0567
EXIT   0401
FELD   0330
FUNC   0357
FWD    0320
GAP    0527
GLOP   0267
GRIP   0533
GWATE  0307
IWSF   0466
LOCATE 0367
LOCO   0370
LWSF   0476
MOVE   0306
MTA    0200
MTCDIF 0230
MTRL   0271
MTSTOP 0340
M03    0564
M203   0365
M4010  0366
NORMAL 0332
N70    0363
N77    0570
OFFSET 0364
OUT    0324
PAD    0206
RAD    0245
RANT   0504
RCNT   0560
RCNTR  0557
READ   0413
REDE   0421
REDMOR 0447
REED   0432
RITE   0506
ROUT   0523
STAT   0351
STATUS 0342
TEMP   0562
TEMP1  0362
TRY    0417
USTOP  0201
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WARF        158   188#  189   219
WITE        214#  215
WRIT        153   186#  225
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                        /INIT: SMART TAPE INITIATOR/
           6701         IRS=6701
           6702         ISR=6702
           6704         IMC=6704
           6705         IGS=6705
           6707         IRD=6707
                        FIXTAB
00200      7600 OS8,    7600                    /CLA
00201      6702         ISR                     /READ TAPE STATUS
00202      7006         RTL                     /TNT INTO SIGN
00203      7710         SPA CLA                 /TAPE TENSIONED?
00204      5240         JMP     ERROR           /NO, CAN'T DO ANYTHING
00205      6702         ISR
00206      7710         SPA CLA                 /READY?
00207      5223         JMP     LOCO            /YES, PROCEED
00210      7130         CLL CML RAR             /4000
00211      6704         IMC                     /START LOAD FORWARD
00212      6705 LOWAIT, IGS                     /WAIT FOR GAP FLAG
00213      5212         JMP     LOWAIT
00214      7300         CLA CLL
00215      6702         ISR                     /GET STATUS WORD
00216      7006         RTL;RTL;RTL             /BOT INTO LINK
00217      7006
00220      7006
00221      7620         SNL CLA                 /IS IT UP?
00222      5240         JMP     ERROR           /NO, SOMETHINGS FUNNY
00223      7133 LOCO,   CLL CML IAC RTR         /6000
00224      6704 GOGO,   IMC                     /READ
00225      6705 GOWAIT, IGS                     /WAIT FOR GAP
00226      5225         JMP     GOWAIT
00227      2245         ISZ     M40             /COUNT 32 GAPS
00230      5224         JMP     GOGO            /REPEAT
00231      7300         CLA CLL                 /DONE
00232      6702         ISR                     /STATUS AGAIN
00233      1246         TAD     MSTAT           /COMPARE
00234      7640         SZA CLA                 /DOES IT MATCH?
00235      5240         JMP     ERROR           /NO, QUIT
00236      7300         CLA CLL                 /YES, PROCEED
00237      5600         JMP I   OS8
00240      6212 ERROR,  CIF 10                  /TELL OS8 ABOUT ERROR
00241      4644         JMS I   USR
00242      0007         7                       /TYPE 7 REQUEST
00243      0002         2                       /ERROR #2
00244      7700 USR,    7700
00245      7740 M40,    -40
00246      3770 MSTAT,  -4010
                        $$$$$$$$$$$$$$$$$$$$
```

```
ERROR  0240
GOGO   0224
GOWAIT 0225
LOCO   0223
LOWAIT 0212
MSTAT  0246
M40    0245
OS8    0200
USR    0244
  48
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```
    1                       /UNLOAD: TR02 UNLOADING SEQUENCE/
    2             6702              ISR=6702
    3             6703              IWS=6703
    4             6704              IMC=6704
    5             6705              IGS=6705
    6                       FIXTAE
    7    00200    7600      OS8,     7600                  /CLA, AND SYSTEM RETURN
    8    00201    6702               ISR                  /READ STATUS
    9    00202    7700               SMA CLA              /IS IT READY?
   10    00203    5600               JMP I    OS8         /NO, QUIT
   11    00204    6704               IMC                  /START REWINDING
   12    00205    6703      UNWAIT,  IWS                  /WAIT UNTIL DONE
   13    00206    5205               JMP      UNWAIT
   14    00207    5600               JMP I    OS8
   15                       $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
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                        /MTAMRK: TR02 TAPE MARKER/
                6703    IWS=6703
                6704    IMC=6704
                6705    IGS=6705
                6706    IRW=6706
                        FIXTAB
                0200    *200
00200   7600    DISK,   7600                    /CLA
00201   6704            IMC                     /REWIND
00202   6703    REWF,   IWS
00203   5202            JMP     REWF
00204   7330            CLL CLA CML RAR /4000
00205   6704            IMC                     /LOAD FORWARD TO READ
00206   6705    LFRF,   IGS
00207   5206            JMP     LFRF
00210   7032            CML RTR                 /3000
00211   6704            IMC                     /SET UP TO WRITE
00212   6703    WARF,   IWS
00213   5212            JMP     WARF
00214   7300            CLA CLL
00215   1215    GAP,    TAD     GAP
00216   6704            IMC                     /WRITE IRG
00217   6703    IRGF,   IWS
00220   5217            JMP     IRGF
00221   7200            CLA
00222   1261            TAD     M1300
00223   3265            DCA     BCNT
00224   1262            TAD     M300
00225   3264            DCA     ACNT
00226   1263            TAD     BMRK
00227   7041            CIA
00230   7012            RTR; RTR; RTR
00231   7012
00232   7012
00233   0267            AND     N77
00234   6706    WRITE1, IRW
00235   6703    IWRF,   IWS
00236   5235            JMP     IWRF
00237   2265            ISZ     BCNT
00240   5234            JMP     WRITE1
00241   7200            CLA
00242   1263            TAD     BMRK
00243   7041            CIA
00244   0267            AND     N77
00245   6706    WRITE2, IRW
00246   6703    IWSF,   IWS
00247   5246            JMP     IWSF
00250   2264            ISZ     ACNT
00251   5245            JMP     WRITE2
00252   2263            ISZ     BMRK
00253   7000            NOP
00254   7200            CLA
00255   2266            ISZ     LONG
00256   5215            JMP     GAP
00257   6704            IMC                     /REWIND
```

```
 56   00260  5600          JMP I   DISK    /RETURN
 57   00261  6500  M1300,  -1300
 58   00262  7500  M300,   -300
 59   00263  7700  BMRK,   -100
 60   00264  0000  ACNT,   0
 61   00265  0000  BCNT,   0
 62   00266  3700  LONG,   -4100
 63   00267  0077  N77,    77
 64                $$$$$$$$$$$$$$$$$$$$$
```



```
ACNT   0264
BCNT   0265
BMRK   0263
DISK   0200
GAP    0215
IRGF   0217
IWRF   0235
IWSF   0246
LFRF   0206
LONG   0266
M1300  0261
M300   0262
N77    0267
REWF   0202
WARF   0212
WRITE1 0234
WRITE2 0245
  65
```

```
ACNT          29     48     60#
BCNT          27     39     61#
BMRK          30     42     50     59#
DISK           8#    56
GAP           21#    21#    54
IRGF          23#    24
IWRF          37#    38
IWSF          46#    47
LFRF          14#    15
LONG          53     62#
M1300         26     57#
M300          28     58#
N77           35     44     63#
REWF          10#    11
WARF          18#    19
WRITE1        36#    40
WRITE2        45#    49
```
