```
01
02                ;                                                  PAGE 1 OF 16
03                ;       RCSL:   44-RT 1898
04                ;
05                ;       VERSION:        2.0     15 JULI 79      JEP
06                ;
07                ;               PROGRAM:
08                ;               ********
09                ;
10                ;       RC 3600 - MTC 3XX DIAGNOSTIC TEST
11                ;
12                ;               PROGRAM SOURCE:
13                ;
14                ;       S-BINARY TAPE:  RCSL 44-RT 1899 (SELFSTART AUTOLOAD HEAD)
15                ;       ASCII SOURCE:   RCSL 44-RT 1900 TAPE 1 - 10
16                ;       BINARY CARD:    RCSL 44-RT 1901
17                ;
18                ;
19                ;
20                ;
21                ;
22                ;
23                ;
24                ;
25                ;
26                ;
27                ;
28                ;
29                ;
30                ;
31                ;
32                ;
33                ;
34                ;0. INDEX
35                ;       1. ABSTRACT                                 PAGE 1
36                ;       2. MACHINE REQUIREMENTS                     PAGE 1
37                ;       3. STANDARD OPERATING PROCEDURE             PAGE 2
38                ;               BOOTSTRAP FOR S-BINARY TAPE         PAGE 8
39                ;       4. ADDITIONAL OPERATING PROCEDURE           PAGE 9
40                ;       5. PROGRAM DESCRIPTION                      PAGE 11
41                ;       6. STATUS BIT TABLE                         PAGE 14
42                ;       7. SOFTWARE SURVEY                          PAGE 15
43                ;       8. MESSAGES FROM THIS PROGRAM               PAGE 16
44                ;
45                ;1. ABSTRACT
46                ;       THIS TESTPROGRAM IS A MAINTENANCE PROGRAM DESIGNED TO
47                ;       DETECT MALFUNCTIONS IN THE MAGNETIC TAPE CHANNEL.
48                ;
49                ;2. MACHINE REQUIREMENTS
50                ;       RC 3600 FAMILY PROCESSOR                    CPU
51                ;       MINIMUM 12K READ/WRITE MEMORY               MEM
52                ;       TELETYPE OR OPERATORS CONTROL PANEL         TTY/OCP *NOTE
53                ;       MAGNETIC TAPE CONTROLLER UNDER TEST
54                ;               INCL FORMATTER AND UNIT             MTC
55                ;       LINEPRINTER, OPTIONALLY                     LPT     *NOTE
56                ;
57                ;       *NOTE: IF THIS DEVICES IS SET ONLINE AFTER PROGRAM
58                ;       START, THE PROGRAM MUST BE RESTARTED TO GET OUTPUT.
```

```
;
;3. STANDARD OPERATING PROCEDURE.
;                   1.  LOADING
;                   2.  LOADING MESSAGE
;                   3.  START
;                   4.  ANSWERING TO QUESTIONS
;                   5.  PROGRAM DATA
;                   6.  SWITCH CONTROL
;                   7.  UTILITY START ADDRESSES
;                   8.  TERMINATE
;                   9.  RESTART FROM TTI
;                   10. RESTART FROM TCP
;                   11. RESTART FROM CPU FRONT EDGE
;                   12. POWER RESTART
;                   13. RESTART WITH BREAK OPTION
;                   14. RESTART PROGRAM AS WHEN LOADED
;                   15. MEMORY SIZE
;                   16. EXAMINE/DEPOSIT MEMORY
;                   17. PROGRAM BREAK MESSAGE
;                   18. BINARY LOADER
;                   19. PROGRAM SUPERVISOR
;                   20. VOLTAGE UNIT ADMINISTRATION
;                   21. CPU TYPE NO
;                   22. PRINTER ALPHABETH
;
;       3.1 LOADING:
;                   IF FROM PTR:
;       1           AUTOLOAD TAPE
;       OR 2        USE BOOTSTRAP FOR AUTOLOAD-TAPE (END OF CHAPTER)
;       OR 3        USE BINARY LOADER STARTING TAPE AFTER 1. BLOCK
;
;                   IF FROM ANOTHER DEVICE:
;                   READ THE INSTRUCTIONS ATTACHED TO THE MEDIUM.
;
;       3.2 LOADING MESSAGE:
;                   AFTER LOADING THE PROGRAM WILL WRITE FOLLOWING:
;
;                   ACTUAL PROGRAM NAME
;                   SWITCHES: 000030
;                   SET SWITCHES TO CONTROL, (3.6), STARTADDR 400 ?
;
;       3.3 START
;                   OF PROGRAM AFTER LOADING:
;
;                   SET SWITCHES TO CONTROL, READ 3.6
;                   BEFORE START READ ADDITIONAL OPERATING PROCEDURE
;
;       3.4 ANSWERING TO QUESTIONS:
;                   IF THE SUGGESTED ANSWER IS OK,
;                   ANSWER ONLY NL (RETURN),
;                   ELSE INPUT YOUR CHOICE.
;
;                   THE LAST DIGIT ANSWERED CAN BE ERASED WITH
;                   RUBOUT (CANCEL OR DELETE).
;                   MORE DIGITS CAN'T BUT PASS LIMIT BY GIVING TO
;                   MANY DIGITS.
;
;                   IF THE ANSWER IS BEYOND LIMITS THE QUESTION
;                   IS REPEATED.
```

3.5 PROGRAM DATA:

AFTER LOADING IT IS POSSIBLE TO KNOW MORE ABOUT
THE PROGRAM AND THE MACHINE BY STARTING IN
SA 2226. FOLLOWING DATA ARE PRINTED:

ACTUAL PROGRAM NAME
RCSL 44-RT XXXX DATE: DD.MM.YEAR VERSION: 0.0
CPU TYPE: 000021 RC 3600 NORMAL
MIKROPROG VERSION: 0. CPU 708
LAST LOC. 077777
BINARY LOADER Ok ; SEE 3.18
SWITCHES: 000030
SET SWITCHES TO CONTROL. (3.6). STARTADDR 400 ?

GO TO 3.3 START

3.6 SWITCH CONTROL: NORMAL ALL ZERO.

SW0: LOOP IN TEST IN CASE OF ERROR. (SCOPING).
SW10: INHIBIT PRINTOUT IN TESTLOOP-PROGRAM.
SW11: PRINT FAILURE RATE IN TESTLOOP-PROGRAM.
SW12: NO HALT IN CASE OF ERROR IN TESTLOOP-PROGR.
SW13: WAIT AFTER DIS MESSAGE. DIS IS THE 16 CHAR
SW14: HALT AFTER DIS MESSAGE. DISPLAY AT OPERAT.
SW15: CLEAR DIS AFTER MESSAGE. CONTROL PANEL. OCP

3.7 UTILITY START ADDRESSES:

2202 GET A NEW PRINTER ALPHABETH
2204 SET TO 64K WORDS MODE, MEM SIZE ?
2206 SET TO 32K WORDS MODE, MEM SIZE ?
2210 EXAMINE MEMORY
2212 DEPOSIT MEMORY
2214 TROUBLE BREAKPOINT HALT
2216 TROUBLE BREAKPOINT LOOP REPORT
2220 TROUBLE BREAKPOINT RESET
2222 START BINARY LOADER, READ FROM PTR/TTI (SW 0)
2224 RESTART PROGRAM AS WHEN LOADED
2226 PRINT PROGRAM DATA
2230 INCREASE/DECREASE VOLTAGE UNIT ADMINISTRATION

3.8 TERMINATE:

NORMALLY IT IS POSSIBLE TO TERMINATE THE PROGRAM
BY PRESSING ESC AT MAIN CONSOLE (TTI) OR PRESSING
INT AT OPERATORS CONTROL PANEL (OCP).

IF THE PROGRAM IS WAITING FOR INPUT TO A QUESTION
ANSWER ENOUGH DIGITS TO PASS THE LIMIT, AND WHEN
THE QUESTION STARTS REPEATING, PRESS ESC
IMMEDIATELY.

```
01
02          ;
03          ;
04          ;       3.9 RESTART FROM TTI:
05          ;
06          ;               ANSWER THE START ADDRESS QUESTION AFTER
07          ;               TERMINATING.
08          ;
09          ;       3.10 RESTART FROM TCP:
10
11          ;               THE BEST WAY TO INSURE
12          ;               CORRECT SWITCH SETTINGS:
13          ;               RESET
14          ;               SET SWITCHES TO START ADDR.
15          ;               EXAMINE
16          ;               SET SWITCHES TO CONTROL. (3.6).
17          ;               CONTINUE.
18          ;               THE START ADDR IS LISTED AT TTO, LPT AND DIS.
19          ;
20          ;       3.11 RESTART FROM CPU FRONT EDGE
21          ;               ONLY IF RESTART OPTION (RC 3603):
22
23          ;               SET DATASWITCH 0, 10 - 15 UP (1)
24          ;               SET RESET PARITY ERROR DOWN (ON)
25          ;               PRESS AUTOLOAD AND RELEASE
26          ;               SET RESET PARITY ERROR UP (OFF)
27          ;               SET SWITCHES TO CONTROL (3.6).
28          ;               ANSWER THE QUESTION WRITTEN ON TTY/OCP.
29          ;
30          ;       3.12 POWER RESTART
31          ;               ONLY IF POWER MONITOR OPTION:
32
33          ;               SET KEY IN LOCK BEFORE REMOVING POWER
34          ;               AFTER POWERING UP THE PROGRAM WRITES:
35          ;               POWER
36          ;               ACTUAL PROGRAM NAME
37          ;               SET SWITCHES TO CONTROL. (3.6).
38          ;               ANSWER THE START ADDRESS QUESTION.
39          ;
40          ;       3.13 RESTART WITH BREAK OPTION (RC 3603):
41
42          ;               RESET
43          ;               SET SWITCHES TO HALT INSTR      063077
44          ;               SET REGISTER SELECT TO 6
45          ;               DEPOSIT INTO REGISTER
46          ;               SET SWITCHES TO ADDRESS         000003
47          ;               SET REGISTER SELECT TO 5
48          ;               DEPOSIT INTO REGISTER
49          ;               SET BREAK SWITCH TO ON
50          ;               GO TO 3.10 RESTART WITH SA = 2224
51          ;
52          ;       3.14 RESTART PROGRAM AS WHEN LOADED:
53
54          ;               USING START ADDRESS 2224 WILL START THE PROGRAM
55          ;               THE SAME WAY AS WHEN LOADED. IT SEARCHS FOR
56          ;               CPU TYPE, MEMORY SIZE (IF SWITCH FOR MEMORY
57          ;               EXTENSION IS ON, THE FLAG IS SET).
58          ;               SEE 3.21 AND 3.15.
```

3.15 MEMORY SIZE:

IF THE MEMORY SIZE IS CHANGED THE PROGRAM MUST START IN ONE OF FOLLOWING ADDRESSES:
2204 SET MEM EXT FLAG AND FIND MEMSIZE
2206 RESET MEM EXT FLAG AND FIND MEMSIZE
2224 SEE RESTART 3.14
EACH TIME THE PROGRAM IS STARTED IN ONE OF THE OTHER STARTADDRESSES, THE MEM EXT FLAG IS SET/RESET IN THE STATE USED LAST TIME MEMSIZE WAS FOUND. (BY RESET ROUTINE).

3.16 EXAMINE/DEPOSIT MEMORY:

IT IS POSSIBLY TO SUPERVISE SMALL PARTS OF MEMORY BY SA 2210:
ANSWER THE QUESTIONS FROM LOC TO LOC AND THAT PART IS PRINTED IN OCTAL.
IT IS POSSIBLE TO CHANGE A DATABUFFER OR THE PROGRAM BY USING SA 2212:
ANSWER DEPOSIT WITH THE WANTED PATTERN IN OCTAL (THE SAME CONTENT TO ALL LOCATIONS SPECIFIED).
ANSWER FROM LOC TO LOC QUESTION.

COMMON FOR BOTH START ADDRESSES:
IF "FROM LOC" AND "TO LOC (INCL.)" ARE ANSWERED EQUAL, ONLY ONE LOCATION IS USED.
THE PROGRAMS WORK IN THE WHOLE MEMORY (0-64K WORDS) IF THE MEMORY EXTENSION FLAG IS SET. SEE 3.15 MEMORY SIZE.

3.17 PROGRAM BREAK MESSAGE:

AFTER START OF THE MAIN PROGRAM(S) (SA 400,..) THE NOT USED PART OF MEMORY IS FILLED WITH THE PROGRAM BREAK COMMAND PROIN (LOC 6 ?).
IF THE PROGRAM IS DESTROYED AND THE PC HITS ONE OF THESE UNUSED LOCATIONS, A MESSAGE IS PRINTED IF THAT PART OF PROGRAM TO DO THIS STILL EXISTS:
"PROGRAM BREAK AT 067652"

3.18 BINARY LOADER:

THE BINARY LOADER FOR PAPER TAPES IS PLACED IN TOP OF MEMORY (MAX 32K) AFTER LOADING OF THIS PROGRAM REGARDLESS OF WHICH LOAD MEDIUM THERE WAS USED TO INPUT THIS PROGRAM. RESTART IN SA 2222 WILL RESTORE THE LOADER AGAIN. IT IS A SLIGHTLY MODIFIED VERSION (TS) INCL BOOTSTRAP.
AFTER MESSAGE "WAITING" SET SWITCH 0 TO CORRECT STATE (1=PTR, 0=TTY), LOAD READER AND ANSWER NL OR ESC.
IF SUMCHECK OR OVERWRITING CHECK REACTS:
ERRORHALT: XX7751
IF USED TO LOAD NOT SELFSTARTING PROGRAMS:
READYHALT: XX7676

```
0000  .MAIN
01
02          ;
03          ;
04          ;       3.19 PROGRAM SUPERVISOR:
05          ;            IF THE PROGRAM DESTROYES ITSELF OR IN ANOTHER
06          ;            WAY DISBEHAVE THEN USE THE BUILT IN SUPERVISING
07          ;            METHOD:
08          ;            ALL LOOPS ARE STARTED WITH JMP .+1
09          ;            BY HAND IT IS POSSIBLE TO SHORTEN THE PROGRAM,
10          ;            THEREBY NOT RUNNING ALL LOOPS BY CHANGING TO A
11          ;            HALT OR JMP ARTEST (CAUSES PASS MESSAGE FOR
12          ;            LOOPS IN USE UP TO THIS POINT).
13          ;            AUTOMATICALLY IT'S POSSIBLE TO INSERT.
14          ;            1.      HALT                    SA 2214
15          ;            2.      CALL LOOP REPORT        SA 2216
16          ;            3.      JMP .+1 (NO ACTION)     SA 2220
17          ;            IN ALL THE BREAKPOINTS CHOOSEN BY THE PROGRAMMER,
18          ;            WHO HAS PUT THE ADDRESS OF ALL LOOP START POINTS
19          ;            IN THE TABLE TROTB.
20          ;             SA 2216 IS VERY USEFUL, IT IS POSSIBLE TO
21          ;            FOLLOW THE PROGRAM STEP BY STEP AS THE START
22          ;            ADDR OF EACH LOOP ARE PRINTED.
23          ;
24          ;       3.20 INCREASE/DECREASE VOLTAGE UNIT ADMINISTRATION:
25          ;
26          ;            FOR MARGINAL TEST IS AN IDU-UNIT DEVELOPED.
27          ;            WITH THIS UNIT IT IS POSSIBLE TO LET THE
28          ;            PROGRAM CHANGE THE VOLTAGE AFTER A PASS MESSAGE.
29          ;            THE PROGRAM IS GIVEN SOME PARAMETERS BY MEANS OF
30          ;            SA 2230:
31          ;            IDUMODE:  (Y)
32          ;            0 OR N  NO, IDU DISABLED, VOLTAGE 100 %
33          ;            1 OR Y  YES, VOLTAGE PROGRAM 100, 105, 95 %
34          ;            2       VOLTAGE PROGRAM 100, 95, 105 %
35          ;            3                       100, 105 %
36          ;            4                       100, 95 %
37          ;            5                       105, 95 %
38          ;            6                       100 %
39          ;            7                       105 %
40          ;            8                       95 %
41          ;            P       PASS, NEW QUESTION:
42          ;                    NO OF PASSES BEFORE VOLTAGE SHIFT:  (4)
43          ;            D       DEVICE NUMBER FOR IDU, NEW QUESTION:
44          ;                    DEVICE NO:  (5)
45          ;
46          ;            EACH TIME THE VOLTAGE IS SHIFTED A MESSAGE IS
47          ;            PRINTED.
48          ;
49          ;       3.21 CPUNO:
50          ;            FOR TIMING PURPOSE THE PROGRAM DETERMINES IN
51          ;            WHICH CPU IT RESIDUES. IF IT FAILS THE PROGRAM
52          ;            WILL TRY TO CONTINUE AFTER THE MESSAGE
53          ;            "MISERABLE TIMING". IF IMPOSSIBLE THE PROGRAM
54          ;            WILL ASK YOU TO IDENTIFY THE CPU WITH A NUMBER
55          ;            BETWEEN 0 AND 6. USE 2 FOR NOVA1200, RC3603-BREAK
56          ;                                 4 FOR RC3603
57          ;                                 5 FOR NOVA 2-16K
58          ;                                 6 FOR NOVA 2-8K WHERE
59          ;            THE MEMORY TYPE FOR THE FIRST 8K IS RELEVANT.
60          ;            STANDARD QUESTION FORMAT USED.
```

```
01
02                ;                                                    PAGE 7 OF 16
03                ;
04                ;       3.22 PRINTER ALPHABETH:
05                ;
06                ;               THIS PROGRAM CONTAINS 4 PRINTER ALPHABETHS.
07                ;               AFTER LOADING OF THE PROGRAM THE ASCII IS USED.
08                ;               IF ANOTHER IS WANTED OR YOU WANT TO DESIGN YOUR
09                ;               OWN SPECIAL TABLE, READ FOLLOWING.
10                ;
11                ;       PRINTER ALPHABETH CHANGE:
12                ;AT ANY TIME AFTER LOADING THIS PROGRAM IT IS POSSIBLE TO CHANGE
13                ;THE ALPHABETH USED ON THE LINEPRINTER. THERE ARE 2 METHODS:
14                ;  1.                    GET ONE OF THE BUILD-IN ALPHABETHS:
15                ;       START PROGRAM IN SA 2202
16                ;       REMEMBER SWITCHES TO CONTROL. (3.6).
17                ;       ANSWER ALPHABETH 0, SEE EXISTING BELOW
18                ;THE PROGRAM WILL RESTART AFTER CHANGING THE ALPHABETH.
19                ;       ANSWER NEXT START ADDRESS.
20                ;  2.                           GET AN -ADD ON- TAPE WITH
21                ;A NEW ALPHABETH AND LOAD THIS UPON THE PROGRAM AND RESTART. THE
22                ;TAPES WITH PRINTER TABLE ALPHABETH ARE DESCRIBED BELOW:
23                ;EXISTING: 01   44-RT 535       ASCII
24                ;          02   44-RT 529       RC STANDARD TYPE 71/78 STARTING .
25                ;          03   44-RT 532       RC STANDARD TYPE 71/78 STARTING 0
26                ;                                       (SKEWED 4 POSITIONS)
27                ;          04   44-RT 1213      PL 1, TYPE 70
28                ;
29                ;HOW TO PRODUCE A NEW TABLE:
30                ;THE TABLE HAS 200 OKTAL (128 DECIMAL) BOXES. INPUT KEY
31                ;IS THE ASCII VALUE OF THE CHARACTER TO PRINT ADDED TO 2000.
32                ;THE RESULT IS ADDRESS OF A BOX. EACH BOX OCCUPIES A CORE WORD.
33                ;IT IS BUILT UP OF TWO FIGURES. THE FIRST IS THE CLASS OF THE
34                ;CHARACTER TO BE PRINTED: 0 FOR PRINT, 6 FOR BLIND. THE SECOND
35                ;IS THE CHARACTER VALUE AT THE PRESENT PRINT DRUM. BELOW
36                ;VALUE 40 OCTAL FOLLOWING CHARACTERS MAY BE USED: 11 TAB,
37                ;12 LF, 14 FF AND 15 CR. ALL OTHERS BELOW 40 WILL GIVE SPACE.
38                ;THE FIRST BOX SHOULD CONTAIN THE VALUE FOR THE NULL CHAR
39                ;AND THE LAST THE VALUE FOR THE DEL CHAR, WHICH BOTH NORMALLY
40                ;ARE BLIND. IF YOU COUNT 0,1,2, ,7,10, , THE BOX 101 SHALL
41                ;CONTAIN THE PRINT DRUM VALUE FOR AN A. IF THE DRUM DO NOT
42                ;HAVE SMALL LETTERS, FILL IN THE VALUE FOR BIG ONES. NOW PUNCH
43                ;AN ASCII TAPE LIKE THIS:
44                ;    .LOC 2000
45                ;    .RDX 8          ;WHICH RDX YOU WANT
46                ;    .TXTE?
47                ;    <6><0>          ;(2000) FIRST BOX, BOX 0
48                ;    <6><0>
49                ;    .
50                ;    .
51                ;    .
52                ;    <0><101>        ;(2101) BOX 101 FOR A. FOR ASCII DRUM
53                ;    .               ;101 IS USED, FOR TYPE 71 137 IS USED.
54                ;    .
55                ;    .
56                ;    <6><0>?         ;(2177) BOX 177, LAST
57                ;    .RDX 8
58                ;    .END 101        ;AUTOMATIC RESTART OF MAIN PROGRAM.
59                ;PRODUCE A BINARY TAPE AND LOAD THIS TO MEMORY WITH
60                ;BINARY LOADER AFTER LOADING OF MAIN PROGRAM.
```

```
01
02
03                      ;       BOOTSTRAP FOR AUTOLOAD-TAPES, PTR.
04                      ;       **********************************
05
06                      ;SELF, A PROGRAM SIMILAR TO AUTOLOAD PROM FOR PTR, BUT
07                      ;READ TO MEMORY BY THE OPERATOR THROUGH FRONT PANEL SWITCHES.
08
09                      ;DEPOSIT SELF PROGRAM.
10                      ;START IN LOCATION 50.
11
12 00050 060112 BEGIN:  NIOS    PTR     ;START READER
13 00051 126440         SUBO    1,1     ;CLEAR AC1, CLEAR CARRY
14 00052 004413 LOOP:   JSR     GET1    ;GET A BYTE
15 00053 101065         MOVC    0,0,SNR ;IS IT ZERO ?
16 00054 000776         JMP     LOOP    ;YES, IGNORE AND GET NEXT
17 00055 030420         LDA     2,SAPRE ;NO, IT WAS TAPE SYNCRONIZER, DROP IT
18                                      ;AND SET AC2 TO FIRST MEM LOC FOR PREAM
19 00056 004406 LOOP1:  JSR     GET     ;GET A FULL WORD, FIRST = WORD COUNT
20 00057 045000         STA     1,0,2   ;STORE INTO MEMORY FROM COUNT
21 00060 151400         INC     2,2     ;INCREMENT ADDR TO NEXT
22 00061 010417         ISZ     COUNT   ;BUMP WORD COUNT, DONE ?
23 00062 000774         JMP     LOOP1   ;NO, REPEAT, STILL DATA
24 00063 000416         JMP     PREAM   ;YES, FINISHED, GIVE CONTROL TO
25                                      ;FIRST WORD IN PREAM PROGRAM
26 00064 126420 GET:    SUBZ    1,1     ;CLEAR AC1, SET CARRY
27 00065 063512 GET1:   SKPBZ   PTR     ;
28 00066 000777         JMP     .-1     ;WAIT NON-BUSY
29 00067 060412         DIA     0,PTR   ;READ A BYTE TO AC0
30 00070 060112         NIOS    PTR     ;START READER FOR NEXT BYTE
31 00071 107363         ADDCS   0,1,SNC ;ADD 2 BYTES SWAPPED, GOT SECOND ?
32 00072 000773         JMP     GET1    ;NO, GO BACK AFTER IT
33 00073 125300         MOVS    1,1     ;YES, SWAP AC1
34 00074 001400         JMP     0,3     ;RETURN WITH FULL WORD
35 00075 000100 SAPRE:  .+3             ;START ADDR FOR LOADING PREAM
36 00076 000050 SADDR:  50              ;SPARE, NOT USED ,(START ADDR FOR SELF)
37
38                      ;AFTER DEPOSITING ABOVE PROGRAM, SET SWITCHES TO 000050 AND
39                      ;LOAD THE PAPER TAPE READER WITH SUITABLE TAPE (S-BIN OR H-BIN).
40                      ;PRESS RESET, START. NOW THE BINARY LOADER IN NORMAL OR
41                      ;SELFSTART VERSION IS READ IN, THEN THE MAIN PROGRAM.
42
43                      ;TAPES WHICH CAN BE READ BY THIS BOOTSTRAP:
44
45                      ;       1       TESTPROGAMS IN S-BIN FORMAT (WITH S-BIN HEAD).
46
47                      ;       OR 2    S-BIN HEAD ITSELF (RCSL 44-RT 1711), WHEN PTR
48                      ;               HAS FINISHED LOAD NORMAL ABS BINARY TAPE (A-BIN)
49                      ;               AND THE PTR CONTINUES AUTOMATICALLY.
50                      ;               (OR CONNECT THE TAPES TO ONE WITH ADHESIVE TAPE)
51
52                      ;       OR 3    H-BIN TAPE (RCSL 44-RT 1712) WHICH LOADS THE
53                      ;               BINARY LOADER AND HALTS. SWITCH=1X7777, START.
54
55                      ;       FOR MORE INFORMATION READ RCSL 44-RT 1710, PROGRAM LOAD.
```

```
;4. ADDITIONAL OPERATING PROCEDURE FOR THIS PROGRAM.
;
;       LOAD TAPE, MAX 600 FEET (REWIND TIME).
;       POSITION AT BOT AND SET ONLINE. TEST ONLY ONE UNIT
;       AT TIME.
;       FOR A COMPLETE TEST MAKE SUCCESSIVE RUNS OF EACH UNIT,
;       PE 1600 BPI AND NRZI (800, 556 AND 200 BPI) 7 OR 9 TRACK,
;       BY USING ALL FOUR STARTADDRESSES.
;
;       START ADDRESSES:
;               400     DIAGNOSTIC TEST
;               401     WRITE LOCK TEST
;               402     END TAPE TEST
;               403     DATA LATE TEST
;               404     RESTART LAST USED START ADDR
;                               USING THE SAME PARAMETERS
;
;       AFTER START FOLLOWING MESSAGES ARE PRINTED:
;
;       000400   STARTADDR
;       SWITCHES: 000010
;
;       SOME QUESTIONS TO ANSWER, SEE 8. MESSAGES
;                       FROM THIS PROGRAM.
;
;
;               NOW THE PROGRAM RUNS.
;
;               A PASS MESSAGE IS PRINTED WITH MAX
;               2 MINUTES AND 30 SECONDS INTERVAL.
;
;               IN CASE OF ERRORS THE PROGRAM WILL PRINT
;               THE PC AND THE AC'S.
;               THE FURTHER FLOW WILL DEPEND OF THE SWITCHES.
;               USE THE LISTNING FOR FURTHER INFORMATION ABOUT
;               THE ERROR SYMPTOMS.
;
;       ABBREVIATIONS:
;               AC = ADDR COUNTER = ADDR REGISTER
;               WC = WORD COUNTER
;
;                 PLEASE READ
;                 ***********
;         THE DIAGNOSTIC PROGRAM IS PROVIDED
;         TO FIND HARDCORE PROBLEMS THAT ARE
;         RELATED TO BASIC OPERATIONS OF THE
;         TAPE CONTROL. THE RELIABILITY PRO-
;         GRAM IS PROVIDED AS A MORE STRINGENT
;         TEST TO SHOW UP INTERMITTENT AND
;         PATTERN SENSITIVE PROBLEMS
;         FOR THE MOST PART THE DIAGNOSTIC
;         ASSUMES THE MAGNETIC TAPE MEDIA
;         IS PERFECT AND NOT THE CAUSE OF AN
;         ERROR. HOWEVER, IF PARITY ERRORS
;         OCCUR WHILE RUNNING THE DIAGNOSTIC
;         THE TAPE SHOULD ALWAYS BE SUSPECT!
;                 ******
```

```
. 0010  .MAIN
01
02                ;                                        PAGE 10 OF 16
03                ;
04                ;4.1  BASIC DIAGNOSTIC
05                ;       THE MOST COMMON OPERATIONS ARE CHECKED.
06                ;       EACH TEST MAY CONTAIN SEVERAL CHECK POINTS
07                ;       WHERE AN ERROR HALT CAN OCCUR. GENERALLY
08                ;       SPEAKING, ERRORS MAY BE EXPECTED AT CHECK
09                ;       POINTS FURTHER ON WHEN ONE ERROR IS FOUND.
10                ;       IF A MALFUNCTION IS DETECTED THE PROGRAM WILL
11                ;       PRINT THE AC'S, CONSULT THE LISTNING.
12                ;       EACH SUCCESSIVE TEST ASSUMES THAT ALL PREVIOUS
13                ;       TESTS WORK CORRECTLY. BYPASSING A FAILIURE MAY
14                ;       CAUSE IRRELEVANT ERRORMESSAGES IN LATER TESTS.
15                ;       IF PARITY ERRORS TRY TO RUN THE LOOPS CHECKING CRC/LPC
16                ;       AS THESE LOOPS DELIVERS MORE INFORMATION.
17                ;
18                ;4.2  WRITE LOCK TEST
19                ;       REMOVE WRITE ENABLE RING. MOUNT AND POSITION
20                ;       TAPE REEL AT BOT. START. AN ATTEMPT IS MADE TO
21                ;       WRITE, WRITE END OF FILE AND ERASE AND STATUS
22                ;       IS CHECKED AFTER EACH ATTEMPT.
23                ;       IF THIS STATUS IS FOUND "WRITE LOCK OK"
24                ;       IS PRINTED AND THE TEST IS REPEATED. THE TAPE IS NOT
25                ;       MOVED. IF THE ABOVE STATUS IS NOT FOUND "WRITE LOCK BAD"
26                ;       IS PRINTED FOLLOWED BY AN ERRORHALT.
27                ;       THE TEST REPEATS 10 TIMES AND THEN THE GO OFFLINE
28                ;       COMMAND IS CHECKED.
29                ;       IF ERRORS IT IS EASY TO CHANGE THE 10 TRYES TO INFINITE
30                ;       LOOPS, SEE LISTNING.
31                ;
32                ;4.3  END TAPE TEST
33                ;       FOLLOWING START, 4K RECORDS ARE WRITTEN DOWN
34                ;       THE LENGTH OF THE TAPE. WHEN END OF TAPE STATUS
35                ;       IS DETECTED "EOT" IS PRINTED.
36                ;       NOW 10 TIMES THE PROGRAM BACKSPACES 3 RECORDS
37                ;       AND TRYES TO WRITE 4 RECORDS SEARCHING FOR EOT.
38                ;       AFTER THAT THE GO OFFLINE COMMAND IS CHECKED FOR
39                ;       REWINDING AND OFFLINE.
40                ;       IN ALL OPERATIONS STATUS IS CHECKED AND IF MISMATCH
41                ;       FROM EXPECTED OCCURS THE STATUS IS PRINTED.
42                ;       IF ERRORS IT IS EASY TO CHANGE THE 10 TRYES TO INFINITE
43                ;       LOOPS, SEE LISTNING.
44                ;
45                ;4.4  DATA LATE TEST
46                ;       FOLLOWING START THE TAPE IS REWOUND. ONE 4K BYTE RECORD
47                ;       IS THEN WRITTEN AND THE DATA LATE STATUS CHECKED.
48                ;       IF THE STATUS IS FOUND, "STATUS XXXXXX DATA LATE"
49                ;       IS PRINTED. IF NOT, "STATUS XXXXXX NO DATA LATE" IS
50                ;       PRINTED. THE TEST THEN REPEATS 100 TIMES.
51                ;       TO CAUSE A DATA LATE STATUS TO OCCUR, STOP THE
52                ;       PROGRAM DURING A WRITE OPERATION. THEN PUSH
53                ;       CONTINUE. THE   LONG RECORD LENGTH ALLOWS PLENTY
54                ;       OF TIME TO INSURE THE PROGRAM STOP OCCURS DURING
55                ;       DATA CHANNEL TRANSFER.
56                ;       IF ERRORS IT IS EASY TO CHANGE THE 100 TRYES TO
57                ;       INFINITE LOOPS, SEE LISTNING.
58                ;
59                ;4.5 OLD TYPE CONTROLLER.
60                ;       IF OLD TYPE CONTROLLER (MANY PCBA'S) USE TEST FOR
61                ;       CONTROLLER IN IOC 301, SH 3604 MAG TAPE SYSTEM:
62                ;       RCSL 44-RT 1904.
```

```
;
;5. PROGRAM DESCRIPTION
;       5.1 TESTLOOP FAILURE RATE
;       5.2 STRUCTURE OF PROGRAM, NEXT PAGE.
;               5.1 TESTLOOP FAILURE RATE:
;THERE ARE TWO DIFFERENT WAYS TO USE THE ROUTINES FOR TESTLOOP:
;SINGLE OR MULTIPLE ERRORHALT:

;SINGLE:        SETP1       MULTIPLE:   SETP1
;               ERRORHALT               ERRORHALT
;               LOOP                    ERRORHALT
;                                       ERRORHALT
;                                       LOOP

;IN CASE OF A CONSTANT ERROR THE RATE WILL BE PRINTED
;THIS WAY:
;PC XXXXXX 100 %                        PC XXXXXX 300 %
;WERE THE LAST IS A MULTIPLE OF 100 %.

;THERE ARE THREE POSSIBILITIES FOR THE NUMBER OF LOOPS IN A
;CYCLE, I. E. HOW MANY TIMES THE PROGRAM RUNS THROUGH THE
;INSTRUCTIONS BETWEEN SETP1 AND LOOP. IF SWITCH 0 IS 0 FIRST
;TIME AN ERROR IS DETECTED THE PROGRAM PROCEEDS TO NEXT
;INSTRUCTION AFTER LOOP.

;NUMBER OF LOOPS:           SETP0:  1
;                           SETP1:  10
;                           SETP2:  100

;IF THE ERROR IS NOT CONSTANTLY IT IS POSSIBLE TO SEE THESE
;FAILURE RATES IF SINGLE OPERATION:

;SETP0: 100 % ERROR IN THE ONE LOOP.
;SETP1: 100,50,33,25,20,16,14,12,11,10 % FOR ERROR IN
;         1, 2, 3, 4, 5, 6, 7, 8, 9, 10 -TH LOOP.
;SETP2: LIKE SETP1, ONLY ADD 9...1 % FOR ERROR IN
;        11...100 -TH LOOP.

;IF MULTIPLE OPERATION THE RATES DEPENDS ON HOW MANY OF THE
;ERRORS ARE FOUND IN THE FIRST LOOP WITH ERROR:
;       100 % COULD BE  1 ERROR IN FIRST LOOP
;               OR      2 ERRORS IN SECOND LOOP
;               OR      3 ERRORS IN THIRD LOOP ETC.

;IF SWITCH 0 IS 1 THE PROGRAM WILL REMAIN IN THE LOOP WITH
;ERROR. FIRST TIME AN ERROR IS SEEN THE PROGRAM WILL HALT
;(IF NOT SWITCH 12). THEN THE PROGRAM CONTINUES UNTILL ALL
;NUMBER OF LOOPS ARE PERFORMED. THEN A NEW CYCLE IS
;ENTERED CALLED ERRORCYCLE. AFTER EACH ERRORCYCLE A NEW IS
;STARTED UNTILL SWITCH 0 IS SET TO 0.

;IN ALL CYCLES (FIRST OR ERROR) THE PC (PROGRAM COUNTER OF ERROR)
;IS WRITTEN FIRST TIME AN ERROR IS SEEN AND IN MULTIPLE OPERATION
;MORE THAN ONE ERRORHALT COULD WRITE THE PC. BUT ONLY WITHIN
;THAT FIRST LOOP WITH ERROR. THE FAILURE RATE IS PRINTED WHEN
;THE CYCLE IS FINISHED. THE PROGRAM ONLY HALTS IN THE FIRST CYCLE
;(DEPENDING ON SW 12). THE ERRORCYCLES HAVE ANOTHER AMOUNT OF
;LOOPS THAN FIRST CYCLE:
```

```
01
02                ;                                                PAGE 12 OF 16
03
04                ;NUMBER OF LOOPS:        FIRST CYCLE      ERROR CYCLE
05                ;                SETP0:  1                10
06                ;                SETP1:  10               100
07                ;                SETP2:  100              100
08
09                ;IN SINGLE OPERATION FAILURE RATE IS TELLING HOW OFTEN THE ERROR
10                ;APPEARS. IN MULTIPLE OPERATION FAILURE RATE SHOULD BE USED
11                ;VERY CAREFULLY.
12
13                ;              5.2 STRUCTURE OF PROGRAM:
14                ;       THE PROGRAM IS A NORMAL DIAGNOSTIC PROGRAM, I. E. IN
15                ;       CASE OF ERROR THE PROGRAM WILL HALT WITH AC3 = PC. THE
16                ;       OPERATOR SHOULD THEN LOOK UP IN THE LISTNING TO KNOW WHAT
17                ;       WAS CAUSING THE ERRORHALT. THE PROGRAM INCLUDES ONLY FEW
18                ;       SUBROUTINES TO MAKE IT EASYER FOR THE OPERATOR.
19                ;       THE PROGRAM ALSO CONTAINS NORMAL TESTLOOP FACILITIES, SEE
20                ;       5.1. IN CASE OF SEVERAL ERRORHALTS ATTENTION SHOULD ONLY
21                ;       BE GIVEN TO THE FIRST (THE LOWEST PC) BECAUSE THE REST
22                ;       COULD BE DERIVED FROM THE FIRST. TIMING IN A LOOP IS
23                ;       AFFECTED BY PRINTING FIRST ERROR, TOO.
24                ;
25                ;       THE PROGRAM WILL TEST THE MTC 3XX WITH AID OF FOLLOWING
26                ;       TEST LOOPS:
27                ;       A0  SELB BUS LINE
28                ;       A1  SELD BUS LINE
29                ;       A2  MTC BUSY FLOP OFF
30                ;       A3  MTC DONE FLOP OFF
31                ;       A4  MTC SELECT,DOB,DIB,ADDR COUNTER IN-OUT
32                ;       A5  ADDR COUNTER IN-OUT
33                ;       A6  ILLEGAL MTC SELECT
34                ;       A7  ADDR COUNTER LOADING ERRORS
35                ;       A8  RESET OF ADDR COUNTER AND STATUS REG
36                ;       A8A ADDR COUNTER LOADING FAST
37                ;       A8B
38                ;       A8C
39                ;       A8D
40                ;       A8E --"--
41                ;       A8F WAIT FOR BOT
42                ;       A9  MTC START AND BUSY FLOP
43                ;       A10 IORST OF BUSY FLOP
44                ;       A11 CLEAR PULSE
45                ;       A12 DOA COMMAND DECODER
46                ;       A13 DIA AND STATUS REG AT BOT
47                ;       A14 UNIT SELECT LOGIC, NOOP COMMAND DECODE
48                ;       A14B UNIT UNDER TEST ONLINE
49                ;       A15 REWIND-ERASE-REWIND SEQUENCE AND WHOLE STATUS
50                ;       A16 REWINDING STATUS BIT
51                ;       A17 WAS REWINDING BUFFERED AT BOT
52                ;       A18 SIMPLE 4 CHAR WRITE
53                ;       A19 ADDRESS COUNTER COUNTING
54                ;       A20 WORD COUNTER LOAD AND COUNTING
55                ;       A21 INTERRUPT AND DISABLE
56                ;       A22 WRITE 16 CHAR RECORD ODD PARITY
57                ;       A23 ILLEGAL STATUS
58                ;       A24 ILLEGAL STATUS
59                ;       A25 ILLEGAL STATUS, BACKSPACE
60                ;       A26 WRITE EOF
61                ;       A27 WRITE ODD NUMBER OF CHARS
```

```
01
02                ;
03                ;
04                ;       A28 BACKSPACE
05                ;       A29 TAPEMOTION, WRITE, BACKSPACE, ...
06                ;       A31 BACKSPACE STOP ON BOT
07                ;       A32 SPACE FORWARD
08                ;       A33 READ 16 CHAR RECORD
09                ;       A34 READ 16 CHAR RECORD EVEN PARITY 7 TRACK
10                ;       A35 READ 16 CHAR RECORD, WORDCOUNT = 63
11                ;       A36 READ 126 CHAR RECORD, WORDCOUNT = 8, BLOCKLENGTH ST.
12                ;       A37 READ ODD NUMBER OF CHARS
13                ;       A38 ODD AND MINIMUM BLOCKLENGTH
14                ;       A39 READ EOF
15                ;       A40 READ EOF, SPACE BACK A WHOLE FILE
16                ;       A40B READ EOF, SPACE BACK 1 RECORD
17                ;       A41 READ EOF, SPACE FORWARD A WHOLE FILE
18                ;       A42 CRC/LPC 9 TRACK
19                ;       A43
20                ;       A44
21                ;       A45
22                ;       A45B --"--
23                ;       A46 LPC 7 TRACK
24                ;       A47
25                ;       A48
26                ;       A49 --"--
27                ;       A50 BACKSPACE FILE
28                ;       A51 BACKSPACE FILE
29                ;       A52 BACKSPACE FILE
30                ;       A53 BACKSPACE FILE
31                ;       A54 LONGITUDINAL PARITY 7 TRACK
32                ;       A55 START REWIND
33                ;       A56 END OF TEST
```

```
;6. STATUS BIT TABLE:
;
;       0       BLIND = 0
;
;       1       OFFLINE
;       2       REWINDING
;       3       BEGIN OF TAPE - BOT
;
;       4       PE - 1600 BPI
;       5       WRITE LOCK (PROTECTED)
;       6       ILLEGAL
;
;       7       END OF FILE - EOF
;       8       BLOCK LENGTH ERROR (TOO LONG)
;       9       DATA LATE
;
;       10      PARITY ERROR
;       11      END OF TAPE - EOT
;       12      ODD CHARACTER
;
;       13      7 TRACK
;       14      BLIND = 0
;       15      BLIND = 0
```

```
0015  .MAIN
01
02                ;
03                ;
04                ;7. SOFTWARE SURVEY
05                ;       SHORT REVIEW FROM PROG REFF MANUAL.
06                ;
07                ;       NOT IMPLEMENTED
```

```
01
02          ;                                                    PAGE 16 OF 16
03          ;
04          ;8. MESSAGES FROM THIS PROGRAM.
05          ;       ALL MESSAGES ARE WRITTEN ON TTY, LPT AND THE 16 CHAR DIS
06          ;       ON OPERATORS CONTROL PANEL. IT IS POSSIBLE TO ANSWER
07          ;       QUESTIONS AT TTY OR NUK, NUMERIC KEYBOARD ON OPERATORS
08          ;       CONTROL PANEL.
09          ;       ABOUT THE NUMBERS:
10          ;               0-5 DIGITS IS A DECIMAL NUMBER
11          ;                   RANGE -32768 TO -1 AND 0 TO 32767
12          ;                 6 DIGITS IS AN OCTAL NUMBER
13          ;               0-6 DIGITS IS AN OCTAL NUMBER WITH
14          ;                   LEADING ZEROES SUPPRESSED, DON'T USE.
15          ;                 8 DIGITS IS A BINARY NUMBER.
16          ;
17          ;       MESSAGES:
18          ;
19          ;       MTC 3XX DIAGTEST
20          ;       000400   STARTADDR
21          ;       SWITCHES: 000030
22          ;
23          ;       MTC 304/309 (Y/N): Y  ?
24          ;
25          ;       MTC 304 (Y/N): Y  ?
26          ;
27          ;       DEVICE NO     0  ?
28          ;
29          ;         UNIT NO     0  ?
30          ;
31          ;       NRZ (Y/N): Y  ?
32          ;
33          ;       7TR (Y/N): Y  ?
34          ;
35          ;       MTC WITH ADDRBIT 0: N  ?
36          ;
37          ;             1. PASS OF  1 RUN
38          ;
39          ;       000000  177777  002422
40          ;       AC0     AC1     AC2
41          ;       PC  13610
42          ;       LOOP FAILURE RATE   100 %
43
44          ;       TERMINATED
45          ;       SWITCHES: 000030
46          ;       SET SWITCHES TO CONTROL, (3,6), STARTADDR 400 ?
47          ;
48
49          ;TAPE 1
50
51          .EOT
```

```
01
02                ;TAPE 2          PAGE ZERO FOR TAPE 3,4,5
03
04        000000 .LOC 0
05
06 00000 003074 LOCU:   2*MELOC              ;MESS AFTER RDOS LOAD, LATER USED FOR
07                                           ;POWER INTR (POWZE) OR PC IF NORMAL INTR
08 00001 010420         SERINT               ;ADDR OF INTR. SERVICE ROUTINE
09 00002 001403         REBIN                ;SELFSTART ADDR FOR RDOS ETC.
10 00003 000000 LOC3:   0                    ;0=HALT, 1=SELFSTART PROG AFTER REBIN
11 00004 000000 LOC4:   0                    ;ADDR FOR SELFSTART PROG AFTER REBIN
12 00005 000000 LOC5:   0                    ;FOR LOAD RDOS, USED BY POW. INTR, FITYP
13 00006 006007 PROIN:  JSR     APROAD       ;PROGRAM BREAK INSTRUCTION
14 00007 006143 PROAD:  PROAK                ;ADDR OF PROGRAM BREAK ROUTINE.
15
16        000020 .LOC 20
17
18 00020 000000 IDX0:   0                    ;AUTO INCREMENT LOCATION
19 00021 000000 IDX1:   0                    ;AUTO INCREMENT LOCATION
20 00022 000000 IDX2:   0                    ;AUTO INCREMENT LOCATION
21 00023 000000 IDX3:   0                    ;AUTO INCREMENT LOCATION
22 00024 000000 IDX4:   0                    ;--"-- FOR MTC
23
24        000040 .LOC 40                     ;INDIRECT ADDRESSES
25                                           ;NOT IN AUTO INC,DEC LOC.
26 00040 000412 IMESS:  XMESS
27 00041 000716 ICHAR:  XCHAR
28 00042 000724 ITYPE:  XTYPE
29 00043 001045 ICRLF:  XCRLF
30 00044 001133 IDISP:  XDISP
31 00045 001167 IDOUT:  XDOUT
32 00046 001215 IDICL:  XDICL
33 00047 001237 IDATT:  DISATT
34 00050 001265 IHAAT:  HAATT
35 00051 001015 ITBIN:  XTBIN
36 00052 000554 ITOCT:  XTOCT
37 00053 000465 ITDEC:  XTDEC
38 00054 000544 ITZOC:  XTZOC
39 00055 001021 IDBIN:  XDBIN
40 00056 000560 IDOCT:  XDOCT
41 00057 000461 IDDEC:  XDDEC
42 00060 000550 IDZOC:  XDZOC
43 00061 003050 IWAIT:  XWAIT
44 00062 002651 IWAOP:  XWTOP
45 00063 003120 ITISK:  RTIME
46 00064 003177 ITIMS:  MSTIM
47 00065 003326 ITIRO:  XTIMS
48 00066 003277 IMULT:  XMULT
49 00067 003311 IDIVS:  XDIVS
50 00070 003312 IDIVD:  XDIVD
51 00071 006470 IQUES:  XQUES
52 00072 001531 ISAMS:  XSAMS
53 00073 001314 IRESW:  XRESW
54 00074 003011 IBILO:  XBILO
55 00075 000000 HMEND:  0                    ;TOP OF MEMORY, LOADER PROTECT
56 00076 000000 DIGIN:  0                    ;INPUT BUFFER FOR INPUT ROUTINES.
```

```
01
02                ;PRINTER TABLE HANDLING AND (POWER) RESTART:
03
04          000077 .LOC 77
05
06 00077 006141 IRESA:  SWISA              ;PROGRAM RESTART ADDR.
07 00100 006054 POWRE:  POWON              ;POWER RESTART ADDR. IMPORTANT KEEP NEXT
08 00101 002077 RETAB:  JMP      AIRESA    ;IN 101 BECAUSE PRINTER TABLE SELFSTART
09 00102 002100 POWZE:  JMP      APOWRE    ;INSTRUCTION TO BE STORED IN LOC ZERO
10
11 00103 007373 IGTBI:  GETBI
12 00104 007245 IGTOK:  GETOK
13 00105 006733 IGTDC:  GETDC
14 00106 007164 IGTSC:  GETSC
15 00107 007502 IGTTX:  GETTX
16 00110 010014 ISTPO:  ENTPO
17 00111 010021 ISTP1:  ENTP1
18 00112 010026 ISTP2:  ENTP2
19 00113 007737 ILOOP:  CYCLE
20 00114 010156 IHALT:  ERROR
21 00115 010251 ISTAA:  XSTAA
22 00116 010264 ISTAN:  XSTAN
23 00117 010273 ISTAW:  XSTAW
24 00120 010326 ISTAS:  XSTAS
25 00121 010311 ISTAP:  XSTAP
26 00122 011533 JHALT:  XHALT
27 00123 011515 ILORE:  XLORE
28 00124 010631 IPASS:  XPASS
29 00125 002446 ITHLT:  XTHLT
30 00126 010531 IDRST:  XDRST
31 00127 000000 SHALT:  0                  ;AC3 SAVED FOR HALT ROUTINE
32 00130 000000 INDEV:  0                  ;DEVICE NUMBER AFTER INTA IN SERINT
33 00131 000000 INFLG:  0                  ;INTR FLAG, AFTER INTR = -1
34
35 00132 000000 QCSTA:  0                  ;STATUS BITS FOR STATW, FIXED.
36
37                ;  DEFINITIONS
38
39          000032 FUN=32
40          000033 FUB=33
41          000034 NUK=34
42          000035 DIS=35
43          000010 XTTI=TTI          ;TTI=10
44          000011 XTTO=TTO          ;TTO=11
45          000014 XRTC=RTC          ;RTC=14
46          000017 XLPT=LPT          ;LPT=17
```

```
. 0019   .MAIN
01
02          063077 RHALT=HALT
03          062677 ALRST=IORST
04          076701 MEMEX=DICP       3.1
05          070477 RDSWI=READS      2
06          006040 CMESS=JSR        AIMESS  ;EACH DEFINITION BELOW CORRESPONDS
07          006041 CCHAR=JSR        AICHAR  ;WITH A CALL OF A ROUTINE.
08          006042 CTYPE=JSR        AITYPE
09          006043 CCRLF=JSR        AICRLF
10          006044 CDISP=JSR        AIDISP
11          006045 CDOUT=JSR        AIDOUT
12          006046 CDICL=JSR        AIDICL
13          006047 CDATT=JSR        AIDATT
14          006050 CHAAT=JSR        AIHAAT
15          006051 CTBIN=JSR        AITBIN
16          006052 CTOCT=JSR        AITOCT
17          006053 CTDEC=JSR        AITDEC
18          006054 CTZOC=JSR        AITZOC
19          006055 CDBIN=JSR        AIDBIN
20          006056 CDOCT=JSR        AIDOCT
21          006057 CDDEC=JSR        AIDDEC
22          006060 CDZOC=JSR        AIDZOC
23          006061 CWAIT=JSR        AIWAIT
24          006062 WAIOP=JSR        AIWAOP
25          006063 TIMSK=JSR        AITISK
26          006064 TIMMS=JSR        AITIMS
27          006065 TIMRQ=JSR        AITIRQ
28          006066 MULTI=JSR        AIMULT
29          006067 DIVIS=JSR        AIDIVS
30          006070 DIVID=JSR        AIDIVD
31          006071 CQUES=JSR        AIQUES
32          006072 CSAMS=JSR        AISAMS
33          006073 CRESW=JSR        AIRESW
34          006074 BINLO=JSR        AIBILO
35          006125 THALT=JSR        AITHLT
36          006126 RESET=JSR        AIDRST
37          006103 CGTBI=JSR        AIGTBI
38          006104 CGTOK=JSR        AIGTOK
39          006105 CGTDC=JSR        AIGTDC
40          006106 CGTSC=JSR        AIGTSC
41          006107 CGTTX=JSR        AIGTTX
42          006110 SETP0=JSR        AISTP0
43          006111 SETP1=JSR        AISTP1
44          006112 SETP2=JSR        AISTP2
45          006113 LOOP=JSR         AILOOP
46          006114 EHALT=JSR        AIHALT
47          006115 STATA=JSR        AISTAA
48          006116 STATN=JSR        AISTAN
49          006117 STATW=JSR        AISTAW
50          006120 STATS=JSR        AISTAS
51          006121 STATP=JSR        AISTAP
52          006122 CHALT=JSR        AJHALT
53          006123 CLORE=JSR        AILORE
54          006124 CPASS=JSR        AIPASS
```

```
01
02                              ;CONSTANTS FOR MTC
03 00133 061400 CMTA:   DIB     0,0
04 00134 020367 OBUFF:  LASTP+10
05 00135 020567 IBUFF:  LASTP+210
06
07 00136 003720 J2SEC:  2000.           ;TIME CONSTANT IN MSEC
08
09 00137 000002 C2:     2
10 00140 000003 C3:     3
11 00141 000004 C4:     4
12 00142 000005 C5:     5
13 00143 000006 C6:     6
14 00144 000007 C7:     7
15 00145 000010 C10:    10
16 00146 000020 C20:    20
17 00147 000040 C40:    40
18 00150 000076 C76:    76
19 00151 000077 C77:    77
20 00152 000100 C100:   100
21 00153 000170 C170:   170
22 00154 000176 C176:   176
23 00155 000200 C200:   200
24 00156 000377 C377:   377
25 00157 000400 C400:   400
26 00160 002000 C2K:    2000
27 00161 010000 C10K:   10000
28 00162 007700 C7700:  7700
29 00163 177400 C1774:  177400
30 00164 025252 C0252:  025252
31 00165 125252 C1252:  125252
32 00166 052525 C0525:  052525
33 00167 010421 C0104:  010421
34 00170 021042 C0210:  021042
35 00171 042104 C0421:  042104
36 00172 004210 C0042:  004210
37 00173 104210 C1042:  104210
38
39 00174 177775 M3:     -3
40 00175 177700 M100:   -100
41
42 00176 000062 D50:    50.
43 00177 177160 N400:   -400.
44
45                              ;PATTERN TABLE, ODD PARITY WRITING.
46 00200 000200 POINT:  .
47 00201 177777         177777
48 00202 000000         000000
49 00203 177400         177400
50 00204 000377         000377
51 00205 125252         125252
52 00206 052525         052525
53 00207 000206 LST:    .-1
54
55                              ;PATTERN TABLE, EVEN PARITY WRITING.
56 00210 000210 PONTR:  .
57 00211 177777         177777
58 00212 125252         125252
59 00213 052525         052525
60 00214 000401         000401
61 00215 020040         020040
62 00216 000215 LST1:   .-1
```

```
01
02 00217 000401 COUT7:  000401          ;OUTER TRACK PATTERN 7 TRACK
03 00220 006014 COUT9:  006014          ;OUTER TRACK PATTERN 9 TRACK
04 00221 037477 DAMS7:  037477          ;7 TRACK DATA MASK
05 00222 000224 PONCX:  CX
06
07                      ;VARIABLES FOR MTC
08 00223 000000 X170:   0       ;NOOP COMMAND (INCREMENTAL)
09 00224 000000 CX:     0       ;UNIT 0 +0   (READ)
10 00225 000010 C1X:    10      ;UNIT 0 +10  (WRITE)
11 00226 000020 C2X:    20      ;UNIT 0 +20  (SPACE 1 BLOCK FORW)
12 00227 000030 C3X:    30      ;UNIT 0 +30  (SPACE 1 BLOCK REV)
13 00230 000040 C4X:    40      ;UNIT 0 +40  (WRITE EOF)
14 00231 000050 C5X:    50      ;UNIT 0 +50  (ERASE 3.75 INCH)
15 00232 000060 C6X:    60      ;UNIT 0 +60  (READ UNPACKED)
16 00233 000070 C7X:    70      ;UNIT 0 +70  (REWIND)
17 00234 000100 C10X:   100     ;UNIT 0 +100 (GO OFFLINE)
18 00235 000110 C11X:   110     ;UNIT 0 +110 (NOOP)
19 00236 000120 C12X:   120     ;UNIT 0 +120 (NOOP)
20 00237 000130 C13X:   130     ;UNIT 0 +130 (NOOP)
21 00240 000140 C14X:   140     ;UNIT 0 +140 (NOOP)
22 00241 000150 C15X:   150     ;UNIT 0 +150 (NOOP)
23 00242 000160 C16X:   160     ;UNIT 0 +160 (NOOP)
24 00243 000170 C17X:   170     ;UNIT 0 +170 (USED NOOP)
25
26 00244 000000 WDCNT:  0
27 00245 000000 INST:   0
28 00246 000000 RECTR:  0
29 00247 000000 RECT1:  0
30 00250 000000 DAMSK:  0               ;USED DATA MASK
31
32                      ;QUESTIONS AND ANSWERS
33 00251 000131 OLDCQ:  "Y              ;MTC 304/309 (OLD) QUEST.
34 00252 000000 OLDCA:  0               ;ACTUAL ANSWER, 1=OLD, 0=NEW
35 00253 000131 T304Q:  "Y              ;MTC 304 QUEST.
36 00254 000000 T304A:  0               ;ACTUAL ANSWER, 1=304, 0=OTHER
37 00255 000030 DEVNQ:  30              ;DEVICE CODE QUEST.
38 00256 000000 DEVNA:  0               ;ACTUAL DEVICE CODE, ANSWER
39 00257 000000 UNITQ:  0               ;UNIT 0 QUEST.
40 00260 000000 UNITA:  0               ;ACTUAL UNIT 0, ANSWER
41 00261 000131 NRZIQ:  "Y              ;NRZI QUESTION
42 00262 000000 NRZIA:  0               ;ACTUAL ANSWER, 1=NRZI, 0=PE
43 00263 000131 SETRQ:  "Y              ;SEVEN TRACK QUESTION
44 00264 000000 SETRA:  0               ;ACTUAL ANSWER, 1= 7 TR, 0= 9 TR
45 00265 000116 EXTMQ:  "N              ;MEM EXT ADR BIT 0 QUESTION
46 00266 000000 EXTMA:  0               ;ACTUAL ANSWER, 1=BIT 0, 0=NOT IMPLEMENTED
```

```
                                ;INDIRECT ADDRESSES FOR MTC
00267 013373 ICKST:  CSTAT
00270 013077 IPSTA:  XPSTA
00271 013105 IBOTS:  XBOTS
00272 013111 IWBOT:  XWBOT

00273 013156 IRD:    XRD
00274 013235 IWR:    XWR
00275 012745 IFSP:   XFSP
00276 012764 IBSP:   XBSP
00277 013311 ISARG:  XSARG
00300 012777 IWEOF:  XWEOF
00301 013016 IERAS:  XERAS
00302 013161 IRDU:   XRDU
00303 012760 IRWD:   XRWD
00304 013073 IOFFL:  XOFFL

00305 013046 IGEN:   XGEN
00306 013061 ICLR:   XCLR
00307 012701 ICHK:   XCHK
00310 013413 ICHU:   XCHU
00311 013031 ILD:    XLD

                                ;DEFINITIONS FOR MTC
        000030 MTC=30
        000030 DEV=MTC
        006270 UPSTA=JSR        @IPSTA
        006271 BOTSTA=JSR       @IBOTS
        006272 WABOT=JSR        @IWBOT

        006273 READ=JSR         @IRD
        006274 WRITE=JSR        @IWR
        006275 SPACE=JSR        @IFSP
        006276 BSPACE=JSR       @IBSP
        006277 SPARG=JSR        @ISARG
        006300 WEOF=JSR         @IWEOF
        006301 ERASE=JSR        @IERAS
        006302 READU=JSR        @IRDU
        006303 REWIND=JSR       @IRWD
        006304 OFFLINE=JSR      @IOFFL

        006305 GEN=JSR          @IGEN
        006306 CLEAR=JSR        @ICLR
        006307 CHECK=JSR        @ICHK
        006310 CHECU=JSR        @ICHU
        006311 LOAD=JSR         @ILD
```

```
01
02 00312 000000 RTEST:  0                       ;RETURN ADDR FROM TESTLOOPS
03
04       000400 .LOC 400
05 00400 006405         JSR     AIDIAG  ;DIAGNOSTIC TESTPROGRAM START ADDR
06 00401 006405         JSR     AIWLT   ;WRITE LOCK TEST
07 00402 006405         JSR     AIETT   ;END TAPE TEST
08 00403 006405         JSR     AIDLT   ;DATA LATE TEST
09 00404 006405         JSR     AIANSW  ;RESTART, NO QUESTIONS, LAST ANSWERS
10
11 00405 012626 IDIAG:  XDIAG
12 00406 012640 IWLT:   XWLT
13 00407 012650 IETT:   XETT
14 00410 012660 IDLT:   XDLT
15 00411 012670 IANSW:  XANSW
16
17:             ;THIS PROGRAM USES STANDARD TEST ROUTINES. NOT LISTED.
18              ;IF NEEDED, ASK FOR SPECIAL LISTNING FOR STANDARD TEST ROUTINES.
19
20              ;THE STANDARD ROUTINES ARE NOT MODIFIED.
21              ;IF MODIFICATIONS, LIST HERE:
22
23:             ;       PAGE ZERO:      IDX4 AND DEV
24
25
26
27              ;THIS PROGRAM WILL USE FOLLOWING MEMORY LOCATIONS ALLTHOUGH
28              ;NOT DIRECTLY SHOWN IN THE ASSEMBLING LIST:
29
30              ;       VMEND + 100000  USED IN MEMSIZE ROUTINE, PLUS A LDA/STA
31              ;                       FOR EACH 4K SLICE, CONTENT RESTORED.
32              ;       0X7600 (0X7635) TO 0X7777, BINARY LOADER, SA 2222
33              ;
34              ;       NOT USED MEM ABOVE LASTP IS FILLED WITH PROGRAM BREAK
35              ;       COMMAND (SEE LOC 6).
36              ;
37              ;       LASTP + XXX     SEE XREFF LIST, BUFFERS ETC.
38
39
40              ;TAPE 2
41
42              .EOT
```

```
0024  .MAIN
01
02              ;THE PAGES MISSING UP TO PAGE 133
03              ;ARE THE STANDARD TEST ROUTINES.
04              ;IF THE LISTNING IS IMPORTANT FOR YOU,
05              ;ORDER THE ASCII TAPES FOR THIS PROGRAM,
06              ;RCSL 44-RT 1900.
07              ;PRODUCE YOUR OWN COMPLETE LISTNING
08              ;BY MEANS OF THE ASSEMBLER.
```

```
TSS
                  ;TAPE 6

                  PROG:    .TXT !MTC 3XX DIAGTEST! ;"MTC 3XX DIAGTEST"
   11602 052115
   11603 020103
   11604 054063
   11605 020130
   11606 044504
   11607 043501
   11610 042524
   11611 052123
   11612 000000

                  PROGA:   .TXT !RCSL 44-RT 1898   DATE: 15.07.1979   VERSION: 2.0!
   11613 041522
   11614 046123
   11615 032040
   11616 026464
   11617 052122
   11620 030440
   11621 034470
   11622 020070
   11623 020040
   11624 040504
   11625 042524
   11626 020072
   11627 032461
   11630 030056
   11631 027067
   11632 034461
   11633 034467
   11634 020040
   11635 053040
   11636 051105
   11637 044523
   11640 047117
   11641 020072
   11642 027062
   11643 000060
                           ;"RCSL 44-RT 1898   DATE: 15.07.1979   VERSION: 2.0"

   11644 000001 PASSM:  1.                ;USER DEFINITION OF PASS: # OF RUNS
                                           ;THROUGH ALL TESTLOOPS BEFORE PASS
                                           ;MESSAGE IS PRINTED. MAX 99 DECIMAL.
```

```
01
02 11645 011645 TROTB:  .               ;ADDRESS TABLE FOR LOOPS WITH
03                                      ;AUTO BREAKPOINTS.
04 11646 013617         DLT
05 11647 013763         ETT
06 11650 014113         WLT1
07 11651 014253         A0
08 11652 014260         A1
09 11653 014265         A2
10 11654 014272         A3
11 11655 014277         A4
12 11656 014312         A5
13 11657 014322         A6
14 11660 014350         A7
15 11661 014377         A8
16 11662 014421         A8A
17 11663 014433         A8B
18 11664 014445         A8C
19 11665 014457         A8D
20 11666 014474         A8E
21 11667 014516         A8F
22 11670 014522         A9
23 11671 014532         A10
24 11672 014545         A11
25 11673 014560         A12
26 11674 014574         A13
27 11675 014603         A14
28 11676 014622         A14B
29 11677 014631         A15
30 11700 014653         A16
31 11701 014672         A17
32 11702 014716         A18
33 11703 014744         A19
34 11704 015040         A20
35 11705 015145         A21
36 11706 015214         A22
37 11707 015251         A23
38 11710 015270         A24
39 11711 015306         A25
40 11712 015325         A26
41 11713 015341         A27
42 11714 015372         A28
43 11715 015426         A29
44 11716 015632         A31
45 11717 015656         A32
46 11720 015726         A33
47 11721 016006         A34
48 11722 016061         A35
49 11723 016122         A36
50 11724 016163         A37
51 11725 016230         A38
52 11726 016513         A39
```

```
01
02 11727 016603                A40
03 11730 016653                A40B
04 11731 016705                A41
05 11732 016772                A42
06 11733 017033                A43
07 11734 017074                A44
08 11735 017135                A45
09 11736 017176                A45B
10 11737 017241                A46
11 11740 017302                A47
12 11741 017343                A48
13 11742 017404                A49
14 11743 017446                A50
15 11744 017602                A51
16 11745 017736                A52
17 11746 020072                A53
18 11747 020233                A54
19 11750 020353                A55
20 11751 020355                A56
21 11752 000000                0                ;END OF TABLE
22 11753 000000                0                ;SPARES
23 11754 000000                0
24 11755 000000                0
25
26                             ;TABLE FOR ADDRESSES TO CORRECT DEVICE NUMBER.
27
28 11756 010254 COTB1:         SDEV1
29 11757 010267                SDEV2
30 11760 010303                SDEV3
31 11761 010317                SDEV4
32 11762 010331                SDEV5
33 11763 012750                MTC01            ;TABLE FOR DEVICE MTC
34 11764 012751                MTC02
35 11765 012754                MTC03
36 11766 012761                MTC04
37 11767 012762                MTC05
38 11770 012767                MTC06
39 11771 012770                MTC07
40 11772 012773                MTC08
41 11773 013006                MTC09
42 11774 013007                MTC10
43 11775 013012                MTC11
44 11776 013021                MTC12
45 11777 013022                MTC13
46 12000 013025                MTC14
47 12001 014525                MTC15
48 12002 013101                MTC16
49 12003 013102                MTC17
50 12004 013106                MTC18
51 12005 013107                MTC19
52 12006 013210                MTC20
```

```
0136  .MAIN
01
02 12007 013212          MTC21
03 12010 013214          MTC22
04 12011 013215          MTC23
05 12012 013220          MTC24
06 12013 013265          MTC25
07 12014 013267          MTC26
08 12015 013271          MTC27
09 12016 013272          MTC28
10 12017 013275          MTC29
11 12020 013625          MTC30
12 12021 013627          MTC31
13 12022 013631          MTC32
14 12023 013632          MTC33
15 12024 013635          MTC34
16 12025 013643          MTC35
17 12026 013703          MTC36
18 12027 013705          MTC37
19 12030 013707          MTC38
20 12031 013710          MTC39
21 12032 013713          MTC40
22 12033 013731          MTC41
23 12034 013753          MTC42
24 12035 014267          MTC50
25 12036 014274          MTC51
26 12037 014305          MTC52
27 12040 014306          MTC53
28 12041 014315          MTC54
29 12042 014316          MTC55
30 12043 014327          MTC56
31 12044 014512          MTC57
32 12045 014405          MTC58
33 12046 014406          MTC59
34 12047 014412          MTC60
35 12050 014425          MTC61
36 12051 014426          MTC62
37 12052 014427          MTC63
38 12053 014437          MTC64
39 12054 014440          MTC65
40 12055 014441          MTC66
41 12056 014451          MTC67
42 12057 014452          MTC68
43 12060 014453          MTC69
44 12061 014466          MTC70
45 12062 014467          MTC71
46 12063 014470          MTC72
47 12064 014505          MTC73
48 12065 014506          MTC74
49 12066 014507          MTC75
50 12067 014510          MTC76
51 12070 014511          MTC77
52 12071 014526          MTC78
53 12072 014527          MTC79
54 12073 014536          MTC80
55 12074 014537          MTC81
56 12075 014542          MTC82
57 12076 014551          MTC83
58 12077 014552          MTC84
59 12100 014554          MTC85
60 12101 014555          MTC86
61 12102 014565          MTC87
62 12103 014566          MTC88
63 12104 014571          MTC89
64 12105 014610          MTC90
```

```
01
02 12106 014611          MTC91
03 12107 014730          MTC92
04 12110 015232          MTC93
05 12111 015262          MTC94
06 12112 015263          MTC95
07 12113 015300          MTC96
08 12114 015301          MTC97
09 12115 015760          MTC98
10 12116 016113          MTC99
11 12117 016154          MT100
12 12120 016554          MT101
13 12121 017021          MT102
14 12122 017062          MT103
15 12123 017123          MT104
16 12124 017164          MT105
17 12125 017514          MT106
18 12126 017525          MT107
19 12127 017526          MT108
20 12130 017572          MT109
21 12131 017544          MT115
22 12132 017650          MT116
23 12133 017661          MT117
24 12134 017662          MT118
25 12135 017726          MT119
26 12136 017700          MT125
27 12137 020004          MT126
28 12140 020015          MT127
29 12141 020016          MT128
30 12142 020062          MT129
31 12143 020034          MT135
32 12144 020140          MT136
33 12145 020151          MT137
34 12146 020152          MT138
35 12147 020216          MT139
36 12150 020170          MT145
37 12151 020266          MT146
38 12152 020270          MT147
39 12153 020274          MT148
40 12154 020275          MT149
41 12155 020300          MT150
42 12156 020303          MT151
43 12157 014535          MT152
44 12160 014550          MT153
45 12161 014563          MT154
46 12162 015415          MT155
47 12163 015710          MT156
48 12164 013343          MT157
49 12165 013345          MT158
50 12166 013347          MT159
51 12167 013350          MT160
52 12170 013356          MT161
53 12171 015556          MT162
54 12172 015521          MT163
55 12173 015535          MT164
56 12174 015577          MT165
57 12175 015622          MT166
58 12176 015505          MT167
59 12177 017225          MT168
60 12200 017270          MT169
61 12201 017331          MT170
62 12202 017372          MT171
63 12203 017433          MT172
64 12204 015357          MT173
```

```
01
02 12205 016212          MT174
03 12206 014356          MT175
04 12207 014357          MT176
05 12210 014362          MT177
06 12211 014363          MT178
07 12212 014372          MT179
08 12213 014373          MT180
09 12214 014762          MT181
10 12215 014763          MT182
11 12216 014764          MT183
12 12217 014765          MT184
13 12220 014770          MT185
14 12221 014777          MT186
15 12222 015050          MT187
16 12223 015056          MT188
17 12224 015061          MT189
18 12225 015062          MT190
19 12226 015063          MT191
20 12227 015066          MT192
21 12230 015073          MT193
22 12231 016640          MT194
23 12232 016745          MT195
24 12233 016257          MT196
25 12234 016304          MT197
26 12235 013074          MT198
27 12236 013075          MT199
28 12237 016040          MT200
29 12240 014415          MT201
30 12241 000000          0              ;END OF TABLE
31 12242 000000          0              ;SPARES
32 12243 000000          0
33 12244 000000          0
```

```
                        ;ROUTINE USER INITIALIZE.
                        ;USED IF SPECIAL INITIALIZATION IS REQUIRED FOR UNIT
                        ;UNDER TEST. THIS ROUTINE IS CALLED FROM STANDARD
                        ;INITIALIZING ROUTINE (XNITI).
12245 054402 USINI:     STA     3,USINR
                                        ;INSERT HERE
12246 002401            JMP     @USINR
12247 000000 USINR:     0

                        ;ROUTINE USER RESET.
                        ;USED IF SPECIAL RESETTING IS REQUIRED FOR UNIT
                        ;UNDER TEST. THIS ROUTINE IS CALLED FROM STANDARD
                        ;RESET ROUTINE (RESET).
                        ;SAVE/RESTORE ALL USED AC'S !
12250 054402 USDER:     STA     3,USDRR
                                        ;INSERT HERE, SAVE AC'S
                        ;INTEN          ;IF INTR ON WANTED AFTER RESET
12251 002401            JMP     @USDRR
12252 000000 USDRR:     0

                        ;ROUTINE USER SETUP.
                        ;USED IF SPECIAL SETUP IS REQUIRED FOR UNIT
                        ;UNDER TEST. THIS ROUTINE IS CALLED FROM STANDARD
                        ;SETUP ROUTINE (SETP0, SETP1, SETP2).
12253 054403 USSET:     STA     3,USSTR
12254 006126            RESET           ;INSERT/CHANGE HERE (RESET CHECKS TERMW)
                        ;JSR     @USRTW  ;IS TERMINATION WAITING ?
12255 002401            JMP     @USSTR
12256 000000 USSTR:     0

                        ;ROUTINE USER LOOP.
                        ;USED IF SPECIAL LOOP ACTION IS REQUIRED FOR UNIT
                        ;UNDER TEST. THIS ROUTINE IS CALLED FROM STANDARD
                        ;LOOP ROUTINE (LOOP).
12257 054404 USLOP:     STA     3,USLOR
12260 006126            RESET           ;INSERT/CHANGE HERE (RESET CHECKS TERMW)
                        ;JSR     @USTRW  ;IS TERMINATION WAITING ?
12261 002402            JMP     @USLOR
12262 010404 USTRW:     TERMW
12263 000000 USLOR:     0

                        ;ROUTINE USER SERVICE INTERRUPT.
                        ;USED IF SPECIAL INTERRUPT HANDLING IS REQUIRED.
                        ;THIS ROUTINE IS CALLED FROM STANDARD SERVICE INTERRUPT
                        ;(SERINT), WHICH HAS STORED RETURN ADDR IN LOC 5 AND
                        ;DEVICE NUMBER AFTER INTA IN PAGE ZERO (INDEV) AND
                        ;RESTORED LOC 0 FOR POWER RESTART AND STORED -1 IN
                        ;PAGE ZERO (INFLG), INTR FLAG.
12264 054407 USSEI:     STA     3,USSER ;ALL AC'S AND CARRY ARE SAVED/RESTORED
                                        ;IN SERINT. ANY RESULT FROM THIS ROUTINE
                                        ;HAVE TO BE STORED IN MEM.
                        ;ISZ     USSER  ;IF USED: INTEN COMMAND WHEN LEAVING
                                        ;INTR SERVICE ROUTINE (SERINT).
12265 010005            ISZ     LOC5    ;PC:=PC+1
12266 000401            JMP     .+1     ;SKIP SAFETY
12267 020130            LDA     0,INDEV ;LEAVE STANDARD INTR SERVICE (SERINT)
12270 042402            STA     0,@USSEO ;WITH AC0=RESULT FROM INTA
12271 002402            JMP     @USSER
12272 010470 USSEO:     SERAO
12273 000000 USSER:     0
```

```
. 0140  .MAIN
01
02                              ;ROUTINE TO MONITOR QUESTIONS AND ANSWERS.
03 12274 054574 XNIQA:  STA     3,RNIQA
04 12275 006071 RPOLD:  CQUES
05 12276 012500         MXOLD           ;MTC 304/309 (Y/N): ?
06 12277 012512         DXOLD
07 12300 000251         OLDCQ
08 12301 006041         CCHAR
09 12302 006045         CDOUT
10 12303 006106         CGTSC
11 12304 000402         JMP     .+2     ;SUGGESTED ACCEPTED
12 12305 000770         JMP     RPOLD   ;ERROR RETURN
13 12306 006571         JSR     @YNCHK  ;ANSWER INPUT'ED
14 12307 000766         JMP     RPOLD   ;OUT OF RANGE
15 12310 040252         STA     0,OLDCA
16 12311 101015         MOVO    0,0,SNR ;CONTROLLER WITHOUT DEVO STRAP ?
17 12312 000423         JMP     RPDVN   ;NO, ASK FOR DEV O
18 12313 006071 RP304:  CQUES           ;YES, THEN MTC 304/309
19 12314 012521         MX304           ;MTC 304 (Y/N): ?
20 12315 012531         DX304
21 12316 000253         T304Q
22 12317 006041         CCHAR
23 12320 006045         CDOUT
24 12321 006106         CGTSC
25 12322 000402         JMP     .+2     ;SUGGESTED ACCEPTED
26 12323 000770         JMP     RP304   ;ERROR RETURN
27 12324 006553         JSR     @YNCHK  ;ANSWER INPUT'ED
28 12325 000766         JMP     RP304   ;OUT OF RANGE
29 12326 040254         STA     0,T304A
30 12327 024544         LDA     1,DEV30
31 12330 101015         MOVO    0,0,SNR ;DEV O 30 ?
32 12331 024543         LDA     1,DEV44 ;NO, DEV O 44
33 12332 044256         STA     1,DEVNA ;YES, STORE DEV O
34 12333 006536         JSR     @ICORD  ;CORRECT OLD DEV O
35 12334 000422         JMP     RPUNN   ;ASK FOR UNIT O
36 12335 006071 RPDVN:  CQUES
37 12336 012540         TXDVN           ;DEVICE NO ?
38 12337 012540         TXDVN
39 12340 000255         DEVNQ
40 12341 006054         CTZOC
41 12342 006060         CDZOC
42 12343 006104         CGTOK
43 12344 000402         JMP     .+2     ;SUGGESTED ACCEPTED
44 12345 000770         JMP     RPDVN   ;ERROR RETURN
45 12346 020076         LDA     0,DIGIN ;ANSWER INPUT'ED
46 12347 024150         LDA     1,C76   ;UPPER LIMIT
47 12350 030137         LDA     2,C2    ;LOWER LIMIT
48 12351 122033         ADCZO   1,0,SNC
49 12352 112032         ADCZO   0,2,SZC ;AC2=<AC0=<AC1 ?
50 12353 000762         JMP     RPDVN   ;OUTSIDE LIMITS
51 12354 040256         STA     0,DEVNA ;INPUT ACCEPTED
52 12355 006514         JSR     @ICORD  ;CORRECT OLD DEV NO.
```

```
01
02 12356 006071 RPUNN:  CQUES
03 12357 012545         TXUNN           ;.UNIT NO.?
04 12360 012545         TXUNN
05 12361 000257         UNITQ
06 12362 006054         CTZOC
07 12363 006060         CDZOC
08 12364 006104         CGTOK
09 12365 000402         JMP     .+2     ;SUGGESTED ACCEPTED
10 12366 000770         JMP     RPUNN   ;ERROR RETURN
11 12367 020076         LDA     0,DIGIN ;ANSWER INPUT'ED
12 12370 101112         MOVLO   0,0,SZC ;POSITIVE ?
13 12371 000765         JMP     RPUNN   ;NO
14 12372 024144         LDA     1,C7    ;UPPER LIMIT
15 12373 122032         ADCZO   1,0,SZC ;AC0=<AC1 ?
16 12374 000762         JMP     RPUNN   ;NO, TOO BIG
17 12375 040260         STA     0,UNITA ;INPUT ACCEPTED
18 12376 006474         JSR     AICORU  ;CORRECT OLD UNIT NO.
19 12377 006270         UPSTA           ;UPDATE STATUS (ONLINE, ILLEGAL ETC)
20 12400 000401         JMP     .+1     ;STILL BUSY, NOT TESTING HERE
21 12401 006303         REWIND          ;START A REWIND
22 12402 000401         JMP     .+1     ;STILL BUSY, NOT TESTING HERE
23 12403 006071 RPNRZ:  CQUES
24 12404 012552         MXNRZ           ;NRZ (Y/N): ?
25 12405 012560         DXNRZ
26 12406 000261         NRZIQ
27 12407 006041         CCHAR
28 12410 006045         CDOUT
29 12411 006106         CGTSC
30 12412 000402         JMP     .+2     ;SUGGESTED ACCEPTED
31 12413 000770         JMP     RPNRZ   ;ERROR RETURN
32 12414 006463         JSR     AYNCHK  ;ANSWER INPUT'ED
33 12415 000766         JMP     RPNRZ   ;OUT OF RANGE
34 12416 040262         STA     0,NRZIA
35 12417 101015         MOVO    0,0,SNR
36 12420 000414         JMP     RPSPE   ;PASS 7/9 TRACK IF PE, BUT SET TO 9 TRACK
37 12421 006071 RPNTR:  CQUES
38 12422 012566         MXSTR           ;7TR (Y/N): ?
39 12423 012574         DXSTR
40 12424 000263         SETRQ
41 12425 006041         CCHAR
42 12426 006045         CDOUT
43 12427 006106         CGTSC
44 12430 000402         JMP     .+2     ;SUGGESTED ACCEPTED
45 12431 000770         JMP     RPNTR   ;ERROR RETURN
46 12432 006445         JSR     AYNCHK  ;ANSWER INPUT'ED
47 12433 000766         JMP     RPNTR   ;OUT OF RANGE
48 12434 040264 RPSPE:  STA     0,SETRA
```

```
01
02 12435 006071 RPEXT:  CQUES
03 12436 012602         MXEXT           ;MTC WITH ADRBIT 0 ?
04 12437 012615         DXEXT
05 12440 000265         EXTMQ
06 12441 006041         CCHAR
07 12442 006045         CDOUT
08 12443 006106         CGTSC
09 12444 000402         JMP     .+2     ;SUGGESTED ACCEPTED
10 12445 000770         JMP     RPEXT   ;ERROR RETURN
11 12446 006431         JSR     @YNCHK  ;ANSWER INPUT'ED
12 12447 000766         JMP     RPEXT   ;OUT OF RANGE
13 12450 040266         STA     0,EXTMA
14 12451 020424         LDA     0,STAPE ;AC0=PE STATUS
15 12452 024262         LDA     1,NRZIA ;1 FOR NRZI, 0 FOR PE
16 12453 125015         MOVO    1,1,SNR ;NRZI ?
17 12454 000405         JMP     RPEND   ;NO, PE
18 12455 020421         LDA     0,STAST ;AC0=SEVEN TRACK STATUS
19 12456 024264         LDA     1,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
20 12457 125015         MOVO    1,1,SNR ;7 TRACK ?
21 12460 102440         SUBO    0,0     ;NO, CLEAR 7 TR STATUS
22 12461 040132 RPEND:  STA     0,QCSTA ;KNOWN STATUS CONSTANTS
23 12462 020221         LDA     0,DAMS7 ;7 TRACK DATA MASK
24 12463 024264         LDA     1,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
25 12464 125015         MOVO    1,1,SNR ;7 TRACK ?
26 12465 102000         ADC     0,0     ;NO, ALL 1 MASK
27 12466 040250         STA     0,DAMSK ;DATA MASK FOR CHECK ROUTINE
28 12467 002401         JMP     @RNIQA
29 12470 000000 RNIQA:  0
30 12471 010346 ICORD:  CORDN
31 12472 013141 ICORU:  CORUN
32 12473 000030 DEV30:  30
33 12474 000044 DEV44:  44
34 12475 004000 STAPE:  004000          ;PE STATUS
35 12476 000004 STAST:  000004          ;SEVEN TRACK STATUS
36 12477 006432 YNCHK:  YESNO
```

```
0143  .MAIN
01
02                MXOLD:  .TXT !MTC 304/309 (Y/N): !      ;"MTC 304/309 (Y/N): "
   12500 052115
   12501 020103
   12502 030063
   12503 027464
   12504 030063
   12505 020071
   12506 054450
   12507 047057
   12510 035051
   12511 000040
03
04                DXOLD:  .TXT !304/309(1/0) !     ;"304/309(1/0) "
   12512 030063
   12513 027464
   12514 030063
   12515 024071
   12516 027461
   12517 024460
   12520 000040
05
06                MX304:  .TXT !MTC 304 (Y/N): !  ;"MTC 304 (Y/N): "
   12521 052115
   12522 020103
   12523 030063
   12524 020064
   12525 054450
   12526 047057
   12527 035051
   12530 000040
07
08                DX304:  .TXT !MTC 304 (1/0)!    ;"MTC 304 (1/0)"
   12531 052115
   12532 020103
   12533 030063
   12534 020064
   12535 030450
   12536 030057
   12537 000051
09
10                TXDVN:  .TXT !DEVICE NO!        ;"DEVICE NO"
   12540 042504
   12541 044526
   12542 042503
   12543 047040
   12544 000117
11
12                TXUNN:  .TXT !  UNIT NO!        ;"  UNIT NO"
   12545 020040
   12546 047125
   12547 052111
   12550 047040
   12551 000117
```

```
. 0144  .MAIN
01
02                  MXNRZ:  .TXT !NRZ (Y/N): !      ;"NRZ (Y/N): "
   12552 051116
   12553 020132
   12554 054450
   12555 047057
   12556 035051
   12557 000040
03
04                  DXNRZ:  .TXT !NRZ (1/0): !      ;"NRZ (1/0): "
   12560 051116
   12561 020132
   12562 030450
   12563 030057
   12564 035051
   12565 000040
05:
06                  MXSTR:  .TXT !7TR (Y/N): !      ;"7TR (Y/N): "
   12566 052067
   12567 020122
   12570 054450
   12571 047057
   12572 035051
   12573 000040
07
08                  DXSTR:  .TXT !7TR (1/0): !      ;"7TR (1/0): "
   12574 052067
   12575 020122
   12576 030450
   12577 030057
   12600 035051
   12601 000040
09
10                  MXEXT:  .TXT !MTC WITH ADDRBIT 0: !     ;"MTC WITH ADDRBIT 0: "
   12602 052115
   12603 020103
   12604 044527
   12605 044124
   12606 040440
   12607 042104
   12610 041122
   12611 052111
   12612 030040
   12613 020072
   12614 000000
11
12                  DXEXT:  .TXT !ADDRBIT 0: !      ;"ADDRBIT 0: "
   12615 042101
   12616 051104
   12617 044502
   12620 020124
   12621 035060
   12622 000040
```

```
01
02 12623 012630 RENOQ:  YDIAG-4 ;RESTART NO QUESTION, ASM VALUE TO POINT FOR
03                              ;MAX 0 OF QUES IN CASE OF START BEFORE ANY QUES
04                              ;IS ANSWERED, DON'T FORGET HOW USEDE JMP 1,RENOQ
05 12624 012274 INIQA:  XNIQA
06 12625 010707 INITI:  XNITI
07
08 12626 165000 XDIAG:  MOV     3,1     ;PRINT START ADDR
09 12627 006072         CSAMS
10 12630 006774         JSR     AINIQA  ;ANSWER QUESTIONS
11 12631 006774         JSR     AINITI  ;INITIALIZE (PASSCOUNT, BUFFER ETC.)
12 12632 004401         JSR     .+1     ;NO QUESTION RESTART ADDR
13 12633 054770         STA     3,RENOQ ;THIS 2 INSTR JUST ABOVE LOOP LABEL
14 12634 006403 YDIAG:  JSR     AZDIAG  ;PERFORM TESTLOOPS AS ONE ROUTINE
15 12635 006124         CPASS           ;CALL PASS ADMINI.
16 12636 000776         JMP     YDIAG   ;LOOP
17 12637 014252 ZDIAG:  TEST
18
19 12640 165000 XWLT:   MOV     3,1     ;PRINT START ADDR
20 12641 006072         CSAMS
21 12642 006762         JSR     AINIQA
22 12643 006762         JSR     AINITI
23 12644 004401         JSR     .+1
24 12645 054756         STA     3,RENOQ
25 12646 002401 YWLT:   JMP     A.+1
26 12647 014104         WLT
27
28 12650 165000 XETT:   MOV     3,1     ;PRINT START ADDR
29 12651 006072         CSAMS
30 12652 006752         JSR     AINIQA
31 12653 006752         JSR     AINITI
32 12654 004401         JSR     .+1
33 12655 054746         STA     3,RENOQ
34 12656 002401 YETT:   JMP     A.+1
35 12657 013763         ETT
36
37 12660 165000 XDLT:   MOV     3,1     ;PRINT START ADDR
38 12661 006072         CSAMS
39 12662 006742         JSR     AINIQA
40 12663 006742         JSR     AINITI
41 12664 004401         JSR     .+1
42 12665 054736         STA     3,RENOQ
43 12666 002401 YDLT:   JMP     A.+1
44 12667 013617         DLT
45
46 12670 165000 XANSW:  MOV     3,1     ;PRINT START ADDR
47 12671 006072         CSAMS
48 12672 006270         UPSTA           ;INITIALIZING, WHICH IS DONE IN INIQA
49 12673 000401         JMP     .+1     ;STILL BUSY, NOT TESTING HERE
50 12674 006303         REWIND
51 12675 000401         JMP     .+1     ;STILL BUSY, NOT TESTING HERE
52 12676 006727         JSR     AINITI  ;INITIALIZE, SEE XDIAG
53 12677 034724         LDA     3,RENOQ
54 12700 001401         JMP     1,3     ;RESTART, NO QUESTIONS, LAST ANSWERS
55
56
57              ;TAPE 6
58
59              .EOT
```

```
01
02                ;TAPE 7 ROUTINES FOR MTC.
03
04                        ;COMPARE IBUFF WITH OBUFF
05                        ;
06                        ;       CHECK
07                        ;       ARG
08                        ;
09                        ;ARGUMENT FOLLOWING CALL SPECIFIES
10                        ;BITS 10-15 = # OF WORDS
11                        ;BIT   3    = 1 FOR ODD # OF CHARS MODE
12                        ;COMPARE WORD FOR WORD
13                        ;WORD N+1 IN IBUFF MUST BE ZERO
14                        ;IF ERROR RETURN TO CALL +2
15                        ;OTHERWISE CALL+3
16                        ;EXIT WITH AC0=BAD WORD
17                        ;AC1=GOOD WORD
18                        ;AC2=ADDR. OF IBUFF BAD WORD
19 12701 054443 XCHK:   STA     3,RCHK
20 12702 031400         LDA     2,0,3   ;GET ARG
21 12703 020151         LDA     0,C77
22 12704 143400         AND     2,0
23 12705 040435         STA     0,CNTR
24 12706 102000         ADC     0,0     ;AC0:=177777, NORMAL MASK
25 12707 024161         LDA     1,C10K
26 12710 133414         ANDZ    1,2,SZR ;ODD CHAR BIT IN ARG ?
27 12711 020163         LDA     0,C1774 ;YES, USE ODD MASK
28 12712 040431         STA     0,XCHMA
29 12713 030135         LDA     2,IBUFF
30 12714 034134         LDA     3,OBUFF
31 12715 020250 XCHK1:  LDA     0,DAMSK ;7/9 TRACK MASK
32 12716 025400         LDA     1,0,3   ;WRITTEN WORD
33 12717 107400         AND     0,1     ;MASK OUTPUT BUFFER WORD
34 12720 020422         LDA     0,CNTR
35 12721 101234         MOVZRZ  0,0,SZR ;LAST WORD ?
36 12722 000403         JMP     XCHK2   ;NO, PASS SPECIAL
37 12723 020420         LDA     0,XCHMA ;LAST BYTE/WORD MASK
38 12724 107400         AND     0,1     ;MASK OUTPUT BUFFER WORD
39 12725 021000 XCHK2:  LDA     0,0,2   ;READ WORD
40 12726 106414         SUBZ    0,1,SZR
41 12727 000411         JMP     LEAV    ;ERROR
42 12730 151400         INC     2,2
43 12731 175400         INC     3,3
44 12732 014410         DSZ     CNTR    ;END BUFFER DATA ?
45 12733 000762         JMP     XCHK1   ;NO
46 12734 126400         SUB     1,1     ;1, WORD NOT USED SHOULD BE ZERO
47 12735 021000         LDA     0,0,2
48 12736 101015         MOVZ    0,0,SNR ;WORD FOLLOWING LAST MUST BE ZERO
49 12737 010405         ISZ     RCHK    ;PASS ERROR RETURN
50 12740 010404 LEAV:   ISZ     RCHK
51 12741 002403         JMP     @RCHK
52 12742 000000 CNTR:   0
53 12743 000000 XCHMA:  0
54 12744 000000 RCHK:   0
```

```
01
02                              ;DO A SPACE FORWARD
03 12745 054412 XFSP:   STA     3,RFSP
04 12746 010411         ISZ     RFSP    ;PASS ERROR RETURN
05 12747 024226         LDA     1,C2X
06 12750 065030 MTC01:  DOA     1,MTC   ;DO IT
07 12751 060130 MTC02:  NIOS    MTC
08 12752 006063         TIMSK
09 12753 003720         2000.           ;WAIT MAX 2 SEC
10 12754 063630 MTC03:  SKPDN   MTC
11 12755 014402         DSZ     RFSP    ;GO IN ERROR
12 12756 002401         JMP     ARFSP
13 12757 000000 RFSP:   0
14
15                              ;REWIND SUBROUTINE
16 12760 024233 XRWD:   LDA     1,C7X
17 12761 065030 MTC04:  DOA     1,MTC
18 12762 060130 MTC05:  NIOS    MTC
19 12763 001400         JMP     0,3
20
21                              ;BACKSPACE ROUTINE
22 12764 054412 XBSP:   STA     3,RBSP
23 12765 010411         ISZ     RBSP    ;PASS ERROR RETURN
24 12766 024227         LDA     1,C3X
25 12767 065030 MTC06:  DOA     1,MTC
26 12770 060130 MTC07:  NIOS    MTC
27 12771 006063         TIMSK
28 12772 003720         2000.           ;WAIT MAX 2 SEC
29 12773 063630 MTC08:  SKPDN   MTC
30 12774 014402         DSZ     RBSP    ;GO IN ERROR
31 12775 002401         JMP     ARBSP
32 12776 000000 RBSP:   0
33
34                              ;WRITE EOF
35 12777 054416 XWEOF:  STA     3,RWEOF
36 13000 010415         ISZ     RWEOF   ;PASS ERROR RETURN
37 13001 020157         LDA     0,C400  ;EVEN PARITY COMMAND
38 13002 024230         LDA     1,C4X
39 13003 030264         LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
40 13004 151014         MOVO    2,2,SZR ;7 TRACK ?
41 13005 107000         ADD     0,1     ;YES, ADD EVEN
42 13006 065030 MTC09:  DOA     1,MTC
43 13007 060130 MTC10:  NIOS    MTC
44 13010 006063         TIMSK
45 13011 001750         1000.           ;WAIT MAX 1 SEC
46 13012 063630 MTC11:  SKPDN   MTC
47 13013 014402         DSZ     RWEOF   ;GO IN ERROR
48 13014 002401         JMP     ARWEOF
49 13015 000000 RWEOF:  0
50
51                              ;ERASE ROUTINE
52 13016 054412 XERAS:  STA     3,XERAR
53 13017 010411         ISZ     XERAR   ;PASS ERROR RETURN
54 13020 020231         LDA     0,C5X
55 13021 061030 MTC12:  DOA     0,MTC
56 13022 060130 MTC13:  NIOS    MTC
57 13023 006063         TIMSK
58 13024 001750         1000.           ;WAIT MAX 1 SEC
59 13025 063630 MTC14:  SKPDN   MTC
60 13026 014402         DSZ     XERAR   ;GO IN ERROR
61 13027 002401         JMP     AXERAR
62 13030 000000 XERAR:  0
```

```
01
02                          ;LOAD OBUFF WITH 3 WORDS.
03                          ;
04                          ;       LOAD
05                          ;       ARG
06                          ;
07                          ;ARGUMENT=ADDR OF 3 WORD FIELD
08: 13031 054414 XLD:       STA     3,RLD
09: 13032 010413            ISZ     RLD
10  13033 031400            LDA     2,0,3
11: 13034 034134            LDA     3,OBUFF
12  13035 024174            LDA     1,M3
13  13036 021000 YLD:       LDA     0,0,2
14: 13037 041400            STA     0,0,3
15  13040 151400            INC     2,2
16  13041 175400            INC     3,3
17: 13042 125404            INC     1,1,SZR
18  13043 000773            JMP     YLD
19  13044 002401            JMP     @RLD
20  13045 000000 RLD:       0
21
22                          ;GENERATE ARGUMENT DATA INTO OBUFF
23:                         ;ALWAYS GENERATE 64 WORDS ALL SAME
24                          ;
25                          ;       GEN
26                          ;       ARG
27                          ;
28  13046 054412 XGEN:      STA     3,RGEN
29: 13047 010411            ISZ     RGEN
30  13050 031400            LDA     2,0,3   ;GET DATA WORD
31  13051 034134            LDA     3,OBUFF
32  13052 024175            LDA     1,M100  ;LOAD 64 COUNTER
33  13053 051400 YGEN:      STA     2,0,3
34  13054 175400            INC     3,3
35  13055 125404            INC     1,1,SZR
36  13056 000775            JMP     YGEN
37  13057 002401            JMP     @RGEN
38  13060 000000 RGEN:      0
39
40                          ;
41                          ;CLEAR INPUT BUFFER TO ZEROES.
42                          ;
43                          ;       CLEAR
44                          ;
45  13061 054411 XCLR:      STA     3,RCLR
46  13062 102400            SUB     0,0     ;DATA = 0
47: 13063 030135            LDA     2,IBUFF
48  13064 024175            LDA     1,M100  ;LOAD 64 COUNTER
49  13065 041000 YCLR:      STA     0,0,2
50  13066 151400            INC     2,2
51  13067 125404            INC     1,1,SZR
52  13070 000775            JMP     YCLR
53: 13071 002401            JMP     @RCLR
54  13072 000000 RCLR:      0
55
56:                         ;GO OFFLINE ROUTINE
57  13073 024234 XOFFL:     LDA     1,C10X
58  13074 065030 MT198:     DOA     T,MTC
59: 13075 060130 MT199:     NIOS    MTC
60  13076 00140U            JMP     0,3
```

```
01
02                          ;START A NO-OP COMMAND TO HAVE
03                          ;BUSY SET FOR A SHORT TIME, UPDATING
04                          ;STATUS, (NOT SETTING DONE).
05                          ;
06 13077 054405 XPSTA:  STA     3,RXUPS
07 13100 034243         LDA     3,C17X
08 13101 075030 MTC16:  DOA     3,MTC
09 13102 060130 MTC17:  NIOS    MTC
10 13103 002401         JMP     ARXUPS
11 13104 000000 RXUPS:  0
12
13                          ;ROUTINE USED TO HAVE ONLY ONE CALL OF UPSTA + STATA,
14                          ;LOOKING FOR ARGUMENT STATUS WITH HELP OF TIMRO ROUTINE.
15 13105 030243 XBOTS:  LDA     2,C17X
16 13106 071030 MTC18:  DOA     2,MTC   ;NO OP COMMAND
17 13107 060130 MTC19:  NIOS    MTC
18 13110 002115         JMP     AISTAA  ;STATA ROUTINE USE AC3 FOR RETURN, ARG.
19
20                          ;ROUTINE TO WAIT FOR BOT AFTER REWIND
21                          ;CALL:  WABOT
22                          ;       ERROR RETURN
23                          ;       NORMAL RETURN
24 13111 054424 XWBOT:  STA     3,RWBOT
25 13112 006270         UPSTA           ;UPDATE STATUS
26 13113 006115         STATA
27 13114 042000         042000          ;OFFLINE, WRITE LOCK
28 13115 000402         JMP     .+2     ;TAPE MOUNTED
29 13116 002417         JMP     ARWBOT  ;BOTH STATUSBITS, NO TAPE MOUNTED ?
30 13117 006065         TIMRO
31 13120 013136         TFREW           ;TIME FOR REWIND MAX
32 13121 006271         BOTSTA          ;UPDATE AND CHECK STATUS
33 13122 010000         010000          ;BOT STATUS
34 13123 002412         JMP     ARWBOT  ;NO BOT STATUS
35 13124 006061         CWAIT           ;BE SURE TO GET OFF BOT
36 13125 013137         TFPBB           ;WHEN PASSING BACKWARDS
37 13126 006065         TIMRO
38 13127 013140         TFFTB           ;TIME FOR FORWARD MAX
39 13130 006271         BOTSTA          ;UPDATE AND CHECK STATUS
40 13131 010000         010000          ;BOT STATUS
41 13132 002403         JMP     ARWBOT  ;NO BOT STATUS
42 13133 010402         ISZ     RWBOT   ;OK, PASS ERROR RETURN
43 13134 002401         JMP     ARWBOT
44 13135 000000 RWBOT:  0
45 13136 141520 TFREW:  50000.          ;TIME FOR REWIND IN MSEC (600 FEET TAPE)
46 13137 000062 TFPBB:  50.             ;TIME FOR PASSING BOT BACKWARDS
47 13140 003720 TFFTB:  2000.           ;TIME FOR FORWARD TO BOT
48
49                          ;ROUTINE TO CORRECT UNIT NUMBER
50                          ;IN INSTRUCTION LIST IN PAGE ZERO.
51 13141 054414 CORUN:  STA     3,CORUR
52 13142 020260         LDA     0,UNITA ;UNIT 0 (AND UNIT 0 + READ INSTR)
53 13143 024145         LDA     1,C10   ;INSTR COUNT
54 13144 030222         LDA     2,PONCX ;ADDR OF FIRST INSTR
55 13145 034153         LDA     3,C170  ;LAST INSTR
56 13146 117000         ADD     0,3     ;INCL UNIT 0
57 13147 041000 CORNX:  STA     0,0,2   ;STORE INSTR + UNIT 0
58 13150 116415         SUB0    0,3,SNR ;LAST INSTR ?
59 13151 002404         JMP     ACORUR  ;YES, RETURN
60 13152 123000         ADD     1,0     ;NO, NEXT INSTR
61 13153 151400         INC     2,2     ;ADDR TO NEXT INSTR
62 13154 000773         JMP     CORNX
63 13155 000000 CORUR:  0
```

```
01
02                              ;READ SUBROUTINE
03 13156 020224 XRD:    LDA     0,CX
04 13157 040455         STA     0,XRDC  ;USE READ COMMAND
05 13160 000404         JMP     XRDO
06
07                              ;READ UNPACKED SUBROUTINE
08 13161 020232 XRDU:   LDA     0,C6X
09 13162 040452         STA     0,XRDC  ;USE READ UNPACKED COMMAND
10 13163 000401         JMP     XRDO
11
12                              ;COMMON READ SUBROUTINE
13                              ;ARGUMENT FOLLOWING CALL SPECIFIES
14                              ;# OF RECORDS, # OF WORDS, AND PARITY TYPE.
15                              ;BITS10-15=# OF WORDS
16                              ;BITS 4- 9=# OF RECORDS
17                              ;BIT  0   =1 FOR EVEN PARITY
18                              ;NO STATUS CHECKING !
19                              ;CALL   READ/READU
20                              ;       ARG
21                              ;       ERROR RETURN, NO DONE WITHIN 2 SEC, AC2=REC #.
22 13164 054445 XRDO:   STA     3,RRD
23 13165 010444         ISZ     RRD     ;PASS ARG
24 13166 031400         LDA     2,0,3   ;AC2=ARG
25 13167 020151         LDA     0,C77
26 13170 143400         AND     2,0
27 13171 100400         NEG     0,0
28 13172 040244         STA     0,WDCNT ;SAVE WORD COUNT
29 13173 020441         LDA     0,XRDC
30 13174 024157         LDA     1,C400  ;EVEN PARITY COMMAND
31 13175 151112         MOVL#   2,2,SZC ;EVEN PARITY BIT IN ARG ?
32 13176 123000         ADD     1,0     ;YES, ADD EVEN
33 13177 040245         STA     0,INST  ;SAVE INSTR
34 13200 024162         LDA     1,C7700
35 13201 147400         AND     2,1     ;AC1=#RECX100
36 13202 030152         LDA     2,C100  ;AC2=100
37 13203 006067         DIVIS           ;AC1=# OF REC
38 13204 044426         STA     1,PRD
39 13205 125400         INC     1,1
40 13206 044425         STA     1,PRD1
41 13207 030244 XRD1:   LDA     2,WDCNT
42 13210 073030 MTC20:  DOC     2,MTC   ;SET WC
43 13211 030135         LDA     2,IBUFF
44 13212 072030 MTC21:  DOB     2,MTC   ;SET AC
45 13213 030245         LDA     2,INST
46 13214 071030 MTC22:  DOA     2,MTC   ;START READ
47 13215 060130 MTC23:  NIOS    MTC
48 13216 006063         TIMSK
49 13217 003720         2000.           ;WAIT MAX 2 SEC
50 13220 063630 MTC24:  SKPDN   MTC
51 13221 000404         JMP     XRD2    ;GO IN ERROR
52 13222 014410         DSZ     PRD     ;COUNT # OF REC
53 13223 000764         JMP     XRD1
54 13224 010405         ISZ     RRD     ;PASS ERROR RETURN
55 13225 030406 XRD2:   LDA     2,PRD1
56 13226 034404         LDA     3,PRD
57 13227 172400         SUB     3,2     ;AC2= REC # IF ERROR
58 13230 002401         JMP     @RRD
59 13231 000000 RRD:    0
60 13232 000000 PRD:    0
61 13233 000000 PRD1:   0
62 13234 000000 XRDC:   0               ;TYPE OF READ COMMAND
```

```
01
02                              ;WRITE SUBROUTINE
03                              ;ARGUMENT FOLLOWING CALL SPECIFIES
04                              ;# OF RECORDS, # OF WORDS, AND PARITY TYPE.
05                              ;BITS10-15=# OF WORDS
06                              ;BITS 4- 9=# OF RECORDS
07                              ;BIT  3   =1 FOR WRITE ODD # OF CHARS
08                              ;BIT  0   =1 FOR EVEN PARITY
09                              ;NO STATUS CHECKING !
10                              ;CALL   WRITE
11                              ;       ARG
12                              ;       ERROR RETURN, NO DONE WITHIN 2 SEC, AC2=REC #.
13 13235 054451 XWR:    STA     3,RWRT
14 13236 010450         ISZ     RWRT    ;PASS ARG
15 13237 031400         LDA     2,0,3   ;AC2=ARG
16 13240 020151         LDA     0,C77
17 13241 143400         AND     2,0
18 13242 100400         NEG     0,0
19 13243 040244         STA     0,WDCNT ;SAVE WORD COUNT
20 13244 020225         LDA     0,C1X
21 13245 024157         LDA     1,C400  ;EVEN PARITY COMMAND
22 13246 151112         MOVLO   2,2,SZC ;EVEN PARITY BIT IN ARG ?
23 13247 123000         ADD     1,0     ;YES, ADD EVEN
24 13250 024155         LDA     1,C200  ;ODD CHAR COMMAND
25 13251 034161         LDA     3,C10K
26 13252 157414         ANDO    2,3,SZR ;ODD CHAR BIT IN ARG ?
27 13253 123000         ADD     1,0     ;YES, ADD ODD
28 13254 040245         STA     0,INST  ;SAVE INSTR
29 13255 024162         LDA     1,C7700
30 13256 147400         AND     2,1     ;AC1=#RECX100
31 13257 030152         LDA     2,C100  ;AC2=100
32 13260 006067         DIVIS           ;AC1= # OF REC
33 13261 044426         STA     1,PWRT
34 13262 125400         INC     1,1
35 13263 044425         STA     1,PWRT1
36 13264 030244 XWRT1:  LDA     2,WDCNT
37 13265 073030 MTC25:  DOC     2,MTC   ;SET WC
38 13266 030134         LDA     2,OBUFF
39 13267 072030 MTC26:  DOB     2,MTC   ;SET AC
40 13270 030245         LDA     2,INST
41 13271 071030 MTC27:  DOA     2,MTC   ;START WRITE
42 13272 060130 MTC28:  NIOS    MTC
43 13273 006063         TIMSK
44 13274 003720         2000.           ;WAIT MAX 2 SEC
45 13275 063630 MTC29:  SKPDN   MTC
46 13276 000404         JMP     XWRT2   ;GO IN ERROR
47 13277 014410         DSZ     PWRT    ;COUNT # OF REC
48 13300 000764         JMP     XWRT1
49 13301 010405         ISZ     RWRT    ;PASS ERROR RETURN
50 13302 030406 XWRT2:  LDA     2,PWRT1
51 13303 034404         LDA     3,PWRT
52 13304 172400         SUB     3,2     ;AC2=REC # IF ERROR
53 13305 002401         JMP     @RWRT
54 13306 000000 RWRT:   0
55 13307 000000 PWRT:   0
56 13310 000000 PWRT1:  0
```

```
                        ;SPACE SUBROUTINE
                        ;ARGUMENT FOLLOWING CALL SPECIFIES
                        ;# OF RECORDS, FORW/REVERSE AND PARITY TYPE.
                        ;BITS 4- 9=# OF RECORDS
                        ;IF # OF RECORDS IS ZERO
                        ;THE TAPE IS SPACED ONE FILE (POSITIONED AFTER NEXT EOF).
                        ;BIT 3 = 1 FOR BACKSPACE, 0 FOR FORWARD.
                        ;BIT 0 = 1 FOR EVEN PARITY.
                        ;NO STATUS CHECKING !   NO DONE CHECKING IF SPACE FILE !
                        ;CALL   SPARG
                        ;       ARG
                        ;       ERROR RETURN, NO DONE WITHIN 2 SEC, AC2=REC #.
13311 054456 XSARG:     STA     3,RSARG
13312 010455            ISZ     RSARG   ;PASS ARG
13313 054457            STA     3,PSP2  ;SET SPACE NORMAL FLAG NON ZERO
13314 031400            LDA     2,0,3   ;AC2=ARG
13315 020226            LDA     0,C2X   ;SPACE FORWARD COMMAND
13316 024161            LDA     1,C10K
13317 133414            ANDZ    1,2,SZR ;BACKSPACE BIT IN ARG ?
13320 020227            LDA     0,C3X   ;YES, BACKSPACE COMMAND
13321 024157            LDA     1,C400  ;EVEN PARITY COMMAND
13322 151112            MOVLZ   2,2,SZC ;EVEN PARITY BIT IN ARG ?
13323 123000            ADD     1,0     ;YES, ADD EVEN
13324 024162            LDA     1,C7700
13325 034160            LDA     3,C2K   ;SPACE FILE COMMAND
13326 147405            AND     2,1,SNR ;AC1=#RECX100
13327 163000            ADD     3,0     ;IF # REC IS ZERO, ADD SPACE FILE COMM
13330 040245            STA     0,INST
13331 030152            LDA     2,C100
13332 006067            DIVIS           ;AC1=# OF REC
13333 125015            MOVZ    1,1,SNR ;SPACE FILE ?
13334 044436            STA     1,PSP2  ;YES, SET FLAG TO ZERO
13335 125015            MOVZ    1,1,SNR ;SPACE FILE ?
13336 125400            INC     1,1     ;YES, SET PSP TO 1 FOR REC #
13337 044431            STA     1,PSP
13340 125400            INC     1,1
13341 044430            STA     1,PSP1
13342 152000            ADC     2,2     ;AC2=177777
13343 073030 MT157:     DOC     2,MTC   ;SET WC TO 1, NOT USED
13344 030135            LDA     2,IBUFF ;SET AC TO IBUFF
13345 072030 MT158:     DOB     2,MTC   ;START COUNT FOR BYTES
13346 030245 XSAR1:     LDA     2,INST
13347 071030 MT159:     DOA     2,MTC   ;START SPACE
13350 060130 MT160:     NIOS    MTC
13351 024421            LDA     1,PSP2
13352 125015            MOVZ    1,1,SNR ;SPACE FILE ?
13353 000410            JMP     XSAR2   ;YES, NO BUSY WAITING
13354 006063            TIMSK
13355 003720            2000.           ;WAIT MAX 2 SEC
13356 063630 MT161:     SKPDN   MTC
13357 000404            JMP     XSAR2   ;GO IN ERROR
13360 014410            DSZ     PSP     ;COUNT # OF REC
13361 000765            JMP     XSAR1
13362 010405            ISZ     RSARG   ;PASS ERROR RETURN
13363 030406 XSAR2:     LDA     2,PSP1
13364 034404            LDA     3,PSP
13365 172400            SUB     3,2     ;AC2=REC # IF ERROR
13366 002401            JMP     @RSARG
13367 000000 RSARG:     0
13370 000000 PSP:       0
13371 000000 PSP1:      0
13372 000000 PSP2:      0               ;SPACE NORMAL FLAG (0 FOR SPACE FILE)
```

```
                        ;CHECK STATUS FOR BOT OR OFF-LINE.
                        ;AC2=UNIT BEING SELECTED + COMMAND NOOP.
                        ;RETURN+1 IF ERROR
13373 054417 CSTAT:     STA     3,CSTAR
13374 024144            LDA     1,C7
13375 147400            AND     2,1     ;AC1=ACTUAL UNIT BEING SELECTED
13376 034260            LDA     3,UNITA ;AC3=UNIT UNDER TEST
13377 166415            SUBO    3,1,SNR
13400 000405            JMP     CSTON   ;SHOULD BE AT BOT IF UNIT UNDER TEST
13401 006115            STATA           ;ELSE TEST FOR OFFLINE.
13402 040000            040000          ;EXPECTED STATUSBITS
13403 002407            JMP     ACSTAR  ;ERROR, RETURN +1
13404 000404            JMP     CSTOK   ;OK, RETURN +2
13405 006115 CSTON:     STATA
13406 010000            010000          ;EXPECTED STATUSBITS
13407 002403            JMP     ACSTAR  ;ERROR, RETURN +1
13410 010402 CSTOK:     ISZ     CSTAR   ;OK, RETURN +2
13411 002401            JMP     ACSTAR
13412 000000 CSTAR:     0

                        ;COMPARE IBUFF WITH TABLE.
                        ;TABLE = OBUFF DATA, BUT FORMAT USED IN READ UNPACKED.
                        ;
                        ;       CHECU
                        ;       ARG
                        ;
                        ;ARGUMENT = ADDR OF TABLE WITH CORRECT PATTERN.
                        ;1. WORD IN THAT TABLE IS 0 OF WORDS IN TABLE (N).
                        ;COMPARE WORD FOR WORD.
                        ;WORD N+1 IN IBUFF MUST BE ZERO.
                        ;IF ERROR RETURN TO CALL+2
                        ;OTHERWISE TO CALL+3
                        ;EXIT WITH AC0=BAD WORD
                        ;AC1=GOOD WORD
                        ;AC2=ADDR OF IBUFF BAD WORD.
13413 054431 XCHU:      STA     3,RCHU
13414 035400            LDA     3,0,3   ;GET ARG
13415 031400            LDA     2,0,3   ;GET TABLE LENGTH
13416 050427            STA     2,CNTRU
13417 030135            LDA     2,IBUFF
13420 020250 XCHU1:     LDA     0,DAMSK ;7/9 TRACK MASK
13421 024156            LDA     1,C377  ;UNPACKED DATA BYTE MASK
13422 123400            AND     1,0     ;NEW DATA MASK 7/9 TRACK
13423 024163            LDA     1,C1774 ;UNPACKED INFO BITS + ZEROES MASK
13424 123000            ADD     1,0     ;COMPLETE MASK
13425 025401            LDA     1,1,3   ;TABLE WORD
13426 107400            AND     0,1     ;MASK OUT 2 TRACKS IF 7 TRACK
13427 021000            LDA     0,0,2   ;READ WORD
13430 106414            SUBO    0,1,SZR
13431 000411            JMP     LEAVU   ;ERROR
13432 151400            INC     2,2
13433 175400            INC     3,3
13434 014411            DSZ     CNTRU   ;END BUFFER DATA ?
13435 000763            JMP     XCHU1   ;NO
13436 126400            SUB     1,1     ;1. WORD NOT USED SHOULD BE ZERO
13437 021000            LDA     0,0,2   ;
13440 101015            MOVO    0,0,SNR ;WORD FOLLOWING LAST MUST BE ZERO
13441 010403            ISZ     RCHU    ;PASS ERROR RETURN
13442 010402 LEAVU:     ISZ     RCHU    ;PASS ARG
13443 002401            JMP     ARCHU
13444 000000 RCHU:      0
13445 000000 CNTRU:     0
```

```
01
02                              ;BAD TAPE STATUS WRITE BUFFER.
03 13446 020001 BTBF:   020001  ;1
04 13447 010002         010002  ;2
05 13450 004004         004004  ;3
06 13451 002010         002010  ;4
07 13452 000000         000000  ;5
08 13453 000002         000002  ;6
09 13454 000420         000420  ;7
10 13455 020040         020040  ;8
11
12                              ;CRC CHECK WRITE DATA.
13 13456 121125 PAT0:   121125
14 13457 052400         052400
15 13460 000000         000000
16 13461 000200 PAT1:   000200
17 13462 000200         000200
18 13463 000000         000000
19 13464 177474 PAT2:   177474
20 13465 136074         136074
21 13466 000000         000000
22 13467 052652 PAT3:   052652
23 13470 076232         076232
24 13471 000000         000000
25 13472 167141 PAT4:   167141
26 13473 000200         000200
27 13474 000000         000000
28
29                              ;CRC CHECK CONTROL DATA UNPACKED.
30 13475 000005 UPAT0:  5                       ;LENGTH OF TABLE
31 13476 000242         000242
32 13477 000525         000525
33 13500 000525         000525
34 13501 040242         040242
35 13502 000000         000000
36 13503 000006 UPAT1:  6                       ;LENGTH OF TABLE
37 13504 000400         000400
38 13505 000200         000200
39 13506 000400         000400
40 13507 000200         000200
41 13510 040727         040727
42 13511 040727         040727
43 13512 000006 UPAT2:  6
44 13513 000777         000777
45 13514 000474         000474
46 13515 000274         000274
47 13516 000474         000474
48 13517 040224         040224
49 13520 040727         040727
50 13521 000006 UPAT3:  6
51 13522 000525         000525
52 13523 000652         000652
53 13524 000174         000174
54 13525 000632         000632
55 13526 040076         040076
56 13527 040447         040447
57 13530 000006 UPAT4:  6
58 13531 000756         000756
59 13532 000141         000141
60 13533 000400         000400
61 13534 000200         000200
62 13535 040147         040147
63 13536 040150         040150
```

```
01
02                              ;LPC CHECK WRITE DATA 7 TRACK.
03 13537 000077 PAT5:   000077
04 13540 000077         000077
05 13541 000000         000000
06 13542 012425 PAT6:   012425
07 13543 025000         025000
08 13544 000000         000000
09 13545 025052 PAT7:   025052
10 13546 012053         012053
11 13547 000000         000000
12 13550 025025 PAT8:   025025
13 13551 037425         037425
14 13552 000000         000000
15
16                              ;LPC CHECK CONTROL DATA UNPACKED.
17 13553 000005 UPAT5:  5                       ;LENGTH OF TABLE
18 13554 000400         000400
19 13555 000477         000477
20 13556 000400         000400
21 13557 000477         000477
22 13560 000000         000000
23 13561 000004 UPAT6:  4
24 13562 000025         000025
25 13563 000025         000025
26 13564 000052         000052
27 13565 040052         040052
28 13566 000006 UPAT7:  6
29 13567 000052         000052
30 13570 000052         000052
31 13571 000424         000424
32 13572 000453         000453
33 13573 000400         000400
34 13574 040477         040477
35 13575 000005 UPAT8:  5
36 13576 000452         000452
37 13577 000425         000425
38 13600 000077         000077
39 13601 000425         000425
40 13602 040425         040425
41
42                              ;BACKSPACE FILE WRITE DATA
43 13603 177420 PAT9:   177420
44 13604 010377         010377
45 13605 024050         024050
46 13606 100001 PAT10:  100001
47 13607 040002         040002
48 13610 020004         020004
49 13611 010010 PAT11:  010010
50 13612 004020         004020
51 13613 002040         002040
52 13614 001100 PAT12:  001100
53 13615 000600         000600
54 13616 042104         042104
```

```
01
02                              ;DATA LATE TEST
03                              ;CONTINUALLY WRITE 4K RECORDS. (100 RECORDS)
04                              ;CHECK STATUS AFTER EACH WRITE
05                              ;AND PRINT IT OUT.  DO TECHNICAL PANEL
06                              ;STOP-CONTINUE TO CAUSE DATA LATE.
07 13617 000401 DLT:    JMP     .+1             ;REWIND STARTED IN SA ADMINI
08 13620 006110         SETPO                   ;NO LOOP FOR THIS, ONLY FOR EHALT
09 13621 006272         WABOT                   ;UPDATE STATUS, LOOK FOR BOT
10 13622 006114         EHALT                   ;NO BOT FOUND
11                                              ;AC0=BAD STATUS
12 13623 006112         SETP2
13 13624 030453 DENT:   LDA     2,DLADR
14 13625 072030 MTC30:  DOB     2,MTC
15 13626 030452         LDA     2,DLBLE
16 13627 073030 MTC31:  DOC     2,MTC
17 13630 020225         LDA     0,C1X
18 13631 061030 MTC32:  DOA     0,MTC           ;START WRITE
19 13632 060130 MTC33:  NIOS    MTC
20 13633 006063         TIMSK
21 13634 003720         2000.                   ;WAIT MAX 2 SEC
22 13635 063630 MTC34:  SKPDN   MTC
23 13636 006114         EHALT                   ;NO DONE AFTER COMMAND
24 13637 006044         CDISP
25 13640 014235         MDL
26 13641 006040         CMESS
27 13642 014235         MDL
28 13643 064430 MTC35:  DIA     1,MTC           ;GET STATUS
29 13644 006052         CTOCT                   ;PRINT IT
30 13645 006056         CDOCT
31 13646 006047         CDATT
32 13647 006046         CDICL
33 13650 006116         STATN
34 13651 000100         000100                  ;DATA LATE
35 13652 000405         JMP     YESDL           ;YES
36 13653 006044 NODL:   CDISP
37 13654 014243         MDL1
38 13655 006040         CMESS
39 13656 014243         MDL1
40 13657 006044 YESDL:  CDISP
41 13660 014245         MDL2
42 13661 006040         CMESS
43 13662 014245         MDL2
44 13663 006047         CDATT
45 13664 006115         STATA
46 13665 000020         000020                  ;EOT
47 13666 000404         JMP     DLT1            ;NO
48 13667 006303         REWIND                  ;YES, REWIND
49 13670 006272         WABOT                   ;UPDATE STATUS, LOOK FOR BOT
50 13671 006114         EHALT                   ;NO BOT FOUND
51                                              ;AC0=BAD STATUS
52 13672 000402 DLT1:   JMP     .+2             ;CHANGE TO JMP .+1 (401) IF
53 13673 000731         JMP     DENT            ;INFINITE # OF LOOPS WANTED.
54 13674 006113         LOOP                    ;TRY 100 BLOCKS
55 13675 002401         JMP     A.+1
56 13676 006141         SWISA                   ;RESTART
57
58 13677 021357 DLADR:  LASTP+1000
59 13700 170000 DLBLE:  170000                  ;4K BLOCK
```

```
01
02                          ;END TAPE TEST. WRITE TO EOT AND TEST 10 TIMES.
03                          ;TEST GO OFFLINE/REWIND. NOTE ERRORS ALONG THE WAY.
04
05                          ;FIRST 2 ROUTINES, START IN ETT NEXT PAGE.
06
07                          ;ROUTINE TO WRITE, CHECK STATUS
08                          ;CALL
09                          ;EOT RETURN, STATUS NOT CHECKED
10                          ;NORMAL RETURN
11 13701 054457 ETTWR:  STA     3,ENDTR
12 13702 030457         LDA     2,ENADR
13 13703 072030 MTC36:  DOB     2,MTC
14 13704 030456         LDA     2,ENBLE
15 13705 073030 MTC37:  DOC     2,MTC
16 13706 020225         LDA     0,CTX
17 13707 061030 MTC38:  DOA     0,MTC   ;WRITE
18 13710 060130 MTC39:  NIOS    MTC
19 13711 006063         TIMSK
20 13712 003720         2000.           ;WAIT MAX 2 SEC
21 13713 063630 MTC40:  SKPDN   MTC
22 13714 006114         EHALT           ;NO HALT AFTER COMMAND
23 13715 006116         STATN
24 13716 000020         000020
25 13717 002441         JMP     AENDTR  ;END TAPE RETURN
26 13720 010440         ISZ     ENDTR   ;PASS EOT RETURN
27 13721 006116         STATN
28 13722 173500         173500
29 13723 000402         JMP     .+2
30 13724 002434         JMP     AENDTR  ;NO EOT, NO ERRORS
31 13725 006044         CDISP
32 13726 014061         DSTAR
33 13727 006040         CMESS
34 13730 014050         MSTAR
35 13731 064430 MTC41:  DIA     1,MTC
36 13732 006052         CTOCT
37 13733 006056         CDOCT
38 13734 006047         CDATT
39 13735 002423         JMP     AENDTR
40
41                          ;ROUTINE EOT MESS AND CHECK STATUS FOR ERRORS.
42 13736 054422 ENDTM:  STA     3,ENDTR ;EOT FOUND, BUT OTHER STATUSBITS
43 13737 006044         CDISP           ;NOT CHECKED.
44 13740 014067         MENDT
45 13741 006040         CMESS
46 13742 014067         MENDT
47 13743 006116         STATN
48 13744 173500         173500
49 13745 000402         JMP     .+2
50 13746 000410         JMP     ENDTF
51 13747 006044         CDISP
52 13750 014100         DESTA
53 13751 006040         CMESS
54 13752 014072         MESTA
55 13753 064430 MTC42:  DIA     1,MTC
56 13754 006052         CTOCT
57 13755 006056         CDOCT
58 13756 006047 ENDTF:  CDATT
59 13757 002401         JMP     AENDTR
60
61 13760 000000 ENDTR:  0
62 13761 021357 ENADR:  LASTP+1000
63 13762 170000 ENBLE:  170000          ;4K BLOCK
```

```
01
02                              ;END TAPE TEST PAGE 2.
03 13763 000401 ETT:    JMP     .+1
04 13764 006110                 SETPO                   ;NO LOOP FOR THIS, ONLY FOR EHALT
05 13765 006272                 WABOT                   ;UPDATE STATUS, LOOK FOR BOT
06 13766 006114                 EHALT                   ;NO BOT FOUND
07                                                      ;AC0=BAD STATUS
08 13767 004712 ETT1:   JSR     ETTWR   ;WRITE A BLOCK
09 13770 000402                 JMP     ENDI    ;EOT FOUND
10 13771 000776                 JMP     ETT1    ;CONTINUOSLY WRITE BLOCKS
11
12 13772 004744 ENDI:   JSR     ENDTM   ;WRITE MESS EOT AND CHECK STATUS
13 13773 006111                 SETP1                   ;TRY 10 TIMES TO CHECK EOT
14 13774 006276 EREP:   BSPACE
15 13775 006114                 EHALT                   ;NO DONE AFTER COMMAND
16 13776 006276                 BSPACE
17 13777 006114                 EHALT                   ;NO DONE AFTER COMMAND
18 14000 006276                 BSPACE
19 14001 006114                 EHALT                   ;NO DONE AFTER COMMAND
20 14002 006116                 STATN                   ;NO EOT STATUS NOW AFTER BACKSPACE
21 14003 173520                 173520                  ;EOT/ERRORS
22 14004 006114                 EHALT                   ;AC0=BAD STATUS
23                                                      ;AC1=NOT EXPECTED
24 14005 004674                 JSR     ETTWR   ;WRITE BLOCK 1
25 14006 000413                 JMP     ENDT1
26 14007 004672                 JSR     ETTWR   ;WRITE BLOCK 2
27 14010 000411                 JMP     ENDT1
28 14011 004670                 JSR     ETTWR   ;WRITE BLOCK 3
29 14012 000407                 JMP     ENDT1
30 14013 004666                 JSR     ETTWR   ;WRITE BLOCK 4
31 14014 000405                 JMP     ENDT1
32 14015 006114                 EHALT                   ;BACKSPACING 3 BLOCKS FROM EOT,
33                                                      ;WRITING 4 BLOCKS WITHOUT EOT STATUS.
34                                                      ;AC0=STATUS
35 14016 006276                 BSPACE                  ;BACKSPACE 1 BLOCK
36 14017 006114                 EHALT                   ;NO DONE AFTER COMMAND
37 14020 000402                 JMP     ENDT2   ;BACKSPACE 3 BLOCKS AND TRY AGAIN
38 14021 004715 ENDT1:  JSR     ENDTM   ;WRITE MESS EOT AND CHECK STATUS
39 14022 000402 ENDT2:  JMP     .+2     ;CHANGE TO JMP .+1 (401) IF
40 14023 000751                 JMP     EREP    ;INFINITE # OF LOOPS WANTED.
41 14024 006113                 LOOP                    ;BACKSPACE 3 BLOCKS AND TRY AGAIN
42                                                      ;UP TO 10 TIMES
43 14025 006305                 REWIND                  ;START REWIND
44 14026 006304                 OFFLINE                 ;TEST OF GO OFFLINE COMMAND
45 14027 006121                 STATP
46 14030 060000                 060000                  ;OFFLINE, REWINDING
47 14031 177757                 177757                  ;MASK OUT EOT
48 14032 006114                 EHALT                   ;AC0=BAD STATUS
49                                                      ;AC1=EXPECTED
50                                                      ;AC2=MASK
51 14033 006270                 UPSTA                   ;UPDATE STATUS
52 14034 006121                 STATP
53 14035 060000                 060000                  ;OFFLINE, REWINDING
54 14036 177757                 177757                  ;MASK OUT EOT
55 14037 006114                 EHALT                   ;AC0=BAD STATUS
56                                                      ;AC1=EXPECTED
57                                                      ;AC2=MASK
58 14040 006272                 WABOT                   ;UPDATE STATUS, LOOK FOR BOT
59 14041 006114                 EHALT                   ;NO BOT FOUND
60                                                      ;AC0=BAD STATUS
61 14042 006270                 UPSTA                   ;UPDATE STATUS
62 14043 006117                 STATW
63 14044 050000                 050000                  ;OFFLINE, BOT
64 14045 006114                 EHALT                   ;AC0=BAD STATUS
65                                                      ;AC1=EXPECTED
66 14046 002401                 JMP     A.+1
67 14047 006141                 SWISA                   ;RESTART
```

```
U159  .MAIN
01
02                MSTAR:  .TXT !<15><12>WRITE STATUS  !    ;"<15><12>WRITE STATUS  "
  14050 005015
  14051 051127
  14052 052111
  14053 020105
  14054 052123
  14055 052101
  14056 051525
  14057 020040
  14060 000000
03
04                DSTAR:  .TXT !<15><12>WR STAT  !         ;"<15><12>WR STAT  "
  14061 005015
  14062 051127
  14063 051440
  14064 040524
  14065 020124
  14066 000040
05
06                MENDT:  .TXT !<15><12>EOT!       ;"<15><12>EOT"
  14067 005015
  14070 047505
  14071 000124
07
08                MESTA:  .TXT !, STATUS  !        ;", STATUS  "
  14072 020054
  14073 052123
  14074 052101
  14075 051525
  14076 020040
  14077 000000
09
10                DESTA:  .TXT !, STAT !  ;", STAT "
  14100 020054
  14101 052123
  14102 052101
  14103 000040
```

```
01
02                              ;WRITE LOCK TEST
03 14104 006044 WLT:    CDISP
04 14105 014223         MWLS
05 14106 006040         CMESS
06 14107 014223         MWLS
07 14110 006062         WATOP           ;WAIT OPERATOR TO
08 14111 020000         020000          ;CONTINUE
09 14112 006043         CCRLF
10 14113 000401 WLT1:   JMP     .+1     ;REWIND STARTED IN SA ADMINI
11 14114 006110         SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
12 14115 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
13 14116 006114         EHALT           ;NO BOT FOUND
14                                      ;AC0=BAD STATUS
15 14117 006111         SETP1
16 14120 006270 WREP:   UPSTA           ;UPDATE STATUS
17 14121 006117         STATW
18 14122 012000         012000          ;BOT, WRITE LOCK
19 14123 006114         EHALT           ;AC0=BAD STATUS
20                                      ;AC1=EXPECTED
21                                      ;ALL COMMANDS BELOW ARE ILLEGAL,
22                                      ;THEREFORE THE TAPE SHOULD
23                                      ;STILL BE PLACED AT BOT.
24 14124 006274         WRITE
25 14125 000102         102
26 14126 006114         EHALT           ;NO DONE AFTER COMMAND
27 14127 006115         STATA
28 14130 013000         013000
29 14131 000421         JMP     ERWL    ;BAD STATUS
30 14132 006300         WEOF
31 14133 006114         EHALT           ;NO DONE AFTER COMMAND
32 14134 006115         STATA
33 14135 013000         013000
34 14136 000414         JMP     ERWL
35 14137 006301         ERASE
36 14140 006114         EHALT           ;NO DONE AFTER COMMAND
37 14141 006115         STATA
38 14142 013000         013000
39 14143 000407         JMP     ERWL
40 14144 006044         CDISP           ;GOOD STATUS
41 14145 014202         MWLO
42 14146 006040         CMESS
43 14147 014202         MWLO
44 14150 006047         CDATT
45 14151 000412         JMP     OKWL
46 14152 040426 ERWL:   STA     0,SAC0
47 14153 044426         STA     1,SAC1
48 14154 006044         CDISP
49 14155 014212         MWLB
50 14156 006040         CMESS
51 14157 014212         MWLB
52 14160 020420         LDA     0,SAC0
53 14161 024420         LDA     1,SAC1
54 14162 006114         EHALT           ;AC0=BAD STATUS
55                                      ;AC1=EXPECTED
56 14163 000402 OKWL:   JMP     .+2     ;CHANGE TO JMP .+1 (401) IF
57 14164 000734         JMP     WREP    ;INFINITE # OF LOOPS WANTED.
58
59 14165 006113         LOOP            ;TRY 10 TIMES
60
61                                      ;CONTINUE NEXT PAGE
```

```
01
02                      ;TEST OF GO OFFLINE COMMAND.
03
04 14166 006304         OFFLINE
05 14167 006117         STATW
06 14170 052000         052000          ;OFFLINE, BOT, WRITE LOCK
07 14171 006114         EHALT           ;AC0=BAD STATUS
08                                      ;AC1=EXPECTED
09 14172 006270         UPSTA           ;UPDATE STATUS
10 14173 006117         STATW
11 14174 052000         052000          ;OFFLINE, BOT, WRITE LOCK
12 14175 006114         EHALT           ;AC0=BAD STATUS
13                                      ;AC1=EXPECTED
14 14176 002401         JMP     .-+1
15 14177 006141         SWISA           ;RESTART
16
17 14200 000000 SAC0:   0
18 14201 000000 SAC1:   0
```

```
. 0162  .MAIN
01
02                MWLO:   .TXT !<15><12>WRITE LOCK OK!     ;"<15><12>WRITE LOCK OK"
   14202 005015
   14203 051127
   14204 052111
   14205 020105
   14206 047514
   14207 045503
   14210 047440
   14211 000113
03
04                MWLB:   .TXT !<15><12>WRITE LOCK BAD!    ;"<15><12>WRITE LOCK BAD"
   14212 005015
   14213 051127
   14214 052111
   14215 020105
   14216 047514
   14217 045503
   14220 041040
   14221 042101
   14222 000000
05
06:               MWLS:   .TXT !<15><12>REM. RING & CONT!
   14223 005015
   14224 042522
   14225 027115
   14226 051040
   14227 047111
   14230 020107
   14231 020046
   14232 047503
   14233 052116
   14234 000000
07                        ;"<15><12>REM. RING & CONT"
08
09                MDL:    .TXT !<15><12>STATUS  ! ;"<15><12>STATUS  "
   14235 005015
   14236 052123
   14237 052101
   14240 051525
   14241 020040
   14242 000000
10
11                MDL1:   .TXT !NO !       ;"NO "
   14243 047516
   14244 000040
12
13                MDL2:   .TXT !DATA LATE!         ;"DATA LATE"
   14245 040504
   14246 040524
   14247 046040
   14250 052101
   14251 000105
14
15
16:               ;TAPE 7
17
18                .EOT
```

```
01
02                      ;TAPE 8
03
04 14252 054312 TEST:   STA     3,RTEST ;RETURN ADDR USED WHEN ALL LOOP FINISHED
05
06                      ;CHECK SELB BUS LINE
07 14253 000401 A0:     JMP     .+1
08 14254 006112         SETP2           ;DO SKPBZ, DEVICE 0
09 14255 063500         SKPBZ   0
10 14256 006114         EHALT           ;BUSY LINE BAD
11 14257 006113         LOOP
12
13                      ;CHECK SELD BUS LINE
14 14260 000401 A1:     JMP     .+1
15 14261 006112         SETP2           ;DO SKPDZ, DEVICE 0
16 14262 063700         SKPDZ   0
17 14263 006114         EHALT           ;DONE LINE BAD
18 14264 006113         LOOP
19
20                      ;CHECK MTC BUSY FLOP OFF
21 14265 000401 A2:     JMP     .+1
22 14266 006112         SETP2           ;DO BUSY TEST ON MTC
23 14267 063530 MTC50:  SKPBZ   MTC
24 14270 006114         EHALT           ;IORST CANNOT RESET MTC BUSY
25 14271 006113         LOOP
26
27                      ;CHECK MTC DONE FLOP OFF
28 14272 000401 A3:     JMP     .+1
29 14273 006112         SETP2           ;DONE TEST ON MTC
30 14274 063730 MTC51:  SKPDZ   MTC
31 14275 006114         EHALT           ;IORST CANNOT RESET MTC DONE
32 14276 006113         LOOP
33
34                      ;CHECK MTC SELECT,DOB,DIB,ADDR COUNTER (AC) IN-OUT
35 14277 000401 A4:     JMP     .+1
36 14300 006112         SETP2
37 14301 024164         LDA     1,C0252 ;LOAD AC WITH 025252
38 14302 030266         LDA     2,EXTMA ;1=BIT 0, 0=NOT IMPL.
39 14303 151014         MOVO    2,2,SZR ;BIT 0 ?
40 14304 024165         LDA     1,C1252 ;YES, LOAD AC WITH 125252
41 14305 066030 MTC52:  DOB     1,MTC
42 14306 061430 MTC53:  DIB     0,MTC   ;READ BACK AND CHECK
43 14307 106414         SUBO    0,1,SZR
44 14310 006114         EHALT           ;AC0=VALUE READ BACK
45                                      ;AC1=VALUE SENT TO AC
46                                      ;CHECK THE MTC SELECT, LOAD AC
47                                      ;ENABLE ADDR. TO BUS, AND ADDR COUNTER.
48 14311 006113         LOOP
49
50                      ;CHECK ADDR COUNTER (AC) REGISTER IN-OUT
51 14312 000401 A5:     JMP     .+1
52 14313 006112         SETP2           ;LOAD AC WITH 052525
53 14314 024166         LDA     1,C0525 ;READ BACK AND CHECK
54 14315 066030 MTC54:  DOB     1,MTC
55 14316 061430 MTC55:  DIB     0,MTC
56 14317 106414         SUBO    0,1,SZR
57 14320 006114         EHALT           ;AC0=VALUE READ BACK
58                                      ;AC1=VALUE SENT TO AC
59                                      ;CHECK ADDR COUNTER DATA PATHS
60 14321 006113         LOOP
```

```
01
02                              ;CHECK FOR ILLEGAL MTC SELECT
03 14322 000401 A6:     JMP     .+1
04 14323 020133         LDA     0,CMTA  ;LOAD AC WITH 052525
05 14324 040404         STA     0,A62   ;READ BACK USING EVERY
06 14325 006111 A61:    SETP1           ;DEVICE CODE EXCEPT MTC
07 14326 024166         LDA     1,C0525
08 14327 066030 MTC56:  DOB     1,MTC
09 14330 061400 A62:    DIB     0,0     ;PROGRAM COUNTS DEVICE CODE HERE
10 14331 030777         LDA     2,A62
11 14332 122415         SUBO    1,0,SNR ;DATA SHOULD NOT BE FOUND
12 14333 006114         EHALT           ;AC0=DATA READ BACK
13                                      ;AC1=DATA SENT TO ADDR COUNTER IN MTC
14                                      ;AC2=DEV CODE, LAST 6 BITS
15 14334 006113         LOOP
16 14335 020773         LDA     0,A62
17 14336 101400 A63:    INC     0,0     ;FIRST TRY DEV 0
18 14337 024151         LDA     1,C77   ;DEVICE MASK
19 14340 107405         AND     0,1,SNR ;1<DEV<77 ?
20 14341 000406         JMP     E6      ;DEV = 77, DONT TRY
21 14342 030256         LDA     2,DEVNA
22 14343 132415         SUBO    1,2,SNR
23 14344 000772         JMP     A63     ;MTC INC AGAIN PASSING DEVICE UNDER TEST
24 14345 040763         STA     0,A62
25 14346 000757         JMP     A61     ;TEST NEXT DEV CODE
26 14347 000401 E6:     JMP     .+1     ;NEXT LOOP
27
28                              ;CHECK ADDR COUNTER (AC) FOR LOADING ERRORS.
29 14350 000401 A7:     JMP     .+1
30 14351 126000         ADC     1,1     ;START VALUE = 177777 OR
   14352 030266         LDA     2,EXTMA ;1=BIT 0, 0=NOT IMPL.
   14353 151015         MOVO    2,2,SNR ;BIT 0 ?
   14354 125220         MOVZR   1,1     ;NO, START VALUE = 077777
   14355 006112         SETP2
   14356 066030 MT175:  DOB     1,MTC   ;REETABLISH ADDR COUNTER
   14357 061430 MT176:  DIB     0,MTC   ;TO VALUE JUST BEFORE LOOP
   14360 106414         SUBO    0,1,SZR
   14361 006114         EHALT           ;AC0=VALUE READ BACK
                                        ;AC1=VALUE SENT
40 14362 066030 MT177:  DOB     1,MTC   ;TESTING LOAD 0 TO 0 AND
41 14363 061430 MT178:  DIB     0,MTC   ;1 TO 1 ALTERNATING.
42 14364 106414         SUBO    0,1,SZR
43 14365 006114         EHALT           ;AC0=VALUE READ BACK
44                                      ;AC1=VALUE SENT
45 14366 102620         SUBZR   0,0     ;AC0:=100000
46 14367 124000         COM     1,1     ;AC1:=COMPL. OF AC1
47 14370 151015         MOVO    2,2,SNR ;BIT 0 ?
48 14371 107000         ADD     0,1     ;NO, REMOVE BIT 0 BY ADDING
49 14372 066030 MT179:  DOB     1,MTC   ;TESTING LOAD 0 TO 1 AND
50 14373 061430 MT180:  DIB     0,MTC   ;1 TO 0 ALTERNATING.
51 14374 106414         SUBO    0,1,SZR
52 14375 006114         EHALT           ;AC0=VALUE READ BACK
53                                      ;AC1=VALUE SENT
54 14376 006113         LOOP            ;INCL IORST, RESETTING ADDR COUNTER
```

```
01
02                          ;CHECK TO RESET OF ADDR COUNTER (AC) AND STATUS REG.
03 14377 000401 A8A:        JMP     .+1
04 14400 006112             SETP2               ;LOAD AC WITH ALL 1'S
05 14401 126000             ADC     1,1         ;START VALUE = 177777 OR
06 14402 030266             LDA     2,EXIMA     ;1=BIT 0, 0=NOT IMPLEMENTED
07 14403 151015             MOVO    2,2,SNR     ;BIT 0 ?
08 14404 125220             MOVZR   1,1         ;NO, START VALUE = 077777
09 14405 066030 MTC58:      DOB     1,MTC       ;LOAD AC WITH ALL 1'S
10 14406 061430 MTC59:      DIB     0,MTC       ;READ BACK AND CHECK
11 14407 106414             SUBO    0,1,SZR
12 14410 006114             EHALT               ;AC0=DATA READ BACK
13                                              ;AC1=DATA SENT TO AC
14 14411 000126             RESET               ;DO IORST,
15 14412 061430 MTC60:      DIB     0,MTC       ;READ AC AND CHECK FOR 0'S
16 14413 101004             MOV     0,0,SZR
17 14414 006114             EHALT               ;AC0=DATA READ BACK
18                                              ;AC1=DATA SENT TO AC BEFORE IORST
19                                              ;CHECK IORST, RESET, AND
20                                              ;ADDRESS COUNTER RESET GATES
21 14415 060430 MT201:      DIA     0,MTC
22 14416 101004             MOV     0,0,SZR
23 14417 006114             EHALT               ;AC0=BAD STATUS, EXPECTED ALL ZERO
24 14420 006113             LOOP
25
26                          ;CHECK ADDR COUNTER (AC) LOADING FAST.
27 14421 000401 A8A:        JMP     .+1
28 14422 006112             SETP2
29 14423 102400             SUB     0,0
30 14424 024167             LDA     1,C0104
31 14425 066030 MTC61:      DOB     1,MTC       ;LOAD AC WITH 010421
32 14426 062030 MTC62:      DOB     0,MTC       ;LOAD AC WITH 0
33 14427 061430 MTC63:      DIB     0,MTC       ;READ BACK AND CHECK
34 14430 101004             MOV     0,0,SZR
35 14431 006114             EHALT               ;AC0=AC READ BACK, SHOULD BE 0
36                                              ;AC1=PREVIOUS CONTENT OF AC
37 14432 006113             LOOP
38
39 14433 000401 A8B:        JMP     .+1
40 14434 006112             SETP2
41 14435 102400             SUB     0,0
42 14436 024170             LDA     1,C0210
43 14437 066030 MTC64:      DOB     1,MTC       ;LOAD AC WITH 021042
44 14440 062030 MTC65:      DOB     0,MTC       ;LOAD AC WITH 0
45 14441 061430 MTC66:      DIB     0,MTC       ;READ BACK AND CHECK
46 14442 101004             MOV     0,0,SZR
47 14443 006114             EHALT               ;AC0=AC READ BACK, SHOULD BE 0
48                                              ;AC1=PREVIOUS CONTENT OF AC
49 14444 006113             LOOP
50
51 14445 000401 A8C:        JMP     .+1
52 14446 006112             SETP2
53 14447 102400             SUB     0,0
54 14450 024171             LDA     1,C0421
55 14451 066030 MTC67:      DOB     1,MTC       ;LOAD AC WITH 042104
56 14452 062030 MTC68:      DOB     0,MTC       ;LOAD AC WITH 0
57 14453 061430 MTC69:      DIB     0,MTC       ;READ BACK AND CHECK
58 14454 101004             MOV     0,0,SZR
59 14455 006114             EHALT               ;AC0=AC READ BACK, SHOULD BE 0
60                                              ;AC1=PREVIOUS CONTENT OF AC
61 14456 006113             LOOP
```

```
01
02                              ;CHECK ADDR COUNTER (AC) LOADING FAST.
03 14457 000401 A8D:    JMP     .+1
04 14460 006112         SETP2
05 14461 102400         SUB     0,0
06 14462 024172         LDA     1,C0042 ;LOAD AC WITH 004210
07 14463 030266         LDA     2,EXTMA ;1=BIT 0, 0=NOT IMPL.
08 14464 151014         MOVO    2,2,SZR ;BIT 0 ?
09 14465 024173         LDA     1,C1042 ;YES, LOAD AC WITH 104210
10 14466 066030 MTC70:  DOB     1,MTC
11 14467 062030 MTC71:  DOB     0,MTC   ;LOAD AC WITH ALL ZEROS
12 14470 061430 MTC72:  DIB     0,MTC   ;READ BACK AND CHECK
13 14471 101004         MOV     0,0,SZR
14 14472 006114         EHALT           ;AC0=AC READ BACK, SHOULD BE 0
15                                      ;AC1=PREVIOUS CONTENT OF AC
16 14473 006113         LOOP
17
18                              ;CHECK ADDR COUNTER (AC) LOADING FAST.
19 14474 000401 A8E:    JMP     .+1
20 14475 006112         SETP2           ;LOAD AC WITH:
21 14476 034172         LDA     3,C0042 ;                   004210 OR
22 14477 030266         LDA     2,EXTMA ;1=BIT 0, 0=NOT IMPL.
23 14500 151014         MOVO    2,2,SZR ;BIT 0 ?
24 14501 034173         LDA     3,C1042 ;YES                104210
25 14502 030171         LDA     2,C0421 ;                   042104
26 14503 020170         LDA     0,C0210 ;                   021042
27 14504 024167         LDA     1,C0104 ;                   010421
28 14505 076030 MTC73:  DOB     3,MTC
29 14506 072030 MTC74:  DOB     2,MTC
30 14507 062030 MTC75:  DOB     0,MTC
31 14510 066030 MTC76:  DOB     1,MTC
32 14511 061430 MTC77:  DIB     0,MTC   ;READ BACK AND CHECK
33 14512 071430 MTC57:  DIB     2,MTC   ;VERIFY READ BACK
34 14513 106414         SUBO    0,1,SZR
35 14514 006114         EHALT           ;AC0=VALUE READ BACK
36                                      ;AC1=VALUE SENT LAST
37                                      ;AC2=VALUE READ BACK SECOND TRY
38 14515 006113         LOOP
39
40                              ;WAIT FOR BOT BEFORE SENDING COMMANDS.
41 14516 000401 A8F:    JMP     .+1
42 14517 006110         SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
43 14520 006272         WABOT           ;UPDATE STATUS, WAIT MAX 50 SEC FOR BOT
44 14521 006114         EHALT           ;NO BOT FOUND, READ FOLLOWING:
45                                      ;AC0=BAD STATUS
46                                      ;IS UNIT 0 ANSWERED CORRECT AND IS
47                                      ;THAT UNIT ONLINE ?
48                                      ;
49                                      ;UNDER INITIALIZATION AND AFTER EVERY
50                                      ;RUN THROUGH ALL THE TESTLOOPS, A REWIND
51                                      ;IS STARTED. HERE IS SEARCHED
52                                      ;FOR BOT. IF IT WORKS IT IS GOOD,
53                                      ;IF NOT THIS IS NOT THE TEST FOR
54                                      ;BOT (BUSY, NOOP COMM.)
55                                      ;THEREFORE PLACE THE TAPE MANUALLY
56                                      ;ON BOT, SET ONLINE AGAIN AND
57                                      ;CONTINUE OR RESTART TEST.
```

```
                                ;CHECK MTC START AND BUSY FLOP
14522 000401 A9:    JMP     .+1
14523 006111        SETP1
14524 020231        LDA     0,C5X       ;SELECT UNIT
14525 061030 MTC15: DOA     0,MTC       ;BY ERASE COMMAND
14526 060130 MTC78: NIOS    MTC         ;SEND START PULSE
14527 063430 MTC79: SKPBN   MTC         ;SKIP ON BUSY SET
14530 006114        EHALT               ;MTC START DID NOT SET BUSY
                                        ;CHECK MTC START, MTC BUSY FLOP.
14531 006113        LOOP

                                ;CHECK IORST OF BUSY FLOP.
14532 000401 A10:   JMP     .+1
14533 006111        SETP1
14534 020231        LDA     0,C5X       ;SELECT UNIT
14535 061030 MT152: DOA     0,MTC       ;BY ERASE COMMAND
14536 060130 MTC80: NIOS    MTC         ;SEND START PULSE
14537 063430 MTC81: SKPBN   MTC         ;MAKE SURE BUSY IS ON
14540 006114        EHALT               ;START PULSE DIDN'T SET BUSY
                                        ;THIS JUST WORKED IN THE
                                        ;PREVIOUS TEST!
14541 006126        RESET               ;DO IORST AND MAKE SURE BUSY OFF
14542 063530 MTC82: SKPBZ   MTC
14543 006114        EHALT               ;IORST DIDN'T RESET BUSY
                                        ;CHECK CLEAR COM AND
                                        ;MTC BUSY RESET LINE
14544 006113        LOOP

                                ;CHECK CLEAR PULSE
14545 000401 A11:   JMP     .+1
14546 006111        SETP1
14547 020231        LDA     0,C5X       ;SELECT UNIT
14550 061030 MT153: DOA     0,MTC       ;BY ERASE COMMAND
14551 060130 MTC83: NIOS    MTC         ;SEND START PULSE
14552 063430 MTC84: SKPBN   MTC         ;MAKE SURE BUSY IS ON
14553 006114        EHALT               ;MT START DIDN'T SET MT BUSY
                                        ;THIS HAS WORKED TWICE BEFORE!
14554 060230 MTC85: NIOC    MTC         ;SEND CLEAR PULSE AND
14555 063530 MTC86: SKPBZ   MTC         ;MAKE SURE BUSY RESETS
14556 006114        EHALT               ;MTC CLR DIDN'T RESET BUSY
                                        ;CHECK MT CLR THRU CLEAR ON
14557 006113        LOOP

                                ;CHECK DOA=MTLC=COMMAND DECODER
14560 000401 A12:   JMP     .+1
14561 006111        SETP1
14562 020231        LDA     0,C5X       ;SELECT UNIT
14563 061030 MT154: DOA     0,MTC       ;BY ERASE COMMAND
14564 020233        LDA     0,C7X
14565 061030 MTC87: DOA     0,MTC       ;CHANGE ERASE TO REWIND COMMAND
14566 060130 MTC88: NIOS    MTC         ;SEND START PULSE, SETTING BUSY SHORT
14567 006063        TIMSK               ;BUSY SHOULD CLEAR IN ABOUT 5 USEC
14570 000001        1                   ;WAIT MAX 1 MSEC
14571 063530 MTC89: SKPBZ   MTC         ;MAKE SURE BUSY IS CLEARED
14572 006114        EHALT               ;CHECK THE GATE DRIVING THE
                                        ;MT BUSY SET LINE.  REWIND IS ON
                                        ;AND MT START IS SETTING BUSY.
                                        ;CHECK COMMAND DECODER.
14573 006113        LOOP
```

```
01
02                              ;CHECK DIA AND STATUS REGISTER AT BOT
03 14574 000401 A13:    JMP     .+1
04 14575 006111         SETP1
05 14576 006303         REWIND          ;REWIND TAPE.
06 14577 006270         UPSTA           ;CHECK THAT BUSY CLEARS AFTER NOOP
07 14600 006272         WABOT           ;UPDATE STATUS, READ AND CHECK STATUS
08                                      ;FOR BOT, WAIT MAX 50 SEC.
09 14601 006114         EHALT           ;AC0=BAD STATUS, ONLY BOT STATUS CHECKED
10                                      ;AC1=BOT STATUS
11                                      ;THIS IS THE FIRST READ STATUS.
12                                      ;CHECK RD STATUS, REWIND THRU TO
13                                      ;TAPE AND BOT LINE FROM TAPE.
14                                      ;ALSO BOT STATUS REG. GATE
15 14602 006113         LOOP
16
17                              ;CHECK UNIT SELECT LOGIC,NOOP COMMAND DECODE
18 14603 000401 A14:    JMP     .+1
19 14604 020153         LDA     0,C170  ;SELECT EACH UNIT
20 14605 040223         STA     0,X170  ;IN SEQUENCE 0-7
21 14606 006111 A141:   SETP1           ;CHECK FOR BOT IF IT IS
22 14607 030223         LDA     2,X170  ;UNIT UNDER TEST
23 14610 071030 MTC90:  DOA     2,MTC   ;OTHERWISE CHECK FOR OFFLINE
24 14611 060130 MTC91:  NIOS    MTC     ;SEND START PULSE
25 14612 006267         JSR     AICKST
26 14613 006114         EHALT           ;AC0=BAD STATUS
27                                      ;AC1=EXPECTED
28                                      ;AC2(13-15)=UNIT JUST TESTED
29                                      ;IF UNIT TESTED=UNIT SELECTED
30                                      ;PROCEED ON THE STATUS INFO.
31                                      ;IF NOT CHECK FOR ERRONEOUS OFF-LINE.
32                                      ;ONLY UNIT UNDER TEST ONLINE !
33 14614 006113         LOOP
34 14615 010223         ISZ     X170
35 14616 030223         LDA     2,X170  ;NEXT UNIT TO TEST + COMMAND
36 14617 024155         LDA     1,C200  ;IF UNIT 0 OVERFLOW, STOP
37 14620 132414         SUBO    1,2,SZR
38 14621 000765         JMP     A141
39
40                              ;CHECK UNIT UNDER TEST FOR ONLINE.
41 14622 000401 A14B:   JMP     .+1
42 14623 006111         SETP1
43 14624 006270         UPSTA           ;UPDATE STATUS FOR UNIT UNDER TEST
44 14625 006116         STATN           ;WITH NOOP COMMAND, CHECK STATUS.
45 14626 040000         040000          ;OFFLINE STATUS
46 14627 006114         EHALT           ;AC0=BAD STATUS
47                                      ;AC1=NOT EXPECTED
48                                      ;UNIT UNDER TEST MUST BE ONLINE.
49 14630 006113         LOOP
```

```
01
02                          ;CHECK REWIND=ERASE=REWIND SEQUENCE
03                          ;CHECK WHOLE STATUS
04 14631 000401 A15:        JMP     .+1
05 14632 006110             SETPO
06 14633 006303             REWIND              ;REWIND, WAIT MAX 50 SEC., CHECK STATUS.
07 14634 006272             WABOT               ;UPDATE STATUS, READ AND CHECK STATUS
08 14635 006114             EHALT               ;BOT NOT FOUND
09                                              ;AC0=BAD STATUS, ONLY BOT STATUS CHECKED
10                                              ;AC1=BOT STATUS
11 14636 006301             ERASE               ;ERASE, WAIT MAX 1 SEC.
12 14637 006114             EHALT               ;NO DONE AFTER COMMAND
13 14640 006117             STATW               ;CHECK WHOLE STATUS FIRST TIME
14 14641 000000             000000
15 14642 006114             EHALT               ;AC0=BAD STATUS
16                                              ;AC1=EXPECTED
17                                              ;THIS IS THE FIRST ALL STATUSBITS TEST
18                                              ;IF (BOT), ERASE DIDN'T MOVE TAPE.
19                                              ;CHECK ERASE COMMAND THRU TO TAPE
20 14643 006270             UPSTA               ;UPDATE STATUS
21 14644 006117             STATW               ;READ AND CHECK STATUS
22 14645 000000             000000
23 14646 006114             EHALT               ;AC0=BAD STATUS
24                                              ;AC1=EXPECTED
25                                              ;COMMAND WAS FIRST ERASE, THEN NOOP
26 14647 006303             REWIND
27 14650 006272             WABOT               ;UPDATE STATUS, LOOK FOR BOT
28 14651 006114             EHALT               ;AC0=BAD STATUS, ONLY BOT STATUS CHECKED
29                                              ;AC1=BOT STATUS
30                                              ;REWIND FOLLOWING ERASE DIDN'T
31                                              ;WORK. THE CLUE IS IN THE BAD
32                                              ;STATUS.
33 14652 006113             LOOP
```

```
01
02                              ;CHECK REWINDING STATUS BIT
03 14653 000401 A16:    JMP     .+1
04 14654 006110         SETPO           ;DO ERASE-REWIND
05 14655 006301         ERASE
06 14656 006114         EHALT           ;NO DONE AFTER COMMAND
07 14657 006303         REWIND
08 14660 006115         STATA           ;CHECK STATUS DURING REWIND
09 14661 020000         020000
10 14662 006114         EHALT           ;AC1=EXPECTED STATUS, AC0=BAD
11                                      ;CHECK REWINDING STATUS BIT GATE
12 14663 006272         WABOT           ;UPDATE STATUS, WAIT FOR BOT MAX 50 SEC
13 14664 006114         EHALT           ;NO BOT FOUND
14                                      ;AC0=BAD STATUS, ONLY BOT STATUS CHECKED
15                                      ;AC1=BOT STATUS
16 14665 006121         STATP           ;CHECK REWINDING STATUS OFF
17 14666 010000         010000
18 14667 030000         030000          ;MASK
19 14670 006114         EHALT           ;AC0=BAD STATUS
20                                      ;AC1=EXPECTED
21                                      ;AC2=MASK
22                                      ;AFTER NOOP, BOT STATUS, NO REW, EXP
23 14671 006113         LOOP
24
25
26                              ;CHECK "WAS REWINDING" STATUS BUFFERED ON BOT
27 14672 000401 A17:    JMP     .+1
28 14673 006110         SETPO
29 14674 006303         REWIND
30 14675 006272         WABOT           ;WAIT FOR BOT
31 14676 006114         EHALT           ;NO BOT FOUND
32                                      ;AC0=BAD STATUS
33 14677 006301         ERASE
34 14700 006114         EHALT           ;NO DONE AFTER COMMAND
35 14701 006303         REWIND
36 14702 006061         CWAIT           ;WAIT FOR REWINDING THE ERASED
37 14703 000136         J2SEC           ;3.75 INCH TAPE (2.0 SEC)
38 14704 006121         STATP           ;CHECK WAS REWINDING STATUS ON BOT
39 14705 020000         020000
40 14706 030000         030000          ;MASK
41 14707 006114         EHALT           ;AC0=BAD STATUS
42                                      ;AC1=EXPECTED
43                                      ;AC2=MASK
44 14710 006270         UPSTA           ;UPDATE STATUS
45 14711 006121         STATP           ;CHECK REWINDING STATUS OFF
46 14712 010000         010000          ;AFTER NOOP COMMAND
47 14713 030000         030000          ;MASK
48 14714 006114         EHALT           ;AC0=BAD STATUS
49                                      ;AC1=EXPECTED
50                                      ;AC2=MASK
51 14715 006113         LOOP
```

```
                        ;CHECK SIMPLE 4 CHAR WRITE
14716 000401 A18:       JMP     .+1
14717 006111            SETP1           ;THIS IS THE FIRST WRITE AND
14720 006305            GEN             ;INVOLVES ALL THE WRITE LOGIC.
14721 000377            377             ;WRITE 2 WORDS, CHECK DONE,
14722 006274            WRITE           ;ADDR COUNTER (AC) AND STATUS.
14723 000102            102             ;ONE RECORD, 2 WORDS
14724 000414            JMP     A181    ;DONE FLAG SHOULD BE ON, ELSE JMP
14725 024134 A182:      LDA     1,OBUFF
14726 030137            LDA     2,C2
14727 147000            ADD     2,1
14730 061430 MTC92:     DIB     0,MTC
14731 106414            SUBO    0,1,SZR
14732 006114            EHALT           ;ADDR COUNTER WRONG !
                        ;AC0=BAD READ VALUE
                        ;AC1=EXPECTED
                        ;TWO OUTPUT XFERS SHOULD HAVE OCCURED.
14733 006117            STATW
14734 000000            0
14735 006114            EHALT           ;AC0=BAD STATUS
                        ;AC1=EXPECTED
                        ;IF AC WRONG YOU MIGHT EXPECT
                        ;BAD STATUS.  FIX FIRST PROBLEMS
                        ;FIRST!
                        ;DATA PATTERN IS I=0=1=0
                        ;FOR EACH TRACK.  LATERAL
                        ;PARITY IS ALWAYS 1.
14736 006113            LOOP
14737 000404            JMP     E18     ;END THIS LOOP

14740 006270 A181:      UPSTA           ;NOOP COMMAND TO STOP TAPE MOTION
14741 006114            EHALT           ;NO DONE FLAG AFTER WRITE
                        ;NO WRITE STROBE FROM FORMATTER TO
                        ;WORDCOUNTER (WC).  ?
14742 000763            JMP     A182

14743 000401 E18:       JMP     .+1     ;NEXT LOOP
```

```
01
02                              ;CHECK ADDRESS COUNTER (AC) COUNTING.
03 14744 000401 A19:    JMP     .+1
04 14745 020445         LDA     0,A192  ;INITIALIZE POINTER
05 14746 040024         STA     0,IDX4
06 14747 032024 A191:   LDA     2,AIDX4 ;AC START ADDR
07 14750 151015         MOVO    2,2,SNR ;NEXT PATTERN ?
08 14751 000466         JMP     E19     ;END THIS LOOP
09 14752 102220         ADCZR   0,0     ;AC0:=077777
10 14753 024266         LDA     1,EXTMA ;1=BIT 0, 0=NOT IMPLEMENTED
11 14754 125015         MOVO    1,1,SNR ;BIT 0 ?
12 14755 113400         AND     0,2     ;NO, REMOVE BIT 0 BY ANDING
13 14756 006110         SETPO
14 14757 024457         LDA     1,A193  ;WORD COUNT (WC)
15 14760 124400         NEG     1,1     ;-WC
16 14761 020225         LDA     0,C1X   ;WRITE COMMAND
17 14762 061030 MT181:  DOA     0,MTC   ;SET COMMAND
18 14763 062030 MT182:  DOC     1,MTC   ;SET WC
19 14764 072030 MT183:  DOB     2,MTC   ;SET AC
20 14765 060130 MT184:  NIOS    MTC
21 14766 006063         TIMSK
22 14767 003720         2000.           ;WAIT MAX 2 SEC
23 14770 063530 MT185:  SKPBZ   MTC
24 14771 006114         EHALT           ;OPERATION NOT FINISHED
25                                      ;ONLY DIFFERANCE FROM PREVIOUS LOOP
26                                      ;IS THE START ADDR IN AC.
27 14772 024102         LDA     1,POWZE ;RESTORING IF COMMAND CHANGED TO READ
28 14773 044000         STA     1,0     ;RESTORE POWER INTR LOC 0
29 14774 006074         BINLO           ;RESTORE BINARY LOADER
30 14775 024441         LDA     1,A193  ;WC
31 14776 147000         ADD     2,1     ;NEW AC ADDR
32 14777 061430 MT186:  DIB     0,MTC
33 15000 034266         LDA     3,EXTMA ;1=BIT 0, 0=NOT IMPLEMENTED
34 15001 175014         MOVO    3,3,SZR ;BIT 0 ?
35 15002 106415         SUBO    0,1,SNR ;YES, CHECK 16 BIT
36 15003 106554         SUBOLO  0,1,SZR ;ALLWAYS CHECK 15 BIT
37 15004 006114         EHALT           ;ADDR COUNTER WRONG
38                                      ;AC0=BAD READ VALUE
39                                      ;AC1=EXPECTED
40                                      ;AC2=START ADDR
41 15005 006117         STATW
42 15006 000000         0
43 15007 006114         EHALT           ;AC0=BAD STATUS
44                                      ;AC1=EXPECTED
45 15010 006113         LOOP
46
47 15011 000736         JMP     A191    ;NEXT PATTERN
```

```
01
02 15012 015012 A192:  .                    ;ADDR-1 OF TESTPATTERN AC
03 15013 040000        040000
04 15014 157776        157776
05 15015 137775        137775
06 15016 157773        157773
07 15017 157767        157767
08 15020 157757        157757
09 15021 157737        157737
10 15022 157677        157677
11 15023 157577        157577
12 15024 157377        157377
13 15025 156777        156777
14 15026 155777        155777
15 15027 153777        153777
16 15030 167777        167777
17 15031 157777        157777
18 15032 137777        137777
19 15033 077777        077777
20 15034 177777        177777
21 15035 000000        0
22 15036 000002 A193:  2                    ;WC
23
24 15037 000401 E19:   JMP     .+1          ;NEXT LOOP
```

```
01
02                              ;CHECK WORD COUNTER (WC), BOTH LOAD AND COUNTING.
03 15040 000401 A20:    JMP     .+1
04 15041 020445         LDA     0,A202  ;INITIALIZE POINTER
05 15042 040024         STA     0,IDX4
06 15043 032024 A201:   LDA     2,AIDX4 ;TEST PATTERN SET
07 15044 151015         MOVO    2,2,SNR ;NEXT PATTERN SET ?
08 15045 000477         JMP     E20     ;END THIS LOOP
09 15046 006110         SETPO
10 15047 035000         LDA     3,0,2   ;TESTPATTERN WC 1. LOAD
11 15050 077030 MT187:  DOC     3,MTC   ;LOAD COMPLEMENT OF SECOND PATTERN
12 15051 035001         LDA     3,1,2   ;TESTPATTERN WC 2. LOAD
13 15052 175014         MOVO    3,3,SZR ;IF ZERO THEN IORST INSTEAD OF
14 15053 000403         JMP     A2010   ;LOAD WC
15 15054 006126         RESET
16 15055 000402         JMP     A2011   ;WC RESET TO ALL ZERO BY IORST
17:             A2010:
18 15056 077030 MT188:  DOC     3,MTC   ;LOAD SECOND PATTERN (NONZERO)
19 15057 024437 A2011:  LDA     1,A203  ;ADDR COUNT START
20 15060 020225         LDA     0,C1X   ;WRITE COMMAND
21 15061 061030 MT189:  DOA     0,MTC   ;SET COMMAND
22 15062 066030 MT190:  DOB     1,MTC   ;SET AC
23 15063 060130 MT191:  NIOS    MTC
24 15064 006063         TIMSK
25 15065 006654         3500.           ;WAIT MAX 3,5 SEC
26 15066 063530 MT192:  SKPBZ   MTC
27 15067 000452         JMP     A2012   ;IF OPERATION NOT FINISHED, JUMP
28 15070 020426 A2013:  LDA     0,A203  ;AC START
29 15071 025002         LDA     1,2,2   ;BLOCK LENGTH
30 15072 107000         ADD     0,1     ;AC AFTER WRITING POINTING TO FIRST FREE
31 15073 061430 MT193:  DIB     0,MTC
32 15074 034266         LDA     3,EXTMA ;1=BIT 0, 0=NOT IMPLEMENTED
33 15075 175014         MOVO    3,3,SZR ;BIT 0 ?
34 15076 106415         SUBO    0,1,SNR ;YES, CHECK 16 BIT
35 15077 106554         SUBOLO  0,1,SZR ;ALLWAYS CHECK 15 BIT
36 15100 006114         EHALT           ;WORD COUNTER WRONG SEEN IN ADDR COUNT:
37                                      ;AC0=BAD READ VALUE
38                                      ;AC1=EXPECTED
39                                      ;AC2=TESTPATTERN ADDR
40 15101 006117         STATW
41 15102 000000         0
42 15103 006114         EHALT           ;AC0=BAD STATUS
43                                      ;AC1=EXPECTED
44 15104 006113         LOOP
45
46 15105 000736         JMP     A201    ;NEXT PATTERN
```

```
. 0175  .MAIN
01
02 15106 015106 A202:   .                       ;ADDR-1 OF TESTPATTERN POINTER
03 15107 015117          A204
04 15110 015122          A205
05 15111 015125          A206
06 15112 015130          A207
07 15113 015133          A208
08 15114 015136          A209
09 15115 000000          0
10
11 15116 000000 A203:    0                      ;START ADDR AC
12
13 15117 125252 A204:    125252                 ;FIRST LOOP:    1. LOAD WC
14 15120 052525          052525                 ;               2. LOAD WC
15 15121 025253          10923.                 ;               BLOCKLENGTH
16
17 15122 052525 A205:    052525                 ;2. LOOP
18 15123 052525          052525
19 15124 025253          10923.
20
21 15125 052525 A206:    052525                 ;3. LOOP
22 15126 125252          125252
23 15127 052526          21846.
24
25 15130 125252 A207:    125252                 ;4. LOOP
26 15131 125252          125252
27 15132 052526          21846.
28
29 15133 177000 A208:    177000                 ;5. LOOP        1.LOAD WC
30 15134 000000          000000                 ;               IORST  WC
31 15135 100000          32768.                 ;               MAX BLOCKLENGTH
32
33 15136 100777 A209:    100777                 ;6. LOOP
34 15137 000000          000000
35 15140 100000          32768.
36
37 15141 006270 A2012:   UPSTA                  ;NOOP COMMAND TO STOP TAPEMOTION
38 15142 006114          EHALT                  ;NO DONE FLAG AFTER WRITE
39                                              ;WORDCOUNTER NEVER FINISH COUNTING
40 15143 000725          JMP     A2013
41
42 15144 000401 E20:     JMP     .+1            ;NEXT LOOP
```

```
01
02                              ;CHECK INTERRUPT AND DISABLE
03 15145 000401 A21:    JMP     .+1
04 15146 006111         SETP1           ;WRITE 2 WORDS, CHECK DONE, INTR
05 15147 060177         INTEN
06 15150 000401         JMP     .+1     ;ALLOW THIS INSTR BEFORE INTR
07 15151 000402         JMP     .+2     ;IF INTR THEN PC:=PC+1 BY SERVICE ROUT.
08 15152 006114         EHALT           ;ILLEGAL INTERRUPT AFTER IORST
09                                      ;IN SETP1. AC0=DEVICE NUMBER
10                                      ;INTERRUPTING READ BY SERVICE ROUTINE
11 15153 063477         SKPBN   CPU     ;TEST CPU INTR FLAG ON
12 15154 006114         EHALT           ;ERROR, FLAG SHOULD ONLY BE OFF
13                                      ;AFTER INTERRUPT.
14 15155 065477         INTA    1       ;TEST INTR ACK FOR NO ANSWER
15 15156 125004         MOV     1,1,SZR
16 15157 006114         EHALT           ;ILLEGAL INTR ACK
17 15160 060277         INTDS
18 15161 006274         WRITE
19 15162 000102         102             ;ONE RECORD, 2 WORDS (4 CHARS)
20 15163 006114         EHALT           ;NO DONE FLAG!  THIS HAS WORKED
21                                      ;BEFORE!  RESTART PROGRAM.
22 15164 024256         LDA     1,DEVNA ;AC1= DEV NUMBER UNDER TEST
23 15165 060177         INTEN
24 15166 000401         JMP     .+1     ;ALLOW THIS INSTR BEFORE INTR.
25                                      ;PC:=PC+1 BY INTR SERVICE ROUTINE
26 15167 006114         EHALT           ;NO INTERRUPT.  CHECK MTC INTR REG.,
27                                      ;INTR GATE, INTP IN GATE.
28                                      ;DISABLE FF SHOULD BE CLEARED (IORST
29                                      ;IN SETP1). THIS FF IS SET IN THE END
30                                      ;OF THIS LOOP.
31 15170 024256         LDA     1,DEVNA ;AC1=DEV NUMBER UNDER TEST
32 15171 106414         SUBO    0,1,SZR ;AC0=DEV 0 READ BY INTR ROUTINE (INTA)
33 15172 006114         EHALT           ;WRONG ADDRESS FROM MTC INTR.
34                                      ;CHECK INTA AND GATES
35                                      ;AC0=BAD READ VALUE
36                                      ;AC1=EXPECTED ADDRESS
37 15173 063577         SKPBZ   CPU     ;TEST CPU INTR FLAG OFF AFTER INTR.
38 15174 006114         EHALT           ;ERROR, INTR FLAG ON (ION)
39 15175 030160         LDA     2,C2K
40 15176 072077         MSKO    2       ;DISABLE MTC INTR
41 15177 060177         INTEN
42 15200 152400         SUB     2,2     ;ALLOW 1 INSTR BEFORE INTR.
43 15201 000402         JMP     .+2
44 15202 006114         EHALT           ;ILLEGAL INTERRUPT!  CHECK
45                                      ;MTC INTR DISABLE FLOP, AND
46                                      ;CONTROL GATES
47                                      ;AC0=DEV NUMBER INTERRUPTING READ
48                                      ;BY SERVICE ROUTINE.
49                                      ;AC1=DEV NUMBER UNDER TEST
50 15203 060277         INTDS
51 15204 072077         MSKO    2
52 15205 060177         INTEN
53 15206 000401         JMP     .+1     ;ALLOW 1 INSTR BEFORE INTR.
54 15207 006114         EHALT           ;NO INTERRUPT. CHECK MTC INTR DISABLE
55                                      ;FLOP AND CONTROL GATES.
56                                      ;AC1=DEVICE NUMBER UNDER TEST
57 15210 060277         INTDS           ;DISABLE ARE "SET" BY THE
58                                      ;LAST INTERRUPT.
59 15211 030160         LDA     2,C2K
60 15212 072077         MSKO    2       ;DISABLE MTC INTR FOR TESTING WHEN
61                                      ;LOOPING BACK THAT IORST IN LOOP
62                                      ;RESETS DISABLE FF.
63 15213 006113         LOOP
```

```
                        ;WRITE 16 CHAR RECORD. ODD PARITY
                        ;PATTERN IN POINT TABLE.
                                                ;WRITE, CHECK DONE, ADDR COUNTER (AC2
                                                ;AND STATUS.
15214 000401 A22:       JMP     .+1
15215 020200            LDA     0,POINT
15216 040024            STA     0,IDX4
15217 022024            LDA     0,AIDX4
15220 040403            STA     0,A222
15221 006110 A221:      SETPO
15222 006305            GEN
15223 177777 A222:      177777
15224 006274            WRITE
15225 000110            110
15226 006114            EHALT                   ;NO DONE FLAG!  RECORDS TO NOW
                                                ;HAVE BEEN 4 CHAR.  THIS ONE IS
                                                ;16 CHAR. THIS IS THE ONLY DIFFERENCE.
15227 024134            LDA     1,OBUFF
15230 030145            LDA     2,C10
15231 147000            ADD     2,1
15232 061430 MTC93:     DIB     0,MTC
15233 106414            SUBO    0,1,SZR
15234 006114            EHALT                   ;ADDR COUNTER (AC) WRONG.
                                                ;AC0=BAD READ VALUE
                                                ;AC1=EXPECTED
                                                ;CHECK DATACHANNEL CONTROL AND INCREMENT
                                                ;WC.  10 OCTAL WORDS WRITTEN
15235 006117            STATW
15236 000000            0
15237 006114            EHALT                   ;AC0=BAD STATUS
                                                ;AC1=EXPECTED
                                                ;THE CLUE IS IN THE BAD STATUS
                                                ;EXPECTED BAD STATUS IF ERRORS
                                                ;OCCURRED PREVIOUSLY HERE.
15240 006113            LOOP
15241 020024            LDA     0,IDX4
15242 024207            LDA     1,LST
15243 106405            SUB     0,1,SNR
15244 000404            JMP     E22             ;GO TO NEXT TEST
15245 022024            LDA     0,AIDX4
15246 040755            STA     0,A222
15247 000752            JMP     A221
15250 000401 E22:       JMP     .+1             ;NEXT LOOP
```

```
01
02                              ;TEST ILLEGAL STATUS
03 15251 000401 A23:    JMP     .+1
04 15252 030144         LDA     2,C7    ;GIVE START TO UNIT NOT SELECTED FOR TEST
05 15253 034260         LDA     3,UNITA ;BY ADDING 5 TO UNIT 0
06 15254 020142         LDA     0,C5    ;UNIT UNDER TEST= 3 OR 7 STARTS
07 15255 117000         ADD     0,3     ;UNIT CONNECTED TO FORMATTER UNDER TEST
08 15256 173400         AND     3,2     ;UNIT UNDER TEST= 0,1,2 OR 4,5,6 STARTS
09 15257 034153         LDA     3,C170  ;UNIT CONNECTED TO ANOTHER FORMATTER
10 15260 173000         ADD     3,2
11 15261 006112         SETP2
12 15262 071030 MTC94:  DOA     2,MTC
13 15263 060130 MTC95:  NIOS    MTC     ;START NOOP
14 15264 006115         STATA
15 15265 040000         040000
16 15266 006114         EHALT           ;AC0=BAD STATUS
17                                      ;AC1=EXPECTED
18                                      ;CHECK ILLEGAL FLOP AND GATES
19 15267 006113         LOOP
20
21                              ;TEST ILLEGAL STATUS
22 15270 000401 A24:    JMP     .+1
23 15271 030144         LDA     2,C7    ;GIVE START TO UNIT NOT SELECTED FOR TEST
24 15272 034260         LDA     3,UNITA ;BY ADDING 1 TO UNIT 0
25 15273 175400         INC     3,3     ;UNIT UNDER TEST= 3 OR 7 STARTS
26 15274 173400         AND     3,2     ;UNIT CONNECTED TO ANOTHER FORMATTER
27 15275 034153         LDA     3,C170  ;UNIT UNDER TEST= 0,1,2 OR 4,5,6 STARTS
28 15276 173000         ADD     3,2     ;UNIT CONNECTED TO FORMATTER UNDER TEST
29 15277 006112         SETP2
30 15300 071030 MTC96:  DOA     2,MTC   ;START NOOP
31 15301 060130 MTC97:  NIOS    MTC
32 15302 006115         STATA
33 15303 040000         040000
34 15304 006114         EHALT           ;AC0=BAD STATUS
35                                      ;AC1=EXPECTED
36 15305 006113         LOOP            ;CHECK ILLEGAL FLOP AND GATES
37
38                              ;TEST ILLEGAL STATUS AND BACKSPACE COMMAND.
39 15306 000401 A25:    JMP     .+1
40 15307 006111         SETP1           ;REWIND. GIVE SPACE BACK AT BOT
41 15310 006303         REWIND
42 15311 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
43 15312 006114         EHALT           ;NO BOT FOUND
44                                      ;AC0=BAD STATUS
45 15313 006276         BSPACE          ;THIS IS THE FIRST BACKSPACE
46 15314 006114         EHALT           ;NO DONE AFTER COMMAND
47 15315 006115         STATA           ;CHECK SPACE BACK AND BOT GATE TO SIGNAL
48 15316 011000         011000          ;SET ILLEGAL. CHECK COMMAND DECODER.
49 15317 006114         EHALT           ;AC0=BAD STATUS
50                                      ;AC1=EXPECTED
51 15320 006270         UPSTA           ;UPDATE STATUS
52 15321 006116         STATN
53 15322 001000         001000
54 15323 006114         EHALT           ;AC0=BAD STATUS
55                                      ;AC1=NOT EXPECTED
56 15324 006113         LOOP
```

```
01
02                              ;CHECK WRITE EOF STATUS
03 15325 000401 A26:            JMP     .+1
04 15326 006111                 SETP1                   ;WRITE END OF FILE (FILEMARK)
05                                                      ;AND CHECK STATUS
06 15327 006300                 WEOF
07 15330 006114                 EHALT                   ;NO DONE AFTER COMMAND
08 15331 006117                 STATW
09 15332 000400                 000400
10 15333 006114                 EHALT                   ;AC0=BAD STATUS
11                                                      ;AC1=EXPECTED
12 15334 006270                 UPSTA                   ;UPDATE STATUS
13 15335 006116                 STATN
14 15336 000400                 000400
15 15337 006114                 EHALT                   ;AC0=BAD STATUS
16                                                      ;AC1=NOT EXPECTED
17 15340 006113                 LOOP
18
19                              ;CHECK WRITE ODD STATUS
20 15341 000401 A27:            JMP     .+1
21 15342 006110                 SETP0                   ;NO LOOP FOR THIS, ONLY FOR EHALT
22 15343 006303                 REWIND
23 15344 006272                 WABOT                   ;UPDATE STATUS, LOOK FOR BOT
24 15345 006114                 EHALT                   ;NO BOT FOUND
25                                                      ;AC0=BAD STATUS
26 15346 006111                 SETP1
27 15347 006305                 GEN
28 15350 177777                 177777
29 15351 006274                 WRITE
30 15352 010110                 010110                  ;ODD CHAR MODE, 1 REC, 8 WORDS
31 15353 006114                 EHALT                   ;NO DONE AFTER COMMAND
32 15354 024134                 LDA     1,OBUFF
33 15355 030145                 LDA     2,C10
34 15356 147000                 ADD     2,1
35 15357 061430 MT173:          DIB     0,MTC
36 15360 106414                 SUBO    0,1,SZR
37 15361 006114                 EHALT                   ;ADDR COUNTER WRONG
38                                                      ;AC0=BAD READ VALUE
39                                                      ;AC1=EXPECTED
40 15362 006117                 STATW
41 15363 000010                 10
42 15364 006114                 EHALT                   ;AC0=BAD STATUS
43                                                      ;AC1=EXPECTED
44 15365 006270                 UPSTA                   ;UPDATE STATUS
45 15366 006116                 STATN
46 15367 000010                 10
47 15370 006114                 EHALT                   ;AC0=BAD STATUS
48                                                      ;AC1=NOT EXPECTED
49 15371 006113                 LOOP
```

```
. 0180  .MAIN
01
02                              ;CHECK BACKSPACE
03 15372 000401 A28:    JMP     .+1
04 15373 006110         SETPO                   ;REWIND, WRITE 1 REC., BACKSPACE
05 15374 006303         REWIND                  ;AND CHECK DONE AND CORRECT STATUS
06 15375 006272         WABOT                   ;UPDATE STATUS, LOOK FOR BOT
07 15376 006114         EHALT                   ;NO BOT FOUND
08                                              ;AC0=BAD STATUS
09 15377 006305         GEN
10 15400 125252 A281:   125252
11 15401 006306         CLEAR
12 15402 006274         WRITE
13 15403 000102         102
14 15404 006114         EHALT                   ;NO DONE AFTER COMMAND
15 15405 006276         BSPACE
16 15406 006114         EHALT                   ;NO DONE AFTER COMMAND BACKSPACE.
17                                              ;CHECK CAPSTAN SLIPPING ON TAPE.
18                                              ;CHECK READ STROBES
19 15407 006117         STATW
20 15410 000000         0
21 15411 006114         EHALT                   ;AC0=BAD STATUS
22                                              ;AC1=EXPECTED
23                                              ;CHECK START/STOP TIME
24 15412 024134         LDA     1,OBUFF         ;ADDRESS COUNTER FROM WRITE 2 WORDS
25 15413 030143         LDA     2,C6            ;IS OBUFF+2, THEN COUNT 4 CHARS ON TAPE
26 15414 147000         ADD     2,1             ;WHEN SPACING.
27 15415 061430 MT155:  DIB     0,MTC
28 15416 106414         SUBO    0,1,SZR
29 15417 006114         EHALT                   ;ADDRESS COUNTER WRONG
30                                              ;AC0=BAD READ VALUE
31                                              ;AC1=EXPECTED
32 15420 022135         LDA     0,AIBUFF        ;CHECK FOR NO DATA TRANSFER
33 15421 126400         SUB     1,1             ;INPUT BUFFER CLEARED
34 15422 030756         LDA     2,A281          ;OUTPUT WRITTEN FROM OBUFF
35 15423 101014         MOVO    0,0,SZR
36 15424 006114         EHALT                   ;SPACE USES DATACHANNEL:
37                                              ;AC0=INPUT BUFFER BAD CONTENT
38                                              ;AC1=EXPECTED
39                                              ;AC2=WRITTEN PATTERN
40 15425 006113         LOOP
```

```
                        ;CHECK TAPEMOTION WRITE, BACKSPACE, WRITE...
15426 000401 A29:       JMP     .+1
15427 006110            SETPO
15430 006303            REWIND
15431 102620            SUBZR   0,0     ;EVEN PARITY ARG, AC0=100000
15432 114000            COM     0,3     ;AC3=077777
15433 024442            LDA     1,A292  ;ARG FOR WRITE
15434 167400            AND     3,1     ;MASK OUT PARITY FROM ARG
15435 030264            LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
15436 151014            MOVO    2,2,SZR ;7 TRACK ?
15437 107000            ADD     0,1     ;YES, ADD EVEN
15440 044435            STA     1,A292  ;SET ARG
15441 024450            LDA     1,A294  ;ARG FOR SECOND WRITE
15442 167400            AND     3,1     ;MASK OUT PARITY FROM ARG
15443 151014            MOVO    2,2,SZR ;7 TRACK ?
15444 107000            ADD     0,1     ;YES, ADD EVEN
15445 044444            STA     1,A294  ;SET ARG
15446 024457            LDA     1,A295  ;ARG FOR BACKSPACE
15447 167400            AND     3,1     ;MASK OUT PARITY FROM ARG
15450 151014            MOVO    2,2,SZR ;7 TRACK ?
15451 107000            ADD     0,1     ;YES, ADD EVEN
15452 044453            STA     1,A295  ;SET ARG
15453 024473            LDA     1,A297  ;ARG FOR SPACE FORWARD
15454 167400            AND     3,1     ;MASK OUT PARITY FROM ARG
15455 151014            MOVO    2,2,SZR ;7 TRACK ?
15456 107000            ADD     0,1     ;YES, ADD EVEN
15457 044467            STA     1,A297  ;SET ARG
15460 024220            LDA     1,COUT9 ;FOR 9 TRACK USE 100001001
15461 151014            MOVO    2,2,SZR ;7 TRACK ?
15462 024217            LDA     1,COUT7 ;YES, USE 1000001 ON TAPE
15463 044410            STA     1,A291  ;PHYSICAL PATTERN SHOWN ABOVE
15464 006272            WABOT           ;UPDATE STATUS, LOOK FOR BOT
15465 006114            EHALT           ;NO BOT FOUND
                                        ;AC0=BAD STATUS
15466 020152            LDA     0,C100
15467 040246            STA     0,RECTR ;TRY 64 TAPE TOGGLES
15470 101400            INC     0,0
15471 040247            STA     0,RECT1
15472 006305            GEN
15473 000000 A291:      0               ;7/9 TRACK PATTERN IS PUT HERE
15474 006274            WRITE
15475 000177 A292:      177             ;WRITE ONE CHECK REC.
15476 006114            EHALT           ;NO DONE AFTER COMMAND
15477 006117            STATW
15500 000000            0
15501 006114            EHALT           ;AC0=BAD STATUS
                                        ;AC1=EXPECTED
15502 020134            LDA     0,OBUFF ;START COUNT IN ADDR COUNTER
15503 024151            LDA     1,C77   ;63 WORDS WRITTEN
15504 107000            ADD     0,1
15505 061430 MT167:     DIB     0,MTC   ;GET AC
15506 106414            SUBO    0,1,SZR
15507 006114            EHALT           ;ADDR COUNTER WRONG
                                        ;AC0=BAD READ VALUE
                                        ;AC1=EXPECTED
```

```
01
02 15510 006274 A293:   WRITE
03 15511 000102 A294:   102             ;WRITE ONE SHORT BLOCK (4 BYTES)
04 15512 000451         JMP     A298    ;NO DONE AFTER COMMAND
05 15513 006117         STATW
06 15514 000000         0
07 15515 000453         JMP     A299    ;STATUS ERROR
08 15516 020134         LDA     0,OBUFF ;START COUNT IN ADDR COUNTER
09 15517 024137         LDA     1,C2    ;2 WORDS WRITTEN
10 15520 107000         ADD     0,1
11 15521 061430 MT163:  DIB     0,MTC   ;GET AC
12 15522 106414         SUBO    0,1,SZR
13 15523 000455         JMP     A2912   ;AC ERROR
14 15524 006277         SPARG
15 15525 010100 A295:   010100          ;BACKSPACE ONE REC.
16 15526 000460         JMP     A2910   ;NO DONE AFTER COMMAND
17 15527 006117         STATW
18 15530 000000         0
19 15531 000462         JMP     A2911   ;STATUS ERROR
20 15532 020135         LDA     0,IBUFF ;START COUNT IN ADDRESS COUNTER
21 15533 024141         LDA     1,C4    ;SPACED 4 BYTES
22 15534 107000         ADD     0,1
23 15535 061430 MT164:  DIB     0,MTC   ;GET AC
24 15536 106414         SUBO    0,1,SZR
25 15537 000464         JMP     A2913   ;AC ERROR
26 15540 014246         DSZ     RECTR   ;TOGGLE TAPE 64 TIMES
27 15541 000747         JMP     A293
28 15542 006303 A296:   REWIND
29 15543 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
30 15544 006114         EHALT           ;NO BOT FOUND
31                                      ;AC0=BAD STATUS
32 15545 006277         SPARG
33 15546 000177 A297:   177             ;SPACE FORWARD CHECK REC.
34 15547 006114         EHALT           ;NO DONE AFTER COMMAND
35 15550 006117         STATW           ;CHECK STATUS AFTER SPACE FORWARD
36 15551 000000         0
37 15552 006114         EHALT           ;AC0=BAD STATUS
38                                      ;AC1=EXPECTED
39 15553 020135         LDA     0,IBUFF ;START COUNT IN ADDR COUNTER
40 15554 024154         LDA     1,C176  ;SPACED 126 BYTES
41 15555 107000         ADD     0,1
42 15556 061430 MT162:  DIB     0,MTC   ;GET AC
43 15557 106414         SUBO    0,1,SZR
44 15560 006114         EHALT           ;ADDRESS COUNTER WRONG.
45                                      ;AC0=BAD READ VALUE
46                                      ;AC1=EXPECTED
47                                      ;CHECK START/STOP TIME.
48                                      ;THE PROBLEM IS THAT 64 TOGGLES ON TAPE
49                                      ;MOVES IT BACK IN THE FIRST CHECK REC.
50 15561 006113         LOOP
51
52 15562 000447         JMP     E29     ;END LOOP
```

```
01
02 15563 030247 A298:   LDA     2,RECT1
03 15564 034246         LDA     3,RECTR
04 15565 172400         SUB     3,2
05 15566 006114         EHALT           ;NO DONE AFTER WRITE COMMAND
06                                      ;AC2=TOGGLE 0
07 15567 000753         JMP     A296
08
09 15570 030247 A299:   LDA     2,RECT1
10 15571 034246         LDA     3,RECTR
11 15572 172400         SUB     3,2
12 15573 006114         EHALT           ;STATUS ERROR AFTER WRITE
13                                      ;AC0=BAD STATUS
14                                      ;AC1=EXPECTED
15                                      ;AC2=TOGGLE 0
16 15574 020134         LDA     0,OBUFF ;START COUNT IN ADDR COUNTER
17 15575 024137         LDA     1,C2    ;2 WORDS WRITTEN
18 15576 107000         ADD     0,1
19 15577 061430 MT165:  DIB     0,MTC   ;GET AC
20
21 15600 030247 A2912:  LDA     2,RECT1
22 15601 034246         LDA     3,RECTR
23 15602 172400         SUB     3,2
24 15603 106414         SUBO    0,1,SZR
25 15604 006114         EHALT           ;ADDRESS COUNTER WRONG AFTER WRITE
26                                      ;AC0=BAD READ VALUE
27                                      ;AC1=EXPECTED
28                                      ;AC2=TOGGLE 0
29 15605 000735         JMP     A296
30
31 15606 030247 A2910:  LDA     2,RECT1
32 15607 034246         LDA     3,RECTR
33 15610 172400         SUB     3,2
34 15611 006114         EHALT           ;NO DONE AFTER BACKSPACE COMMAND
35                                      ;AC2=TOGGLE 0
36 15612 000730         JMP     A296
37
38 15613 030247 A2911:  LDA     2,RECT1
39 15614 034246         LDA     3,RECTR
40 15615 172400         SUB     3,2
41 15616 006114         EHALT           ;STATUS ERROR AFTER BACKSPACE
42                                      ;AC0=BAD STATUS
43                                      ;AC1=EXPECTED
44                                      ;AC2=TOGGLE 0
45 15617 020135         LDA     0,IBUFF ;START COUNT IN ADDR COUNTER
46 15620 024141         LDA     1,C4    ;SPACED 4 BYTES
47 15621 107000         ADD     0,1
48 15622 061430 MT166:  DIB     0,MTC   ;GET AC
49
50 15623 030247 A2913:  LDA     2,RECT1
51 15624 034246         LDA     3,RECTR
52 15625 172400         SUB     3,2
53 15626 106414         SUBO    0,1,SZR
54 15627 006114         EHALT           ;ADDRESS COUNTER WRONG AFTER SPACE
55                                      ;AC0=BAD READ VALUE
56                                      ;AC1=EXPECTED
57                                      ;AC2=TOGGLE 0
58 15630 000712         JMP     A296
59
60 15631 000401 E29:    JMP     .+1     ;NEXT LOOP
```

```
01
02                          ;CHECK BACKSPACE STOP ON BOT.
03                                                  ;REWIND, WRITE 1 REC.,
04                                                  ;BACKSPACE 2 RECS., CHECK BOT.
05 15632 000401 A31:        JMP     .+1
06 15633 006110             SETPO
07 15634 006303             REWIND
08 15635 006272             WABOT                   ;UPDATE STATUS, LOOK FOR BOT
09 15636 006114             EHALT                   ;NO BOT FOUND
10                                                  ;AC0=BAD STATUS
11 15637 006274             WRITE
12 15640 000102             102                     ;ONE RECORD OF 4 CHARS.
13 15641 006114             EHALT                   ;NO DONE AFTER COMMAND
14 15642 006276             BSPACE
15 15643 006114             EHALT                   ;NO DONE AFTER COMMAND
16 15644 006276             BSPACE
17 15645 006114             EHALT                   ;NO DONE AFTER COMMAND
18                                                  ;BOT SHOULD STOP MOTION.
19 15646 006117             STATW
20 15647 011000             011000
21 15650 006114             EHALT                   ;AC0=BAD STATUS
22                                                  ;AC1=EXPECTED
23 15651 006270             UPSTA                   ;UPDATE STATUS
24 15652 006117             STATW
25 15653 010000             010000
26 15654 006114             EHALT                   ;AC0=BAD STATUS
27                                                  ;AC1=EXPECTED
28 15655 006113             LOOP
```

```
01
02                                ;CHECK SPACE FORWARD
03                                ;REWIND, WRITE 3 RECS., REWIND.
04                                ;CHECK STATUS, SPACE FORWARD 1 REC.,
05                                ;CHECK FOR NO BOT, CHECK ADDR COUNTER.
06 15656 000401 A32:  JMP   .+1
07 15657 006110       SETPO
08 15660 006303       REWIND
09 15661 006272       WABOT           ;UPDATE STATUS, LOOK FOR BOT
10 15662 006114       EHALT           ;NO BOT FOUND
11                                    ;AC0=BAD STATUS
12 15663 006305       GEN
13 15664 125252 A321: 125252
14 15665 006306       CLEAR
15 15666 006274       WRITE
16 15667 000302       302             ;3 RECORDS OF 4 CHARS.
17 15670 006114       EHALT           ;NO DONE AFTER COMMAND
18                                    ;AC2=BLOCK 0
19 15671 006303       REWIND
20 15672 006272       WABOT           ;UPDATE STATUS, LOOK FOR BOT
21 15673 006114       EHALT           ;NO BOT FOUND
22                                    ;AC0=BAD STATUS
23 15674 006270       UPSTA           ;UPDATE STATUS
24 15675 006117       STATW           ;THIS HAS WORKED MANY TIMES
25 15676 010000       010000          ;BEFORE. IF ERROR RESTART PROG
26 15677 006114       EHALT           ;AC0=BAD STATUS
27                                    ;AC1=EXPECTED
28 15700 006275       SPACE
29 15701 000421       JMP   A322      ;JMP IF NO DONE AFTER COMMAND SPACE.
30 15702 006117 A323: STATW
31 15703 000000       0
32 15704 006114       EHALT           ;AC0=BAD STATUS
33                                    ;AC1=EXPECTED
34                                    ;THIS IS THE FIRST SPACE FORWARD.
35                                    ;CHECK COMMAND DECODER
36 15705 024134       LDA   1,OBUFF   ;ADDRESS COUNTER FROM WRITE 2 WORDS
37 15706 030143       LDA   2,C6      ;IS OBUFF+2, THEN COUNT 4 CHARS ON TAPE
38 15707 147000       ADD   2,1       ;WHEN SPACING.
39 15710 061430 MT156: DIB  0,MTC
40 15711 106414       SUBO  0,1,SZR
41 15712 006114       EHALT           ;ADDRESS COUNTER WRONG
42                                    ;AC0=BAD READ VALUE
43                                    ;AC1=EXPECTED
44 15713 022135       LDA   0,AIBUFF  ;CHECK FOR NO DATA TRANSFER
45 15714 126400       SUB   1,1       ;INPUT BUFFER CLEARED
46 15715 030747       LDA   2,A321    ;OUTPUT WRITTEN FROM OBUFF
47 15716 101014       MOVO  0,0,SZR
48 15717 006114       EHALT           ;SPACE USES DATACHANNEL:
49                                    ;AC0=INPUT BUFFER BAD CONTENT
50                                    ;AC1=EXPECTED
51                                    ;AC2=WRITTEN PATTERN
52 15720 006113       LOOP
53:
54 15721 000404       JMP   E32       ;END THIS LOOP
55
56 15722 006270 A322: UPSTA           ;NOOP COMMAND TO STOP TAPE MOTION.
57 15723 006114       EHALT           ;NO DONE AFTER SPACE, NO READ STROBES ?
58                                    ;UNIT SHOULD STOP IN BLOCKGAP.
59 15724 000756       JMP   A323
60
61 15725 000401 E32:  JMP   .+1       ;NEXT LOOP
```

```
01
02                          ;CHECK READ INSTRUCTION.  READ 16 CHAR RECORDS.
03                          ;PATTERN IN POINT TABLE. (ODD PARITY)
04                                                  ;WRITE 1 RECORD, CHECK STATUS, BACKSPACE,
05                                                  ;READ 1 RECORD, CHECK DONE, STATUS.
06                                                  ;CHECK ADDR COUNTER (AC) AND DATA BUFFER.
07 15726 000401 A33:        JMP     .+1
08 15727 020200             LDA     0,POINT
09 15730 040024             STA     0,IDX4
10 15731 022024             LDA     0,AIDX4
11 15732 040403             STA     0,A332
12 15733 006110 A331:       SETPO
13 15734 006305             GEN
14 15735 177777 A332:       177777
15 15736 006274             WRITE
16 15737 000110             110                     ;ONE RECORD, 8 WORDS (16 CHARS)
17 15740 006114             EHALT                   ;NO DONE AFTER COMMAND
18 15741 006117             STATW
19 15742 000000             0
20 15743 006114             EHALT                   ;AC0=BAD STATUS
21                                                  ;AC1=EXPECTED
22                                                  ;THIS MUCH HAS WORKED BEFORE,
23                                                  ;MANY TIMES!  RESTART THE PROGRAM
24 15744 006276             BSPACE
25 15745 006114             EHALT                   ;NO DONE AFTER COMMAND
26 15746 006306             CLEAR
27 15747 006273             READ
28 15750 000110             110
29 15751 006114             EHALT                   ;NO DONE FLAG FOLLOWING READ,
30                                                  ;THIS IS THE FIRST READ INSTR.
31 15752 006117             STATW
32 15753 000000             0
33 15754 006114             EHALT                   ;AC0=BAD STATUS
34                                                  ;AC1=EXPECTED
35                                                  ;90% OF THE READ LOGIC HAS BEEN
36                                                  ;CHECKED DURING WRITE/SPACE OPERATIONS.
37                                                  ;PROBLEMS HERE ARE LIKELY IN THE
38                                                  ;PROCESSOR INTERFACE AREA.
39 15755 020135             LDA     0,IBUFF
40 15756 024145             LDA     1,C10
41 15757 107000             ADD     0,1
42 15760 061430 MTC98:      DIB     0,MTC
43 15761 106414             SUBO    0,1,SZR
44 15762 006114             EHALT                   ;ADDRESS COUNTER IS WRONG.
45                                                  ;AC0=BAD READ VALUE
46                                                  ;AC1=EXPECTED
47                                                  ;8 WORDS RECORD READ.
48 15763 006307             CHECK
49 15764 000010             10
50 15765 006114             EHALT                   ;INPUT BUFFER CONTAINS WRONG
51                                                  ;DATA.  INPUT BUFFER SHOULD EQUAL
52                                                  ;OUTPUT BUFFER FOR THE FIRST 8 WORDS.
53                                                  ;AC0=BAD READ DATA
54                                                  ;AC1=GOOD WRITTEN
55                                                  ;AC2=ADDRESS OF INPUT BUFFER BAD WORD
56 15766 006276             BSPACE
57 15767 006114             EHALT                   ;NO DONE AFTER COMMAND
58 15770 006113             LOOP
59 15771 020024             LDA     0,IDX4
60 15772 024207             LDA     1,LST
61 15773 106405             SUB     0,1,SNR
62 15774 000404             JMP     E33
63 15775 022024             LDA     0,AIDX4
64 15776 040737             STA     0,A332
65 15777 000734             JMP     A331
66 16000 000401 E33:        JMP     .+1             ;NEXT LOOP
```

```
01
02                          ;7 TRACK:       READ EVEN PARITY
03                          ;9 TRACK:       PASS
04 16001 024264 B34:        LDA     1,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
05 16002 125014             MOVO    1,1,SZR ;7 TRACK ?
06 16003 000403             JMP     A34     ;YES
07 16004 002401             JMP     A.+1    ;NO, PASS NEXT LOOP
08 16005 016060             E34
09
10                          ;CHECK READ INSTRUCTION.  READ 16 CHAR RECORDS.
11                          ;PATTERN IN PONTR TABLE. (EVEN PARITY)
12 16006 000401 A34:        JMP     .+1     ;THIS LOOP IS EQUAL TO A33 BUT EVEN PARITY
13 16007 020210             LDA     0,PONTR
14 16010 040024             STA     0,IDX4
15 16011 022024             LDA     0,AIDX4
16 16012 040403             STA     0,A342
17 16013 006110 A341:       SETPO
18 16014 006305             GEN
19 16015 177777 A342:       177777
20 16016 006274             WRITE           ;FIRST WRITE IN EVEN PARITY
21 16017 100110             100110          ;ONE RECORD, 8 WORDS (16 CHARS)
22 16020 006114             EHALT           ;NO DONE AFTER COMMAND
23 16021 006117             STATW
24 16022 000000             0
25 16023 006114             EHALT           ;AC0=BAD STATUS
26                                          ;AC1=EXPECTED
27 16024 006276             BSPACE
28 16025 006114             EHALT           ;NO DONE AFTER COMMAND
29 16026 006306             CLEAR
30 16027 006273             READ
31 16030 100110             100110
32 16031 006114             EHALT           ;NO DONE FLAG FOLLOWING READ, THIS
33                                          ;IS THE FIRST READ INSTR. EVEN PARITY.
34 16032 006117             STATW
35 16033 000000             0
36 16034 006114             EHALT           ;AC0=BAD STATUS
37                                          ;AC1=EXPECTED
38 16035 020135             LDA     0,IBUFF
39 16036 024145             LDA     1,C10
40 16037 107000             ADD     0,1
41 16040 061430 MT200:      DIB     0,MTC
42 16041 106414             SUBO    0,1,SZR
43 16042 006114             EHALT           ;ADDRESS COUNTER IS WRONG.
44                                          ;AC0=BAD READ VALUE
45                                          ;AC1=EXPECTED
46                                          ;8 WORDS RECORD READ.
47 16043 006307             CHECK
48 16044 000010             10
49 16045 006114             EHALT           ;INPUT BUFFER CONTAINS WRONG
50                                          ;DATA.  INPUT BUFFER SHOULD EQUAL
51                                          ;OUTPUT BUFFER FOR THE FIRST 8 WORDS.
52                                          ;AC0=BAD READ DATA
53                                          ;AC1=GOOD WRITTEN
54                                          ;AC2=ADDRESS OF INPUT BUFFER BAD WORD
55 16046 006276             BSPACE
56 16047 006114             EHALT           ;NO DONE AFTER COMMAND
57 16050 006113             LOOP
58 16051 020024             LDA     0,IDX4
59 16052 024216             LDA     1,LST1
60 16053 106405             SUB     0,1,SNR
61 16054 000404             JMP     E34
62 16055 022024             LDA     0,AIDX4
63 16056 040737             STA     0,A342
64 16057 000734             JMP     A341
65 16060 000401 E34:        JMP     .+1     ;NEXT LOOP
```

```
. 0188  .MAIN
01
02                              ;READ 8 WORD (16 CHARS) REC. WITH WC=63 (126 CHARS).
03                                      ;REWIND, WRITE 1 REC., CHECK STATUS.
04                                      ;BACKSPACE, READ, CHECK DONE,
05                                      ;CHECK STATUS, ADDR COUNTER AND DATA.
06 16061 000401 A35:    JMP     .+1
07 16062 006110         SETPU           ;NO LOOP FOR THIS, ONLY FOR EHALT
08 16063 006303         REWIND
09 16064 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
10 16065 006114         EHALT           ;NO BOT FOUND
11                                      ;AC0=BAD STATUS
12 16066 006111         SETP1
13 16067 006305         GEN
14 16070 125252         125252
15 16071 006274         WRITE
16 16072 000110         110             ;ONE RECORD, 8 WORDS (16 CHARS)
17 16073 006114         EHALT           ;NO DONE AFTER COMMAND
18 16074 006117         STATW
19 16075 000000         0
20 16076 006114         EHALT           ;AC0=BAD STATUS
21                                      ;AC1=EXPECTED
22                                      ;DON'T TRY TO READ IT IF IT
23                                      ;CANNOT BE WRITTEN PROPERLY.
24                                      ;THIS HAS WORKED BEFORE,
25                                      ;RESTART PROGRAM
26 16077 006276         BSPACE
27 16100 006114         EHALT           ;NO DONE AFTER COMMAND
28 16101 006306         CLEAR
29 16102 006273         READ
30 16103 000177         177             ;ONE RECORD, 63 WORDS (126 CHARS)
31 16104 006114         EHALT           ;NO DONE AFTER COMMAND
32                                      ;CHECK INCREMENT WC
33 16105 006117         STATW
34 16106 000000         0
35 16107 006114         EHALT           ;AC0=BAD STATUS
36                                      ;AC1=EXPECTED
37                                      ;THIS IS THE FIRST TIME ON A
38                                      ;READ THAT THE WC DIDN'T MATCH
39                                      ;THE RECORD LENGTH.  CHECK
40                                      ;ERF GATE ON STOP.
41 16110 020135         LDA     0,IBUFF
42 16111 024145         LDA     1,C10
43 16112 107000         ADD     0,1
44 16113 061430 MTC99:  DIB     0,MTC
45 16114 106414         SUBO    0,1,SZR
46 16115 006114         EHALT           ;ADDRESS COUNTER WRONG
47                                      ;AC0=BAD ADDR
48                                      ;AC1=EXPECTED
49                                      ;CHECK INCREMENT WC
50 16116 006307         CHECK
51 16117 000010         10
52 16120 006114         EHALT           ;DATA ERROR.
53:                                     ;AC0=BAD READ DATA
54                                      ;AC1=GOOD WRITTEN
55                                      ;AC2=ADDRESS OF THE INPUT BUFFER BAD WORD
56: 16121 006113        LOOP
```

```
                        ;CHECK BLOCKLENGTH STATUS.
                        ;READ 63 WORD (126 CHARS) REC. WITH WC=8 (16 CHARS).
                                                ;REWIND, WRITE 1 REC., CHECK STATUS.
                                                ;BACKSPACE, READ, CHECK DONE.
                                                ;CHECK STATUS, ADDR COUNTER AND DATA.
16122 000401 A36:       JMP     .+1
16123 006110            SETPO                   ;NO LOOP FOR THIS, ONLY FOR EHALT
16124 006303            REWIND
16125 006272            WABOT                   ;UPDATE STATUS, LOOK FOR BOT
16126 006114            EHALT                   ;NO BOT FOUND
                                                ;AC0=BAD STATUS
16127 006111            SETP1
16130 006305            GEN
16131 125252            125252
16132 006274            WRITE
16133 000177            177                     ;ONE RECORD, 63 WORDS (126 CHARS)
16134 006114            EHALT                   ;NO DONE AFTER COMMAND
16135 006117            STATW
16136 000000            0
16137 006114            EHALT                   ;AC0=BAD STATUS
                                                ;AC1=EXPECTED
                                                ;THIS MUCH HAS WORKED MANY
                                                ;TIMES BEFORE.  RESTART PROG.
16140 006276            BSPACE
16141 006114            EHALT                   ;NO DONE AFTER COMMAND
16142 006306            CLEAR
16143 006273            READ
16144 000110            110                     ;ONE RECORD, 8 WORDS (16 CHARS)
16145 006114            EHALT                   ;NO DONE AFTER COMMAND
                                                ;CHECK INCREMENT WC
16146 006117            STATW
16147 000200            000200
16150 006114            EHALT                   ;AC0=BAD STATUS
                                                ;AC1=EXPECTED
                                                ;THIS IS THE FIRST TIME A READ IS
                                                ;STOPPED BY WC OVERFLOW ALONE.
                                                ;LOOK FOR WC OVERFLOW AND CHECK
                                                ;THE WC OVERFLOW GATE ON STOP
16151 020135            LDA     0,IBUFF
16152 024145            LDA     1,C10
16153 107000            ADD     0,1
16154 061430 MT100:     DIB     0,MTC
16155 106414            SUBO    0,1,SZR
16156 006114            EHALT                   ;ADDRESS COUNTER WRONG.
                                                ;AC0=BAD ADDR
                                                ;AC1=EXPECTED
                                                ;CHECK DCHI LOGIC AND INCREMENT WC
16157 006307            CHECK
16160 000010            10
16161 006114            EHALT                   ;DATA ERROR. INPUT BUFFER SHOULD EQUAL
                                                ;OUTPUT BUFFER FOR THE FIRST 8 WORDS.
                                                ;NEXT WORD CLEARED BEFORE READING.
                                                ;AC0=BAD READ DATA
                                                ;AC1=GOOD WRITTEN
                                                ;AC2=ADDRESS OF THE INPUT BUFFER BAD WORD
16162 006113            LOOP
```

```
01
02                          ;CHECK READ ODD STATUS
03 16163 000401 A37:        JMP     .+1
04 16164 006110             SETPO               ;NO LOOP FOR THIS, ONLY FOR EHALT
05 16165 006303             REWIND
06 16166 006272             WABOT               ;UPDATE STATUS, LOOK FOR BOT
07 16167 006114             EHALT               ;NO BOT FOUND
08                                              ;AC0=BAD STATUS
09 16170 006111             SETP1
10 16171 006305             GEN
11 16172 177777             177777
12 16173 006274             WRITE
13 16174 010110             010110              ;ODD CHAR MODE, 1 REC, 8 WORDS
14 16175 006114             EHALT               ;NO DONE AFTER COMMAND
15 16176 006117             STATW
16 16177 000010             10
17 16200 006114             EHALT               ;AC0=BAD STATUS
18                                              ;AC1=EXPECTED
19 16201 006276             BSPACE
20 16202 006114             EHALT               ;NO DONE AFTER COMMAND
21 16203 006306             CLEAR
22 16204 006273             READ
23 16205 000110             110
24 16206 006114             EHALT               ;NO DONE AFTER COMMAND
25 16207 020135             LDA     0,IBUFF
26 16210 024145             LDA     1,C10
27 16211 107000             ADD     0,1
28 16212 061430 MT174:      DIB     0,MTC
29 16213 106414             SUBO    0,1,SZR
30 16214 006114             EHALT               ;ADDR COUNTER WRONG
31                                              ;AC0=BAD READ VALUE
32                                              ;AC1=EXPECTED
33 16215 006117             STATW
34 16216 000010             10
35 16217 006114             EHALT               ;AC0=BAD STATUS
36                                              ;AC1=EXPECTED
37 16220 006270             UPSTA               ;UPDATE STATUS
38 16221 006116             STATN
39 16222 000010             10
40 16223 006114             EHALT               ;AC0=BAD STATUS
41                                              ;AC1=NOT EXPECTED
42 16224 006307             CHECK
43 16225 010010             010010              ;LAST WORD ONLY 1 CHAR
44 16226 006114             EHALT               ;DATA ERROR
45                                              ;AC0=BAD READ DATA
46                                              ;AC1=GOOD WRITTEN
47                                              ;AC2=ADDR OF INPUT BUFFER BAD WORD
48 16227 006113             LOOP
49
50
51                  ;TAPE 8
52
53:                 .EOT
```

```
01
02                          ;TAPE 9
03
04                          ;CHECK ODD AND MIN. BLOCKLENGTH.                    NOTE!
05                          ;HARDWARE ALLWAYS ALLOWS AN EVEN # OF BYTES TO BE READ.
06 16230 000401 A38:        JMP     .+1
07 16231 020475             LDA     0,A3810 ;INITIALIZE POINTER
08 16232 024252             LDA     1,OLDCA ;1=MTC 304/309
09 16233 125015             MOVO    1,1,SNR ;OTHER MTC ?
10 16234 020503             LDA     0,A3820 ;YES, BUFFERING DATA INCREASES MIN.
11 16235 040024             STA     0,IDX4  ;BLOCKLENGTH
12 16236 032024 A381:       LDA     2,AIDX4 ;TESTPATTERN SET
13 16237 151015             MOVO    2,2,SNR ;NEXT ?
14 16240 000464             JMP     A388    ;END THIS LOOP
15 16241 050464             STA     2,A387
16 16242 006110             SETPO
17 16243 006305             GEN
18 16244 125125             125125
19 16245 030460             LDA     2,A387
20 16246 021000             LDA     0,0,2   ;WRITE ARG
21 16247 040402             STA     0,A382
22 16250 006274             WRITE
23 16251 010101 A382:       010101          ;1. ELEMENT OF TEST PATTERN
24 16252 006114             EHALT           ;NO DONE AFTER COMMAND
25                                          ;A387 = TESTPATTERN ADDR
26 16253 030452             LDA     2,A387
27 16254 020134             LDA     0,OBUFF
28 16255 025001             LDA     1,1,2   ;2. ELEMENT OF TEST PATTERN
29 16256 107000             ADD     0,1
30 16257 061430 MT196:      DIB     0,MTC
31 16260 106414             SUBO    0,1,SZR
32 16261 006114             EHALT           ;ADDR COUNTER WRONG
33                                          ;AC0=BAD READ VALUE
34                                          ;AC1=EXPECTED
35                                          ;AC2=TESTPATTERN ADDR
36 16262 021002             LDA     0,2,2
37 16263 040402             STA     0,A383
38 16264 006117             STATW
39 16265 000010 A383:       000010          ;3. ELEMENT OF TEST PATTERN
40 16266 006114             EHALT           ;AC0=BAD STATUS
41                                          ;AC1=EXPECTED
42                                          ;A387=TESTPATTERN ADDR
43 16267 006276             BSPACE
44 16270 006114             EHALT           ;NO DONE AFTER COMMAND
45 16271 006306             CLEAR
46 16272 030433             LDA     2,A387
47 16273 021003             LDA     0,3,2
48 16274 040402             STA     0,A384
49 16275 006273             READ
50 16276 000101 A384:       000101          ;4. ELEMENT OF TEST PATTERN
51 16277 006114             EHALT           ;NO DONE AFTER COMMAND
52                                          ;A387 = TESTPATTERN ADDR
```

```
. 0192  .MAIN
01
02 16300 030425            LDA     2,A387
03 16301 020135            LDA     0,IBUFF
04 16302 025004            LDA     1,4,2    ;5. ELEMENT OF TEST PATTERN
05 16303 107000            ADD     0,1
06 16304 061430 MT197:     DIB     0,MTC
07 16305 106414            SUBO    0,1,SZR
08 16306 006114            EHALT               ;ADDR COUNTER WRONG
09                                              ;AC0=BAD READ VALUE
10                                              ;AC1=EXPECTED
11                                              ;AC2=TESTPATTERN ADDR
12 16307 021005            LDA     0,5,2
13 16310 040402            STA     0,A385
14 16311 006117            STATW
15 16312 000010 A385:      000010               ;6. ELEMENT OF TEST PATTERN
16 16313 006114            EHALT                ;AC0=BAD STATUS
17                                              ;AC1=EXPECTED
18                                              ;A387 = TESTPATTERN ADDR
19 16314 030411            LDA     2,A387
20 16315 021006            LDA     0,6,2
21 16316 040402            STA     0,A386
22 16317 006307            CHECK
23 16320 010001 A386:      010001               ;7. ELEMENT OF TEST PATTERN
24 16321 006114            EHALT                ;DATA ERROR
25                                              ;AC0=BAD READ DATA
26                                              ;AC1=GOOD WRITTEN
27                                              ;AC2=ADDR OF INPUT BUFFER BAD WORD
28                                              ;A387 = TESTPATTERN ADDR
29 16322 006113            LOOP
30
31 16323 000713            JMP     A381     ;NEXT PATTERN
32 16324 000566 A388:      JMP     E38      ;END THIS LOOP
33
34 16325 000000 A387:      0                ;ACTUAL TEST PATTERN ADDR
35
36 16326 016326 A3810:     .                ;ADDR-1 OF TESTPATTERN POINTER
37 16327 016350            A3811            ;FOR MTC 304/309
38 16330 016357            A3812
39 16331 016366            A3813
40 16332 016375            A3814
41 16333 016404            A3815
42 16334 016413            A3816
43 16335 016422            A3817
44 16336 000000            0                ;END OF TABLE
45
46 16337 016337 A3820:     .                ;ADDR-1 OF TESTPATTERN POINTER
47 16340 016431            A3821            ;FOR MTC WITH DOUBLE DATA BUFFER.
48 16341 016440            A3822
49 16342 016447            A3823
50 16343 016456            A3824
51 16344 016465            A3825
52 16345 016474            A3826
53 16346 016503            A3827
54 16347 000000            0                ;END OF TABLE
```

```
01
02 16350 000101 A3811:  000101  ;FIRST LOOP:    WRITE ARG
03 16351 000001         1       ;2 BYTES        # OF WORDS TO WRITE
04 16352 000000         0       ;               EXP STATUS
05 16353 000101         000101  ;READ 2 BYTES   READ ARG
06 16354 000001         1       ;2 BYTES        MAX # OF WORDS
07 16355 000000         0       ;               EXP STATUS
08 16356 000001         1       ;CHECK 2 BYTES  # OF READ WORDS TO CHECK
09
10                              ;IF BIT 3 IS SET IN # OF WORDS TO CHECK OR
11                              ;IN WRITE/READ ARG IT MEANS ODD:
12                              ;LAST WORD ONLY ONE BYTE.
13
14 16357 010101 A3812:  010101  ;2. LOOP
15 16360 000001         1       ;1 BYTE
16 16361 000010         10      ;ODD STATUS
17 16362 010101         010101  ;READ 1 BYTE
18 16363 000001         1       ;2 BYTES
19 16364 000010         10      ;ODD STATUS
20 16365 010001         010001  ;CHECK 1 BYTE
21
22 16366 000101 A3813:  000101  ;3. LOOP
23 16367 000001         1       ;2 BYTES
24 16370 000000         0
25 16371 010101         010101  ;READ 1 BYTE
26 16372 000001         1       ;2 BYTES
27 16373 000000         0
28 16374 000001         1       ;CHECK 2 BYTES
29
30 16375 010101 A3814:  010101  ;4. LOOP
31 16376 000001         1       ;1 BYTE
32 16377 000010         10      ;ODD STATUS
33 16400 000101         000101  ;READ 2 BYTES
34 16401 000001         1       ;2 BYTES
35 16402 000010         10      ;ODD STATUS
36 16403 010001         010001  ;CHECK 1 BYTE
37
38 16404 010102 A3815:  010102  ;5. LOOP
39 16405 000002         2       ;3 BYTES
40 16406 000010         10      ;ODD STATUS
41 16407 000101         000101  ;READ 2 BYTES
42 16410 000001         1       ;2 BYTES
43 16411 000210         210     ;BLOCKLENGTH + ODD STATUS
44 16412 000001         1       ;CHECK 2 BYTES
45
46 16413 000102 A3816:  000102  ;6. LOOP
47 16414 000002         2       ;4 BYTES
48 16415 000000         0
49 16416 000101         000101  ;READ 2 BYTES
50 16417 000001         1       ;2 BYTES
51 16420 000200         200     ;BLOCKLENGTH STATUS
52 16421 000001         1       ;CHECK 2 BYTES
53:
54 16422 010102 A3817:  010102  ;7. LOOP
55 16423 000002         2       ;3 BYTES
56 16424 000010         10      ;ODD STATUS
57 16425 010101         010101  ;READ 1 BYTE
58 16426 000001         1       ;2 BYTES
59 16427 000210         210     ;BLOCKLENGTH + ODD STATUS
60 16430 000001         1       ;CHECK 2 BYTES
```

```
01
02 16431 000102 A3821:  000102  ;FIRST LOOP:    WRITE ARG
03 16432 000002         2       ;4 BYTES        # OF WORDS TO WRITE
04 16433 000000         0       ;               EXP STATUS
05 16434 000102         000102  ;READ 4 BYTES   READ ARG
06 16435 000002         2       ;4 BYTES        MAX # OF WORDS
07 16436 000000         0       ;               EXP STATUS
08 16437 000002         2       ;CHECK 4 BYTES  # OF READ WORDS TO CHECK
09
10                              ;IF BIT 3 IS SET IN # OF WORDS TO CHECK OR
11                              ;IN WRITE/READ ARG IT MEANS ODD:
12                              ;LAST WORD ONLY ONE BYTE.
13
14 16440 010103 A3822:  010103  ;2. LOOP
15 16441 000003         3       ;5 BYTES
16 16442 000010         10      ;ODD STATUS
17 16443 010103         010103  ;READ 5 BYTES
18 16444 000003         3       ;6 BYTES
19 16445 000010         10      ;ODD STATUS
20 16446 010003         010003  ;CHECK 5 BYTES
21
22 16447 000102 A3823:  000102  ;3. LOOP
23 16450 000002         2       ;4 BYTES
24 16451 000000         0
25 16452 010102         010102  ;READ 3 BYTES
26 16453 000002         2       ;4 BYTES
27 16454 000000         0
28 16455 000002         2       ;CHECK 4 BYTES
29
30 16456 010103 A3824:  010103  ;4. LOOP
31 16457 000003         3       ;5 BYTES
32 16460 000010         10      ;ODD STATUS
33 16461 000103         000103  ;READ 6 BYTES
34 16462 000003         3       ;6 BYTES
35 16463 000010         10      ;ODD STATUS
36 16464 010003         010003  ;CHECK 5 BYTES
37
38 16465 010103 A3825:  010103  ;5. LOOP
39 16466 000003         3       ;5 BYTES
40 16467 000010         10      ;ODD STATUS
41 16470 000102         000102  ;READ 4 BYTES
42 16471 000002         2       ;4 BYTES
43 16472 000210         210     ;BLOCKLENGTH + ODD STATUS
44 16473 000002         2       ;CHECK 4 BYTES
45
46 16474 000103 A3826:  000103  ;6. LOOP
47 16475 000003         3       ;6 BYTES
48 16476 000000         0
49 16477 000102         000102  ;READ 4 BYTES
50 16500 000002         2       ;4 BYTES
51 16501 000200         200     ;BLOCKLENGTH STATUS
52 16502 000002         2       ;CHECK 4 BYTES
53:
54 16503 010103 A3827:  010103  ;7. LOOP
55 16504 000003         3       ;5 BYTES
56 16505 000010         10      ;ODD STATUS
57 16506 010102         010102  ;READ 3 BYTES
58 16507 000002         2       ;4 BYTES
59 16510 000210         210     ;BLOCKLENGTH + ODD STATUS
60 16511 000002         2       ;CHECK 4 BYTES
61
62 16512 000401 E38:    JMP     .+1     ;NEXT LOOP
```

```
. 0195  .MAIN
01
02                              ;CHECK READ EOF
03                                      ;REWIND, WRITE 1 REC., WRITE EOF,
04                                      ;BACKSPACE 2 RECS., READ 2 RECS., CHECK.
05 16513 000401 A39:    JMP     .+1
06 16514 006110         SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
07 16515 006303         REWIND
08 16516 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
09 16517 006114         EHALT           ;NO BOT FOUND
10                                      ;AC0=BAD STATUS
11 16520 006111         SETP1
12 16521 006274         WRITE
13 16522 000110         110
14 16523 006114         EHALT           ;NO DONE AFTER COMMAND
15 16524 006300         WEOF
16 16525 006114         EHALT           ;NO DONE AFTER COMMAND
17 16526 006117         STATW
18 16527 000400         000400
19 16530 006114         EHALT           ;AC0=BAD STATUS
20                                      ;AC1=EXPECTED
21 16531 006270         UPSTA           ;UPDATE STATUS
22 16532 006117         STATW
23 16533 000000         0
24 16534 006114         EHALT           ;AC0=BAD STATUS
25                                      ;AC1=EXPECTED
26 16535 102620         SUBZR   0,0     ;EVEN PARITY ARG, AC0=100000
27 16536 114000         COM     0,3     ;AC3=077777
28 16537 024412         LDA     1,A394  ;ARG FOR READ
29 16540 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
30 16541 030264         LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
31 16542 151014         MOVO    2,2,SZR ;7 TRACK ?
32 16543 107000         ADD     0,1     ;YES, ADD EVEN
33 16544 044405         STA     1,A394  ;SET ARG
34 16545 006277         SPARG
35 16546 010200         010200          ;BACKSPACE 2 RECS.
36 16547 006114         EHALT           ;NO DONE AFTER COMMAND
37                                      ;AC2=BLOCK 0
38 16550 006273         READ            ;READ 2 RECS.,
39 16551 000210 A394:   210             ;STATUS UPDATED FOR LAST REC.
40 16552 006114         EHALT           ;NO DONE AFTER COMMAND
41                                      ;AC2=BLOCK 0
42 16553 024135         LDA     1,IBUFF
43 16554 061430 MT101:  DIB     0,MTC
44 16555 030262         LDA     2,NRZIA ;1 FOR NRZI, 0 FOR PE
45 16556 151015         MOVO    2,2,SNR ;NRZI ?
46 16557 000415         JMP     A392    ;NO, PE
47 16560 125400         INC     1,1
48 16561 106414         SUBO    0,1,SZR ;EOF SHOULD COUNT 1 IN WC AND AC IF NRZI
49 16562 006114         EHALT           ;ADDRESS COUNTER WRONG.
50                                      ;AC0=BAD READ VALUE
51                                      ;AC1=EXPECTED
52 16563 006117         STATW           ;LOOKING FOR READ EOF
53 16564 000410         000410
54 16565 006114         EHALT           ;AC0=BAD STATUS
55                                      ;AC1=EXPECTED
56 16566 006270 A391:   UPSTA           ;UPDATE STATUS
57 16567 006117         STATW
58 16570 000000         0
59 16571 006114         EHALT           ;AC0=BAD STATUS
60                                      ;AC1=EXPECTED
61 16572 006113         LOOP
62
63 16573 000407         JMP     E39
```

```
. 0196  .MAIN
01
02 16574 106414 A392:   SUBO    0,1,SZR ;EOF SHOULD NOT COUNT IN WC AND AC IF PE
03 16575 006114         EHALT           ;ADDRESS COUNTER WRONG. AC1=CORRECT
04                                      ;AC0=BAD READ VALUE
05 16576 006117         STATW           ;LOOKING FOR READ EOF
06 16577 000400         000400
07 16600 006114         EHALT           ;AC0=BAD STATUS
08                                      ;AC1=EXPECTED
09 16601 000765         JMP     A391
10
11 16602 000401 E39:    JMP     .+1     ;NEXT LOOP
12
13                      ;CHECK READ EOF ON SPACE BACK A WHOLE FILE.
14                                      ;REWIND, WRITE 2 RECS., EOF AND 3 RECS.,
15                                      ;BACKSPACE FILE, CHECK EOF.
16 16603 000401 A40:    JMP     .+1
17 16604 006110         SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
18 16605 006303         REWIND
19 16606 102620         SUBZR   0,0     ;EVEN PARITY ARG, AC0=100000
20 16607 114000         COM     0,3     ;AC3=077777
21 16610 024425         LDA     1,A401  ;ARG FOR SPACE
22 16611 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
23 16612 030264         LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
24 16613 151014         MOVO    2,2,SZR ;7 TRACK ?
25 16614 107000         ADD     0,1     ;YES, ADD EVEN
26 16615 044420         STA     1,A401  ;SET ARG
27 16616 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
28 16617 006114         EHALT           ;NO BOT FOUND
29                                      ;AC0=BAD STATUS
30 16620 006111         SETP1
31 16621 006274         WRITE
32 16622 000210         210
33 16623 006114         EHALT           ;NO DONE AFTER COMMAND
34                                      ;AC2=BLOCK 0
35 16624 006300         WEOF
36 16625 006114         EHALT           ;NO DONE AFTER COMMAND
37 16626 006117         STATW
38 16627 000400         000400
39 16630 006114         EHALT           ;AC0=BAD STATUS
40                                      ;AC1=EXPECTED
41 16631 006274         WRITE
42 16632 000310         310
43 16633 006114         EHALT           ;NO DONE AFTER COMMAND
44                                      ;AC2=BLOCK 0
45 16634 006277         SPARG           ;BACKSPACE FILE, I. E.
46 16635 010000 A401:   010000          ;4 RECS., STATUS UPDATED FOR LAST REC.
47 16636 006063         TIMSK
48 16637 000020         400.            ;WAIT MAX 0.4 SEC
49 16640 063530 MT194:  SKPBZ   MTC
50 16641 006114         EHALT           ;NOT FINISHED, EOF SHOULD STOP MOTION.
51                                      ;AC2=BLOCK 0
52 16642 006117         STATW
53 16643 000400         000400
54 16644 006114         EHALT           ;AC0=BAD STATUS
55                                      ;AC1=EXPECTED
56                                      ;LOOKING FOR EOF.
57 16645 006276         BSPACE
58 16646 006114         EHALT           ;NO DONE AFTER COMMAND
59 16647 006116         STATN
60 16650 000400         000400
61 16651 006114         EHALT           ;AC0=BAD STATUS
62                                      ;AC1=NOT EXPECTED
63                                      ;EOF BIT CANNOT BE RESET
64 16652 006113         LOOP
```

```
01
02                          ;CHECK READ EOF ON SPACE BACK 1 RECORD (THE EOF).
03 16653 000401 A40B:   JMP     .+1
04 16654 006110         SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
05 16655 006303         REWIND
06 16656 102620         SUBZR   0,0     ;EVEN PARITY ARG, AC0=100000
07 16657 114000         COM     0,3     ;AC3=077777
08 16660 024417         LDA     1,A401B ;ARG FOR SPACE
09 16661 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
10 16662 030264         LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
11 16663 151014         MOVO    2,2,SZR ;7 TRACK ?
12 16664 107000         ADD     0,1     ;YES, ADD EVEN
13 16665 044412         STA     1,A401B ;SET ARG
14 16666 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
15 16667 006114         EHALT           ;NO BOT FOUND
16                                      ;AC0=BAD STATUS
17 16670 006111         SETP1
18 16671 006300         WEOF
19 16672 006114         EHALT           ;NO DONE AFTER COMMAND
20 16673 006117         STATW
21 16674 000400         000400
22 16675 006114         EHALT           ;AC0=BAD STATUS
23                                      ;AC1=EXPECTED
24 16676 006277         SPARG
25 16677 010100 A401B:  010100          ;BACKSPACE ONE REC.
26 16700 006114         EHALT           ;NO DONE AFTER COMMAND
27 16701 006117         STATW
28 16702 000400         000400
29 16703 006114         EHALT           ;AC0=BAD STATUS
30                                      ;AC1=EXPECTED
31                                      ;CHECK SKEW AND START/STOP TIME.
32 16704 006113         LOOP
```

```
                                ;CHECK READ EOF ON SPACE FORWARD A WHOLE FILE.
                                ;REWIND, WRITE 3 RECS., EOF AND 2 RECS.,
                                ;BACKSPACE 6 RECS., SPACE FORWARD FILE,
                                ;CHECK EOF.
16705 000401 A41:   JMP    .+1
16706 006110        SETP0       ;NO LOOP FOR THIS, ONLY FOR EHALT
16707 006303        REWIND
16710 006272        WABOT       ;UPDATE STATUS, LOOK FOR BOT
16711 006114        EHALT       ;NO BOT FOUND
                                ;AC0=BAD STATUS
16712 006111        SETP1
16713 006274        WRITE
16714 000310        310         ;3 RECS. OF 8 WORDS (16 CHARS)
16715 006114        EHALT       ;NO DONE AFTER COMMAND
                                ;AC2=BLOCK 0
16716 006300        WEOF
16717 006114        EHALT       ;NO DONE AFTER COMMAND
16720 006117        STATW
16721 000400        000400
16722 006114        EHALT       ;AC0=BAD STATUS
                                ;AC1=EXPECTED
16723 006274        WRITE
16724 000210        210
16725 006114        EHALT       ;NO DONE AFTER COMMAND
                                ;AC2=BLOCK 0
16726 102620        SUBZR  0,0  ;EVEN PARITY ARG, AC0=100000
16727 114000        COM    0,3  ;AC3=077777
16730 024412        LDA    1,A411 ;ARG FOR SPACE
16731 167400        AND    3,1  ;MASK OUT PARITY FROM ARG
16732 030264        LDA    2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
16733 151014        MOVO   2,2,SZR ;7 TRACK ?
16734 107000        ADD    0,1  ;YES, ADD EVEN
16735 044405        STA    1,A411 ;SET ARG
16736 006277        SPARG
16737 010600        010600      ;BACKSPACE 6 RECORDS
16740 006114        EHALT       ;NO DONE AFTER COMMAND
                                ;AC2=BLOCK 0
16741 006277        SPARG       ;SPACE FORWARD FILE, I. E.
16742 000000 A411:  000000      ;4 RECS., STATUS UPDATED FOR LAST REC.
16743 006063        TIMSK
16744 000620        400.        ;WAIT MAX 0.4 SEC.
16745 063530 MT195: SKPBZ  MTC
16746 006114        EHALT       ;NOT FINISHED, EOF SHOULD STOP MOTION.
                                ;AC2=BLOCK 0
16747 006117        STATW
16750 000400        000400
16751 006114        EHALT       ;AC0=BAD STATUS
                                ;AC1=EXPECTED
                                ;LOOKING FOR EOF STATUS.  THIS IS
                                ;THE SAME AS THE LAST EXCEPT THAT
                                ;SPACING IS FORWARD
16752 006275        SPACE
16753 006114        EHALT       ;NO DONE AFTER COMMAND
16754 006116        STATN
16755 000400        000400
16756 006114        EHALT       ;AC0=BAD STATUS
                                ;AC1=NOT EXPECTED
                                ;EOF BIT CANNOT BE RESET
16757 006113        LOOP
```

```
. 0199  .MAIN
01
02                          ;9 TRACK NRZI:  CRC, LPC CHECK
03                          ;7 TRACK:       LPC CHECK
04                          ;9 TRACK PE:    PASS
05 16760 024264 B42:        LDA     1,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
06 16761 125014             MOVO    1,1,SZR ;7 TRACK ?
07 16762 000406             JMP     B421    ;YES, DO NOT PERFORM NEXT FIVE LOOPS
08 16763 024262             LDA     1,NRZIA ;1 FOR NRZI, 0 FOR PE
09 16764 125014             MOVO    1,1,SZR ;NRZI ?
10 16765 000405             JMP     A42     ;YES, PERFORM NEXT FIVE LOOPS
11 16766 002401             JMP     A.+1    ;NO, PASS 9 LOOPS
12 16767 017445             E49
13 16770 002401 B421:       JMP     A.+1
14 16771 017237             E45B            ;PASS 5 LOOPS
```

```
. 0200  .MAIN
01
02                              ;CRC-LPC CHECK
03                              ;9 TRACK ONLY NRZI
04                                              ;REWIND, WRITE 1 REC, CHECK STATUS
05                                              ;BACKSPACE, READ (TESTMODE, UNPACKED)
06                                              ;CHECK STATUS, AC, DATA + CRC + LPC
07 16772 000401 A42:    JMP     .+1
08 16773 006110         SETPO                   ;NO LOOP FOR THIS, ONLY FOR EHALT
09 16774 006303         REWIND
10 16775 006272         WABOT                   ;UPDATE STATUS, LOOK FOR BOT
11 16776 006114         EHALT                   ;NO BOT FOUND
12                                              ;AC0=BAD STATUS
13 16777 006111         SETP1
14 17000 006311         LOAD
15 17001 013461         PAT1
16 17002 006274         WRITE
17 17003 000102         102
18 17004 006114         EHALT                   ;NO DONE AFTER COMMAND
19 17005 006117         STATW
20 17006 000000         0
21 17007 006114         EHALT                   ;AC0=BAD STATUS
22                                              ;AC1=EXPECTED
23                                              ;THIS HAS WORKED BEFORE.
24                                              ;RESTART PROGRAM
25 17010 006276         BSPACE
26 17011 006114         EHALT                   ;NO DONE AFTER COMMAND
27 17012 006306         CLEAR
28 17013 006302         READU
29 17014 000106         106
30 17015 006114         EHALT                   ;NO DONE AFTER COMMAND
31 17016 006117         STATW
32 17017 000000         0
33 17020 006114         EHALT                   ;AC0=BAD STATUS
34                                              ;AC1=EXPECTED
35                                              ;JUST READ 4 CHAR REC IN UNPACKED MODE.
36                                              ;UNPACKED MODE IS THE ONLY NEW VARIABLE.
37 17021 061430 MT102:  DIB     0,MTC
38 17022 024135         LDA     1,IBUFF
39 17023 030143         LDA     2,C6            ;4 CHARS + CRC + LPC
40 17024 147000         ADD     2,1
41 17025 106414         SUBO    0,1,SZR
42 17026 006114         EHALT                   ;ADDR COUNTER WRONG.  AC1=CORRECT
43                                              ;AC0=ACTUAL
44 17027 006310         CHECU
45 17030 013503         UPAT1
46 17031 006114         EHALT   ;DATA ERROR. 2 WORDS WERE WRITTEN,
47                              ;6 BYTES WERE READ. 4 DATA + CRC + LPC
48                              ;THIS TEST LOOKS FOR BIT PICKUPS
49                              ;IN THE CRC GENERATOR.  DATA IS CHOSEN
50                              ;TO PRODUCE A MINIMUM 1'S IN CRC
51                              ;GENERATION.  THE SEQUENCE XOR-SHIFT
52                              ;IS DONE ONCE FOR EACH OF THE
53                              ;4 CHAR. XOR 1&3 PRODUCE A 1 IN CRC1
54                              ;WHICH IS THEN SHIFTED INTO CRC2.
55                              ;ALL OTHER CASES PRODUCE 0'S.
56                              ;1'S ARE WRITTEN ON TAPE BECAUSE
57                              ;OF CRC COMPLEMENT AT THE END.
58                              ;AC2= ADDR. OF IBUFF BAD WORD
59                              ;AC1= GOOD WORD
60                              ;AC0= BAD WORD
61                              ;EXPECTED CRC = 727
62                              ;            LPC = 727
63 17032 006113         LOOP
```

```
0201   .MAIN
01
02                          ;CRC-LPC CHECK
03                          ;9 TRACK ONLY NRZI
04                                          ;REWIND, WRITE 7 REC, CHECK STATUS
05                                          ;BACKSPACE, READ (TESTMODE, UNPACKED)
06                                          ;CHECK STATUS, AC, DATA + CRC + LPC
07 17033 000401 A43:    JMP     .+1
08 17034 006110         SETPO               ;NO LOOP FOR THIS, ONLY FOR EHALT
09 17035 006303         REWIND
10 17036 006272         WABOT               ;UPDATE STATUS, LOOK FOR BOT
11 17037 006114         EHALT               ;NO BOT FOUND
12                                          ;AC0=BAD STATUS
13 17040 006111         SETP1
14 17041 006311         LOAD
15 17042 013464         PAT2
16 17043 006274         WRITE
17 17044 000102         102
18 17045 006114         EHALT               ;NO DONE AFTER COMMAND
19 17046 006117         STATW
20 17047 000000         0
21 17050 006114         EHALT               ;AC0=BAD STATUS
22                                          ;AC1=EXPECTED
23                                          ;THIS HAS WORKED BEFORE.
24                                          ;RESTART PROGRAM
25 17051 006276         BSPACE
26 17052 006114         EHALT               ;NO DONE AFTER COMMAND
27 17053 006306         CLEAR
28 17054 006302         READU
29 17055 000106         106
30 17056 006114         EHALT               ;NO DONE AFTER COMMAND
31 17057 006117         STATW
32 17060 000000         0
33 17061 006114         EHALT               ;AC0=BAD STATUS
34                                          ;AC1=EXPECTED
35                                          ;JUST READ 4 CHAR REC IN UNPACKED MODE.
36                                          ;UNPACKED MODE IS THE ONLY NEW VARIABLE.
37 17062 061430 MT103:  DIB     0,MTC
38 17063 024135         LDA     1,IBUFF
39 17064 030143         LDA     2,C6        ;4 CHARS + CRC + LPC
40 17065 147000         ADD     2,1
41 17066 106414         SUBO    0,1,SZR
42 17067 006114         EHALT               ;ADDR COUNTER WRONG.  AC1=CORRECT
43                                          ;AC0=ACTUAL.
44 17070 006310         CHECU
45 17071 013512         UPAT2
46 17072 006114         EHALT   ;DATA ERROR.  2 WORDS WERE WRITTEN
47                              ;6 BYTES WERE READ. 4 DATA + CRC + LPC
48                              ;THIS TEST LOOKS FOR BIT DROPS IN THE
49                              ;CRC GENERATOR.  DATA IS CHOSEN
50                              ;TO PRODUCE A MINIMUM OF 0'S.  THE
51                              ;SEQUENCE XOR-SHIFT-COMP OCCURS
52                              ;ONCE FOR EACH OF THE 4 CHAR.  FOLLOWING
53                              ;EACH COMP CRC 4,5,6,7 ARE ZEROS.
54                              ;ALL OTHER BITS ARE ALWAYS 1'S.
55                              ;ZEROS ARE WRITTEN ON TAPE BECAUSE
56                              ;OF CRC COMPLEMENT AT END.
57                              ;AC2=ADDR OF IBUFF BAD WORD
58                              ;AC1= GOOD WORD
59                              ;AC0= BAD WORD
60                              ;EXPECTED CRC = 224
61                              ;             LPC = 727
62 17073 006113         LOOP
```

```
. 0202  .MAIN
01
02                              ;CRC-LPC CHECK
03                              ;9 TRACK ONLY NRZI
04                                                  ;REWIND, WRITE 1 REC, CHECK STATUS
05                                                  ;BACKSPACE, READ (TESTMODE, UNPACKED)
06                                                  ;CHECK STATUS, AC, DATA + CRC + LPC
07 17074 000401 A44:    JMP     .+1
08 17075 006110         SETPO                       ;NO LOOP FOR THIS, ONLY FOR EHALT
09 17076 006303         REWIND
10 17077 006272         WABOT                       ;UPDATE STATUS, LOOK FOR BOT
11 17100 006114         EHALT                       ;NO BOT FOUND
12                                                  ;AC0=BAD STATUS
13 17101 006111         SETP1
14 17102 006311         LOAD
15 17103 013467         PAI3
16 17104 006274         WRITE
17 17105 000102         102
18 17106 006114         EHALT                       ;NO DONE AFTER COMMAND
19 17107 006117         STATW
20 17110 000000         0
21 17111 006114         EHALT                       ;AC0=BAD STATUS
22                                                  ;AC1=EXPECTED
23                                                  ;THIS HAS WORKED BEFORE
24                                                  ;RESTART PROGRAM
25 17112 006276         BSPACE
26 17113 006114         EHALT                       ;NO DONE AFTER COMMAND
27 17114 006306         CLEAR
28 17115 006302         READU
29 17116 000106         106
30 17117 006114         EHALT                       ;NO DONE AFTER COMMAND
31 17120 006117         STATW
32 17121 000000         0
33 17122 006114         EHALT                       ;AC0=BAD STATUS
34                                                  ;AC1=EXPECTED
35                                                  ;JUST READ 4 CHAR REC IN UNPACKED MODE.
36                                                  ;UNPACKED MODE IS THE ONLY NEW VARIABLE.
37 17123 061430 MT104:  DIB     0,MTC
38 17124 024135         LDA     1,IBUFF
39 17125 030143         LDA     2,C6                ;4 CHARS + CRC + LPC
40 17126 147000         ADD     2,1
41 17127 106414         SUBO    0,1,SZR
42 17130 006114         EHALT                       ;ADDR COUNTER WRONG.  AC1=CORRECT
43                                                  ;AC0=ACTUAL.
44 17131 006310         CHECU
45 17132 013521         UPAT3
46 17133 006114         EHALT   ;DATA ERROR.  2 WORDS WERE WRITTEN
47                              ;6 BYTES WERE READ. 4 DATA + CRC + LPC
48                              ;THIS TEST IS A GATE CHECK FOR THE
49                              ;CRC GENERATOR.  DATA IS CHOSEN
50                              ;TO PRODUCE ALL COMBINATIONS OF XOR
51                              ;ON EACH CRC BIT.  THIS 4 CHAR
52                              ;RECORD CATCHES 80% OF THE CASES.
53                              ;AC2=ADDR OF IBUFF BAD WORD
54                              ;AC1= GOOD WORD
55                              ;AC0= BAD WORD
56                              ;EXPECTED CRC = 076
57                              ;         LPC = 447
58 17134 006113         LOOP
```

```
01
02                        ;CRC-LPC CHECK
03                        ;9 TRACK ONLY NRZI
04                                  ;REWIND, WRITE 1 REC, CHECK STATUS
05                                  ;BACKSPACE, READ (TESTMODE, UNPACKED)
06                                  ;CHECK STATUS, AC, DATA + CRC + LPC
07 17135 000401 A45:      JMP   .+1
08 17136 006110           SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
09 17137 006303           REWIND
10 17140 006272           WABOT           ;UPDATE STATUS, LOOK FOR BOT
11 17141 006114           EHALT           ;NO BOT FOUND
12                                  ;AC0=BAD STATUS
13 17142 006111           SETP1
14 17143 006311           LOAD
15 17144 013472           PAT4
16 17145 006274           WRITE
17 17146 000102           102
18 17147 006114           EHALT           ;NO DONE AFTER COMMAND
19 17150 006117           STATW
20 17151 000000           0
21 17152 006114           EHALT           ;AC0=BAD STATUS
22                                  ;AC1=EXPECTED
23                                  ;THIS HAS WORKED BEFORE.
24                                  ;RESTART PROGRAM
25 17153 006276           BSPACE
26 17154 006114           EHALT           ;NO DONE AFTER COMMAND
27 17155 006306           CLEAR
28 17156 006302           READU
29 17157 000106           106
30 17160 006114           EHALT           ;NO DONE AFTER COMMAND
31 17161 006117           STATW
32 17162 000000           0
33 17163 006114           EHALT           ;AC0=BAD STATUS
34                                  ;AC1=EXPECTED
35                                  ;JUST READ 4 CHAR REC IN UNPACKED MODE.
36                                  ;UNPACKED MODE IS THE ONLY NEW VARIABLE.
37 17164 061430 MT105:    DIB     0,MTC
38 17165 024135           LDA     1,IBUFF
39 17166 030143           LDA     2,C6      ;4 CHARS + CRC + LPC
40 17167 147000           ADD     2,1
41 17170 106414           SUBZ    0,1,SZR
42 17171 006114           EHALT             ;ADDR COUNTER WRONG.  AC1=CORRECT
43                                  ;AC0=ACTUAL.
44 17172 006310           CHECU
45 17173 013530           UPAT4
46 17174 006114           EHALT   ;DATA ERROR.  2 WORDS WERE WRITTEN
47                                ;6 BYTES WERE READ. 4 DATA + CRC + LPC
48                                ;THIS TEST IS A GATE CHECK FOR THE
49                                ;CRC GENERATOR.  DATA IS CHOSEN TO
50                                ;PRODUCE ALL COMBINATIONS OF XOR
51                                ;ON EACH CRC BIT.  THIS TEST CATCHES
52                                ;THE REMAINING 20% OF THE CASES
53                                ;NOT COVERED IN THE PREVIOUS TEST.
54                                ;AC2=ADDR OF IBUFF BAD WORD
55                                ;AC1= GOOD WORD
56                                ;AC0= BAD WORD
57                                ;EXPECTED CRC = 147
58                                ;             LPC = 150
59 17175 006113           LOOP
```

```
01
02                              ;CRC-LPC CHECK
03                              ;9 TRACK ONLY NRZI
04                                              ;REWIND, WRITE 1 REC, CHECK STATUS
05                                              ;BACKSPACE, READ (TESTMODE, UNPACKED)
06                                              ;CHECK STATUS, AC, DATA + CRC + LPC
07 17176 000401 A458:   JMP     .+1
08 17177 006110         SETPO                   ;NO LOOP FOR THIS, ONLY FOR EHALT
09 17200 006303         REWIND
10 17201 006272         WABOT                   ;UPDATE STATUS, LOOK FOR BOT
11 17202 006114         EHALT                   ;NO BOT FOUND
12                                              ;AC0=BAD STATUS
13 17203 006111         SETP1
14 17204 006311         LOAD
15 17205 013456         PATO
16 17206 006274         WRITE
17 17207 010102         010102                  ;WRITE ODD # OF CHARS
18 17210 006114         EHALT                   ;NO DONE AFTER COMMAND
19 17211 006117         STATW
20 17212 000010         10
21 17213 006114         EHALT                   ;AC0=BAD STATUS
22                                              ;AC1=EXPECTED
23                                              ;THIS HAS WORKED BEFORE.
24                                              ;RESTART PROGRAM
25 17214 006276         BSPACE
26 17215 006114         EHALT                   ;NO DONE AFTER COMMAND
27 17216 006306         CLEAR
28 17217 006302         READU
29 17220 000104         104
30 17221 006114         EHALT                   ;NO DONE AFTER COMMAND
31 17222 006117         STATW
32 17223 000000         0
33 17224 006114         EHALT                   ;AC0=BAD STATUS
34                                              ;AC1=EXPECTED
35                                              ;JUST READ 4 CHAR REC IN UNPACKED MODE.
36                                              ;UNPACKED MODE IS THE ONLY NEW VARIABLE.
37 17225 061430 MT168:  DIB     0,MTC
38 17226 024135         LDA     1,IBUFF
39 17227 030141         LDA     2,C4            ;3 CHARS + LPC
40 17230 147000         ADD     2,1
41 17231 106414         SUBO    0,1,SZR
42 17232 006114         EHALT                   ;ADDR COUNTER WRONG.  AC1=CORRECT
43                                              ;AC0=ACTUAL.
44 17233 006310         CHECU
45 17234 013475         UPATO
46 17235 006114         EHALT   ;DATA ERROR.  2 WORDS WERE WRITTEN IN ODD MODE,
47                              ;4 BYTES WERE READ. 3 DATA + LPC
48                              ;THIS TEST GENERATES A TESTPATTERN TESTING
49                              ;THE REMAINING BITCOMBINATIONS NOT TESTED
50                              ;IN THE PREVIOUS 4 LOOPS. THE RESULTING
51                              ;CRC CHAR IS ZERO, GIVING NO READ STROBE
52                              ;WHEN READING.
53                              ;AC2=ADDR OF IBUFF BAD WORD
54                              ;AC1= GOOD WORD
55                              ;AC0= BAD WORD
56                              ;EXPECTED CRC = 000 (NO READ STROBE)
57                              ;             LPC = 242
58 17236 006113         LOOP
59
60 17237 002401 E458:   JMP     A.+1            ;NEXT LOOP
61 17240 017445         E49                     ;PASS THE FOUR 7 TRACK LOOPS
```

```
01
02                              ;LPC CHECK
03                              ;7 TRACK ONLY NRZI
04                                                  ;REWIND, WRITE 1 REC, CHECK STATUS
05                                                  ;BACKSPACE, READ (TESTMODE, UNPACKED)
06                                                  ;CHECK STATUS, AC, DATA + LPC
07 17241 000401 A46:    JMP     .+1
08 17242 006110         SETPO                       ;NO LOOP FOR THIS, ONLY FOR EHALT
09 17243 006303         REWIND
10 17244 006272         WABOT                       ;UPDATE STATUS, LOOK FOR BOT
11 17245 006114         EHALT                       ;NO BOT FOUND
12                                                  ;AC0=BAD STATUS
13 17246 006111         SETP1
14 17247 006311         LOAD
15 17250 013537         PAT5
16 17251 006274         WRITE
17 17252 000102         102
18 17253 006114         EHALT                       ;NO DONE AFTER COMMAND
19 17254 006117         STATW
20 17255 000000         0
21 17256 006114         EHALT                       ;AC0=BAD STATUS
22                                                  ;AC1=EXPECTED
23 17257 006276         BSPACE
24 17260 006114         EHALT                       ;NO DONE AFTER COMMAND
25 17261 006306         CLEAR
26 17262 006302         READU
27 17263 000104         104
28 17264 006114         EHALT                       ;NO DONE AFTER COMMAND
29 17265 006117         STATW
30 17266 000000         0
31 17267 006114         EHALT                       ;AC0=BAD STATUS
32                                                  ;AC1=EXPECTED
33 17270 061430 MT169:  DIB     0,MTC
34 17271 024135         LDA     1,IBUFF
35 17272 030141         LDA     2,C4                ;4 CHARS, NO LPC READ STROBE
36 17273 147000         ADD     2,1
37 17274 106414         SUBO    0,1,SZR
38 17275 006114         EHALT                       ;ADDR COUNTER WRONG,
39                                                  ;AC0=BAD READ VALUE
40                                                  ;AC1=EXPECTED
41 17276 006310         CHECU
42 17277 013553         UPAT5
43 17300 006114         EHALT                       ;DATA ERROR OR LPC ERROR
44                                                  ;
45                                                  ;AC2=ADDR OF IBUFF BAD WORD
46                                                  ;AC1=GOOD WORD
47                                                  ;AC0=BAD WORD
48                                                  ;EXPECTED LPC = 000 (NO READ STROBE)
49 17301 006113         LOOP
```

```
                        ;LPC CHECK
                        ;7 TRACK ONLY NRZI
                                        ;REWIND, WRITE 1 REC, CHECK STATUS
                                        ;BACKSPACE, READ (TESTMODE, UNPACKED)
                                        ;CHECK STATUS, AC, DATA + LPC
17302 000401 A47:       JMP     .+1
17303 006110            SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
17304 006303            REWIND
17305 006272            WABOT           ;UPDATE STATUS, LOOK FOR BOT
17306 006114            EHALT           ;NO BOT FOUND
                                        ;AC0=BAD STATUS
17307 006111            SETP1
17310 006311            LOAD
17311 013542            PAT6
17312 006274            WRITE
17313 010102            010102          ;WRITE ODD CHAR
17314 006114            EHALT           ;NO DONE AFTER COMMAND
17315 006117            STATW
17316 000010            10
17317 006114            EHALT           ;AC0=BAD STATUS
                                        ;AC1=EXPECTED
17320 006276            BSPACE
17321 006114            EHALT           ;NO DONE AFTER COMMAND
17322 006306            CLEAR
17323 006302            READU
17324 000104            104
17325 006114            EHALT           ;NO DONE AFTER COMMAND
17326 006117            STATW
17327 000000            0
17330 006114            EHALT           ;AC0=BAD STATUS
                                        ;AC1=EXPECTED
17331 061430 MT170:     DIB     0,MTC
17332 024135            LDA     1,IBUFF
17333 030141            LDA     2,C4    ;3 CHARS + LPC
17334 147000            ADD     2,1
17335 106414            SUBO    0,1,SZR
17336 006114            EHALT           ;ADDR COUNTER WRONG,
                                        ;AC0=BAD READ VALUE
                                        ;AC1=EXPECTED
17337 006310            CHECU
17340 013561            UPAT6
17341 006114            EHALT           ;DATA ERROR OR LPC ERROR
                                        ;
                                        ;AC2=ADDR OF IBUFF BAD WORD
                                        ;AC1=GOOD WORD
                                        ;AC0=BAD WORD
                                        ;EXPECTED LPC = 052
17342 006113            LOOP
```

```
                        ;LPC CHECK
                        ;7 TRACK ONLY NRZI
                                                ;REWIND, WRITE 1 REC, CHECK STATUS
                                                ;BACKSPACE, READ (TESTMODE, UNPACKED)
                                                ;CHECK STATUS, AC, DATA + LPC
17343 000401 A48:       JMP     .+1
17344 006110            SETPO                   ;NO LOOP FOR THIS, ONLY FOR EHALT
17345 006303            REWIND
17346 006272            WABOT                   ;UPDATE STATUS, LOOK FOR BOT
17347 006114            EHALT                   ;NO BOT FOUND
                                                ;AC0=BAD STATUS
17350 006111            SETP1
17351 006311            LOAD
17352 013545            PAT7
17353 006274            WRITE
17354 010103            010103                  ;WRITE ODD CHAR
17355 006114            EHALT                   ;NO DONE AFTER COMMAND
17356 006117            STATW
17357 000010            10
17360 006114            EHALT                   ;AC0=BAD STATUS
                                                ;AC1=EXPECTED
17361 006276            BSPACE
17362 006114            EHALT                   ;NO DONE AFTER COMMAND
17363 006306            CLEAR
17364 006302            READU
17365 000106            106
17366 006114            EHALT                   ;NO DONE AFTER COMMAND
17367 006117            STATW
17370 000000            0
17371 006114            EHALT                   ;AC0=BAD STATUS
                                                ;AC1=EXPECTED
17372 061430 MT171:     DIB     0,MTC
17373 024135            LDA     1,IBUFF
17374 030143            LDA     2,C6            ;5 CHARS + LPC
17375 147000            ADD     2,1
17376 106414            SUBO    0,1,SZR
17377 006114            EHALT                   ;ADDR COUNTER WRONG.
                                                ;AC0=BAD READ VALUE
                                                ;AC1=EXPECTED
17400 006310            CHECU
17401 013566            UPAT7
17402 006114            EHALT                   ;DATA ERROR OR LPC ERROR
                                                ;
                                                ;AC2=ADDR OF IBUFF BAD WORD
                                                ;AC1=GOOD WORD
                                                ;AC0=BAD WORD
                                                ;EXPECTED LPC = 477
17403 006113            LOOP
```

```
                        ;LPC CHECK
                        ;7 TRACK ONLY NRZI
                                        ;REWIND, WRITE 1 REC, CHECK STATUS
                                        ;BACKSPACE, READ (TESTMODE, UNPACKED)
                                        ;CHECK STATUS, AC, DATA + LPC
17404 000401 A49:       JMP     .+1
17405 006110            SETPO           ;NO LOOP FOR THIS, ONLY FOR EHALT
17406 006303            REWIND
17407 006272            WABOT           ;UPDATE STATUS, LOOK FOR BOT
17410 006114            EHALT           ;NO BOT FOUND
                                        ;AC0=BAD STATUS
17411 006111            SETP1
17412 006311            LOAD
17413 013550            PAT8
17414 006274            WRITE
17415 100102            100102          ;WRITE EVEN PARITY
17416 006114            EHALT           ;NO DONE AFTER COMMAND
17417 006117            STATW
17420 000000            0
17421 006114            EHALT           ;AC0=BAD STATUS
                                        ;AC1=EXPECTED
17422 006276            BSPACE
17423 006114            EHALT           ;NO DONE AFTER COMMAND
17424 006306            CLEAR
17425 006302            READU
17426 100105            100105
17427 006114            EHALT           ;NO DONE AFTER COMMAND
17430 006117            STATW
17431 000010            10
17432 006114            EHALT           ;AC0=BAD STATUS
                                        ;AC1=EXPECTED
17433 061430 MT172:     DIB     0,MTC
17434 024135            LDA     1,IBUFF
17435 030142            LDA     2,C5    ;4 CHARS + LPC
17436 147000            ADD     2,1
17437 106414            SUBO    0,1,SZR
17440 006114            EHALT           ;ADDR COUNTER WRONG,
                                        ;AC0=BAD READ VALUE
                                        ;AC1=EXPECTED
17441 006310            CHECU
17442 013575            UPAT8
17443 006114            EHALT           ;DATA ERROR OR LPC ERROR
                                        ;
                                        ;AC2=ADDR OF IBUFF BAD WORD
                                        ;AC1=GOOD WORD
                                        ;AC0=BAD WORD
                                        ;EXPECTED LPC = 425
17444 006113            LOOP
17445 000401 E49:       JMP     .+1     ;NEXT LOOP
```

```
01
02                          ;CHECK BACKSPACE FILE.
03                          ;DURING SPACING MANY IO COMMANDS ARE
04                          ;ISSUED TO GENERATE NOISE.
05                                          ;WRITE EOF, CHECK STATUS
06                                          ;WRITE 50 3WD REC., CHECK STATUS ETC.
07                                          ;BACKSPACE FILE, CHECK STATUS
08                                          ;CHECK ADDRCOUNTER, BACKSPACE 1, CHECK BOT
09                                          ;IF 7 TRACK ALL ARE DONE IN EVEN PARITY.
10 17446 000401 A50:    JMP     .+1
11 17447 006110         SETPO
12 17450 006303         REWIND
13 17451 006311         LOAD                ;DATA PATTERN
14 17452 013603         PAT9
15 17453 102620         SUBZR   0,0         ;EVEN PARITY ARG, AC0=100000
16 17454 114000         COM     0,3         ;AC3=077777
17 17455 024427         LDA     1,A502      ;ARG FOR WRITE
18 17456 167400         AND     3,1         ;MASK OUT PARITY FROM ARG
19 17457 030264         LDA     2,SETRA     ;1 FOR 7 TR, 0 FOR 9 TR
20 17460 151014         MOVO    2,2,SZR     ;7 TRACK ?
21 17461 107000         ADD     0,1         ;YES, ADD EVEN
22 17462 044422         STA     1,A502      ;SET ARG
23 17463 024437         LDA     1,A503      ;ARG FOR SPACE
24 17464 167400         AND     3,1         ;MASK OUT PARITY FROM ARG
25 17465 151014         MOVO    2,2,SZR     ;7 TRACK ?
26 17466 107000         ADD     0,1         ;YES, ADD EVEN
27 17467 044433         STA     1,A503      ;SET ARG
28 17470 006272         WABOT               ;UPDATE STATUS, LOOK FOR BOT
29 17471 006114         EHALT               ;NO BOT FOUND
30                                          ;AC0=BAD STATUS
31 17472 020176         LDA     0,D50
32 17473 040246         STA     0,RECTR
33 17474 101400         INC     0,0
34 17475 040247         STA     0,RECT1
35 17476 006300         WEOF
36 17477 006114         EHALT               ;NO DONE AFTER COMMAND
37 17500 006117         STATW
38 17501 000400         000400
39 17502 006114         EHALT               ;AC0=BAD STATUS
40                                          ;AC1=EXPECTED
41 17503 006274 A501:   WRITE
42 17504 000103 A502:   103                 ;WRITE 50 RECORDS OF 6 BYTES
43 17505 000451         JMP     A504        ;NO DONE 2 SEC FOLLOWING WRITE COMMAND
44 17506 006117         STATW
45 17507 000000         0
46 17510 000453         JMP     A505        ;STATUS ERROR
47 17511 020134         LDA     0,OBUFF     ;START COUNT IN ADDR COUNTER
48 17512 024140         LDA     1,C3        ;3 WORDS WRITTEN
49 17513 107000         ADD     0,1
50 17514 061430 MT106:  DIB     0,MTC       ;GET AC
51 17515 106414         SUBO    0,1,SZR
52 17516 000455         JMP     A506        ;AC ERROR
53 17517 014246         DSZ     RECTR
54 17520 000763         JMP     A501
55 17521 006277         SPARG               ;BACKSPACE ALL RECORDS + EOF
56 17522 010000 A503:   010000              ;WAIT SUFFIENT TIME BELOW
57 17523 006063         TIMSK               ;SEND I/O INSTR. FOR 1.8 SEC
58 17524 003410         1800.               ;USING TIMSK FOR DIA GIVES UP TO
59 17525 070430 MT107:  DIA     2,MTC       ;15 % TIMING ERROR AND ALLWAYS
60 17526 063530 MT108:  SKPBZ   MTC         ;PRODUCES TIMEOUT RETURN HERE
61 17527 006114         EHALT               ;NO DONE AFTER 1.8 SEC.
62 17530 006121         STATP
63 17531 000400         000400
64 17532 173760         173760              ;MASK
65 17533 006114         EHALT               ;AC0=BAD STATUS
66                                          ;AC1=EXPECTED
67                                          ;AC2=MASK
```

```
0210  .MAIN
01
02 17534 024176          LDA     1,D50
03 17535 030143          LDA     2,C6
04 17536 006066          MULTI           ;AC1=50*6=0 OF BYTES IN DATA
05 17537 030262          LDA     2,NRZIA ;1 FOR NRZI, 0 FOR PE
06 17540 151014          MOVO    2,2,SZR ;NRZI ?
07 17541 125400          INC     1,1     ;YES, ADD EOF COUNT
08 17542 020135          LDA     0,IBUFF ;START COUNT IN ADDR COUNTER
09 17543 107000          ADD     0,1
10 17544 061430 MT115:   DIB     0,MTC
11 17545 122414          SUBO    1,0,SZR
12 17546 006114          EHALT           ;ADDRESS COUNTER WRONG.
13                                       ;SHOULD HAVE COUNTED 50 RECORDS
14                                       ;OF 6 BYTES ON BACKSPACE (+EOF IF NRZI).
15                                       ;AC1=EXPECTED COUNT, AC0=ACTUAL
16 17547 006276          BSPACE
17 17550 006114          EHALT           ;NO DONE AFTER COMMAND
18 17551 006117          STATW
19 17552 011000          U11000
20 17553 006114          EHALT           ;AC0=BAD STATUS
21                                       ;AC1=EXPECTED
22                                       ;BACKSPACE 1 DID NOT PRODUCE BOT.
23 17554 006113 A507:    LOOP
24
25 17555 000424          JMP     E50     ;END LOOP
26
27 17556 030247 A504:    LDA     2,RECT1
28 17557 034246          LDA     3,RECTR
29 17560 172400          SUB     3,2
30 17561 006114          EHALT           ;NO DONE AFTER WRITE COMMAND
31                                       ;AC2=BLOCK 0
32 17562 000772          JMP     A507    ;DO NOT TRY BACKSPACE
33
34 17563 030247 A505:    LDA     2,RECT1
35 17564 034246          LDA     3,RECTR
36 17565 172400          SUB     3,2
37 17566 006114          EHALT           ;STATUS ERROR AFTER WRITE
38                                       ;AC0=BAD STATUS
39                                       ;AC1=EXPECTED
40                                       ;AC2=BLOCK 0
41 17567 020134          LDA     0,OBUFF ;START COUNT ADDR COUNTER
42 17570 024140          LDA     1,C3    ;3 WORDS WRITTEN
43 17571 107000          ADD     0,1
44 17572 061430 MT109:   DIB     0,MTC   ;GET AC
45
46 17573 030247 A506:    LDA     2,RECT1
47 17574 034246          LDA     3,RECTR
48 17575 172400          SUB     3,2
49 17576 106414          SUBO    0,1,SZR
50 17577 006114          EHALT           ;ADDRESS COUNTER WRONG AFTER WRITE
51                                       ;AC0=BAD READ VALUE
52                                       ;AC1=EXPECTED
53                                       ;AC2=BLOCK 0
54 17600 000754          JMP     A507    ;DO NOT TRY BACKSPACE
55
56 17601 000401 E50:     JMP     .+1     ;NEXT LOOP
```

```
01
02                          ;CHECK BACKSPACE FILE.
03                          ;DURING SPACING MANY IO COMMANDS ARE
04                          ;ISSUED TO GENERATE NOISE.
05                                          ;WRITE EOF, CHECK STATUS
06                                          ;WRITE 50 3WD REC., CHECK STATUS ETC.
07                                          ;BACKSPACE FILE, CHECK STATUS
08                                          ;CHECK ADDRCOUNTER, BACKSPACE 1, CHECK BOT
09                                          ;IF 7 TRACK ALL ARE DONE IN EVEN PARITY.
10 17602 000401 A51:    JMP     .+1
11 17603 006110         SETPO
12 17604 006303         REWIND
13 17605 006311         LOAD                ;DATA PATTERN
14 17606 013606         PAT10
15 17607 102620         SUBZR   0,0         ;EVEN PARITY ARG, AC0=100000
16 17610 114000         COM     0,3         ;AC3=077777
17 17611 024427         LDA     1,A512      ;ARG FOR WRITE
18 17612 167400         AND     3,1         ;MASK OUT PARITY FROM ARG
19 17613 030264         LDA     2,SETRA     ;1 FOR 7 TR, 0 FOR 9 TR
20 17614 151014         MOVO    2,2,SZR     ;7 TRACK ?
21 17615 107000         ADD     0,1         ;YES, ADD EVEN
22 17616 044422         STA     1,A512      ;SET ARG
23 17617 024437         LDA     1,A513      ;ARG FOR SPACE
24 17620 167400         AND     3,1         ;MASK OUT PARITY FROM ARG
25 17621 151014         MOVO    2,2,SZR     ;7 TRACK ?
26 17622 107000         ADD     0,1         ;YES, ADD EVEN
27 17623 044433         STA     1,A513      ;SET ARG
28 17624 006272         WABOT               ;UPDATE STATUS, LOOK FOR BOT
29 17625 006114         EHALT               ;NO BOT FOUND
30                                          ;AC0=BAD STATUS
31 17626 020176         LDA     0,D50
32 17627 040246         STA     0,RECTR
33 17630 101400         INC     0,0
34 17631 040247         STA     0,RECT1
35 17632 006300         WEOF
36 17633 006114         EHALT               ;NO DONE AFTER COMMAND
37 17634 006117         STATW
38 17635 000400         000400
39 17636 006114         EHALT               ;AC0=BAD STATUS
40                                          ;AC1=EXPECTED
41 17637 006274 A511:   WRITE
42 17640 000103 A512:   103                 ;WRITE 50 RECORDS OF 6 BYTES
43 17641 000451         JMP     A514        ;NO DONE 2 SEC FOLLOWING WRITE COMMAND
44 17642 006117         STATW
45 17643 000000         0
46 17644 000453         JMP     A515        ;STATUS ERROR
47 17645 020134         LDA     0,OBUFF     ;START COUNT IN ADDR COUNTER
48 17646 024140         LDA     1,C3        ;3 WORDS WRITTEN
49 17647 107000         ADD     0,1
50 17650 061430 MT116:  DIB     0,MTC       ;GET AC
51 17651 106414         SUBO    0,1,SZR
52 17652 000455         JMP     A516        ;AC ERROR
53 17653 014246         DSZ     RECTR
54 17654 000763         JMP     A511
55 17655 006277         SPARG               ;BACKSPACE ALL RECORDS + EOF
56 17656 010000 A513:   010000              ;WAIT SUFFIENT TIME BELOW
57 17657 006063         TIMSK               ;SEND I/O INSTR. FOR 1.8 SEC
58 17660 003410         1800.               ;USING TIMSK FOR DIB GIVES UP TO
59 17661 071430 MT117:  DIB     2,MTC       ;15 % TIMING ERROR AND ALLWAYS
60 17662 063530 MT118:  SKPBZ   MTC         ;PRODUCES TIMEOUT RETURN HERE
61 17663 006114         EHALT               ;NO DONE AFTER 1.8 SEC.
62 17664 006121         STATP
63 17665 000400         000400
64 17666 173760         173760              ;MASK
65 17667 006114         EHALT               ;AC0=BAD STATUS
66                                          ;AC1=EXPECTED
67                                          ;AC2=MASK
```

```
01
02 17670 024176            LDA     1,050
03 17671 030143            LDA     2,C6
04 17672 006066            MULTI           ;AC1=50*6=0 OF BYTES IN DATA
05 17673 030262            LDA     2,NRZIA ;1 FOR NRZI, 0 FOR PE
06 17674 151014            MOV0    2,2,SZR ;NRZI ?
07 17675 125400            INC     1,1     ;YES, ADD EOF COUNT
08 17676 020135            LDA     0,IBUFF ;START COUNT IN ADDR COUNTER
09 17677 107000            ADD     0,1
10 17700 061430 MT125:     DIB     0,MTC
11 17701 122414            SUB0    1,0,SZR
12 17702 006114            EHALT           ;ADDRESS COUNTER WRONG.
13                                         ;SHOULD HAVE COUNTED 50 RECORDS
14                                         ;OF 6 BYTES ON BACKSPACE (+EOF IF NRZI).
15                                         ;AC1=EXPECTED COUNT, AC0=ACTUAL
16 17703 006276            BSPACE
17 17704 006114            EHALT           ;NO DONE AFTER COMMAND
18 17705 006117            STATW
19 17706 011000            011000
20 17707 006114            EHALT           ;AC0=BAD STATUS
21                                         ;AC1=EXPECTED
22                                         ;BACKSPACE 1 DID NOT PRODUCE BOT.
23 17710 006113 A517:      LOOP
24
25 17711 000424            JMP     E51     ;END LOOP
26
27 17712 030247 A514:      LDA     2,RECT1
28 17713 034246            LDA     3,RECTR
29 17714 172400            SUB     3,2
30 17715 006114            EHALT           ;NO DONE AFTER WRITE COMMAND
31                                         ;AC2=BLOCK 0
32 17716 000772            JMP     A517    ;DO NOT TRY BACKSPACE
33
34 17717 030247 A515:      LDA     2,RECT1
35 17720 034246            LDA     3,RECTR
36 17721 172400            SUB     3,2
37 17722 006114            EHALT           ;STATUS ERROR AFTER WRITE
38                                         ;AC0=BAD STATUS
39                                         ;AC1=EXPECTED
40                                         ;AC2=BLOCK 0
41 17723 020134            LDA     0,OBUFF ;START COUNT IN ADDR COUNTER
42 17724 024140            LDA     1,C3    ;3 WORDS WRITTEN
43 17725 107000            ADD     0,1
44 17726 061430 MT119:     DIB     0,MTC   ;GET AC
45
46 17727 030247 A516:      LDA     2,RECT1
47 17730 034246            LDA     3,RECTR
48 17731 172400            SUB     3,2
49 17732 106414            SUB0    0,1,SZR
50 17733 006114            EHALT           ;ADDRESS COUNTER WRONG AFTER WRITE
51                                         ;AC0=BAD READ VALUE
52                                         ;AC1=EXPECTED
53:                                        ;AC2=BLOCK 0
54 17734 000754            JMP     A517    ;DO NOT TRY BACKSPACE
55
56 17735 000401 E51:       JMP     .+1     ;NEXT LOOP
```

```
01
02                          ;CHECK BACKSPACE FILE.
03                          ;DURING SPACING MANY IO COMMANDS ARE
04                          ;ISSUED TO GENERATE NOISE.
05                                      ;WRITE EOF, CHECK STATUS
06                                      ;WRITE 50 3WD REC., CHECK STATUS ETC.
07                                      ;BACKSPACE FILE, CHECK STATUS
08                                      ;CHECK ADDRCOUNTER, BACKSPACE 1, CHECK BOT
09                                      ;IF 7 TRACK ALL ARE DONE IN EVEN PARITY.
10 17736 000401 A52:    JMP     .+1
11 17737 006110         SETPO
12 17740 006303         REWIND
13 17741 006311         LOAD            ;DATA PATTERN
14 17742 013611         PAT11
15 17743 102620         SUBZR   0,0     ;EVEN PARITY ARG, AC0=100000
16 17744 114000         COM     0,3     ;AC3=077777
17 17745 024427         LDA     1,A522  ;ARG FOR WRITE
18 17746 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
19 17747 030264         LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
20 17750 151014         MOVO    2,2,SZR ;7 TRACK ?
21 17751 107000         ADD     0,1     ;YES, ADD EVEN
22 17752 044422         STA     1,A522  ;SET ARG
23 17753 024437         LDA     1,A523  ;ARG FOR SPACE
24 17754 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
25 17755 151014         MOVO    2,2,SZR ;7 TRACK ?
26 17756 107000         ADD     0,1     ;YES, ADD EVEN
27 17757 044433         STA     1,A523  ;SET ARG
28 17760 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
29 17761 006114         EHALT           ;NO BOT FOUND
30                                      ;AC0=BAD STATUS
31 17762 020176         LDA     0,D50
32 17763 040246         STA     0,RECTR
33 17764 101400         INC     0,0
34 17765 040247         STA     0,RECT1
35 17766 006300         WEOF
36 17767 006114         EHALT           ;NO DONE AFTER COMMAND
37 17770 006117         STATW
38 17771 000400         000400
39 17772 006114         EHALT           ;AC0=BAD STATUS
40                                      ;AC1=EXPECTED
41 17773 006274 A521:   WRITE
42 17774 000103 A522:   103             ;WRITE 50 RECORDS OF 6 BYTES
43 17775 000451         JMP     A524    ;NO DONE 2 SEC FOLLOWING WRITE COMMAND
44 17776 006117         STATW
45 17777 000000         0
46 20000 000453         JMP     A525    ;STATUS ERROR
47 20001 020134         LDA     0,OBUFF ;START COUNT IN ADDR COUNTER
48 20002 024140         LDA     1,C3    ;3 WORDS WRITTEN
49 20003 107000         ADD     0,1
50 20004 061430 MT126:  DIB     0,MTC   ;GET AC
51 20005 106414         SUBO    0,1,SZR
52 20006 000455         JMP     A526    ;AC ERROR
53 20007 014246         DSZ     RECTR
54 20010 000763         JMP     A521
55 20011 006277         SPARG           ;BACKSPACE ALL RECORDS + EOF
56 20012 010000 A523:   010000          ;WAIT SUFFIENT TIME BELOW
57 20013 006063         TIMSK           ;SEND I/O INSTR. FOR 1,8 SEC
58 20014 003410         1800.           ;USING TIMSK FOR DIC GIVES UP TO
59 20015 072430 MT127:  DIC     2,MTC   ;15 % TIMING ERROR AND ALLWAYS
60 20016 063530 MT128:  SKPBZ   MTC     ;PRODUCES TIMEOUT RETURN HERE
61 20017 006114         EHALT           ;NO DONE AFTER 1,8 SEC.
62 20020 006121         STATP
63 20021 000400         000400
64 20022 173760         173760          ;MASK
65 20023 006114         EHALT           ;AC0=BAD STATUS
66                                      ;AC1=EXPECTED
67                                      ;AC2=MASK
```

```
. 0214   .MAIN
01
02 20024 024176           LDA     1,D50
03 20025 030143           LDA     2,C6
04 20026 006066           MULTI             ;AC1=50*6=0 OF BYTES IN DATA
05 20027 030262           LDA     2,NRZIA   ;1 FOR NRZI, 0 FOR PE
06 20030 151014           MOVO    2,2,SZR   ;NRZI ?
07 20031 125400           INC     1,1       ;YES, ADD EOF COUNT
08 20032 020135           LDA     0,IBUFF   ;START COUNT IN ADDR COUNTER
09 20033 107000           ADD     0,1
10 20034 061430 MT135:    DIB     0,MTC
11 20035 122414           SUBO    1,0,SZR
12 20036 006114           EHALT             ;ADDRESS COUNTER WRONG.
13                                          ;SHOULD HAVE COUNTED 50 RECORDS
14                                          ;OF 6 BYTES ON BACKSPACE (+EOF IF NRZI).
15                                          ;AC1=EXPECTED COUNT, AC0=ACTUAL
16 20037 006276           BSPACE
17 20040 006114           EHALT             ;NO DONE AFTER COMMAND
18 20041 006117           STATW
19 20042 011000           011000
20 20043 006114           EHALT             ;AC0=BAD STATUS
21                                          ;AC1=EXPECTED
22                                          ;BACKSPACE 1 DID NOT PRODUCE BOT.
23 20044 006113 A527:     LOOP
24
25 20045 000424           JMP     E52       ;END LOOP
26
27 20046 030247 A524:     LDA     2,RECT1
28 20047 034246           LDA     3,RECTR
29 20050 172400           SUB     3,2
30 20051 006114           EHALT             ;NO DONE AFTER WRITE COMMAND
31                                          ;AC2=BLOCK 0
32 20052 000772           JMP     A527      ;DO NOT TRY BACKSPACE
33
34 20053 030247 A525:     LDA     2,RECT1
35 20054 034246           LDA     3,RECTR
36 20055 172400           SUB     3,2
37 20056 006114           EHALT             ;STATUS ERROR AFTER WRITE
38                                          ;AC0=BAD STATUS
39                                          ;AC1=EXPECTED
40                                          ;AC2=BLOCK 0
41 20057 020134           LDA     0,OBUFF   ;START COUNT IN ADDR COUNTER
42 20060 024140           LDA     1,C3      ;3 WORDS WRITTEN
43 20061 107000           ADD     0,1
44 20062 061430 MT129:    DIB     0,MTC     ;GET AC
45
46 20063 030247 A526:     LDA     2,RECT1
47 20064 034246           LDA     3,RECTR
48 20065 172400           SUB     3,2
49 20066 106414           SUBO    0,1,SZR
50 20067 006114           EHALT             ;ADDRESS COUNTER WRONG AFTER WRITE
51                                          ;AC0=BAD READ VALUE
52                                          ;AC1=EXPECTED
53                                          ;AC2=BLOCK 0
54 20070 000754           JMP     A527      ;DO NOT TRY BACKSPACE
55
56 20071 000401 E52:      JMP     .+1       ;NEXT LOOP
```

```
01
02                          ;CHECK BACKSPACE FILE.
03                          ;DURING SPACING MANY IO COMMANDS ARE
04                          ;ISSUED TO GENERATE NOISE.
05                                      ;WRITE EOF, CHECK STATUS
06                                      ;WRITE 50 3WD REC., CHECK STATUS ETC.
07                                      ;BACKSPACE FILE, CHECK STATUS
08                                      ;CHECK ADDRCOUNTER, BACKSPACE 1, CHECK BOT
09                                      ;IF 7 TRACK ALL ARE DONE IN EVEN PARITY.
10 20072 000401 A53:    JMP     .+1
11 20073 006110         SETPO
12 20074 006303         REWIND
13 20075 006311         LOAD            ;DATA PATTERN
14 20076 013614         PAT12
15 20077 102620         SUBZR   0,0     ;EVEN PARITY ARG, AC0=100000
16 20100 114000         COM     0,3     ;AC3=077777
17 20101 024427         LDA     1,A532  ;ARG FOR WRITE
18 20102 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
19 20103 030264         LDA     2,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
20 20104 151014         MOVO    2,2,SZR ;7 TRACK ?
21 20105 107000         ADD     0,1     ;YES, ADD EVEN
22 20106 044422         STA     1,A532  ;SET ARG
23 20107 024437         LDA     1,A533  ;ARG FOR SPACE
24 20110 167400         AND     3,1     ;MASK OUT PARITY FROM ARG
25 20111 151014         MOVO    2,2,SZR ;7 TRACK ?
26 20112 107000         ADD     0,1     ;YES, ADD EVEN
27 20113 044433         STA     1,A533  ;SET ARG
28 20114 006272         WABOT           ;UPDATE STATUS, LOOK FOR BOT
29 20115 006114         EHALT           ;NO BOT FOUND
30                                      ;AC0=BAD STATUS
31 20116 020176         LDA     0,D50
32 20117 040246         STA     0,RECTR
33 20120 101400         INC     0,0
34 20121 040247         STA     0,RECT1
35 20122 006300         WEOF
36 20123 006114         EHALT           ;NO DONE AFTER COMMAND
37 20124 006117         STATW
38 20125 000400         000400
39 20126 006114         EHALT           ;AC0=BAD STATUS
40                                      ;AC1=EXPECTED
41 20127 006274 A531:   WRITE
42 20130 000103 A532:   103             ;WRITE 50 RECORDS OF 6 BYTES
43 20131 000715         JMP     A524    ;NO DONE 2 SEC FOLLOWING WRITE COMMAND
44 20132 006117         STATW
45 20133 000000         0
46 20134 000453         JMP     A535    ;STATUS ERROR
47 20135 020134         LDA     0,OBUFF ;START COUNT IN ADDR COUNTER
48 20136 024140         LDA     1,C3    ;3 WORDS WRITTEN
49 20137 107000         ADD     0,1
50 20140 061430 MT136:  DIB     0,MTC   ;GET AC
51 20141 106414         SUBO    0,1,SZR
52 20142 000455         JMP     A536    ;AC ERROR
53 20143 014246         DSZ     RECTR
54 20144 000763         JMP     A531
55 20145 006277         SPARG           ;BACKSPACE ALL RECORDS + EOF
56 20146 010000 A533:   010000          ;WAIT SUFFIENT TIME BELOW
57 20147 006063         TIMSK           ;SEND I/O INSTR. FOR 1,8 SEC
58 20150 003410         1800.           ;USING TIMSK FOR NIOP GIVES UP TO
59 20151 060330 MT137:  NIOP    MTC     ;15 % TIMING ERROR AND ALLWAYS
60 20152 063530 MT138:  SKPBZ   MTC     ;PRODUCES TIMEOUT RETURN HERE.
61 20153 006114         EHALT           ;NO DONE AFTER 1,8 SEC.
62 20154 006121         STATP
63 20155 000400         000400
64 20156 173760         173760          ;MASK
65 20157 006114         EHALT           ;AC0=BAD STATUS
66                                      ;AC1=EXPECTED
67                                      ;AC2=MASK
```

```
01
02 20160 024176           LDA     1,D50
03 20161 030143           LDA     2,C6
04 20162 006066           MULTI             ;AC1=50*6=0 OF BYTES IN DATA
05 20163 030262           LDA     2,NRZIA   ;1 FOR NRZI, 0 FOR PE
06 20164 151014           MOVO    2,2,SZR   ;NRZI ?
07 20165 125400           INC     1,1       ;YES, ADD EOF COUNT
08 20166 020135           LDA     0,IBUFF   ;START COUNT IN ADDR COUNTER
09 20167 107000           ADD     0,1
10 20170 061430 MT145:    DIB     0,MTC
11 20171 122414           SUBO    1,0,SZR
12 20172 006114           EHALT             ;ADDRESS COUNTER WRONG.
13                                          ;SHOULD HAVE COUNTED 50 RECORDS
14                                          ;OF 6 BYTES ON BACKSPACE (+EOF IF NRZI).
15                                          ;AC1=EXPECTED COUNT, AC0=ACTUAL
16 20173 006276           BSPACE
17 20174 006114           EHALT             ;NO DONE AFTER COMMAND
18 20175 006117           STATW
19 20176 011000           011000
20 20177 006114           EHALT             ;AC0=BAD STATUS
21                                          ;AC1=EXPECTED
22                                          ;BACKSPACE 1 DID NOT PRODUCE BOT.
23 20200 006113 A537:     LOOP
24
25 20201 000424           JMP     E53       ;END LOOP
26
27 20202 030247 A534:     LDA     2,RECT1
28 20203 034246           LDA     3,RECTR
29 20204 172400           SUB     3,2
30 20205 006114           EHALT             ;NO DONE AFTER WRITE COMMAND
31                                          ;AC2=BLOCK 0
32 20206 000772           JMP     A537      ;DO NOT TRY BACKSPACE
33
34 20207 030247 A535:     LDA     2,RECT1
35 20210 034246           LDA     3,RECTR
36 20211 172400           SUB     3,2
37 20212 006114           EHALT             ;STATUS ERROR AFTER WRITE
38                                          ;AC0=BAD STATUS
39                                          ;AC1=EXPECTED
40                                          ;AC2=BLOCK 0
41 20213 020134           LDA     0,OBUFF   ;START COUNT IN ADDR COUNTER
42 20214 024140           LDA     1,C3      ;3 WORDS WRITTEN
43 20215 107000           ADD     0,1
44 20216 061430 MT139:    DIB     0,MTC     ;GET AC
45
46 20217 030247 A536:     LDA     2,RECT1
47 20220 034246           LDA     3,RECTR
48 20221 172400           SUB     3,2
49 20222 106414           SUBO    0,1,SZR
50 20223 006114           EHALT             ;ADDRESS COUNTER WRONG AFTER WRITE
51                                          ;AC0=BAD READ VALUE
52                                          ;AC1=EXPECTED
53                                          ;AC2=BLOCK 0
54 20224 000754           JMP     A537      ;DO NOT TRY BACKSPACE
55
56 20225 000401 E53:      JMP     .+1
```

```
01
02 20226 024264 B54:   LDA     1,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
03 20227 125014        MOVO    1,1,SZR ;7 TRACK ?
04 20230 000403        JMP     A54     ;YES, PERFORM NEXT LOOP
05 20231 002401        JMP     A.+1    ;NO, PASS NEXT LOOP
06 20232 020352        E54
07
08                     ;LONGITUDINAL PARITY CHECK ONLY NRZI 7 TRACK.
09 20233 000401 A54:   JMP     .+1
10 20234 020513        LDA     0,LSTRT ;CAUSE LONG PARITY ERROR
11 20235 040513        STA     0,LPOIT ;IN 2 TRK PAIRS
12 20236 102400        SUB     0,0     ;CHECK PARITY STATUS
13 20237 040512        STA     0,RBCT
14 20240 006303 A541:  REWIND
15 20241 006272        WABOT           ;UPDATE STATUS, LOOK FOR BOT
16 20242 006114        EHALT           ;NO BOT FOUND
17                                     ;AC0=BAD STATUS
18 20243 006301        ERASE
19 20244 006114        EHALT           ;NO DONE AFTER COMMAND
20 20245 006305        GEN
21 20246 037477        37477
22 20247 022501        LDA     0,ALPOIT
23 20250 101005        MOV     0,0,SNR
24 20251 000442        JMP     CKED
25 20252 034134 A542:  LDA     3,OBUFF
26 20253 041402        STA     0,2,3   ;3. WORD IN BUFFER
27 20254 102400        SUB     0,0
28 20255 024177        LDA     1,N400
29 20256 030140        LDA     2,C3
30 20257 147000        ADD     2,1     ;3 WORDS ALLREADY USED
31 20260 041403        STA     0,3,3   ;CLEAR TO END BUFFERS, BOTH IN AND OUT
32 20261 175400        INC     3,3
33 20262 125404        INC     1,1,SZR
34 20263 000775        JMP     .-3
35 20264 006111        SETP1
36 20265 020134        LDA     0,OBUFF
37 20266 062030 MT146: DOB     0,MTC
38 20267 020177        LDA     0,N400
39 20270 063230 MT147: DOCC    0,MTC
40 20271 020225        LDA     0,C1X   ;WRITE UNIT X
41 20272 024157        LDA     1,C400  ;EVEN PARITY
42 20273 123000        ADD     1,0
43 20274 061030 MT148: DOA     0,MTC
44 20275 060130 MT149: NIOS    MTC
45 20276 006063        TIMSK
46 20277 003720        2000.           ;WAIT MAX 2 SEC
47 20300 063630 MT150: SKPDN   MTC
48 20301 006114        EHALT           ;NO DONE AFTER COMMAND
49 20302 030447        LDA     2,RBCT
50 20303 060430 MT151: DIA     0,MTC
51 20304 024147        LDA     1,C40   ;PARITY ERROR STATUS
52 20305 123415        ANDO    1,0,SNR
53 20306 006114        EHALT           ;NO PARITY ERROR.  0 IN AC2
54                                     ;INDICATES WHICH TRACKS SHOULD
55                                     ;CAUSE ERROR. (SEE BELOW)
56                                     ;0=RB2-P 6=RB2-3  14=RB0-P
57                                     ;1=RB3-P 7=RB3-4  15=RB1-P
58                                     ;2=RB4-P 10=RB4-5 16=RB0-1
59                                     ;3=RB5-P 11=RB5-6 17=RB0-2
60                                     ;4=RB6-P 12=RB6-7 20=RB1-2
61                                     ;5=RB7-P 13=RB7-2
62 20307 006113        LOOP
63 20310 010440        ISZ     LPOIT
64 20311 010440        ISZ     RBCT
65 20312 000726        JMP     A541
```

```
01
02 20313 010435 CKED:   ISZ     LPOIT
03 20314 024264         LDA     1,SETRA ;1 FOR 7 TR, 0 FOR 9 TR
04 20315 125014         MOVO    1,1,SZR ;7 TRACK ?
05 20316 000404         JMP     A543    ;YES
06 20317 022431         LDA     0,XLPOIT ;IF 9 TRACK USE LST9 TOO, BUT
07 20320 101004         MOV     0,0,SZR ;THE FORMATTER ARE NOT ABLE TO PERFORM
08 20321 000731         JMP     A542    ;THIS LOOP ON 9 TR (NO EVEN PARITY)
09 20322 000430 A543:   JMP     E54     ;END THIS TESTLOOP
10
11                      ;LONGITUDINAL PARITY DATA LIST
12                      ;7-9 TRACK
13 20323 004000 LST79:  4000    ;RD2-P
14 20324 010000         10000   ;3-P
15 20325 020000         20000   ;4-P
16 20326 000400         400     ;5-P
17 20327 001000         1000    ;6-P
18 20330 002000         2000    ;7-P
19 20331 030000         30000   ;2-3
20 20332 014000         14000   ;3-4
21 20333 006000         6000    ;4-5
22 20334 003000         3000    ;5-6
23 20335 001400         1400    ;6-7
24 20336 000600         600     ;7-2
25 20337 000000         0
26                      ;9 TRACK ONLY
27 20340 100000 LST9:   100000  ;0-P
28 20341 040000         40000   ;1-P
29 20342 140000         140000  ;0-1
30 20343 120000         120000  ;0-2
31 20344 060000         60000   ;1-2
32 20345 000000         0
33 20346 000000         0
34 20347 020323 LSTRT:  LST79
35
36 20350 000000 LPOIT:  0
37 20351 000000 RBCT:   0               ;DATA LIST COUNTER
38
39 20352 000401 E54:    JMP     .+1     ;NEXT LOOP
40
41
42                      ;LAST LOOP NOT A TEST, ONLY START A REWIND
43                      ;BEFORE NEXT PASS.
44 20353 000401 A55:    JMP     .+1     ;SPACE FOR PROGRAM TROUBLESHOOTING
45 20354 006303         REWIND          ;START A REWIND
```

```
 0219  .MAIN
01                    ;TAPE 9 END
02 20355 000401 A56:    JMP     .+1       ;SPACE FOR PROGRAM TROUBLESHOOTING
03 20356 002312         JMP     ARTEST    ;RETURN, END OF TEST LOOPS
04 20357 020357 LASTP:  .                 ;LAST LOC OF PROGRAM
05
06       001403         .END REBIN
 0220  .MAIN
  :
A0       014253    134/07  163/07
A1       014260    134/08  163/14
A10      014532    134/23  167/14
A11      014545    134/24  167/31
A12      014560    134/25  167/46
A13      014574    134/26  168/03
A14      014603    134/27  168/18
A141     014606    168/21  168/38
A14B     014622    134/28  168/41
A15      014631    134/29  169/04
A16      014653    134/30  170/03
A17      014672    134/31  170/27
A18      014716    134/32  171/03
A181     014740    171/09  171/32
A182     014725    171/10  171/36
A19      014744    134/33  172/03
A191     014747    172/06  172/47
A192     015012    172/04  173/02
A193     015036    172/14  172/30  173/22
A2       014265    134/09  163/21
A20      015040    134/34  174/03
A201     015043    174/06  174/46
A2010    015056    174/14  174/17
A2011    015057    174/16  174/19
A2012    015141    174/27  175/37
A2013    015070    174/28  175/40
A202     015106    174/04  175/02
A203     015116    174/19  174/28  175/11
A204     015117    175/03  175/13
A205     015122    175/04  175/17
A206     015125    175/05  175/21
A207     015130    175/06  175/25
A208     015133    175/07  175/29
A209     015136    175/08  175/33
A21      015145    134/35  176/03
A22      015214    134/36  177/06
A221     015221    177/11  177/43
A222     015223    177/10  177/13  177/42
A23      015251    134/37  178/03
A24      015270    134/38  178/22
A25      015306    134/39  178/39
A26      015325    134/40  179/03
A27      015341    134/41  179/20
A28      015372    134/42  180/03
A281     015400    180/10  180/34
A29      015426    134/43  181/03
A291     015473    181/32  181/41
A2910    015606    182/16  183/31
A2911    015613    182/19  183/38
A2912    015600    182/13  183/21
A2913    015623    182/25  183/50
A292     015475    181/08  181/13  181/43
A293     015510    182/02  182/27
A294     015511    181/14  181/18  182/03
A295     015525    181/19  181/23  182/15
A296     015542    182/28  183/07  183/29  183/36  183/58
A297     015546    181/24  181/28  182/33
A298     015563    182/04  183/02
A299     015570    182/07  183/09
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A3	014272	134/10	163/28						
A31	015632	134/44	184/05						
A32	015656	134/45	185/06						
A321	015664	185/13	185/46						
A322	015722	185/29	185/56						
A323	015702	185/30	185/59						
A33	015726	134/46	186/07						
A331	015733	186/12	187/01						
A332	015735	186/11	186/14	187/00					
A34	016006	134/47	187/06	187/12					
A341	016013	187/17	188/00						
A342	016015	187/16	187/19	187/63					
A35	016061	134/48	188/06						
A36	016122	134/49	189/07						
A37	016163	134/50	190/03						
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A3814	016375	192/40	193/30						
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A3822	016440	192/48	194/14						
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A383	016265	191/37	191/39						
A384	016276	191/48	191/50						
A385	016312	192/13	192/15						
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A388	016324	191/14	192/32						
A39	016513	134/52	195/05						
A391	016566	195/56	196/09						
A392	016574	195/46	196/02						
A394	016551	195/28	195/33	195/39					
A4	014277	134/11	163/35						
A40	016603	135/02	196/16						
A401	016635	196/21	196/26	196/46					
A401B	016677	197/08	197/13	197/25					
A408	016653	135/03	197/03						
A41	016705	135/04	198/06						
A411	016742	198/29	198/34	198/40					
A42	016772	135/05	199/10	200/07					
A43	017033	135/06	201/07						
A44	017074	135/07	202/07						
A45	017135	135/08	203/07						
A458	017176	135/09	204/07						
A46	017241	135/10	205/07						
A47	017302	135/11	206/07						
A48	017343	135/12	207/07						

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A5	014312	134/12	163/51				
A50	017446	135/14	209/10				
A501	017503	209/41	209/54				
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A503	017522	209/23	209/27	209/56			
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A507	017554	210/23	210/32	210/54			
A51	017602	135/15	211/10				
A511	017637	211/41	211/54				
A512	017640	211/17	211/22	211/42			
A513	017656	211/23	211/27	211/56			
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A523	020012	213/23	213/27	213/56			
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A527	020044	214/23	214/32	214/54			
A53	020072	135/17	215/10				
A531	020127	215/41	215/54				
A532	020130	215/17	215/22	215/42			
A533	020146	215/23	215/27	215/56			
A534	020202	216/27					
A535	020207	215/46	216/34				
A536	020217	215/52	216/46				
A537	020200	216/23	216/32	216/54			
A54	020233	135/18	217/04	217/09			
A541	020240	217/14	218/01				
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A6	014322	134/13	164/03				
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A62	014330	164/05	164/09	164/10	164/16	164/24	
A63	014336	164/17	164/23				
A7	014350	134/14	164/29				
A8	014377	134/15	165/03				
A8A	014421	134/16	165/27				
A8B	014433	134/17	165/39				
A8C	014445	134/18	165/51				
A8D	014457	134/19	166/03				
A8E	014474	134/20	166/19				
A8F	014516	134/21	166/41				
A9	014522	134/22	167/03				
AAFUB	006621	98/45	98/47				
AANUK	006616	98/42	98/44				
ACTO	001072	31/40	31/53				
ACT6	001073	31/46	31/54				
ACTN	001056	30/52	31/39				
ADDRS	001743	39/46	40/17	40/27	40/37	40/38	41/20

AGTYP	003775	65/10	65/18	65/41					
ALPTT	002307	45/08	45/52						
ALRST	062677	19/03	39/47	40/03	46/35	47/05	65/11	70/14	88/05
		120/34							
AMEND	002431	47/48	47/56						
ARESW	001325	35/18	35/28						
B34	016001	187/04							
B42	016760	199/05							
B421	016770	199/07	199/13						
B54	020226	217/02							
BBEGI	001652	40/03	41/21						
BBGET	001723	41/04	41/15	41/17					
BC20	001720	40/31	40/46						
BC377	001651	39/55	39/59						
BCOUN	001721	40/21	40/33	40/39	40/47				
BDATA	001673	40/24							
BDIFF	001717	40/25	40/45						
BEND	001744	41/21							
BGET1	001724	41/05	41/12						
BIDIG	007436	106/20	106/43	106/49					
BILAD	003047	53/32	53/51						
BILEN	003034	53/36	53/40						
BILFL	003046	53/30	53/50						
BILLA	003045	53/29	53/49						
BILNX	003025	53/33	53/39						
BILOR	003040	53/21	53/43	53/44					
BILRA	003044	36/39	46/54	53/26	53/48				
BILSA	003041	53/22	53/42	53/45					
BILSB	003042	53/23	53/41	53/46					
BILSC	003043	53/24	53/40	53/47					
BINAD	001601	39/09	53/51						
BINLA	001435	36/18	36/39						
BINLO	006074	19/34	36/21	37/12	53/13	172/29			
BLOCK	001657	39/58	40/10	40/12	40/43				
BMEND	002442	47/52	47/57						
BOTST	006271	22/29	149/32	149/39					
BRESW	001367	35/47	35/52						
BSAVE	001631	39/23	39/39	40/05					
BSPAC	006276	22/35	158/14	158/16	158/18	158/35	178/45	180/15	184/14
		184/16	186/24	186/56	187/27	187/55	188/26	189/25	190/19
		191/43	196/57	200/25	201/25	202/25	203/25	204/25	205/23
		206/23	207/23	208/23	210/16	212/16	214/16	216/16	
BSTRP	001735	41/14							
BTBF	013446	154/03							
BTEST	001632	39/42	40/20						
BTMP1	001627	39/12	39/18	39/37					
BTMP2	001630	39/22	39/30	39/36	39/38	40/24			
BUILD	001602	39/12	40/16	40/18	40/36				
BZNUK	006615	98/05	98/41						
BZOUT	000435	26/18	26/22	30/40	36/47	113/44			
C0042	000172	20/36	166/06	166/21					
C0104	000167	20/33	165/30	166/27					
C0210	000170	20/34	165/42	166/26					
C0252	000164	20/30	163/37						
C0421	000171	20/35	165/54	166/25					
C0525	000166	20/32	163/53	164/07					
C10	000145	20/15	149/53	177/20	179/33	186/40	187/39	188/42	189/41
		190/26							
C100	000152	20/20	150/36	151/31	152/30	181/36			

DLOAD	002732	52/04	53/08						
DLOOP	003315	58/36	58/41						
DLT	013617	134/04	145/44	156/07					
DLT1	013672	156/47	156/52						
DMEND	002423	47/42	47/47						
DOUT5	001212	33/20	33/28						
DPASS	010670	122/24	122/35						
DPCON	006353	92/12	93/09						
DPMEM	006355	44/13	93/04						
DPMMC	006357	93/06	93/14						
DPMMF	006372	93/17	93/25						
DPMMT	006405	93/28	93/36						
DPPRT	006421	93/40	93/46						
DRBI4	010555	118/47	120/51						
DRBI9	010554	120/36	120/50						
DREUS	010557	120/46	120/53						
DRILL	010560	120/45	121/02						
DRILR	010572	121/02	121/11	121/12					
DRMEX	010553	120/35	120/49						
DRST2	010556	120/33	120/42	120/52					
DSAQU	006176	88/19	90/06						
DSIGN	007061	100/13	101/07	101/30	101/47	102/16	102/18	102/31	102/38
DSTAR	014061	157/32	159/04						
DX304	012531	140/20	143/08						
DXEXT	012615	142/04	144/12						
DXMMF	006327	91/08	92/04						
DXNRZ	012560	141/25	144/04						
DXOLD	012512	140/06	143/04						
DXQUE	006462	95/06	95/43						
DXSTR	012574	141/39	144/08						
E18	014743	171/30	171/38						
E19	015037	172/08	173/24						
E20	015144	174/08	175/42						
E22	015250	177/40	177/44						
E29	015631	182/52	183/60						
E32	015725	185/54	185/61						
E33	016000	186/62	187/02						
E34	016060	187/08	187/61	188/01					
E38	016512	192/32	194/62						
E39	016602	195/63	196/11						
E45B	017237	199/14	204/60						
E49	017445	199/12	204/61	208/51					
E50	017601	210/25	210/56						
E51	017735	212/25	212/56						
E52	020071	214/25	214/56						
E53	020225	216/25	216/56						
E54	020352	217/06	218/09	218/39					
E6	014347	164/20	164/26						
EBFLG	010056	112/10	113/22	113/37	115/37				
ECHO2	007267	104/22	104/30						
ECHO3	007415	106/22	106/30						
ECHO4	006756	100/29	100/39						
EFLAG	010053	112/11	112/14	112/28	113/19	113/34	115/26	115/52	
EHALT	006114	19/46	156/10	156/23	156/50	157/22	158/06	158/15	158/17
		158/19	158/22	158/32	158/36	158/48	158/55	158/59	159/00
		160/13	160/19	160/26	160/31	160/36	160/54	161/07	161/12
		163/10	163/17	163/24	163/31	163/44	163/57	164/12	164/38
		164/43	164/52	165/12	165/17	165/23	165/35	165/47	165/59
		166/14	166/35	166/44	167/09	167/20	167/25	167/37	167/41

		167/56	168/09	168/26	168/46	169/08	169/12	169/15	169/23
		169/28	170/06	170/10	170/13	170/19	170/31	170/34	170/41
		170/48	171/15	171/21	171/33	172/24	172/37	172/43	174/36
		174/42	175/38	176/08	176/12	176/16	176/20	176/26	176/33
		176/38	176/44	176/54	177/16	177/24	177/31	178/16	178/34
		178/43	178/46	178/49	178/54	179/07	179/10	179/15	179/24
		179/31	179/37	179/42	179/47	180/07	180/14	180/16	180/21
		180/29	180/36	181/34	181/44	181/47	181/54	182/30	182/34
		182/37	182/44	183/05	183/12	183/25	183/34	183/41	183/54
		184/09	184/13	184/15	184/17	184/21	184/26	185/10	185/17
		185/21	185/26	185/32	185/41	185/48	185/57	186/17	186/20
		186/25	186/29	186/33	186/44	186/50	186/57	187/22	187/25
		187/28	187/32	187/36	187/43	187/49	187/56	188/10	188/17
		188/20	188/27	188/31	188/35	188/46	188/52	189/11	189/18
		189/21	189/26	189/30	189/34	189/45	189/51	190/07	190/14
		190/17	190/20	190/24	190/30	190/35	190/40	190/44	191/24
		191/32	191/40	191/44	191/51	192/08	192/16	192/24	195/09
		195/14	195/16	195/19	195/24	195/36	195/40	195/49	195/54
		195/59	196/03	196/07	196/28	196/33	196/36	196/39	196/43
		196/50	196/54	196/58	196/61	197/15	197/19	197/22	197/26
		197/29	198/10	198/15	198/18	198/21	198/25	198/37	198/44
		198/48	198/54	198/57	200/11	200/18	200/21	200/26	200/30
		200/33	200/42	200/46	201/11	201/18	201/21	201/26	201/30
		201/33	201/42	201/46	202/11	202/18	202/21	202/26	202/30
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		203/33	203/42	203/46	204/11	204/18	204/21	204/26	204/30
		204/33	204/42	204/46	205/11	205/18	205/21	205/24	205/28
		205/31	205/38	205/43	206/11	206/18	206/21	206/24	206/28
		206/31	206/38	206/43	207/11	207/18	207/21	207/24	207/28
		207/31	207/38	207/43	208/11	208/18	208/21	208/24	208/28
		208/31	208/38	208/43	209/29	209/36	209/39	209/61	210/01
		210/12	210/17	210/20	210/30	210/37	210/50	211/29	211/36
		211/39	211/61	212/01	212/12	212/17	212/20	212/30	212/37
		212/50	213/29	213/36	213/39	213/61	214/01	214/12	214/17
		214/20	214/30	214/37	214/50	215/29	215/36	215/39	215/61
		216/01	216/12	216/17	216/20	216/30	216/37	216/50	217/16
		217/19	217/48	217/53					
EMEND	002424	47/43	47/46						
ENADR	013761	157/12	157/62						
ENBLE	013762	157/14	157/63						
ENDT	013772	158/09	158/12						
ENDT1	014021	158/25	158/27	158/29	158/31	158/38			
ENDT2	014022	158/37	158/39						
ENDTF	013756	157/50	157/58						
ENDTM	013736	157/42	158/12	158/38					
ENDTR	013760	157/11	157/25	157/26	157/30	157/39	157/42	157/59	157/61
ENTCO	010032	113/06	113/11	113/16					
ENTP0	010014	18/16	113/02						
ENTP1	010021	18/17	113/07						
ENTP2	010026	18/18	113/12						
ERASE	006301	22/38	160/35	169/11	170/05	170/33	217/18		
ERBCT	010055	112/06	112/39	113/21	113/36	114/42			
ERCRR	006115	88/38	88/42	88/60					
ERCRT	006116	36/37	88/08	88/42					
EREP	013774	158/14	158/40						
ERHSW	010064	113/43	115/39						
ERRCT	010054	112/07	112/09	112/19	113/20	113/35	114/12	114/39	
ERRET	010162	114/42	115/33						
ERRHA	010243	50/08	115/49						

IDIAG	000405	23/05	23/11						
IDICL	000046	17/32	19/12						
IDISP	000044	17/30	19/10						
IDIVD	000070	17/50	19/30						
IDIVS	000067	17/49	19/29						
IDLT	000410	23/08	23/14						
IDOCT	000056	17/40	19/20						
IDOUT	000045	17/31	19/11						
IDRST	000126	18/30	19/36						
IDUAO	011217	126/49	127/26						
IDUA1	011216	126/48	127/23						
IDUAD	011212	126/44	127/15						
IDUAG	011306	127/48	127/57						
IDUAL	011220	126/50	127/28						
IDUAN	011215	126/47	127/24						
IDUAP	011213	126/45	127/18						
IDUAU	011221	126/51	127/27						
IDUAY	011214	126/46	127/21						
IDUCD	011327	127/17	128/07	128/15	128/21				
IDUCO	011100	125/23	125/26	125/56	125/59				
IDUCP	011350	127/20	128/25	128/33	128/36				
IDUCR	011210	125/04	125/15	125/36	125/49	125/51	126/42		
IDUCT	011171	125/18	126/26	127/43					
IDUDA	011324	125/54	127/47	128/03	128/22				
IDUDC	011225	126/55	127/42	127/56					
IDUDL	011325	128/04	128/18						
IDUDQ	011323	128/02	128/10						
IDUDR	011320	127/58							
IDUDS	011130	125/50	127/35						
IDUDU	011326	128/05	128/17						
IDUEX	011322	125/50	127/60						
IDUMO	011113	125/37	127/36						
IDUM1	011142	125/38	126/02						
IDUM2	011146	125/39	126/06						
IDUM3	011152	125/40	126/10						
IDUM4	011155	125/41	126/13						
IDUM5	011160	125/42	126/16						
IDUM6	011163	125/43	126/19						
IDUM7	011165	125/44	126/21						
IDUM8	011167	125/45	126/23						
IDUMA	011223	125/05	126/53	127/33					
IDUME	011107	125/25	125/33	125/58					
IDUMQ	011222	126/52	127/08						
IDUMT	011175	125/19	126/30	127/45					
IDUPA	011227	125/12	126/57	128/37					
IDUPN	011124	125/10	125/46						
IDUPQ	011226	126/56	128/28						
IDUPT	011201	125/52	126/34	127/48					
IDUQR	011233	127/05	127/13	127/31	128/23	128/38			
IDUSA	011224	125/08	125/16	126/54	127/41				
IDUWA	011230	125/28	126/58						
IDUXP	011211	125/11	125/46	126/43					
IDXO	000020	17/18	66/06	66/32	68/32	68/43	72/22	72/24	72/27
		127/39	127/49						
IDX1	000021	17/19	66/04	66/48	67/25	67/28	67/30	68/30	69/02
		70/45	70/58	71/07	71/22	72/38	72/40	127/44	127/53
IDX2	000022	17/20	67/44	67/55	68/03	69/16	69/19	70/20	70/38
		127/46	127/55						
IDX3	000023	17/21	66/08	67/11	68/34	132/29	132/37	132/45	132/47

IPASS	000124	18/28	19/54						
IRSTA	000270	22/04	22/28						
IQUES	000071	17/51	19/31						
IRD	000273	22/08	22/32						
IRDU	000302	22/15	22/39						
IRESA	000077	18/06	18/08						
IRESW	000073	17/53	19/33						
IRWD	000303	22/16	22/40						
ISAMS	000072	17/52	19/32						
ISARG	000277	22/12	22/36						
ISLOP	010013	112/37	112/50						
ISSET	010066	113/25	113/45						
ISTAA	000115	18/21	19/47	149/18					
ISTAC	010067	113/24	113/46						
ISTAN	000116	18/22	19/48						
ISTAP	000121	18/25	19/51						
ISTAS	000120	18/24	19/50						
ISTAW	000117	18/23	19/49						
ISTP0	000110	18/16	19/42						
ISTP1	000111	18/17	19/43						
ISTP2	000112	18/18	19/44						
ITBIN	000051	17/35	19/15						
ITDEC	000053	17/37	19/17						
ITHLT	000125	18/29	19/35						
ITIMS	000064	17/46	19/26						
ITIRQ	000065	17/47	19/27						
ITISK	000063	17/45	19/25						
ITOCT	000052	17/36	19/16						
ITR	010051	112/21	113/16	113/32	114/15				
ITRAG	010050	112/20	113/04	113/09	113/14	113/31			
ITRCT	010052	112/12	112/22	113/17	113/33	114/16			
ITRP0	010045	113/05	113/28						
ITRP1	010046	113/03	113/10	113/29					
ITRP2	010047	113/08	113/13	113/15	113/30	114/13			
ITYPE	000042	17/28	19/08						
ITZOC	000054	17/38	19/18						
IWAIT	000061	17/43	19/23						
IWAOP	000062	17/44	19/24						
IWBOT	000272	22/06	22/30						
IWEOF	000300	22/13	22/37						
IWLT	000406	23/06	23/12						
IWR	000274	22/09	22/33						
J2SEC	000136	20/07	170/37						
JHALT	000122	18/26	19/52						
JINSW	001307	34/56	35/33	35/49	35/54				
JMEND	002440	46/15	46/34	47/24	47/31	47/55	120/49		
JPOUT	001067	29/46	29/53	31/15	31/30	31/49	32/39	33/10	33/33
		34/15	34/38						
KCP0	003071	54/33	73/03						
KCP1	003072	54/34							
KCP10	003101	54/43							
KCP11	003102	54/44							
KCP12	003103	54/45							
KCP13	003104	54/46							
KCP14	003105	54/47							
KCP15	003106	54/48							
KCP16	003107	54/49							
KCP17	003110	54/50							
KCP2	003073	54/35							

KCP20	003111	54/51							
KCP21	003112	54/52							
KCP22	003113	54/53							
KCP23	003114	54/54							
KCP24	003115	54/55							
KCP25	003116	54/56							
KCP3	003074	54/36							
KCP4	003075	54/37							
KCP5	003076	54/38							
KCP6	003077	54/39							
KCP7	003100	54/40							
KEYA	004330	69/19	69/24	69/27					
KEYB	004336	69/21	69/25						
KEYS	004325	67/40	69/15						
KINC	003117	54/21	54/22	54/59					
KINDI	003070	54/17	54/30						
KSTAC	001313	34/60	35/31	38/40					
LALOC	001434	36/20	36/38	37/28					
LAST1	007221	102/57	103/06	103/19	103/37	103/39	103/49		
LAST2	007362	104/06	104/21	105/10	105/23	105/33			
LAST3	007471	106/06	106/21	107/04	107/17	107/25			
LAST4	007063	100/12	100/28	101/16	101/49	102/03			
LAST5	007647	108/06	108/19	108/39	109/04	109/22			
LASTN	006731	99/12	99/18	100/05	101/49	103/37	105/33	107/25	109/22
LASTP	020357	20/04	20/05	124/03	156/58	157/62	219/04		
LEAV	012740	146/41	146/50						
LEAVU	013442	153/51	153/60						
LERE1	007217	103/26	103/30	103/33	103/34				
LERE2	007304	104/27	104/37	104/38					
LERE3	007432	106/27	106/37	106/38					
LERE4	007006	100/34	100/55	100/56					
LERE5	007534	108/25	108/29	108/32	108/33				
LETE1	007207	103/14	103/26						
LETE2	007271	104/14	104/27						
LETE3	007417	106/14	106/27						
LETE4	006760	100/21	100/34						
LETE5	007524	108/14	108/25						
LLPTT	002511	45/16	45/54						
LMADR	006315	91/34	91/45	91/58	93/38	93/42			
LMSK	001165	30/50	33/05						
LOAD	006311	22/47	200/14	201/14	202/14	203/14	204/14	205/14	206/14
		207/14	208/14	209/13	211/13	213/13	215/13		
LOADB	002777	44/21	53/05						
LOC0	000000	17/06	36/13	119/17	119/26	120/03	120/17		
LOC3	000003	17/10	36/27						
LOC4	000004	17/11	36/29						
LOC5	000005	17/12	66/60	67/05	67/06	67/10	68/17	69/13	119/24
		119/36	119/44	139/55					
LOCKA	004357	69/31	69/44						
LOOP	006113	19/45	156/54	158/41	160/59	163/11	163/18	163/25	163/32
		163/48	163/60	164/15	164/54	165/24	165/37	165/49	165/61
		166/16	166/38	167/11	167/28	167/43	167/60	168/15	168/33
		168/49	169/33	170/23	170/51	171/29	172/45	174/44	176/63
		177/36	178/19	178/36	178/56	179/17	179/49	180/40	182/50
		184/28	185/52	186/58	187/57	188/56	189/57	190/48	192/29
		195/61	197/00	197/32	198/60	200/63	201/62	202/58	203/59
		204/58	205/49	206/49	207/49	208/49	210/23	212/23	214/23
		216/23	217/62						
LOOPR	010063	112/43	113/02	113/07	113/12	113/26	113/42		

MOREP	002270	45/36	45/42				
MPASS	010656	122/26	122/32				
MPIWA	011013	124/13	124/17				
MPOWI	010617	120/14	121/19				
MPOWO	006173	88/10	90/04				
MPROA	006155	89/19	89/27				
MSAMS	001466	37/06	38/15	38/17			
MSAQU	006203	88/18	90/08				
MSAV	003325	58/09	58/17	58/33	58/42	58/44	
MSTIO	003247	56/59	57/15				
MSTAR	014050	157/34	159/02				
MSTIA	003203	56/19	56/23				
MSTIB	003206	56/17	56/22				
MSTIC	003253	57/06	57/08	57/20			
MSTID	003254	56/27	57/04	57/07			
MSTIM	003177	17/46	56/15				
MSTIO	003250	56/21	57/02				
MSTIR	003276	56/15	57/21	57/23	57/24	57/25	
MSUNO	003420	60/05	64/49				
MSUSC	003426	60/06	64/50				
MSW12	002556	49/19	49/21	49/30			
MSW14	002564	49/25	49/27	49/31			
MSWRG	001457	35/36	37/04				
MT100	016154	137/11	189/43				
MT101	016554	137/12	195/43				
MT102	017021	137/13	200/37				
MT103	017062	137/14	201/37				
MT104	017123	137/15	202/37				
MT105	017164	137/16	203/37				
MT106	017514	137/17	209/50				
MT107	017525	137/18	209/59				
MT108	017526	137/19	209/60				
MT109	017572	137/20	210/44				
MT115	017544	137/21	210/10				
MT116	017650	137/22	211/50				
MT117	017661	137/23	211/59				
MT118	017662	137/24	211/60				
MT119	017726	137/25	212/44				
MT125	017700	137/26	212/10				
MT126	020004	137/27	213/50				
MT127	020015	137/28	213/59				
MT128	020016	137/29	213/60				
MT129	020062	137/30	214/44				
MT135	020034	137/31	214/10				
MT136	020140	137/32	215/50				
MT137	020151	137/33	215/59				
MT138	020152	137/34	215/60				
MT139	020216	137/35	216/44				
MT145	020170	137/36	216/10				
MT146	020266	137/37	217/37				
MT147	020270	137/38	217/39				
MT148	020274	137/39	217/43				
MT149	020275	137/40	217/44				
MT150	020300	137/41	217/47				
MT151	020303	137/42	217/50				
MT152	014535	137/43	167/17				
MT153	014550	137/44	167/34				
MT154	014563	137/45	167/49				
MT155	015415	137/46	180/27				

MT156	015710	137/47	185/39
MT157	013343	137/48	152/40
MT158	013345	137/49	152/42
MT159	013347	137/50	152/44
MT160	013350	137/51	152/45
MT161	013356	137/52	152/51
MT162	015556	137/53	182/42
MT163	015521	137/54	182/11
MT164	015535	137/55	182/23
MT165	015577	137/56	183/19
MT166	015622	137/57	183/48
MT167	015505	137/58	181/52
MT168	017225	137/59	204/37
MT169	017270	137/60	205/33
MT170	017331	137/61	206/33
MT171	017372	137/62	207/33
MT172	017433	137/63	208/33
MT173	015357	138/00	179/35
MT174	016212	138/02	190/28
MT175	014356	138/03	164/35
MT176	014357	138/04	164/36
MT177	014362	138/05	164/40
MT178	014363	138/06	164/41
MT179	014372	138/07	164/49
MT180	014373	138/08	164/50
MT181	014762	138/09	172/17
MT182	014763	138/10	172/18
MT183	014764	138/11	172/19
MT184	014765	138/12	172/20
MT185	014770	138/13	172/23
MT186	014777	138/14	172/32
MT187	015050	138/15	174/11
MT188	015056	138/16	174/18
MT189	015061	138/17	174/21
MT190	015062	138/18	174/22
MT191	015063	138/19	174/23
MT192	015066	138/20	174/26
MT193	015073	138/21	174/31
MT194	016640	138/22	196/49
MT195	016745	138/23	198/43
MT196	016257	138/24	191/30
MT197	016304	138/25	192/06
MT198	013074	138/26	148/58
MT199	013075	138/27	148/59
MT200	016040	138/28	187/41
MT201	014415	138/29	165/21
MTC	000030	22/26	22/27

147/06 147/07 147/10 147/17 147/18 147/25
147/26 147/29 147/42 147/43 147/46 147/55 147/56 147/59
148/58 148/59 149/08 149/09 149/16 149/17 150/42 150/44
150/46 150/47 150/50 151/37 151/39 151/41 151/42 151/45
152/40 152/42 152/44 152/45 152/51 156/14 156/16 156/18
156/19 156/22 156/28 157/13 157/15 157/17 157/18 157/21
157/35 157/55 163/23 163/30 163/41 163/42 163/54 163/55
164/08 164/35 164/36 164/40 164/41 164/49 164/50 165/09
165/10 165/15 165/21 165/31 165/32 165/33 165/43 165/44
165/45 165/55 165/56 165/57 166/10 166/11 166/12 166/28
166/29 166/30 166/31 166/32 166/33 167/06 167/07 167/08
167/17 167/18 167/19 167/24 167/34 167/35 167/36 167/39
167/40 167/49 167/51 167/52 167/55 168/23 168/24 171/13

		172/17	172/18	172/19	172/20	172/23	172/32	174/11	174/18
		174/21	174/22	174/23	174/26	174/31	177/22	178/12	178/13
		178/30	178/31	179/35	180/27	181/52	182/11	182/23	182/42
		183/19	183/48	185/39	186/42	187/41	188/44	189/43	190/28
		191/30	192/06	195/43	196/49	198/43	200/37	201/37	202/37
		203/37	204/37	205/33	206/33	207/33	208/33	209/50	209/59
		209/60	210/10	210/44	211/50	211/59	211/60	212/10	212/44
		213/50	213/59	213/60	214/10	214/44	215/50	215/59	215/60
		216/10	216/44	217/37	217/39	217/43	217/44	217/47	217/50
MTC01	012750	135/33	147/06						
MTC02	012751	135/34	147/07						
MTC03	012754	135/35	147/10						
MTC04	012761	135/36	147/17						
MTC05	012762	135/37	147/18						
MTC06	012767	135/38	147/25						
MTC07	012770	135/39	147/26						
MTC08	012773	135/40	147/29						
MTC09	013006	135/41	147/42						
MTC10	013007	135/42	147/43						
MTC11	013012	135/43	147/46						
MTC12	013021	135/44	147/55						
MTC13	013022	135/45	147/56						
MTC14	013025	135/46	147/59						
MTC15	014525	135/47	167/06						
MTC16	013101	135/48	149/08						
MTC17	013102	135/49	149/09						
MTC18	013106	135/50	149/16						
MTC19	013107	135/51	149/17						
MTC20	013210	135/52	150/42						
MTC21	013212	136/02	150/44						
MTC22	013214	136/03	150/46						
MTC23	013215	136/04	150/47						
MTC24	013220	136/05	150/50						
MTC25	013265	136/06	151/37						
MTC26	013267	136/07	151/39						
MTC27	013271	136/08	151/41						
MTC28	013272	136/09	151/42						
MTC29	013275	136/10	151/45						
MTC30	013625	136/11	156/14						
MTC31	013627	136/12	156/16						
MTC32	013631	136/13	156/18						
MTC33	013632	136/14	156/19						
MTC34	013635	136/15	156/22						
MTC35	013643	136/16	156/28						
MTC36	013703	136/17	157/13						
MTC37	013705	136/18	157/15						
MTC38	013707	136/19	157/17						
MTC39	013710	136/20	157/18						
MTC40	013713	136/21	157/21						
MTC41	013731	136/22	157/35						
MTC42	013753	136/23	157/55						
MTC50	014267	136/24	163/23						
MTC51	014274	136/25	163/30						
MTC52	014305	136/26	163/41						
MTC53	014306	136/27	163/42						
MTC54	014315	136/28	163/54						
MTC55	014316	136/29	163/55						
MTC56	014327	136/30	164/08						
MTC57	014512	136/31	166/33						

MTC58	014405	136/32	165/09						
MTC59	014406	136/33	165/10						
MTC60	014412	136/34	165/15						
MTC61	014425	136/35	165/31						
MTC62	014426	136/36	165/32						
MTC63	014427	136/37	165/33						
MTC64	014437	136/38	165/43						
MTC65	014440	136/39	165/44						
MTC66	014441	136/40	165/45						
MTC67	014451	136/41	165/55						
MTC68	014452	136/42	165/56						
MTC69	014453	136/43	165/57						
MTC70	014466	136/44	166/10						
MTC71	014467	136/45	166/11						
MTC72	014470	136/46	166/12						
MTC73	014505	136/47	166/28						
MTC74	014506	136/48	166/29						
MTC75	014507	136/49	166/30						
MTC76	014510	136/50	166/31						
MTC77	014511	136/51	166/32						
MTC78	014526	136/52	167/07						
MTC79	014527	136/53	167/08						
MTC80	014536	136/54	167/18						
MTC81	014537	136/55	167/19						
MTC82	014542	136/56	167/24						
MTC83	014551	136/57	167/35						
MTC84	014552	136/58	167/36						
MTC85	014554	136/59	167/39						
MTC86	014555	136/60	167/40						
MTC87	014565	136/61	167/51						
MTC88	014566	136/62	167/52						
MTC89	014571	136/63	167/55						
MTC90	014610	137/00	168/23						
MTC91	014611	137/02	168/24						
MTC92	014730	137/03	171/13						
MTC93	015232	137/04	177/22						
MTC94	015262	137/05	178/12						
MTC95	015263	137/06	178/13						
MTC96	015300	137/07	178/30						
MTC97	015301	137/08	178/31						
MTC98	015760	137/09	186/42						
MTC99	016113	137/10	188/44						
MTERM	010336	117/44	120/22	120/24					
MULSA	007060	101/39	101/43	101/46					
MULTE	007052	101/26	101/39						
MULTI	006066	19/28	57/16	72/53	114/14	210/04	212/04	214/04	216/04
MUPR0	003564	62/05	63/07						
MUPR1	003571	62/07	63/08						
MUPR2	003600	62/09	63/09						
MUPR3	003605	62/11	63/10						
MUPR4	003612	62/13	63/11						
MUPRU	003617	63/02	63/12	63/13	63/14	63/15	63/16	63/17	63/18
		63/19	63/20						
MUPRV	003551	62/02	64/32						
MWAIT	002643	50/23	51/17						
MWLB	014212	160/49	160/51	162/04					
MWLO	014202	160/41	160/43	162/02					
MWLS	014223	160/04	160/06	162/06					
MX2SP	006466	95/08	122/18						

MX304	012521	140/19	143/06						
MXEXT	012602	142/03	144/10						
MXMMF	006316	91/07	92/02						
MXMMT	006334	91/25	91/26	92/06	93/29	93/30			
MXNRZ	012552	141/24	144/02						
MXOLD	012500	140/05	143/02						
MXQUE	006463	48/42	95/07	95/45					
MXSTR	012566	141/38	144/06						
N400	000177	20/43	217/28	217/38					
NBEVE	007707	109/41	109/57						
NCSU	005040	75/02	75/34						
NC8	005037	73/30	75/33						
NCTYP	004716	73/39	73/42	73/44					
NEXIS	004742	73/32	74/05						
NFTYP	004707	73/26	73/37						
NINHI	000576	28/10	28/13						
NINSW	000660	28/07	29/11	32/34	34/56	38/42			
NIRET	004717	73/09	73/43	73/45					
NITYP	004710	73/38	75/42						
NN10	000772	30/35	31/18						
NN500	005035	73/22	75/31						
NN9	005036	73/23	75/32						
NODL	013653	156/36							
NOEX	010007	112/16	112/26	112/35	112/45				
NORAT	010132	114/09	114/25						
NOTLO	004777	74/37	74/43						
NOTNX	004754	74/24	74/34	74/40					
NOTRE	004776	74/23	74/41	74/42					
NOTUP	005000	74/36	74/44						
NOTYM	004720	73/46	74/26	74/28					
NOTYP	004753	73/38	74/23						
NRESW	001365	35/17	35/50						
NRTYP	004711	73/36	73/39						
NRZIA	000262	21/42	141/34	142/15	195/44	199/08	210/05	212/05	214/05
		216/05							
NRZIQ	000261	21/41	141/26						
NTDEC	005033	75/03	75/23	75/28					
NTREP	005005	75/06	75/24						
NTRES	005034	75/04	75/11	75/18	75/25	75/29			
NTRET	005032	75/05	75/26	75/27					
NTTYP	005001	73/21	75/02						
NUK	000034	18/41	97/42	98/42					
NUMB2	007363	104/08	105/09	105/24	105/29	105/34	105/40		
NUMB3	007472	106/08	107/03	107/18	107/21	107/26	107/32		
NUMB4	007007	100/15	100/57	101/06	101/25	101/28	102/19		
NUMSC	007220	103/08	103/36	103/44	103/50	103/57			
NUTYP	003776	65/09	65/42						
NWAIT	003060	54/21	54/25						
NWTYP	004653	65/40	73/09						
NXDIS	000564	26/46	27/49	27/59	28/02				
NXTYP	004673	73/25	73/29						
NYTYP	005041	75/22	75/36						
NZTYP	004731	74/02	75/38	75/41					
OBUFF	000134	20/04	146/30	148/11	148/31	151/38	171/10	177/19	179/32
		180/24	181/49	182/08	183/16	185/36	191/27	209/47	210/41
		211/47	212/41	213/47	214/41	215/47	216/41	217/25	217/36
OCTAB	000650	28/24	29/02						
OF2CO	007361	105/16	105/32						
OF3CO	007470	107/10	107/24						

PLASC	007233	103/18	103/49	103/56				
PLASI	007043	101/20	101/24	101/30				
PLASW	006113	88/15	88/36					
PLATX	007625	108/18	109/03	109/38				
PMEND	002421	47/08	47/35					
POINT	000200	20/46	177/07	186/08				
PONCX	000222	21/05	149/54					
PONTR	000210	20/56	187/13					
POWIC	010513	120/07	120/13					
POWIN	010501	119/05	120/02					
POWON	006054	18/07	88/04					
POWRE	000100	18/07	18/09					
POWT1	010512	120/05	120/11					
POWTY	010511	120/04	120/10					
POWZE	000102	18/09	36/12	119/25	120/02	172/27		
PRD	013232	150/38	150/52	150/56	150/60			
PRD1	013233	150/40	150/55	150/61				
PRESW	001305	34/54	35/11					
PROAD	000007	17/13	17/14					
PROAK	006143	17/14	89/16					
PROAR	006170	89/16	89/21	89/30				
PROG	011602	36/25	37/15	37/18	51/44	88/13	133/04	
PROGA	011613	37/21	133/06					
PROIN	000006	17/13	123/31					
PRSET	006167	89/17	89/29					
PRTUL	003624	63/04	64/27					
PRTUU	003625	63/05	64/26					
PRTYE	003671	64/16	64/20	64/24				
PRTYP	003645	36/34	64/04					
PSAAN	006112	88/20	88/35					
PSETP	006114	88/04	88/37	89/05				
PSP	013370	152/36	152/53	152/57	152/61			
PSP1	013371	152/38	152/56	152/62				
PSP2	013372	152/16	152/33	152/46	152/63			
PTAB	001162	30/45	33/02					
PTAB1	005050	45/47	76/04					
PTAB2	005251	45/48	79/04					
PTAB3	005452	45/49	82/04					
PTAB4	005653	45/50	85/04					
PWRT	013307	151/33	151/47	151/51	151/55			
PWRT1	013310	151/35	151/50	151/56				
QCHAR	000665	29/17	29/49					
QCSTA	000132	18/35	116/50	142/22				
QDICL	001223	33/36	33/39					
QDOUT	001177	33/13	33/17					
QHAAT	001273	34/41	34/44					
QMEND	002360	46/55	47/10	47/21	47/26			
QRESW	001306	34/55	35/20					
QTYPE	000734	29/56	30/04					
QUESA	006460	95/03	95/27	95/38				
QUESD	006507	95/24	95/35					
QUESI	006461	95/04	95/46					
QUESM	006511	95/22	95/37					
QUESS	006515	95/31	95/41					
QUEST	006514	95/29	95/40					
RACAN	006634	98/25	98/57					
RAEND	006602	97/51	97/60	98/11	98/28			
RALIF	006627	98/09	98/21	98/52				
RAMIN	006632	98/19	98/55					

RGEN	013060	148/28	148/29	148/37	148/38				
RHAAT	001304	34/37	34/40	34/43	34/52	34/53			
RHALT	063077	19/02	31/51	34/31	39/50	40/42	98/27	115/49	120/08
		131/23							
RINHI	000450	26/34	28/06	28/13	28/14				
RINSW	001132	32/14	32/31	32/32	32/36				
RLD	013045	148/08	148/09	148/19	148/20				
RLPTT	002233	45/05	45/13	45/19					
RMEND	002417	47/04	47/25	47/32	47/33	47/45	47/60		
RMSK	001163	30/43	30/48	33/03					
RNIQA	012470	140/03	142/28	142/29					
RP304	012313	140/18	140/26	140/28					
RPASS	010676	122/10	122/12	122/30	122/37				
RPCON	002537	48/49	49/03	49/12					
RPDVN	012335	140/17	140/36	140/44	140/50				
RPEND	012461	142/17	142/22						
RPEXT	012435	142/02	142/10	142/12					
RPNRZ	012403	141/23	141/31	141/33					
RPNTR	012421	141/37	141/45	141/47					
RPOLD	012275	140/04	140/12	140/14					
RPOUT	000460	26/02	26/05	26/19	26/20	26/42	26/44	26/49	26/60
		27/05	27/42	27/47	27/52	27/57	28/23	31/49	34/54
RPSAQ	006066	88/14	88/25	89/06					
RPSPE	012434	141/36	141/48						
RPUNN	012356	140/35	141/02	141/10	141/13	141/16			
RQUES	006457	95/02	95/20	95/48					
RRD	013231	150/22	150/23	150/54	150/58	150/59			
RRESW	001373	35/13	35/19	35/44	35/51	35/56			
RSAMS	001552	38/06	38/22	38/23					
RSARG	013367	152/14	152/15	152/55	152/59	152/60			
RTEST	000312	23/02	163/04	219/03					
RTIME	003120	17/45	55/10						
RVTMP	004200	67/42	67/47	67/49	68/05	68/14			
RWBOT	013135	149/24	149/29	149/34	149/41	149/42	149/43	149/44	
RWEOF	013015	147/35	147/36	147/47	147/48	147/49			
RWRT	013306	151/13	151/14	151/49	151/53	151/54			
RXDEC	000452	26/36	26/54	26/56	28/02	28/04			
RXPST	010325	117/12	117/13	117/14	117/22	117/23	117/24		
RXSST	010335	117/35	117/36	117/40	117/41	117/42			
RXUPS	013104	149/06	149/10	149/11					
SABIN	001074	31/12	31/26	32/02					
SAC0	014200	160/46	160/52	161/17					
SAC1	014201	160/47	160/53	161/18					
SACHA	000773	29/30	29/38	29/44	30/36				
SADIG	000451	26/35	26/59	27/02	28/20				
SAMCO	002357	46/45	46/54						
SAMEX	002312	44/07	46/12						
SAMMS	002341	46/18	46/26	46/36	46/39				
SAMNM	002332	44/09	46/31						
SAPTB	002231	44/05	45/03						
SCORA	004125	67/24	67/59						
SCORB	004133	67/30	67/34						
SCORE	004123	66/34	67/22	68/45					
SDEV1	010254	116/13	135/28						
SDEV2	010267	116/33	135/29						
SDEV3	010303	116/54	135/30						
SDEV4	010317	117/18	135/31						
SDEV5	010331	117/38	135/32						
SDIST	001204	33/22	33/24	38/49					

TERM2	010417	118/44	118/51	118/54					
TERMB	007473	106/11	107/28						
TERMD	007010	100/18	101/02						
TERMG	010530	120/20	120/27						
TERMI	010520	118/46	118/50	120/19					
TERMO	007364	104/11	105/36						
TERMR	010416	118/43	118/52	118/53					
TERMS	007236	102/60	103/11	103/53					
TERMT	006714	99/25	99/51	100/17	104/52	109/27			
TERMW	010404	30/41	50/17	95/04	118/43	119/07	120/32	139/40	
TERMX	007662	108/11	109/35						
TEROK	007370	105/38	105/40						
TERSC	007242	103/55	103/57						
TERTX	007666	109/32	109/39						
TEST	014252	145/17	163/04						
TEXEN	007624	108/52							
TEXIA	007552	108/50	109/16	109/53	110/07				
TEXIN	007553	108/51							
TFFTB	013140	149/38	149/47						
TFPBB	013137	149/36	149/46						
TFREW	013136	149/31	149/45						
THALT	006125	19/35	34/30	115/48	131/22				
TIDUD	011374	128/08	128/09	128/42					
TIDUM	011366	127/06	127/07	128/40					
TIMCT	003215	56/30	57/13	57/17					
TIMEM	003216	56/31	57/19	68/10					
TIMEX	003214	56/26	56/29	57/03	57/14				
TIMMS	006064	19/26	66/16						
TIMRO	006065	19/27	149/30	149/37					
TIMSK	006063	19/25	26/23	26/27	32/56	33/21	147/08	147/27	147/44
		147/57	150/48	151/43	152/49	156/20	157/19	167/53	172/21
		174/24	196/47	198/41	209/57	211/57	213/57	215/57	217/45
TINHI	001166	31/16	31/31	32/41	33/06	33/11	33/34	34/16	34/39
TMEND	002362	36/36	46/14	47/04					
TOMA	004270	68/41	69/03						
TOMB	004313	68/51	69/04						
TOMC	004311	69/02	69/11						
TOMD	004303	68/49	68/52						
TOMER	004251	65/38	68/26						
TOMF	004305	68/54	68/57						
TOMG	004315	69/06	69/10						
TOMH	004316	69/04	69/07						
TOMJ	004306	68/52	68/55						
TPASS	010667	122/33	123/13	123/20					
TROCO	011573	132/31	132/39	132/47	132/51				
TROEN	011600	132/49	132/52						
TROHA	011552	44/15	132/26						
TROHC	011541	131/28	132/30						
TROLC	011542	131/29	132/38						
TROLO	011560	44/17	132/34						
TRORC	011543	131/30	132/46						
TRORE	011566	44/19	132/42						
TRORR	011537	131/04	131/07	131/17	131/26				
TROTA	011540	131/27	132/28	132/36	132/44				
TROTB	011645	131/27	134/02						
TRTYP	003740	65/12	65/19						
TUM50	004563	72/08	72/52						
TUMBR	004605	72/27	72/33						
TUMBV	004566	72/11	72/35	72/50					

TUMCA	004576	70/41	71/02	71/25	72/20				
TUMCN	004526	71/35	71/39	71/43	71/45				
TUMCR	004562	72/07	72/20	72/58					
TUMCW	004545	70/23	70/29	70/35	72/03				
TUMDR	004622	72/40	72/44						
TUMER	004376	65/39	70/13						
TUMES	004476	71/16	71/20						
TUMGO	004573	71/33	72/16						
TUMG1	004574	71/37	72/17						
TUMG2	004575	71/41	72/18						
TUMGS	004647	71/32	73/02						
TUMI1	004415	70/29	119/50						
TUMI2	004416	70/30	119/51						
TUMI3	004422	70/34	119/52						
TUMI4	004451	70/54	70/58						
TUMI5	004500	71/19	71/22						
TUMNS	004470	71/14	71/18						
TUMNT	004443	70/52	70/56						
TUMRA	004546	70/19	70/44	71/06	72/04	72/21	72/37		
TUMRI	004561	70/21	70/46	71/08	72/06	72/23	72/39	72/45	
TUMRR	004544	70/13	70/33	70/57	71/21	71/31	71/58	72/02	72/60
TUMRS	004463	71/09	71/24						
TUMRT	004436	70/47	70/60						
TUMRW	004466	70/22	70/40						
TUMSA	004652	71/55	73/05						
TUMSV	004567	72/12	72/34	72/47					
TUMTA	004651	71/51	73/04						
TUMTO	004565	72/10	72/56						
TUMVA	004564	72/09	72/49	72/54					
TUMVS	004572	71/26	71/54	72/15					
TUMVT	004571	71/03	71/29	71/49	72/14				
TUMVW	004570	70/42	71/45	72/13					
TUMWA	004650	71/46	73/03						
TXCOU	007651	100/03	108/03	108/44	109/05	109/06	109/14	109/24	109/39
		109/46	110/02						
TXDVN	012540	140/37	140/38	143/10					
TXEND	007722	100/04	109/57	110/13					
TXNDR	007733	110/13	110/21	110/22					
TXUNN	012545	141/03	141/04	143/12					
TYLIM	004175	66/20	68/11						
TYMA	004042	66/30	66/49						
TYMB	004066	66/41	66/50						
TYMC	004064	66/48	66/57						
TYMD	004056	66/39	66/42						
TYME	004206	68/19	68/20						
TYMEM	004174	66/19	68/10						
TYMEN	004172	66/24	67/48	68/08	68/28				
TYMER	004006	65/12	66/02						
TYMF	004060	66/44	66/47						
TYMG	004070	66/52	66/56						
TYMH	004071	66/50	66/53						
TYMJ	004061	66/42	66/45						
TYPE1	000743	30/11	31/53						
TYPE2	000746	30/14	31/54						
TYPE3	000760	30/17	30/24						
TYPE4	000762	30/20	30/26						
TYPE5	000764	30/07	30/28						
TYPEW	001000	30/23	30/41						
TYPIN	006664	99/20	99/24	99/33	99/35	100/29	104/54	109/29	

		120/19							
XTTO	000011	18/44	26/29	30/26	30/27	66/10	66/11	66/12	66/14
		66/15	66/17	66/26	66/27	66/28	66/35	66/43	66/46
		66/51	66/55						
XTTOT	000443	26/28	26/30	38/47					
XTXCO	006727	99/38	100/03						
XTXMD	006730	99/39	100/04						
XTYME	004205	66/03	67/24	67/41	68/19	68/29			
XTYPE	000724	17/28	29/51						
XTYPN	007322	102/59	103/21	104/22	104/54	106/22			
XTZOC	000544	17/38	27/42						
XUMER	003773	65/20	65/39						
XWAIT	003050	17/43	54/13						
XWBOT	013111	22/06	149/24						
XWEOF	012777	22/13	147/35						
XWLT	012640	23/12	145/19						
XWR	013235	22/09	151/13						
XWRT1	013264	151/36	151/48						
XWRT2	013302	151/46	151/50						
XWTOP	002651	17/44	51/14						
XWTYP	003774	65/23	65/40						
XX16	004247	67/27	67/29	67/33	67/46	67/56	68/23		
XXLPT	001575	38/32	38/46						
XXTTO	001576	38/34	38/47						
YCHAR	000664	26/38	26/55	29/16	31/04	31/34	31/36		
YCLR	013065	148/49	148/52						
YDIAG	012634	145/02	145/14	145/16					
YDICL	001222	33/38	34/34						
YDLT	012666	145/43							
YDLTE	007654	108/12	109/28						
YDOUT	001175	26/39	31/09	32/54	33/15	33/40	33/42		
YESDL	013657	156/35	156/40						
YESNO	006432	50/16	94/08	142/36					
YETT	012656	145/34							
YGEN	013053	148/33	148/36						
YGTCH	007652	108/09	109/26						
YHAAT	001272	34/18	34/43						
YILLG	007650	108/31	108/47	109/30					
YINRT	007657	108/04	109/31						
YINSW	001571	38/30	38/42						
YINTR	007660	109/32	109/55						
YLD	013036	148/13	148/18						
YNCHO	006453	94/09	94/26						
YNCH1	006454	94/12	94/27						
YNCHA	006451	94/17	94/23						
YNCHK	012477	140/13	140/27	141/32	141/46	142/11	142/36		
YNCHN	006455	94/15	94/28						
YNCHY	006456	94/18	94/29						
YONTR	007661	109/33	109/36						
YPBIN	001025	31/03	31/08	31/12					
YPDEC	000477	26/45	26/50	27/02					
YPOCT	000602	27/53	27/58	28/19					
YSETP	001570	38/28	38/41						
YSTAC	001567	38/27	38/40						
YTAB3	000704	26/40	29/33						
YTRMT	007653	108/10	109/27						
YTYPE	000732	29/29	29/41	30/02					
YTYPN	007655	108/20	109/29						
YWLT	012646	145/25							

YZUCT	000600	27/43	27/48	28/16	
ZCHAR	000454	26/16	26/38		
ZDIAG	012637	145/14	145/17		
ZDOUT	000455	26/39	28/03		
ZSUPP	000771	28/26	28/32	28/42	30/34
ZTAB3	000456	26/40	26/58		