TMA-11

DATA RELIA EXERCISE
MD-11-DZTMH-D

EP-DZTMH-D-DL-A

FICHE 1 OF 1

NOV 1976
digital
MADE IN USA

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZTMH-D-D
PRODUCT TITLE:	TM,A,B-11 MULTIDRIVE DATA RELIAB
DATE CREATED:	AUGUST 1976
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	R. B. BARNES/RON PLATUKIS/R. SOL

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1. ABSTRACT

THIS PROGRAM IS DESIGNED TO BE USED BY AN EXPERIENCED ENGINEER /TECHNICIAN FOR EVALUATION AND DEBUGGING OF MAG TAPE DRIVES. THE PROGRAM IS CAPABLE OF EXERCISING ANY TAPE DRIVE THAT CAN BE OPERATED ON A UNIBUS PDP-11 SYSTEM THROUGH THE TM,A,B-11 MAG TAPE CONTROLLER. ANY TYPE OF TAPE DRIVE; 7 OR 9 TRACK MAY BE USED. ANY NUMBER OF DRIVES, SINGLE OR MULTIDRIVE SYSTEMS, UP TO EIGHT (8), MAY BE TESTED BY A SINGLE EXECUTION OF THE PROGRAM. THIS FLEXIBILITY IS POSSIBLE BECAUSE THE PROGRAM HAS NO FIXED PARAMETERS OR TESTING SEQUENCE. THE ENTIRE TEST PLAN, INCLUDING PARAMETERS AND OPERATING SEQUENCE, IS DETERMINED BY THE OPERATOR THROUGH RESPONSES TO TELETYPE REQUESTS AND SETTING OF CONSOLE SWITCHES.

THE PROGRAM PROVIDES FOR TESTING OF ALL TAPE DRIVE FUNCTIONS SUCH AS WRITING,READING,REWINDING,TAPE POSITIONING,EOT - BOT SENSING AND ASSUMES A GOOD CONTROLLER.

HOWEVER; THE CONTROLLER IS TESTED SOMEWHAT INTRINSICALLY DURING THE TEST CYCLE IN ORDER TO PROVIDE FULL INFORMATION ABOUT ANY ERROR CONDITIONS DETECTED.

DURING A TEST CYCLE, CHECKS ARE MADE FOR STATUS ERRORS,DATA ERRORS, POSITION ERRORS,WORD COUNT AND CURRENT MEMORY ADDRESS ERRORS WHEREVER APPLICABLE.

2. REQUIREMENTS (HARDWARE)

A. ANY PDP-11 PROCESSER
B. 8K OF CORE
C. TELETYPE
D. TM,A,B-11 TAPE CONTROL UNIT
E. 1 TO 8 TS03 OR TU10,N,W MAG TAPE DRIVES

3. LOADING PROCEDURE

A. USE STANDARD PROCEDURE FOR LOADING BINARY TAPES
B. PROGRAM IS LOADABLE AND CHAINABLE IN 8K OF MEMORY.
   DEFAULT CHAIN MODE IS A SINGLE PASS ON DRIVE 0
   AT 9TRK,800 BPI,100 RECORDS OF 200 CHARACTES EACH,
   WITH PATTERN ONE AND ALL SWITCHES 0.

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4. STARTING PROCEDURE

THERE ARE FOUR (4) STARTING ADDRESSES THAT MAY BE USED;
200(8), 204(8), 210(8), AND 240(8):

A. 200(8): THIS ADDRESS MUST BE USED ON INITIAL START FROM LOAD AS ALL PARAMETERS ARE ENTERED FROM HERE. REQUESTS ARE PRINTED ON THE TELETYPE FOR ENTRY OF CONTROLLER REGISTER STARTING ADDRESS, VECTOR ADDRESS, UNIT NUMBER, DENSITY,PARITY,RECORD COUNT,CHARACTER COUNT,PATTERN NUMBER, TAPE MARK (EOF) OPTION,AND STALL FOR READ, WRITE, AND TURNAROUND. ALL REPONSES SHOULD BE MADE IN OCTAL AND WITHIN THE LIMITS OF THE PARAMETER. A QUESTION MARK (?) WILL BE TYPED IF ANY CHARACTER ENTERED IS NOT BETWEEN 0 THRU 7 (OCTAL). THE CHARACTER MAY BE RETYPED FOLLOWING THE QUESTION MARK. IF THE RESPONSE IS NOT WITHIN ITS LIMITS. A QUESTION MARK (?) IS TYPED AND THE ENTIRE RESPONSE MAY BE RENTERED. SOME RESPONSES REQUIRE MORE THAN ONE (1) CHARACTER, BUT NONE REQUIRES MORE THAN SIX (6). RESPONSES NEED NOT HAVE LEADING ZEROS AND SHOULD BE TERMINATED BY A CARRIAGE RETURN IF LESS THAN THE MAXIMUM NUMBER OF CHARACTERS IS INPUT.

B. 204(8): THIS ADDRESS SHOULD BE USED ANYTIME A RESTART OF THE PROGRAM IS NECESSARY AND THE PARAMETERS ENTERED AT THE INITIAL START OF 200(8) NEED NOT BE CHANGED. ALSO NOTE THAT ANY DATA PATTERN WHICH HAD BEEN GENERATED BY SETTING THE RANDOM DATA SWITCH (CONSOLE SWITCH EIGHT) WILL NOT BE OVERWRITTEN AND THERFORE IS HELD IN CORE FOR USE UNTIL CONSOLE SWITCH EIGHT(8) IS AGAIN SET.

C. 210(8): THIS ADDRESS IS THE SAME AS USING 204(8) IN THAT THE PREVIOUSLY SET PARAMETERS ARE USED; HOWEVER, THE DATA PATTERN IS RETURNED TO THE FIXED PATTERN CRIGINALLY CALLED FOR AT THE 200(8) START. ALSO ALL STATISTICS PREVIOUSLY GATHERED WILL BE CLEARED.

D. 240(8): THIS IS A SPECIAL ADDRESS WHICH WILL CAUSE THE PROGRAM TO EXECUTE A PREDETERMINED TEST PLAN ON ALL AVAILABLE UNITS. THE ONLY INPUT REQUIRED BY THE OPERATOR IS A RESPONSE TO REQUESTS FOR THE CONTROLLER ADDRESS, VECTOR ADDRESS, AND CONTINUOUS OPERATION OF THE SEQUENCE.

SEE ITEM 11, (PAGE 22) FOR FULL DETAILS.

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THE FOLLOWING IS AN EXPLANATION OF THE INITIAL START (200 OCTAL) REQUESTS AND RESPONSES:

REGISTER START: THE RESPONSE REQUIRED FOR THIS REQUEST IS TO ENTER THE ADDRESS OF THE FIRST CONTROLLER REGISTER (MTS) AS A SIX DIGIT UNIBUS ADDRESS.

VECTOR ADDRESS: THE RESPONSE FOR THIS REQUEST IS TO ENTER THE INTERRUPT VECTOR ADDRESS USED BY THE CONTROLLER AS A THREE (3) DIGIT ADDRESS.

UNIT NUMBER: THE UNIT NUMBER IS ENTERED AS ONE (1) OCTAL CHARACTER AND MUST BE WITHIN THE LIMITS OF 0 THROUGH 7. WHEN THE UNIT NUMBER HAS BEEN ENTERED AND IS LEGAL, THE PROGRAM TESTS FOR THE PRESENCE OF A UNIT OF THAT NUMBER. IF THE UNIT IS AVAILABLE A PRINTOUT OF 7 CHANNEL OR 9 CHANNEL WILL BE MADE TO ASSIST THE OPERATOR IN SETTING DENSITY AND PARITY. IF THE UNIT IS NOT AVAILABLE, A MESSAGE STATING SO WILL BE PRINTED AND A NEW UNIT NUMBER REQUEST WILL BE ISSUED. WHEN A GOOD UNIT NUMBER HAS BEEN ENTERED, REQUESTS FOR OPERATING DENSITY AND PARITY ARE MADE FOR THAT UNIT AND SHOULD BE RESPONDED TO ACCORDING TO THAT PARTICULAR UNIT'S NEEDS. AS MANY AS EIGHT (8) UNIT NUMBER REQUESTS MAY BE USED, HOWEVER, AT LEAST ONE MUST BE USED. THE UNIT NUMBER AND THEIR RESPECTIVE DENSITY AND PARITY MAY BE ENTERED IN ANY ORDER. THE INFORMATION FOR EACH UNIT ENTERED IS LOADED INTO A TABLE FOR REFERENCE IN TESTING. IF LESS THAN EIGHT(8) UNITS ARE REQUIRED, THEN RESPONDING TO THE UNIT NUMBER REQUEST WITH A CARRIAGE RETURN WILL TERMINATE THE UNIT ENTRIES AND CONTINUE TO THE NEXT PARAMETER. IT SHOULD BE REMEMBERED THAT AT LEAST ONE UNIT NUMBER REQUEST MUST BE ENTERED. IF THE FIRST REQUEST IS RESPONDED TO BY A CARRIAGE RETURN, THEN THE REQUEST WILL BE REPEATED.

DENSITY: THE DENSITY REQUEST IS RESPONDED TO BY ONE (1) OCTAL CHARACTER AND MUST BE WITHIN THE LIMITS OF 0 THRU 3. AS EACH UNIT NUMBER IS ENTERED, A REQUEST FOR THE OPERATING DENSITY FOR THAT UNIT IS TYPED. THE RESPONSE MEANINGS ARE AS FOLLOWING:

A. 0 = 200BPI, 7 CHANNEL NRZI
B. 1 = 556BPI, 7 CHANNEL NRZI
C. 2 = 800BPI, 7 CHANNEL NRZI
D. 3 = 800BPI, 9 CHANNEL NRZI

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PARITY: THE PARITY REQUEST IS RESPONDED TO BY ONE (1) OCTAL CHARACTER AND MUST BE EITHER 0 OR 1.

A. 1 = EVEN PARITY
B. 0 = ODD PARITY

RECORD COUNT: THIS REQUEST IS RESPONDED TO BY A SIX (6) CHARACTER OCTAL NUMBER FROM 1 TO 177777. REMEMBER LEADING ZEROS ARE NOT REQUIRED AND IF LESS THAN SIX CHARACTERS ARE ENTERED, A CARRIAGE RETURN WILL TERMINATE THE RESPONSE. THE RECORD COUNT IS USED IN CONJUCTION WITH THE CHARACTER COUNT TO ESTABLISH A BLOCKING FACTOR FOR USE IN READ OR WRITE CYCLES.

CHARACTER COUNT: THIS RESPONSE IS ENTERED AS FOUR (4) OCTAL CHARACTERS WITHIN THE LIMITS OF 4 THRU 4000. AGAIN LEADING ZEROS ARE NOT REQUIRED AND A CARRIAGE RETURN TERMINATES A LESS THAN FOUR (4) CHARACTER RESPONSE. THE CHARACTER COUNT IN CONJUNCTION WITH THE RECORD COUNT IS USED TO ESTABLISH THE BLOCK SIZE (CHARACTERS PER RECORD, AND RECORDS PER BLOCK) USED IN READ AND WRITE CYCLES THE SAME BLOCKING IS USED ON ALL AVAILABLE UNITS.

PATTERN NUMBER: THIS RESPONSE IS A TWO (2) CHARACTER OCTAL NUMBER WITHIN THE LIMITS OF 0 THRU 20(8).
THE NUMBER ENTERED WILL CAUSE A SPECIFIC DATA PATTERN TO BE USED FOR ALL READING AND WRITING. THIS DATA PATTERN IS NOT CHANGED UNLESS RANDOM DATA IS REQUESTED BY SETTING CONSOLE SWITCH EIGHT (8) TO A ONE. RESETTING OF THE RANDOM DATA SWITCH DOES NOT CAUSE REVERSION TO THE FIXED PATTERN, BUT WILL HOLD THE LAST GENERATED PATTERN UNTIL A RESTART IS DONE FROM LOCATION 210(8) OR 200(8).
THE SELECTION OF DATA PATTERN ZERO (0) HAS A SPECIAL USE. PATTERN NUMBER ZERO (0) WILL CAUSE TO BE READ IN AT THE HIGH SPEED PAPER TAPE READER ANY DATA PATTERN DESIRED.
THE EXTERNAL INPUT DATA THOUGH THE READER IS DONE BY PREPARING A PAPER TAPE WITH A PROGRAM CALLED DTC. (MAINDEC-11-DZTUF) ANY CONFIGURATION OF BITS AND CHARACTERS MAY BE USED AND A LIMIT OF 377(8) CHARATERS IS IMPOSED. WHEN EXTERNAL DATA IS INPUT, THE ENTIRE WRITE BUFFER IN CORE IS FILLED WITH THE PATTERN SO THAT ANY SIZE RECORD MAY BE USED. DATA PATTERN ZERO (0) EXTERNAL PAPER TAPE NEED ONLY BE READ ONCE AT INITIAL START OF 200(8), AND NEED NOT BE READ AGAIN UNLESS OVERWRITTEN BY RANDOM DATA. BE SURE TO LOAD THE READER BEFORE PRESSING START.

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                                        SEE ITEM 5, (PAGE 7) FOR A DESCRIPTION OF THE
                                        DATA PATTERNS.
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TAPE MARK: THE TAPE MARK REQUEST IS USED TO DETERMINE IF THE OPERATOR WISHES TO HAVE EACH DATA BLOCK SEPARATED BY A TAPE MARK (OFTEN CALLED EOF FOR END OF FILE). IF RESPONDED TO BY A ONE(1) THE TAPE MARK WILL BE WRITTEN AND WHEN READING WILL BE EXPECTED AT THE END OF EACH DATA BLOCK. A ZERO(0) RESPONSE WILL DISALLOW THE TAPE MARK OPTION. PLEASE NOTE THAT THE TAPE MARK RECORD INCREASES THE BLOCK SIZE BY ONE(1) RECORD; IN OTHER WORDS, A BLOCK OF 100 RECORDS WILL HAVE THE TAPE MARK AS RECORD 101.

SINGLE PASS: IF RESPONDED TO WITH A ONE, THE PROGRAM WILL HALT AND PRINT AN END OF PASS MESSAGE WHEN THE LAST AVAILABLE UNIT REACHES END OF TAPE AND IS REWOUND.

STALLS: THE STALL REQUESTS ARE RESPONDED TO BY A SIX (6) CHARACTER OCTAL NUMBER WITHIN THE LIMITS OF 1 THRU 177777. LEADING ZEROS ARE NOT REQUIRED AND AN ENTRY OF LESS THAN SIX (6) CHARACTERS SHOULD BE TERMINATED BY A CARRIAGE RETURN. EACH INCREMENT OF THE VALUE ADDS ABOUT 2.6 MICSEC TO THE DELAY.

READ: THE TIME DELAY BETWEEN EACH RECORD READ
WRITE: THE TIME DELAY BETWEEN EACH RECORD WRITTEN
TURN AROUND: TIME DELAY BETWEEN CHANGES OF TAPE DIRECTION (FORWARD,TO REVERSE,ETC.) AND BETWEEN BLOCKS.

FIXED PARAMETERS: IT SHOULD BE NOTED THAT ALL PARAMETERS EXCEPT FOR THE UNIT DESCRIPTION VALUES (UNIT NUMBER, DENSITY, AND PARITY) HAVE NOMINAL VALUES ALREADY STORED IN THE PROGRAM. AS EACH PARAMETER REQUEST (PATTERN NUMBER, RECORD COUNT, CHARACTER COUNT, AND STALLS) IS TYPED. ITS PRESENT STORED VALUE IS ALSO PRINTED. IF THESE VALUES NEED NOT BE CHANGED, SIMPLY TYPE A CARRIAGE RETURN AS RESPONSE AND NO CHANGE WILL BE MADE. EACH START OF THE PROGRAM AT 200(8) WILL SHOW THE CURRENT VALUES OF THESE PARAMETERS AS PER THE LAST ENTRY. WHEN A FRESH LOAD OF THE PAPER TAPE IS DONE. THE PARAMETERS WILL REFLECT THE FIXED VALUES STORED IN THE PROGRAM.

A. RECORD COUNT = 100
B. CHARACTER COUNT = 200
C. PATTERN NUMBER = 1
D. READ STALL = 1
E. WRITE = 1
F. TURN AROUND = 1

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SAMPLE START AT 200(8):

        THE FOLLOWING IS A SAMPLE OF THE
        PRINTED REQUESTS AND THEIR RESPONSES.
        RESPONSES ARE ENCLOSED IN PARENS FOR
        CLARITY ONLY AND (CR) MEANS CARRIAGE RETURN

LOAD ADDRESS 200(8), SET CONSOLE SWITCHES, PRESS START SWITCH:

        TM,A,B-11:TSO3 OR TU10,N,W MULTIDRIVE DATA RELIABILTY EXERCISER
        ENTER CONDITIONS IN OCTAL
        REGISTER START = 172520 (CR)
        VECTOR ADDRESS = 224 (CR)
        UNIT NUMBER=(5) 9 TRK
        DENSITY=(3)
        PARITY=(0)
        UNIT NUMBER=(2) 7 TRK
        DENSITY=(2)
        PARITY=(1)
        UNIT NUMBER=(CR)
        RECORD COUNT=100 (500)(CR)
        CHARACTER COUNT=201 (38)?(7)(CR)
        PATTERN NUMBER=1 (22)
        ?
        (6)(CR)
        TAPE MARK = 0 (1)(CR)
        SINGLE PASS = 0(CR)

        ENTER STALLS
        READ=1 (CR)
        WRITE=1 (CR)
        TURN AROUND=1 (3000)(CR)

THE PROGRAM WILL NOW PERFORM THE TEST CYCLE SET IN
THE CONSOLE SWITCHES ON UNIT FIVE (5) THEN TWO (2),
ONE BLOCK ON EACH UNIT PER CYCLE, USING DATA PATTERN
NUMBER SIX (6) WITH A BLOCKING FACTOR OF 37 CHARACTERS
PER RECORD AND 500 RECORDS PER BLOCK.  THE DELAYS ARE SET
FOR MINIMUM ON READ AND WRITE, AND APPROXIMATELY .75
SECONDS ON TURN AROUND.
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5. DATA PATTERNS

THERE ARE TWENTY DATA PATTERN GENERATORS STORED IN CORE
AND ANY ONE OF THESE MAY BE SELECTED. THE ONE UNIQUE
CASE IS PATTERN ZERO(0); SELECTION OF PATTERN ZERO(0)
REQUIRES THAT A PREVIOUSLY PREPARED PAPER TAPE BE
ENTERED AT THE HIGH SPEED READER. THIS TAPE CONTAINS
A DATA PATTERN OF NO MORE THAN 377 OCTAL
CHARACTERS. THE FIRST CHARACTER READ IN IS THE
NUMBER OF ACTUAL DATA CHARACTERS THAT ARE CONTAINED
ON THE TAPE. EACH DATA CHARACTER MAY BE ANY
COMBINATION OF BITS AND WILL BE LOADED INTO CORE
AS THEY APPEAR ON THE TAPE. NO MATTER HOW MANY ,
CHARACTERS ARE ON TAPE, THE ENTIRE WRITE BUFFER (2000 CHARACTERS)
WILL BE FILLED WITH THE PATTERN ENTERED SO THAT ANY
SIZE RECORD CAN BE USED.

THE FOLLOWING IS A LIST OF THE DATA FATTERNS AVAILABLE:

DATA0: EXTERNAL INPUT THRU HIGH SPEED READER (SEE DTC; MAINDEC-11-DZTUF-A)
DATA1: ALL ONE BITS IN ALL CHARACTERS
DATA2: ALL ZERO BITS IN ALL CHARACTERS
DATA3: A ONE BIT WALKING FROM RIGHT TO LEFT IN A FIELD OF ZEROS
DATA4: A ZERO BIT WALKING FROM RIGHT TO LEFT IN A FIELD OF ONES.
DATA5: ALTERNATING ONE AND ZERO BITS IN EACH CHARACTER
DATA6: ALTERNATING ZERO AND ONE BITS IN EACH CHARACTER
DATA7: SAME AS DATA5 BUT WITH EVERY OTHER CHARACTER COMPLEMENTED
DATA10: SAME AS DATA6 BUT WITH EVERY OTHER CHARACTER COMPLEMENTED
DATA11: INCREMENTING CHARACTERS (000-377)
DATA12: DECREMENTING CHARACTERS (377-000)
DATA13: ALTERNATING CHARACTERS OF ALL ZERO AND ALL ONE BITS
DATA14: ALTERNATING CHARACTERS OF ALL ONE AND ALL ZERO BITS
DATA15: SPECIAL PATTERN OF A WALKING ZERO BIT REPEATED 4 TIMES
DATA16: IBM COMPAT PATTERN 1: RIPPLE
DATA17: IBM COMPAT PATTERN 2: FIXED (ABCDEF)
DATA20: IBM COMPAT PATTERN 3: FIXED (J)

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6. RANDOMIZATION

THERE ARE THREE (3) VALUES THAT MAY BE GENERATED RANDOMLY; DATA, CHARACTER COUNT, AND RECORD COUNT. THESE ARE NORMALLY SET TO SOME FIXED VALUE BUT MAY BE RANDOMIZED BY SETTING THE APPROPRIATE CONSOLE SWITCHES.

A. RANDOM DATA: (CONSOLE SWITCH 8)
GENERATES AN ENTIRE BUFFER, CHARACTER BY CHARACTER, OF RANDOM DATA WHEN SWITCH 8 IS SET TO A ONE. ONCE SET, THE RESETTING OF SWITCH 8 CAUSES THE LAST GENERATED PATTERN TO BE RETAINED IN CORE. A RESTART AT LOCATION 200(8) OR 210(8) WILL CAUSE REVERSION OF THE DATA TO THE FIXED PATTERN REQUESTED INITIALLY. A RESTART AT LOCATION 204(8) WILL HOLD THE LAST GENERATED PATTERN IN CORE UNTIL SWITCH 8 IS AGAIN SET.
ALTHOUGH THE DATA IS GENERATED AS RANDOM, THE PROGRESSION OF RANDOM CHARACTERS IS ALWAYS THE SAME FROM THE OUTSET OF RANDOMIZATION. THEREFORE IT IS POSSIBLE TO GENERATE ONE TAPE REEL OF RANDOM DATA ON ONE UNIT, RESTART THE PROGRAM TO RE-ESTABLISH THE OUTSET POINT, AND READ THE RANDOM TAPE REEL ON ANOTHER UNIT FOR COMPATABILITY TESTING. IN MULTIDRIVE SYSTEMS THE SAME BLOCK OF DATA, WHETHER RANDOM OR FIXED, IS WRITTEN OR READ ON EACH AVAILABLE UNIT IN THE ORDER THAT THEY WERE ENTERED, BEFORE BEING CHANGED.

B. RANDOM CHARACTER COUNT: (CONSOLE SWITCH 7)
GENERATES A DIFFERENT NUMBER OF CHARACTERS PER RECORD TO BE WRITTEN ON EACH BLOCK CYCLE. THE SAME NUMBER OF CHARACTERS PER RECORD IS WRITTEN OR READ ON EACH AVAILABLE UNIT BEFORE BEING CHANGED. RESETTING SWITCH 7 HOLDS THE LAST VALUE GENERATED.

C. RANDOM RECORD COUNT: (CONSOLE SWITCH 6)
GENERATES A DIFFERENT NUMBER OF RECORDS FOR EACH BLOCK OF DATA WRITTEN OR READ ON EACH BLOCK CYCLE. THE SAME NUMBER OF RECORDS IS WRITTEN OR READ ON EACH AVAILABLE UNIT BEFORE BEING CHANGED. RESETTING SWITCH 6 HOLDS LAST VALUE GENERATED.

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7. DYNAMIC PARAMETERS:

THE THREE (3) STALL VALUES ARE CONSIDERED TO BE DYNAMIC PARAMETERS AS THEY MAY BE CHANGED WHILE THE PROGRAM IS RUNNING BY TYPING A CONTROL C CHARACTER AT THE TELETYPE. AS SOON AS THE BUS IS RELEASED BY THE MAG TAPE OPERATION IN PROGRESS, THE PROGRAM WILL RESPOND TO THE CONTROL C INPUT BY TYPING A REQUEST FOR NEW STALL PARAMETERS. THE LAST VALUES THAT WERE ENTERED WILL BE PRINTED AS THE STORED VALUES AND MAY BE CHANGED BY ENTERING NEW VALUES OR LEFT UNCHANGED BY TYPING A CARRIAGE RETURN.

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8. THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1.	<CR>	IF NO CHANGES ARE TO BE MADE
2.	6 DIGITS 0-7	TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3.	↑U	TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.
4.	<LF>	ONLY VALID FOR ACT-11 SYSTEMS-DO NOT USE

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

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8.1 CONSOLE SWITCH SETTINGS

THE CONSOLE SWITCHES ARE USED TO SET UP THE TEST CYCLE DESIRED, TO GENERATE RANDOM VALUES, AND TO CONTROL ERROR RESPONSES. THE SWITCHES SHOULD BE SET IN THE DESIRED MANNER BEFORE PRESSING THE START SWITCH BECAUSE THEY ARE ALL DYNAMIC AND WILL RUN THE PROGRAM IN ANY CONFIGURATION. ALL SWITCHES SET TO ZERO(0) IS NORMAL.

SW15: 1=STOP ON ERROR
0=CONTINUE ON ERROR

SW14: 1=YOZZLE ON CURRENT BLOCK
0=DO NOT YOZZLE ON BLOCK

SW13: 1=DO NOT CHECK DATA ERRORS
0=CHECK DATA ERRORS

SW12: 1=DO NOT CHECK WRITE STATUS ERRORS
0=CHECK WRITE STATUS ERRORS

SW11: 1=DO NOT CHECK READ STATUS ERRORS
0=CHECK READ STATUS ERRORS

SW10: 1=DO NOT PRINT ANY ERRORS
0=PRINT ALL ERRORS

SW9: 1=REWIND ALL AVAILABLE TAPES
0=DO NOT REWIND

SW8: 1=GENERATE RANDOM DATA
0=USED FIXED DATA

SW7: 1=GENERATE RANDOM CHARACTER COUNT
0=USE FIXED CHARACTER COUNT

SW6: 1=GENERATE RANDOM RECORD COUNT
0=USED FIXED RECORD COUNT

SW5: 1=YOZZLE ON CURRENT RECORD
0=DO NOT YOZZLE ON RECORD

SW4: 1=PRINT STATISTICS
0=DO NOT PRINT STATISTICS

SW3: 1=DO NOT READ
0=READ

SW2: NOT USED

SW1: 1=DISABLE WRITE AND READ RETRY OPTION
0=ENABLE WRITE AND READ RETRY OPTION

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                                SWO:    1=DO NOT WRITE
                                        0=WRITE
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SWITCH EXPLANATION AND EXAMPLES:

SW0+SW3: THESE SWITCHES ARE USED TO CONTROL THE SEQUENCE OF MAG TAPE OPERATIONS PREFORMED ON EACH AVAILABLE UNIT. THE BLOCK OF DATA DESCRIBED THROUGH THE RESPONSES TO TELETYPE REQUESTS AT INITIAL START WILL BE EITHER WRITTEN OR READ FROM EACH AVAILABLE UNIT IN THE ORDER THAT THEY WERE ENTERED. THE SEQUENCE OF OPERATIONS IS CALLED A CYCLE, AND WILL BE PERFORMED CONTINUOUSLY UNTIL STOPPED BY THE OPERATOR. WHEN END OF TAPE IS REACHED, THE UNIT WILL BE REWOUND AND FLAGGED AS UNAVAILABLE FOR TEST UNTIL ALL UNITS HAVE REACHED EOT, AT WHICH TIME TESTING IS RESUMED ON ALL AVAILABLE UNITS.

EXAMPLES: SW0+SW3

A. SW0=0,SW3=1 WRITE ONLY X RECORDS OF Y CHARACTERS
B. SW0=1,SW3=0 READ ONLY X RECORDS OF Y CHARACTERS
C. SW0=0,SW3=0 WRITE THEN BACKSPACE AND READ X RECORDS

SW1: SWITCH ONE(1), WHEN SET TO A ZERO (0), WILL CAUSE ANY DATA RELATED WRITE ERROR TO BE RETRIED. THE RETRY SCHEME CONSISTS OF REWRITING THE RECORD IN THE SAME SPOT ON THE TAPE FOUR (4) TIMES. IF ALL FOUR (4) REPEATS ARE SUCCESSFUL, THE RECORD IS CONSIDERED RECOVERED, AND A TAPE WRITE ERROR IS LOGGED. IF ANY OF THE FOUR (4) REPEATS IS UNSUCCESSFUL, A WRITE WITH EXTENDED INTERECORD GAP IS DONE, A SUSPECTED BAD TAPE SPOT LOGGED AT THIS BLOCK AND RECORD NUMBER, AND A SECOND RETRY OF FOUR REPEATS IS DONE. IF AFTER FOUR (4) RETRIES, THE RECORD CANNOT BE RECOVERED A NOTIFICATION IS PRINTED, AND TESTING IS RESUMED ON THE NEXT RECORD. IF 20(8) BAD TAPE SPOTS ARE FOUND, THE UNIT WILL BE REWOUND AND REMOVED FROM TESTING WITH AN APPROPRIATE MESSAGE PRINTED.

SWITCH ONE (1), WHEN SET TO A ZERO (0), WILL ALSO CAUSE ANY DATA RELATED READ ERROR TO BE RETRIED. THE RETRY SCHEME CONSISTS OF REREADING THE RECORD A MAXIMUM OF FOUR (4) TIMES. IF THE RECORD IS SUCCESSFULLY RECOVERED ON ANY OF THE REREADS IT IS CONSIDERED FOR STATISTICS PURPOSES TO BE A SOFT READ ERROR AND TESTING CONTINUES IF THE REREADS FAIL TO RECOVER THE RECORD, THE ERROR IS LOGGED AS A HARD READ ERROR.

SW4: SWITCH FOUR (4) WHEN SET WILL PRINT THE STATISTICS GATHERED FOR EACH UNIT. THE NUMBER WILL BE PRINTED AT THE END OF A BLOCK CYCLE.

SEE ITEM 10, PAGE 20 FOR FULL DETAILS.

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SW5: SWITCH FIVE (5) WHEN SET DURING A READ OPERATION WILL CAUSE THE PROGRAM TO CONTINUOUSLY READ THE CURRENT RECORD BY SPACING REVERSE OVER THE RECORD AND REREADING THAT RECORD. THIS TAPE MOVEMENT IS CALLED YOZZLING. THERE IS A SOFTWARE DELAY EXECUTED BETWEEN EACH SPACE/READ OF THE RECORD AND IT MAY BE VARIED BY TYPING CONTROL C ON THE TELETYPE DURING THE EXECUTION OF THE YOZZLE AND RESPONDING TO THE PRINTED REQUEST WITH A SIX (6) DIGIT VALUE. THE YOZZLE STALL IS PRESET TO A VALUE OF 1000 IN THE PROGRAM TO PREVENT EXCESSIVE TAPE WEAR, BUT MAY BE SET TO ANY VALUE THROUGH THE TELETYPE.

SW6-8: THESE THREE (3) SWITCHES CONTROL THE RANDOMIZATION OF DATA AND BLOCK SIZE AND MAY BE SET AND RESET AT ANY TIME. THE ACTUAL CHANGE WILL TAKE PLACE BETWEEN BLOCK CYCLES.

SW9: SWITCH NINE (9) WHEN SET WILL CAUSE ALL AVAILABLE TAPE UNITS TO BE REWOUND AT THE END OF THE CURRENT BLOCK CYCLE. TESTING WILL BE RESUMED AT A BLOCK COUNT OF ONE (1) WHEN ALL UNITS HAVE REACHED BOT.

SW10-13: THESE SWITCHES ARE USED TO CONTROL THE ERROR HANDLING TO BE DONE ON THE TAPE OPERATION DESCRIBED BY SWITCHES 0+3.

A. SWITCH TEN (10) WHEN SET TO A ONE WILL DISALLOW ANY ERROR PRINTOUTS MADE ON THE OPERATION IN PROGRESS. CATASTROPHIC FAILURES AND INFORMATION PRINTOUTS WILL STILL OCCUR. IE: UNIT NOT AVAILABLE, ILLEGAL BOT, DROP OR PICK OVERFLOW, AND EOT REWIND.

B. SWITCH ELEVEN (11) WHEN SET TO A ONE WILL DISALLOW THE CHECKING FOR STATUS ERRORS ON READ OPERATIONS.

C. SWITCH TWELVE (12) WHEN SET TO A ONE WILL DISALLOW THE CHECKING FOR STATUS ERRORS ON WRITE OPERATIONS.

D. SWITCH THIRTEEN (13) WHEN SET TO A ONE WILL DISALLOW THE CHECKING OF READ DATA. THIS SWITCH HAS NO EFFECT ON STATUS CHECKING.

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                SW14:                   SWITCH FOURTEEN (14) IS USED DURING A
                                        READ ONLY OPERATION;  WHEN SET, THE
                                        BLOCK OF DATA BEING READ WILL CONTINUOUSLY
                                        BE READ AND SPACED OVER SO THAT TAPE WILL
                                        REMAIN AT THE SAME BLOCK. WHEN RESET, THE
                                        TAPE WILL BE ALLOWED TO MOVE FORWARD AND DATA
                                        BLOCKS WILL BE READ PROGRESSIVELY.
                                        THIS IS A BLOCK YOZZLE.

                SW15:                   SWITCH FIFTEEN (15) WHEN SET TO A ONE,
                                        WILL CAUSE THE PROGRAM TO HALT ON ANY
                                        ERROR DETECTED BY THE OPERATION IN PROGRESS.
                                        IF BOTH SWITCH TEN (10) AND FIFTEEN (15)
                                        ARE SET, THE ACTUAL ERROR DETECTED WILL
                                        NOT BE PRINTED BUT WILL CAUSE A HALT.
                                        IF SWITCH TEN (10) IS RESET BEFORE PRESSING
                                        CONTINUE, THE ERROR WHICH CAUSED THE HALT
                                        WILL BE PRINTED BEFORE TESTING IS RESUMED.
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9. ERROR PRINTOUTS

THERE ARE THREE TYPES OF ERROR PRINTOUTS MADE BY THE PROGRAM; OPERATION ERRORS, DATA ERRORS, AND CONDITION ERRORS. EACH ERROR MESSAGE PRINTED IS PRECEDED BY A HEADER WHICH CONTAINS THE UNIT NUMBER, BLOCK COUNT NUMBER, BAD RECORD NUMBER PLUS TOTAL NUMBER OF RECORDS, SIZE OF RECORD, AND TYPE OF OPERATION WHICH CAUSED ERROR.

A. OPERATION ERRORS:

THESE ARE ERRORS WHICH CAN OCCUR AS A DIRECT RESULT OF A TAPE OPERATION.

1. READ/WRITE STATUS ERRORS: THESE ARE INDICATED BY THE ERROR BIT (BIT 15) OF THE TAPE COMMAND REGISTER BEING SET TO A ONE.

2. RECORD LENGTH ERRORS: THESE ARE INDICATED BY A BYTE COUNT OTHER THAN ZERO (0) OR AN INCORRECT CURRENT MEMORY ADDRESS OR BOTH

3. TAPE POSITIONING ERRORS: THESE ARE INDICATED BY A SPACE COUNT OTHER THAN ZERO (0), NO BOT FOUND FROM A REWIND, OR NO TAPE UNIT READY AT THE END OF REWIND.

B. DATA ERRORS:

DATA ERRORS WILL OCCUR WHEN TAPE IS BEING READ AND THE DATA DOES NOT MATCH THE EXPECTED DATA.

BECAUSE DATA RECORDS CAN BE UP TO TWO THOUSAND CHARACTERS LONG, AN ERROR CONDITION WHICH WILL CAUSE THE ENTIRE RECORD TO READ INCORRECTLY COULD CAUSE A VERY LENGTHY PRINTOUT. THEREFORE, A COUNTER OF SUCCESSIVE BAD CHARACTERS IS EMPLOYED. IF TEN (10) CHARACTERS IN SUCCESSION ARE BAD, A NOTIFICATION IS PRINTED (BAD RECORD) AND THE NEXT TWENTY (20) CHARACTERS ARE SKIPPED BEFORE CHECKING IS RESUMED. IF THE BAD RECORD CONDITION OCCURS THREE (3) TIMES IN ONE RECORD, THE REST OF THE RECORD IS SKIPPED, DOWN TO THE LAST TEN (10) CHARACTERS, WHICH WILL BE CHECKED. THE SKIPPING AND RESUMPTION OF CHECKING WILL ONLY BE DONE ON RECORDS WHICH ARE LONG ENOUGH TO ALLOW IT.

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C. CONDITION ERRORS: THESE ERRORS REFLECT THE STATE OF THE TAPE SYSTEMBEFORE AND AFTER AN OPERATION.

1. EOT: WHEN AN EOT (END OF TAPE) IS ENCOUNTERED DURING EITHER A READ OR A WRITE, THAT UNIT IS FLAGGED AS UNAVAILABLE FOR TESTING AND IS REWOUND UNTIL ALL AVAILABLE UNITS HAVE REACHED EOT. AT WHICH TIME TESTING IS RESUMED ON ALL AVAILABLE UNITS.

2. ILLEGAL BOT: WHEN A UNIT ENCOUNTERS BEGINNING OF TAPE (BOT) DURING A READ OPERATION THE ERROR IS PRINTED AND THE UNIT DROPPED FROM TESTING UNTIL ALL ARE RESTARTED ON THE NEXT PASS.

3. DROP DRIVE:UNIT BECOMES UNAVAILABLE DUE TO LOSE OF SELECT REMOTE, BOT DURING REWIND,OR NO TUR WHEN MAKING INITIAL SELECTION UNIT IS DROPPED,STATISTICS PRINTED, TESTING WILL RESUME AT BEGINNING OF NEXT PASS.

4. CONTROLLER NOT READY: BEFORE ANY OPERATION IS ATTEMPTED THE CONTROLLE IS CHECKED FOR READY. IF IT IS NOT READY, AN ERROR WILL BE PRINTED AND THE PROGRAM WILL STOP.

5. NO INTERRUPT RETURNED: EACH TAPE OPERATION SHOULD BE TERMINATED BY SETTING AN INTERRUPT IN THE CPU. IF NO INTERRUPT IS RETURNED WITHIN THE APPROPIATE TIME, AN ERROR IS PRINTED.

6. NO MORE UNITS TO TEST: IF ALL UNITS HAVE BEEN DROPPED FOR CATASTROPHIC ERRORS, THE PROGRAM WILL STOP.

E. EXAMPLES:

GLOSSARY:
BN = BLOCK NUMBER
RN = RECORD NUMBER (X) OF A TOTAL OF (Y)
RS = RECORD SIZE IN CHARACTERS PER RECORD
WE = WRITE ERROR
RE = READ ERROR
SE = SPACE ERROR
F = FORWARD
CR = COMMAND REGISTER
CS = STATUS REGISTER
WC = BYTE COUNTER
CA = CURRENT MEMORY ADDRESS POINTER AND EXPECTED VALUE
CN = CHARACTER NUMBER
G = GOOD DATA (SHOWN IN BIT FORMAT AS IN CORE)
B = BAD DATA (SHOWN IN BIT FORMAT AS IN CORE)
ERR AMT = NUMBER LEFT TO SPACE
TM = TAPE MARK (OFTEN CALLED EOF FOR END OF FILE)
LPC = LONGITUDINAL PARITY CHECK (RECEIVED - EXPECTED)

```
818                                     PATTRN = DATA PATTERN (R=RANDOM)
```

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EXAMPLE 1

EXAMPLE 1: IN THIS EXAMPLE A TAPE VERTICAL PARITY ERROR
WAS DETECTED DURING A WRITE OPERATION OF THE
TWELVTH (12) RECORD OF THE BLOCK. THE WORD
COUNT AND CURRENT MEMORY ADDRESS ARE CORRECT.
THE RETRY OPTION WAS DISABLED.

```
UNIT NO. 3 *DEN 1 *PAR 0 *PATTRN 1
BN 406*RN 12-200*RS 2000*WE
COMD 1010001111000100
STAT 0001000001000001
WC 0
CA 14436-14436
```

EXAMPLE 2

EXAMPLE 2: IN THIS EXAMPLE A RECORD LENGTH ERROR WAS
DETECTED WHILE READING THE FIRST RECORD OF
THE BLOCK. THE RETRY OPTION WAS DISABLED. THE
WORD COUNT SHOWS A COUNT OF 20 CHARACTERS
LEFT TO BE TRANSFERRED. THE CURRENT MEMORY
ADDRESS REFLECTS THAT A SHORTAGE OF 20
CHARACTERS TRANSFERRED HAD OCCURRED. IN
THIS EXAMPLE THE STATUS AND COMMAND
REGISTERS DO NOT SHOW ANY ERROR, BUT
THE LPC IS SHOWN TO BE INCORRECT.

```
UNIT NO. 7 *DEN 2 *PAR 0  *PATTRN  6
BN 10*RN 1-100*RS 50*RE  F***
COMD 0100011111000100
STAT 0000000001000001
WC 20
CA 12466-12506
LPC 337 -147
```

EXAMPLE 3

EXAMPLE 3: IN THIS EXAMPLE THE TAPE UNIT WAS TRYING
TO SPACE OVER THE 15 RECORDS IN
THE BLOCK IN ORDER TO ESTABLISH PROPER
POSITION TO BEGIN READING.
THE OPERATION WAS TERMINATED
BEFORE THE ENTIRE 15 RECORDS WERE TRAVERSED
AND AN ERROR SHOWN BECAUSE THE TAPE IS
NOT IN PROPER POSITION TO BEGIN READING.

```
UNIT NO. 0 *PATTRN R
BN 2*RN 15-15*RS 23 *SE
ERR AMT 4
```

```
875
```

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EXAMPLE 4

EXAMPLE 4: IN THIS EXAMPLE UNIT NUMBER ONE (1) HAD BEEN
REWOUND VIA CONSOLE SWITCH NINE (9) AND AT THE
COMPLETION OF THE OPERATION BOT WAS NOT SET IN
THE STATUS REGISTER.

```
UNIT NO. 1 *DEN 3 *PAR 0  *PATTRN R
BN 3002*RN 65-65*RS 10
NO BOT ON REWIND-HALT
```

EXAMPLE 5

EXAMPLE 5: IN THIS EXAMPLE TWO BAD CHARACTERS WERE
READ FROM TAPE IN THE FORWARD DIRECTION.
THE FIRST (0) AND THE THIRTEENTH (13) CHARACTERS
OF THE TOTAL NUMBER OF SIXTEEN (16) CHARACTERS
IN THE BLOCK ARE BAD. CHARACTER NUMBER
ZERO (0) HAS DROPPED BIT NUMBER FIVE (5) AND
CHARACTER NUMBER TWELVE (12) HAS PICKED UP
BIT NUMBER SEVEN (7).

```
UNIT NO. 5 *DEN 3 *PAR 0  *PATTRN 5
BN 12*RN 3-10*RS 15*DE-F**
CN 0
G; 10101010
B; 10001010
CN 12
G; 01010101
B; 11010101
```

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EXAMPLE 6

EXAMPLE 6: IN THIS EXAMPLE UNIT NUMBER SIX (6) HAS
REACHED END OF TAPE (EOT) FOR THE 1ST TIME AND WILL BE REWOUND.
TESTING WILL RESTART ON UNIT NUMBER SIX (6)
WHEN ALL UNITS HAVE REACHED EOT.

```
UNIT NO. 6 *DEN 3 *PAR 0  *PATTRN  R
BN 677 *RN 25-600*RS 1566
EOT  NO. 1
UNIT WILL REWIND AND BE
RESTARTED ON BLOCK ONE
WHEN ALL AVAIL UNITS REACH EOT
```

EXAMPLE 7

EXAMPLE 7: IN THIS EXAMPLE UNIT NUMBER TWO (2) HAS
ENCOUNTERED BEGINNING OF TAPE (BOT). DRIVE WILL BE DROPPED
STATISTICS WILL BE PRINTED, TESTING RESUMED
AT BEGINNING OF NEXT PASS.

```
UNIT NO. 2 *DEN 2 *PAR 0  *PATTRN 2
BN 56*RN 2-4*RS 1200
ILLEGAL BOT
```

EXAMPLE 8

EXAMPLE 8: IN THIS EXAMPLE THE SELECTED UNIT (NUMBER 0)
HAS BECOME UNAVAILABLE.UNIT WILL BE DROPPED
STATISTICS WILL BE PRINTED,TESTING WILL RESUME AT
BEGINNING OF NEXT PASS.

```
UNIT NO. 3 *DEN 1 *PAR 0  *PATTRN 4
BN 1*RN 0-200*RS 66 NOT AVAIL
(OR LOST SELECT REMOTE, NO BOT ON REWIND)
```

EXAMPLE 9

EXAMPLE 9: IN THIS EXAMPLE THE WRITE OPERATION EXECUTED ON
UNIT NUMBER SIX (6) WAS NOT COMPLETED AND NO
INTERRUPT WAS RETURNED.

```
UNIT NO. 6 *DEN 2 *PAR 0  *PATTRN R
BN 12*RN 3-4*RS 100*WE
NO INTERRUPT RETURNED
```

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EXAMPLE 10

EXAMPLE: 10 THIS EXAMPLE SHOWS A READ ERROR WHICH
RECOVERED ON THE SECOND RETRY. THIS
ERROR WILL BE LOGGED AS A RDERR BUT WILL BE
CATEGORIZED AS A SOFT ERROR. THE REGISTERS
SHOW A PARITY ERROR WAS THE CAUSE OF THE ERROR.

```
UNIT NO. 1 *DEN 3 *PAR 1  *PATTRN R
*BN 10 *RN 2-100 *RS 1117 *RE  F***
COMD 1110100110000010
STAT 0011000001000001
WC 0
LPC 337-147
***ORIGINAL ERROR***


UNIT NO. 1 *DEN 3 *PAR 0  *PATTRN R
*BN 10 *RN 2-100 *RS 1117 *RE  F***
COMD 1110100110000010
STAT 0011000001000001
WC 0
LPC 337-147
READ FAILED--RETRY: 1
REREAD SUCCESSFUL--RETRY: 2
```

EXAMPLE 11

EXAMPLE 11: THIS EXAMPLE SHOWS A WRITE ERROR WHICH
WAS NOT RECOVERED BY SUCCESSFULLY REWRITTING
THE RECORD FOUR TIMES AT THAT LOCATION. THE
RECORD WAS SUCCESSFULLY WRITTEN AFTER 3
INCHES OF TAPE WAS ERASED. THIS ERROR
WILL BE LOGGED AS A BAD TAPE SPOT.

```
UNIT NO. 0 *DEN 3 *PAR 0 *PATTRN R
*BN 2 *RN 370 -461 *RS 2407 *WE
COMD 1110000010000100
STAT 0011000001000001
WC 0
CA 25613 -25613
***ORIGINAL ERROR***

UNIT NO. 0 *DEN 3 *PAR 0 *PATTRN R
*BN 2 *RN 370 -461 *RS 2407 *WE
COMD 1110000010000100
STAT 0011000001000001
WC 0
CA 25613 -25613
SUSPECT BAD TAPE
RETRY: 0
REPEAT: 0
```

```
1019
1020                                    RECOVERED
                                        RETRY: 1
```

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10. STATISTICS PRINTOUT

THE PROGRAM GATHERS A VARIETY OF STATISTICS DURING THE COURSE OF ITS TESTING. THE STATISTICS ARE KEPT ON A UNIT BY UNIT BASIS AND ARE SUMMARIZED IN A STATISTICS PRINTOUT. STATISTIC PRINTOUTS CAN BE PRINTED AT THE END OF EACH BLOCK CYCLE BY SETTING SWITCH FOUR (4) TO 1. A STATISTIC PRINTOUT IS AUTOMATICALLY PRINTED WHEN A UNIT REACHES EOT AND IS REWOUND.

HERE IS AN EXPLANATION OF THE STATISTIC SUMMARY.

DROPS: THE NUMBER OF BITS DROPPED ON A PER TRACK BASIS. DROPS ARE COLLECTED DURING THE DATA CHECK ROUTINE.

PICKS: THE NUMBER OF BITS PICKED ON A PER TRACK BASIS. DROPS ARE COLLECTED DURING THE DATA CHECK ROUTINE.

WTERR: THE NUMBER OF RECORDS IN WHICH A WRITE ERROR OCCURRED. IF WRITE RETRY WAS ENABLED, WTERR WILL CONTAIN ONLY THOSE RECORDS WHICH WERE NOT RECOVERED AFTER ONE RETRY.

RTRY: THE NUMBER OF RETRIES INITIATED UNDER THE WRITE RETRY OPTION. (SEE ITEM 8., SW1:)

RDERR: THE TOTAL NUMBER OF RECORDS IN WHICH A READ ERROR OCCURRED.

SOFT: THE NUMBER OF READ ERRORS WHICH WERE RECOVERED WITHIN A MAXIMUM OF FOUR REREADS OF A RECORD UNDER THE READ RETRY OPTION. (SEE ITEM 8., SW1:)
**NOTE: SOFT READ ERRORS ARE ONLY CATEGORIZED FOR THOSE READ ERRORS OCCURRING WHEN CONSOLE SWITCH 1 IS SET TO ZERO.

HARD: THE NUMBER OF READ ERRORS WHICH REMAINED UNRECOVERED UNDER THE READ RETRY SCHEME. (SEE ITEM 8., SW1:)
**NOTE: HARD READ ERRORS ARE ONLY CATEGORIZED FOR THOSE READ ERRORS OCCURRING WHEN CONSOLE SWITCH 1 IS SET TO ZERO.

DTERR: THE NUMBER OF DATA ERRORS FOUND FOR THIS UNIT.
**NOTE: DATA ERRORS ARE ONLY FOUND FOR THOSE RECORDS WHICH WERE READ WITH SWITCH 11 RESET TO ZERO.

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BAD TAPE SPOTS: A COUNT OF THE NUMBER OF TAPE SPOTS
WHERE A RECORD COULD NOT BE REWRITTEN SUCCESSFULLY
UNDER THE WRITE RETRY OPTION (SEE ITEM8., SW1:)
FOLLOWING THE COUNT IS A LIST OF THE BAD TAPE
LOCATIONS IDENTIFIED BY THE BLOCK AND RECORD NUMBER
WHEN THE BAD TAPE SPOT WAS LOGGED.

EXAMPLE

```
DROPS:  0 0 0 0 7 0 0 0
PICKS:  0 0 0 2 0 0 0 0
WTERR:  3
 RTRY:  4
RDERR:  6
 SOFT:  1
 HARD:  5
DTERR:  10
1  BAD TAPE SPOTS
0 *BN 16 *RN 41
```

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11. AUTO SEQUENCE

THE AUTO SEQUENCE (START AT ADDRESS 240) WILL EXECUTE A PREDETERMINED TEST PLAN ON ALL AVAILABLE UNITS. THE ONLY OPERATOR RESPONSE REQUIRED IS TO THE TYPED REQUESTS FOR THE CONTROLLER ADDRESS AND VECTOR AND CONTINUOUS OR SINGLE CYCLE. ALL SWITCHES REMAIN ACTIVE AND MAY BE USED NORMALLY; HOWEVER, THE INTENT IS TO LEAVE ALL SWITCHES DOWN AND ALLOW FULL EXECUTION OF THE TEST PLAN FOR SYSTEM CHECKOUT.

SAMPLE START AT 240(8): AUTO SEQUENCE

LOAD ADDRESS 240(8), SET SWITCHES TO ZERO, PRESS START:

```
        TM,A,B-11 AUTO SEQUENCE TEST
        ENTER RESPONSES IN OCTAL

        REGISTER START = 172520 (CR)
        VECTOR = 224 (CR)
        AUTO CONT: 0 (1)
```

THIS EXAMPLE SHOWS AN AUTO SEQUENCE START WITH THE CONTROLLER AT BUS ADDRESS 172520 AND A VECTOR OR 224. ALL AVAILABLE UNITS WILL BE TESTED CONTINUOUSLY.

AS EACH PASS IS COMPLETED A DIVIDER LINE OF ASTERISKS WILL BE PRINTED FOLLOWED BY AN END OF PASS MESSAGE INDICATING HOW MANY PASSES HAVE BEEN COMPLETED SINCE THE AUTO SEQUENCE WAS BEGUN. AT THE START OF EACH PASS THE UNITS BEING TESTED ARE PRINTED.

AUTO SEQUENCE TEST PLAN:

THE AUTO SEQUENCER WILL EXECUTE A PASS CONSISTING OF THE WRITING, READING, AND CHECKING OF SEVERAL DIFFERENT DATA PATTERNS. EACH PASS WILL START AT BOT AND PROCESS AN ENTIRE MAG TAPE BEFORE REWINDING

THE UNITS WILL BE SET UP TO WRITE 800 BPI IN NINE TRACK FORMAT. ODD PARITY WILL BE USED AND NO TAPE MARKS WILL BE WRITTEN.

THE DATA PATTERNS WILL BE AS FOLLOWS:

THREE FIXED DATA PATTERNS:

EACH PATTERN WILL BE USED FOR SIX BLOCKS.
EACH BLOCK CONSISTS OF (100) 4000 CHARACTER RECORDS.

```
PATTERN 3:      WALKING ONE BIT
PATTERN 7:      ALTERNATING ONE AND ZERO BITS
PATTERN 11:     INCREMENTING CHARACTERS (000-377)
```

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RANDOM DATA:

FOLLOWING THE FIXED DATA PATTERNS, RANDOM
DATA WILL BE WRITTEN IN THE SAME BLOCK STRUCTURE
UNTIL EOT IS REACHED.
IT IS IMPORTANT THAT THE TAPE USED FOR THE TEST
BE OF SUFFICIENT LENGTH TO ACCOMODATE ALL OF
THE FIXED DATA PATTERNS AND AT LEAST ONE
RECORD OF RANDOM DATA; OTHERWISE, THE TAPE WILL
BE REWOUND UNTIL ALL OF THE DATA PATTERNS
HAVE BEEN TESTED.

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12. TESTING PROCEDURES

AS PREVIOUSLY STATED THIS PROGRAM CONTAINS NO FIXED TESTS. THE ENTIRE TEST CYCLE TO BE EXECUTED IS DESCRIBED BY THE OPERATOR THOUGH RESPONSES TO TELETYPE REQUESTS FOR PARAMETERS AND CONSOLE SWITCH SETTINGS FOR OPERATION. THE OPERATION SELECTED WILL BE EXECUTED WITH THE PARAMETERS ENTERED CONTINUOUSLY ON EACH AVAILABLE UNIT, ONE BLOCK AT A TIME, UNTIL STOPPED BY THE OPERATOR. THE OPERATION MAY BE CHANGED DYNAMICALLY BY CHANGING THE CONSOLE SWITCHES AT ANY TIME. THE PROGRAM WILL ATTEMPT TO PERFORM ANY OPERATION SET AND THEREFORE CAUTION SHOULD BE TAKEN TO ASSURE THAT THE UNIT IS CAPABLE OF PERFORMING AS REQUESTED. FOR INSTANCE, ONE SHOULD NOT ATTEMPT TO PERFORM READ OPERATIONS ON A TAPE WHICH HAS NOT BEEN WRITTEN AS THE DATA, IF ANY, IS UNPREDICTABLE. HOWEVER, IF A TAPE HAS BEEN WRITTEN WITH THIS PROGRAM, IT CAN BE READ AS OFTEN AS DESIRED WITHOUT BEING REWRITTEN. THIS IS A GOOD PROCEDURE TO USE FOR TESTING TAPE COMPATABILITY. SCOPING OF TAPE UNITS BECOMES SIMPLE; BY SETTING THE DESIRED OPERATION AND ITS PARAMETER, A UNIT MAY BE CONTINUOUSLY EXERCISED IN ANY MANNER DESIRED. BY USING THE VARIOUS ERROR CONTROL SWITCHES AND ENTERING THE NEEDED STALL, ANY FUNCTION CAN BE SCOPED RATHER EASILY. RELIABILITY TESTING CAN BE PREFORMED BY USE OF THE RANDOMIZATION CAPABILITY. PERHAPS A CYCLE OF RANDOM TESTING MIGHT BE SET UP AND ALLOWED TO RUN FOR SOME PERIOD OF TIME, THE STATISTICAL COLLECTION OF DROPS AND PICKS IS THEN SIGNIFICANT. INTERMITTANT PROBLEMS CAN BE FOUND BY SETTING THE DESIRED OPERATION IN MOTION AND DISALLOWING ERROR PRINTOUTS WHILE ALLOWING A HALT ON ERROR. THE ERROR THAT CAUSED THE HALT CAN BE PRINTED BY RESETTING CONSOLE SWITCH TEN AND PRESSING CONTINUE. IF SOME PARTICULAR DATA PATTERN SHOULD BE CAUSING DATA ERROR, USE OF THE YOZZLE SWITCH AND ITS ASSOCIATED STALL CAN BE USED TO ALLOW SCOPING OF THIS PARTICULAR RECORD.

AS YOU SEE, THERE ARE MYRIAD TESTING PROCEDURES WHICH COULD BE PERFORMED. THE PARAMETERS, TAPE OPERATIONS, ERROR EXAMINATION AND REPORTING ARE ALL AT YOUR DISCRETION.

TRY IT, YOU'LL LIKE IT.

13. LISTING

```
%
.TITLE TM,A,B-11 TSO3 OR TU10,N,W  MULTIDRIVE DATA RELIABILITY EXERCISER
;MAINDEC-11-DZTMH-D-D
;AUG 1976
;R. B. BARNES/RON PLATUKIS/R. SOLER
.ENABLE ABS,AMA
.MCALL  .$ACT11
```

```
1221
1222                                    ;CONSOLE SWITCHES************
1223
1224                                    ;SW15: 1=STOP ON ERROR
1225                                    ;       0=CONTINUE ON ERROR
1226
1227                                    ;SW14: 1=YOZZLE ON CURRENT BLOCK
1228                                    ;       0=DO NOT YOZZLE ON BLOCK
1229
1230                                    ;SW13: 1=DO NOT CHECK DATA
1231                                    ;       0=CHECK DATA
1232
1233                                    ;SW12: 1=DO NOT CHECK WRITE ERRORS
1234                                    ;       0=CHECK WRITE ERRORS
1235
1236                                    ;SW11: 1=DO NOT CHECK READ ERRORS
1237                                    ;       0=CHECK READ ERRORS
1238
1239                                    ;SW10: 1=DO NOT PRINT ERRORS
1240                                    ;       0=PRINT ERRORS
1241
1242                                    ;SW9:  1=REWIND TAPE
1243                                    ;       0=DO NOT REWIND
1244
1245                                    ;SW8:  1=USE RANDOM DATA
1246                                    ;       0=USE FIXED DATA PATTERN
1247
1248                                    ;SW7:  1=USE RANDOM CHARACTER COUNT
1249                                    ;       0=USE FIXED CHAR COUNT
1250
1251                                    ;SW6:  1=USE RANDOM RECORD COUNT
1252                                    ;       0=USE FIXED RECORD COUNT
1253
1254                                    ;SW5:  1=YOZZLE ON CURRENT RECORD
1255                                    ;       0=DO NOT YOZZLE ON RECORD
1256
1257                                    ;SW4:  1=PRINT DROPS AND PICKS
1258                                    ;       0=DO NOT PRINT DROPS AND PICKS
1259
1260                                    ;SW3:  1=DO NOT READ FORWARD
1261                                    ;       0=READ FORWARD
1262
1263                                    ;SW2:   NOT USED
1264
1265                                    ;SW1:  1=INHIBIT WRITE AND READ RETRY
1266                                    ;       0=ENABLE WRITE AND READ RETRY
1267
1268                                    ;SW0:  1=DO NOT WRITE
1269                                    ;       0=WRITE
1270
```

```
1271
1272                                    ;REGISTER EQUIVS************
1273
1274            000000                  R0=%0
1275            000001                  R1=%1
1276            000002                  R2=%2
1277            000003                  R3=%3
1278            000004                  R4=%4
1279            000005                  R5=%5
1280            000006                  SP=%6
1281            000007                  PC=%7
1282            000240                  NOP=240
1283
1284                                    ;TRAP CATCHERS***********
1285
1286            000000                  .=0
1287            000042                  .=42
1288                                .SBTTL  ACT11 HOOKS
1289
1290                                ;;**************************************************************
1291                                ;HOOKS REQUIRED BY ACT11
1292            000042                      $SVPC=.                 ;SAVE PC
1293            000046                      .=46
1294  000046    004650                      $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
1295            000052                      .=52
1296  000052    000000                      .WORD   0               ;;2)SET LOC.52 TO ZERO
1297            000042                      .=$SVPC                 ;; RESTORE PC
1298
1299                                    ;TTY INTERRUPT VECTOR**********
1300
1301            000060                  .=60
1302  000060    017404                  TTINT                       ;TTY INTERRUPT HANDLER ADDRESS
1303  000062    000000                  0
1304
1305
1306                                    ;SOFTWARE SWITCH REGISTER LOCATIONS*********
1307
1308            000174                  .=174
1309  000174    000000                DISPREG:0
1310  000176    000000                SWREG:  0
1311
1312                                    ;START ADDRESS**********
1313
1314            000200                  .=200
1315  000200    000137  002772            JMP     START           ;ENTER PARAMETERS VIA TTY
1316
1317            000204                  .=204
1318  000204    000137  003124            JMP     STARTA          ;USE FIXED PARAMETERS; HOLD DATA
1319
1320            000210                  .=210
1321  000210    005037  013304    CHAIN:  CLR     RDFL
1322  000214    000137  003142            JMP     STARTE          ;USE FIXED PARAMETERS; NEW DATA
1323
```

```
1324
1325                                        ;MAG TAPE INTERRUPT VECTOR**********
1326
1327            000224                      .=224
1328  000224    017466                      MTINT                   ;MAG TAPE INTERRUPT HANDLER ADDRESS
1329  000226    000340                      340
1330
1331                                        ;AUTO SEQUENCE START**********
1332            000240                      .=240
1333  000240    005237  021624              INC     ASEQF           ;SET AUTO SEQUENCE FLAG
1334  000244    000137  003106              JMP     STAUT           ;GO TO START OF AUTO SEQ
```

```
1335            000600                          .=600
1336                                            ;CONSTANTS**********
1337
1338    000600  172520                  MTS:    172520          ;TAPE STATUS REGISTER
1339    000602  172522                  MTC:    172522          ;TAPE COMMAND REGISTER
1340    000604  172524                  MWC:    172524          ;TAPE CHARACTER COUNT REGISTER
1341    000606  172526                  MDA:    172526          ;TAPE DATA ADDRESS REGISTER
1342    000610  172530                  MTD:    172530          ;TAPE DATA BUFFER
1343    000612  172532                  MTRD:   172532          ;TAPE READ LINES
1344    000614  000224                  VECT:   224             ;INTERRUPT VECTOR ADDRESS
1345    000616  000000                  UDES:   0               ;UNIT DESCRIPTION (PARITY,DENSITY,UNIT,TRACK)
1346    000620  000100                  RCNT:   100             ;RECORD COUNTER
1347    000622  177600                  CARCNT: 177600          ;NUMBER OF CHAR (2 - 4000) OCTAL IN TWOS COMPLEMENT
1348    000624  000001                  PATRN:  1               ;DATA PATTERN SELECTOR (0 - 20) OCTAL
1349    000626  000002                  RDCMD:  2               ;READ COMMAND
1350    000630  000001                  SPFLG:  1               ;SINGLE PASS FLAG
1351    000632  000001                  RSTAL:  1               ;READ STALL
1352    000634  000001                  WSTAL:  1               ;WRITE STALL
1353    000636  000001                  TSTAL:  1               ;TURN AROUND STAL
1354    000640  001000                  YSTAL:  1000            ;YOZZLE STAL
1355    000642  000100                  RCSAV:  100             ;RECORD COUNT SAVE
1356    000644  177600                  CCSAV:  -200            ;CHARACTER COUNT SAVE
1357    000646  000000                  TMEX:   0               ;TAPE MARK FLAG:  1=TM  0=NO TM
1358    000650  177776                  PSW:    177776          ;PROCESSOR STATUS
1359    000652  177570                  SWR:    177570          ;CONSOLE SWITCHES
1360    000654  177570                  DISPLAY:177570
1361    000656  177560                  TKS:    177560          ;TTY READ STATUS REGISTER
1362    000660  177562                  TKB:    177562          ;TTY READ BUFFER
1363    000662  177564                  TPS:    177564          ;TTY PUNCH STATUS REGISTER
1364    000664  177566                  TPB:    177566          ;TTY PUNCH OUTPUT REGISTER
1365    000666  177550                  PRS:    177550          ;H/S READER STATUS REGISTER
1366    000670  177552                  PRB:    177552          ;H/S READER BUFFER
1367    000672  153624                  RANBAS: 153624          ;RANDOM NUMBER GENERATOR BASE
1368    000674  172520                  REGST:  172520          ;STARTING REGISTER ADDRESS
1369    000676  032561                  RANSAV: 032561          ;RANDOM NUMBER BUFFER
1370
```

```
1371
1372                                        ;FLAGS AND COUNTERS**********
1373
1374  000700  000000  TINF:   0            ;TTY ENTERY FLAG
1375  000702  000000  TOB:    0            ;TTY OUTPUT BUFFER
1376  000704  000000  TIB:    0            ;TTY INPUT BUFFER
1377  000706  000000  TEMP1:  0            ;TEMP STORAGE
1378  000710  000000  TEMP2:  0            ;TEMP STORAGE
1379  000712  000000  TEMP3:  0            ;TEMP STORAGE
1380  000714  000000  TEMP4:  0            ;TEMP STORAGE
1381  000716  000000  EMADDR: 0            ;ERROR MSG ADDRESS STORAGE
1382  000720  000000  BLCNTR: 0            ;BLOCK COUNTER
1383  000722  000000  BBC:    0            ;BAD RECORD COUNTER
1384  000724  000000  RTRN:   0            ;INTERRUUPT RETURN STORAGE
1385  000726  000000  HDRFL:  0            ;HEADER FLAG
1386  000730  000000  STAL:   0            ;DELAY STORAGE
1387  000732  000000  PFLG:   0            ;PRINT FLAG
1388  000734  000000  UNP:    0            ;UNIT TABLE POINTER
1389  000736  000000  BCNT:   0            ;BIT COUNTER
1390  000740  000000  ERSAV:  0            ;STATUS STORAGE
1391  000742  000000  SERFL:  0            ;STATUS ERROR FLAG
1392  000744  000000  DERFL:  0            ;DATA ERROR FLAG
1393  000746  000000  BTFLG:  0            ;BAD TAPE FLAG
1394  000750  000000  RPCNT:  0            ;REPEAT COUNTER
1395  000752  000000  RTCNT:  0            ;RETRY COUNTER
1396  000754  000000  RTYFL:  0            ;RETRY FLAG
1397  000756  000000  TMFLG:  0            ;TM FLAG
1398  000760  000000  EOTREC: 0            ;END OF TAPE RECORD
1399  000762  000000  BTPT:   0            ;BAD TAPE POINTER
1400  000764  000000  ERTFL:  0            ;ERASE TAPE FLAG
1401  000766  000000  BDPP:   0            ;DROP POINTER
1402  000770  000000  BPKP:   0            ;PICK POINTER
1403  000772  000000  BTSTF:  0            ;BAD TAPE STATISTICS FLAG
1404  000774  000000  RRTYFL: 0            ;READ RETRY FLAG
1405  000776  000000  SEQCT:  0            ;AUTO SEQ PASS COUNT
1406  001000  000000  COUNT:  0
1407  001002  000000  TEMPST: 0
1408  001004  000000  RDSW:   0
1409  001006  000000  DUCTR:  0            ;DROPPED UNIT COUNTER
1410  001010  000000  STCDFL: 0            ;7 TRK CORE DUMP FLAG
1411
```

```
1412
1413                                        ;UNIT ORDER AND DESCRIPTION TABLE **********
1414
1415  001012  060000        UN1:    60000           ;THIS TABLE IS LOADED
1416  001014  177777        UN2:    -1              ;WITH UNIT NUMBERS AND
1417  001016  177777        UN3:    -1              ;THEIR DESCRIPTIONS IN
1418  001020  177777        UN4:    -1              ;THE ORDER THAT THEY
1419  001022  177777        UN5:    -1              ;WILL BE TESTED
1420  001024  177777        UN6:    -1
1421  001026  177777        UN7:    -1
1422  001030  177777        UN8:    -1
1423  001032  177777        UNX:    -1
1424
1425                                        ;UNIT DROPS AND PICKS COUNTERS**********
1426
1427  001034  001254        PIK1:   BP00
1428  001036  001274        PIK2:   BP10
1429  001040  001314        PIK3:   BP20
1430  001042  001334        PIK4:   BP30
1431  001044  001354        PIK5:   BP40
1432  001046  001374        PIK6:   BP50
1433  001050  001414        PIK7:   BP60
1434  001052  001434        PIK8:   BP70
1435  001054  001454        DRP1:   BD00
1436  001056  001474        DRP2:   BD10
1437  001060  001514        DRP3:   BD20
1438  001062  001534        DRP4:   BD30
1439  001064  001554        DRP5:   BD40
1440  001066  001574        DRP6:   BD50
1441  001070  001614        DRP7:   BD60
1442  001072  001634        DRP8:   BD70
1443
1444                                        ;UNIT WRITE ERRORS**********
1445
1446  001074  000000        WTER1:  0
1447  001076  000000        WTER2:  0
1448  001100  000000        WTER3:  0
1449  001102  000000        WTER4:  0
1450  001104  000000        WTER5:  0
1451  001106  000000        WTER6:  0
1452  001110  000000        WTER7:  0
1453  001112  000000        WTER8:  0
1454                                        ;UNIT READ ERRORS********************
1455
1456  001114  000000        RDER1:  0
1457  001116  000000        RDER2:  0
1458  001120  000000        RDER3:  0
1459  001122  000000        RDER4:  0
1460  001124  000000        RDER5:  0
1461  001126  000000        RDER6:  0
1462  001130  000000        RDER7:  0
1463  001132  000000        RDER8:  0
1464
1465
```

```
1466                                    ;UNIT DATA ERRORS********************
1467
1468   001134  000000                   DATER1: 0
1469   001136  000000                   DATER2: 0
1470   001140  000000                   DATER3: 0
1471   001142  000000                   DATER4: 0
1472   001144  000000                   DATER5: 0
1473   001146  000000                   DATER6: 0
1474   001150  000000                   DATER7: 0
1475   001152  000000                   DATER8: 0
1476
1477                                    ;UNIT RETRY COUNTERS**********
1478
1479   001154  000000                   RTY1:   0
1480   001156  000000                   RTY2:   0
1481   001160  000000                   RTY3:   0
1482   001162  000000                   RTY4:   0
1483   001164  000000                   RTY5:   0
1484   001166  000000                   RTY6:   0
1485   001170  000000                   RTY7:   0
1486   001172  000000                   RTY8:   0
1487
1488                                    ;UNIT SOFT READ ERRORS**************************
1489
1490   001174  000000                   GDRTY1: 0
1491   001176  000000                   GDRTY2: 0
1492   001200  000000                   GDRTY3: 0
1493   001202  000000                   GDRTY4: 0
1494   001204  000000                   GDRTY5: 0
1495   001206  000000                   GDRTY6: 0
1496   001210  000000                   GDRTY7: 0
1497   001212  000000                   GDRTY8: 0
1498
1499                                    ;UNIT HARD READ ERRORS**************************
1500
1501   001214  000000                   BDRTY1: 0
1502   001216  000000                   BDRTY2: 0
1503   001220  000000                   BDRTY3: 0
1504   001222  000000                   BDRTY4: 0
1505   001224  000000                   BDRTY5: 0
1506   001226  000000                   BDRTY6: 0
1507   001230  000000                   BDRTY7: 0
1508   001232  000000                   BDRTY8: 0
1509
1510                                    ;UNIT EOT COUNTERS**********************************
1511
1512   001234  000000                   EOTCT1: 0
1513   001236  000000                   EOTCT2: 0
1514   001240  000000                   EOTCT3: 0
1515   001242  000000                   EOTCT4: 0
1516   001244  000000                   EOTCT5: 0
1517   001246  000000                   EOTCT6: 0
1518   001250  000000                   EOTCT7: 0
1519   001252  000000                   EOTCT8: 0
1520
```

```
1521
1522                                        ;DROPS + PICKS PER CHANNEL PER UNIT.************************
1523
1524  001254  000000            BP00:   0
1525          001274                    .=.+16
1526  001274  000000            BP10:   0
1527          001314                    .=.+16
1528  001314  000000            BP20:   0
1529          001334                    .=.+16
1530  001334  000000            BP30:   0
1531          001354                    .=.+16
1532  001354  000000            BP40:   0
1533          001374                    .=.+16
1534  001374  000000            BP50:   0
1535          001414                    .=.+16
1536  001414  000000            BP60:   0
1537          001434                    .=.+16
1538  001434  000000            BP70:   0
1539          001454                    .=.+16
1540  001454  000000            BD00:   0
1541          001474                    .=.+16
1542  001474  000000            BD10:   0
1543          001514                    .=.+16
1544  001514  000000            BD20:   0
1545          001534                    .=.+16
1546  001534  000000            BD30:   0
1547          001554                    .=.+16
1548  001554  000000            BD40:   0
1549          001574                    .=.+16
1550  001574  000000            BD50:   0
1551          001614                    .=.+16
1552  001614  000000            BD60:   0
1553          001634                    .=.+16
1554  001634  000000            BD70:   0
1555          001654                    .=.+16
1556
1557                                        ;UNIT BAD TAPE COUNTER: 16 PER DRIVE
1558
1559  001654  000000            BT00:   0
1560          001760                    .=.+102
1561  001760  000000            BT01:   0
1562          002064                    .=.+102
1563  002064  000000            BT02:   0
1564          002170                    .=.+102
1565  002170  000000            BT03:   0
1566          002274                    .=.+102
1567  002274  000000            BT04:   0
1568          002400                    .=.+102
1569  002400  000000            BT05:   0
1570          002504                    .=.+102
1571  002504  000000            BT06:   0
1572          002610                    .=.+102
1573  002610  000000            BT07:   0
1574          002714                    .=.+102
```

```
1575
1576                                    ;UNIT BAD TAPE POINTERS**********
1577
1578  002714  001654          BTADDR:  BT00
1579  002716  001760                   BT01
1580  002720  002064                   BT02
1581  002722  002170                   BT03
1582  002724  002274                   BT04
1583  002726  002400                   BT05
1584  002730  002504                   BT06
1585  002732  002610                   BT07
1586
1587                                    ;DATA PATTERN GENERATORS************
1588
1589  002734  002734          DATBL:   .                      ;ENTRY TABLE
1590  002736  012552          DATA0:   DAT0                   ;EXTERNAL INPUT FROM H/S READER
1591  002740  012754          DATA1:   DAT1                   ;ALL ONES
1592  002742  012776          DATA2:   DAT2                   ;ALL ZEROS
1593  002744  013004          DATA3:   DAT3                   ;WALKING ONE
1594  002746  013032          DATA4:   DAT4                   ;WALKING ZERO
1595  002750  013044          DATA5:   DAT5                   ;ALTERNATING ONE/ZERO
1596  002752  013054          DATA6:   DAT6                   ;ALTERNATING ZERO/ONE
1597  002754  013064          DATA7:   DAT7                   ;ALTERNATING ONE/ZERO IN ALTERNATING CHARACTERS
1598  002756  013074          DATA10:  DAT10                  ;ALTERNATING ZERO/ONE IN ALTERNATING CHARACTERS
1599  002760  013104          DATA11:  DAT11                  ;ALL BITS 0-377
1600  002762  013126          DATA12:  DAT12                  ;ALL BITS 377-0
1601  002764  013152          DATA13:  DAT13                  ;ALTERNATING CHARACTERS  0 AND 377
1602  002766  013162          DATA14:  DAT14                  ;ALTERNATING CHARACTERS 377 AND 0
1603  002770  013172          DATA15:  DAT15                  ;WALKING ZERO REPEATED FOUR TIMES
1604
1605
```

```
1606
1607
1608
1609                                            .EVEN
1610                                            ;*****************************************************
1611                                            ;PROGRAM START AND SEQUENCE FORMATTER:
1612                                            ;
1613                                            ;THIS ROUTINE IS USED TO PERFORM ALL HOUSEKEEPING,
1614                                            ;DECIDE WHICH TRANSPORT TO TEST AND ITS AVAILABILITY,
1615                                            ;LOAD THE WRITE BUFFER WITH THE SELECTED DATA PATTERN,
1616                                            ;GENERATE ANY RANDOM NUMBER AND THEN EXECUTE
1617                                            ;THE TEST CYCLE REQUESTED BY THE SWITCH SETTING.
1618                                            ;AT THE END OF THE TEST CYCLE THE NEXT UNIT IS SELECTED
1619                                            ;AND CHECKED FOR AVAILABILITY AND THE TEST CYCLE IS
1620                                            ;EXECUTED ON IT.
1621                                            ;THE NUMBER OF BITS DROPPED OR PICKED MAY BE PRINTED
1622                                            ;AT THE END OF EACH TEST CYCLE VIA CONSOLE SWITCH FOUR (4).
1623                                            ;*****************************************************
1624
1625
1626  002772  005037  021624          START:  CLR     ASEQF           ;CLEAR AUTO SEQ FLAG
1627  002776  012737  177570  000652          MOV     #177570,SWR     ;PRESET FOR CONSOLE SWITCHES
1628  003004  005737  000042                  TST     @#42            ;SEE IF CHAIN MODE
1629  003010  001436                          BEQ     STAUT           ;IF NOT: BR
1630  003012  012706  000500                  MOV     #500,SP         ;SET UP STACK POINTER
1631  003016  012704  023144                  MOV     #MSG31,R4
1632  003022  004737  020530                  JSR     PC,TTOUT        ;PRINT TITLE
1633  003026  122737  000004  000041          CMPB    #4,@#41         ;SEE IF LOAD MEDIUM
1634  003034  001006                          BNE     1$              ;IF NOT: BR
1635  003036  012704  026120                  MOV     #MSG97,R4
1636  003042  004737  020530                  JSR     PC,TTOUT        ;PRINT NO TEST LOAD MEDIUM
1637  003046  000137  004622                  JMP     REOT8           ;END TEST
1638  003052  012737  000176  000652  1$:     MOV     #176,SWR        ;SET FOR SOFTWARE SWITHCES
1639  003060  012700  001014                  MOV     #UN2,R0         ;SET UNIT POINTER
1640  003064  022720  177777          2$:     CMP     #-1,(R0)+       ;SEE IF END OF UNITS
1641  003070  001404                          BEQ     3$              ;IF SO: BR
1642  003072  062737  000401  004716          ADD     #401,REOTC      ;ELSE BUMP UNIT EOT COUNTER
1643  003100  000771                          BR      2$
1644  003102  000137  000210          3$:     JMP     CHAIN           ;GO DO CHAIN START
1645  003106  012737  000001  000700  STAUT:  MOV     #1,TINF         ;SET TTY ENTRY FLAG
1646  003114  005037  013304                  CLR     RDFL            ;CLEAR RANDOM DATA FLAG
1647  003120  000137  003146                  JMP     STARTB
1648  003124  005037  000700          STARTA: CLR     TINF            ;CLEAR TTY ENTRY FLAG
1649  003130  012706  000500                  MOV     #500,SP         ;SET STACK POINTER
1650  003134  004737  022040                  JSR     PC,SUSWR        ;CHECK FOR SOFTSWR
1651  003140  000451                          BR      STAUTO
1652  003142  005037  000700          STARTE: CLR     TINF            ;CLEAR INPUT FLAG
1653  003146  012700  000702          STARTB: MOV     #TOB,R0
1654  003152  012701  000044                  MOV     #44,R1
1655  003156  005020                  STARTO: CLR     (R0)+           ;CLEAR FLAGS AND COUNTERS
1656  003160  005301                          DEC     R1
1657  003162  001375                          BNE     STARTO
1658  003164  012700  000510                  MOV     #510,R0         ;SET SIZE OF TABLE
1659  003170  012701  001074                  MOV     #WTER1,R1       ;SET START OF TABLE
1660  003174  005021                  STARTC: CLR     (R1)+           ;CLEAR STATISTICS TABLES
1661  003176  005300                          DEC     R0
```

```
1662  003200  001375                        BNE     STARTC          ;CLEAR ALL
1663  003202  012737  177777  012750        MOV     #-1,PATS        ;RESET PATTERN
1664  003210  012737  177777  012752        MOV     #-1,PARS        ;RESET PARITY
1665  003216  012737  000001  000720        MOV     #1,BLCNTR       ;PRESET BLOCK COUNTER
1666  003224  005077  175352                CLR     @MTC
1667  003230  052777  010000  175344        BIS     #10000,@MTC     ;POWER CLEAR CONTROLLER
1668  003236  012706  000500        STARTD: MOV     #500,SP
1669  003242  004737  022040                JSR     PC,SUSWR        ;CHECK FOR SORTSWR
1670  003246  012777  000340  175374  1$:   MOV     #340,@PSW
1671  003254  004737  010722                JSR     PC,TINP         ;GO GET PARAMETERS FROM TTY
1672  003260  004737  004110                JSR     PC,RANSET       ;GO RESET BASE
1673  003264  005000                STAUTO: CLR     R0              ;POINT TO FIRST ENTRY
1674  003266  022737  000176  000652        CMP     #SWREG,SWR      ;TEST FOR SOFTSWR
1675  003274  001005                        BNE     STAR0A
1676  003276  005737  000042                TST     @#42            ;SEE IF CHAIN MODE
1677  003302  001002                        BNE     STAR0A          ;IF SO: BR
1678  003304  004737  022164                JSR     PC,CNTLU        ;ASK FOR CONTROL SETTINGS
1679  003310  005160  001012        STAR0A: COM     UN1(R0)         ;SEE IF LAST ENTRY
1680  003314  001411                        BEQ     STAR0B          ;IF SO: BR
1681  003316  005160  001012                COM     UN1(R0)
1682  003322  042760  100200  001012        BIC     #100200,UN1(R0) ;CLEAR EOT/DROPPED FLAG
1683  003330  062700  000002                ADD     #2,R0           ;POINT TO NEXT UNIT ENTRY
1684  003334  000137  003310                JMP     STAR0A          ;CONTINUE CLEARING
1685  003340  005160  001012        STAR0B: COM     UN1(R0)
1686  003344  013703  004716                MOV     REOTC,R3
1687  003350  000303                        SWAB    R3
1688  003352  110337  004716                MOVB    R3,REOTC        ;RESTORE EOT CNTR
1689  003356  012777  000100  175272  START1: MOV    #100,@TKS       ;SET TTY INTERRUPT ENABLE
1690  003364  013700  000734                MOV     UNP,R0          ;R0 = UNIT TABLE POINTER
1691  003370  005160  001012                COM     UN1(R0)
1692  003374  001407                        BEQ     STAR1B          ;IF LAST UNIT IN STRING: BR
1693  003376  005160  001012                COM     UN1(R0)
1694  003402  016037  001012  000616  STAR1A: MOV    UN1(R0),UDES    ;LOAD NEXT UNIT DESCRIPTION
1695  003410  000137  003542                JMP     START4
1696  003414  005237  000720        STAR1B: INC     BLCNTR          ;BUMP BLOCK COUNTER
1697  003420  005737  021624                TST     ASEQF           ;SEE IF AUTO SEQ
1698  003424  001414                        BEQ     STAR1C          ;IF NOT: BR
1699  003426  023737  000720  021622        CMP     BLCNTR,ABLCNT   ;SEE IF DONE SEQ
1700  003434  001010                        BNE     STAR1C          ;IF NOT: BR
1701  003436  005160  001012                COM     UN1(R0)         ;RESET UNIT TABLE TERMINATOR
1702  003442  012737  000001  000720        MOV     #1,BLCNTR       ;RESET BLOCK COUNTER
1703  003450  005037  000734                CLR     UNP             ;RESET UNIT POINTER
1704  003454  000207                        RTS     PC              ;RETURN TO AUTO SEQ
1705  003456  005037  000734        STAR1C: CLR     UNP
1706  003462  005160  001012                COM     UN1(R0)
1707  003466  005000                        CLR     R0
1708  003470  016037  001012  000616        MOV     UN1(R0),UDES    ;LOAD FIRST UNIT DESCRIPTION
1709  003476  032777  000200  175146        BIT     #200,@SWR       ;SEE IF RANDOM RECORD SIZE
1710  003504  001402                        BEQ     START2          ;IF NOT: BR
1711  003506  004737  010644                JSR     PC,CCNTR        ;GO GENERATE RANDOM CHAR COUNT
1712  003512  032777  000400  175132  START2: BIT    #400,@SWR       ;SEE IF RANDOM DATA
1713  003520  001402                        BEQ     START3          ;IF NOT: BR
1714  003522  004737  013236                JSR     PC,DATR         ;GO GENERATE RANDOM DATA
1715  003526  032777  000100  175116  START3: BIT    #100,@SWR       ;SEE IF RANDOM RECORD COUNT
1716  003534  001402                        BEQ     START4          ;IF NOT: BR
1717  003536  004737  010676                JSR     PC,RCNTR        ;GO GENERATE RANDOM RECORD COUNT
```

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1718  003542  032760  100000  001012  START4: BIT   #100000,UN1(R0) ;SEE IF UNIT REACHED EOT OR DROPPED
1719  003550  001404                  BEQ   START40                 ;IF NOT: BR
1720  003552  062737  000002  000734          ADD   #2,UNP                  ;POINT TO NEXT UNIT
1721  003560  000676                  BR    START1
1722  003562  013777  000616  175012  START40: MOV  UDES,@MTC               ;SET UNIT NUMBER
1723  003570  004737  021226                  JSR   PC,STDLY                ;GO AWAIT ASSURED STATUS
1724  003574  032777  000001  174776          BIT   #1,@MTS                 ;SEE IF TUR
1725  003602  001030                  BNE   START46                 ;IF SO: BR
1726  003604  032777  000002  174766          BIT   #2,@MTS                 ;SEE IF REWINDING
1727  003612  001414                  BEQ   START45                 ;IF NOT: BR
1728  003614  004737  017506                  JSR   PC,PAPRT                ;PRINT HEADER
1729  003620  012704  025477                  MOV   #MSG89,R4
1730  003624  004737  020530                  JSR   PC,TTOUT                ;PRINT REWIND MSG
1731  003630  032777  000001  174742  START44: BIT  #1,@MTS
1732  003636  001774                  BEQ   START44                 ;AWAIT REWIND DONE
1733  003640  000137  003664                  JMP   START46
1734  003644  004737  017506          START45: JSR  PC,PAPRT                ;PRINT HEADER
1735  003650  012704  023703                  MOV   #MSG49,R4
1736  003654  004737  020530                  JSR   PC,TTOUT                ;PRINT NOT AVAIL
1737  003660  000137  020050                  JMP   DRPDRV                  ;GO DROP DRIVE
1738  003664  005037  001010          START46: CLR  STCDFL                  ;CLEAR 7 TRK CORE DUMP FLAG
1739  003670  032777  000020  174702          BIT   #20,@MTS                ;SEE IF 7 TRK
1740  003676  001411                  BEQ   1$                      ;IF NOT: BR
1741  003700  013704  000616                  MOV   UDES,R4                 ;GET UNIT DESCRIPTION
1742  003704  042704  117777                  BIC   #117777,R4              ;MASK DENSITY
1743  003710  022704  060000                  CMP   #60000,R4               ;SEE IF CORE DUMP
1744  003714  001002                  BNE   1$                      ;IF NOT: BR
1745  003716  005237  001010                  INC   STCDFL                  ;ELSE SET FLAG
1746  003722  004737  012370          1$:     JSR   PC,DSUP                 ;GO SET UP WRITE DATA
1747  003726  004737  004720                  JSR   PC,RWND                 ;REWIND
1748  003732  004737  005254                  JSR   PC,WRITE                ;WRITE
1749  003736  013737  000636  000730          MOV   TSTAL,STAL              ;SET TURN AROUND DELAY
1750  003744  004737  010634                  JSR   PC,STALL                ;DELAY
1751  003750  004737  006626                  JSR   PC,RSEQ                 ;GO TO READ SEQUENCER
1752  003754  013737  000636  000730          MOV   TSTAL,STAL              ;SET TURN AROUND DELAY
1753  003762  004737  010634                  JSR   PC,STALL                ;DELAY
1754  003766  032777  000020  174656          BIT   #20,@SWR                ;SEE IF SHOULD PRINT DROPS AND PICK
1755  003774  001410                  BEQ   START5                  ;IF NOT: BR
1756  003776  012700  000001                  MOV   #1,R0                   ;SET RECORD COUNTER TO 1
1757  004002  005237  000772                  INC   BTSTF                   ;SET FOR STAT PRINT ONLY
1758  004006  004737  015370                  JSR   PC,PRSTAT               ;PRINT STATISTICS
1759  004012  005037  000772                  CLR   BTSTF                   ;CLEAR FLAG
1760  004016  017700  174630          START5: MOV   @SWR,R0                 ;LOAD SWR
1761  004022  042700  177762                  BIC   #177762,R0              ;MASK READ/WRITE SWITCHES
1762  004026  022700  000015                  CMP   #15,R0                  ;SEE IF HAVE READ OR WRITE
1763  004032  001424                  BEQ   START8                  ;IF NOT: BR
1764  004034  032777  000001  174536  START6: BIT   #1,@MTS                 ;SEE IF HAVE UNIT READY
1765  004042  001013                  BNE   START7                  ;IF SO: BR
1766  004044  005337  000730                  DEC   STAL
1767  004050  001371                  BNE   START6                  ;DELAY FOR TUR
1768  004052  004737  017506                  JSR   PC,PAPRT                ;PRINT HEADER
1769  004056  012704  023703                  MOV   #MSG49,R4
1770  004062  004737  020530                  JSR   PC,TTOUT                ;PRINT NOT AVAIL
1771  004066  000137  020050                  JMP   DRPDRV                  ;GO DROP DRIVE
1772  004072  062737  000002  000734  START7: ADD   #2,UNP                  ;POINT TO NEXT UNIT
1773  004100  005077  174476                  CLR   @MTC
```

```
 1774  004104  000137  003356          START8: JMP     START1          ;CONTINUE
 1775
 1776                                          ;RANDOM BASE RESET*********
 1777
 1778  004110  012737  153624  000672  RANSET: MOV     #153624,RANBAS  ;RESET BASE
 1779  004116  012737  032561  000676          MOV     #32561,RANSAV   ;RESET BUFFER
 1780  004124  013737  000642  000620          MOV     RCSAV,RCNT      ;RESET RECORD COUNT
 1781  004132  013737  000644  000622          MOV     CCSAV,CARCNT    ;RESET CHAR COUNT
 1782  004140  000207                          RTS     PC
```

```
1783                                    ;*******************************************************
1784                                    ;REWIND FROM EOT:
1785                                    ;
1786                                    ;WHEN ANY TRANSPORT BEING TESTED REACHES END OF TAPE
1787                                    ;DURING A READ OR WRITE OPERATION, IT WILL BE REWOUND
1788                                    ;AND FLAGGED AS UNAVAILABLE UNTIL ALL AVAILABLE UNITS
1789                                    ;HAVE REACHED EOT AT WHICH TIME ALL TESTING WILL BE RESUMED
1790                                    ;AT A BLOCK COUNT OF ONE (1).  A MESSAGE WILL BE
1791                                    ;PRINTED ON THE SUPERVISORS CONSOLE AS EACH UNIT REACHES
1792                                    ;EOT AND IS REWOUND.
1793                                    ;*******************************************************
1794
1795  004142  013777  000616  174432  REOT:   MOV     UDES,@MTC       ;LOAD COMMAND REGISTER
1796  004150  032777  000010  174422  REOT1:  BIT     #10,@MTS
1797  004156  001374                          BNE     REOT1           ;AWAIT SETTLE DOWN RESET
1798  004160  052777  000017  174414          BIS     #17,@MTC        ;START REWIND
1799  004166  004737  017506                  JSR     PC,PAPRT        ;PRINT HEADER
1800  004172  032737  000004  000746          BIT     #4,BTFLG        ;ERROR DURING RETRY?
1801  004200  001405                          BEQ     1$              ;IF NOT:  BR
1802  004202  012704  025470                  MOV     #MSG88,R4
1803  004206  004737  020530                  JSR     PC,TTOUT        ;PRINT RETRY
1804  004212  000404                          BR      2$
1805  004214  032737  000002  000746  1$:     BIT     #2,BTFLG        ;BACKSPACE ERROR
1806  004222  001405                          BEQ     REOT1C          ;IF NOT:  BR
1807  004224  012704  024306          2$:     MOV     #MSG61,R4       ;POINT TO BACKSPACE ERROR MESSG.
1808  004230  005037  000746                  CLR     BTFLG           ;CLEAR BAD TAPE FLAG
1809  004234  000437                          BR      REOT1B
1810  004236  005737  000746          REOT1C: TST     BTFLG           ;TEST BAD TAPE FLAG
1811  004242  001405                          BEQ     REOT1D          ;IF NOT:  BR
1812  004244  012704  024116                  MOV     #MSG59,R4       ;SET UP BAD TAPE MESSAGE
1813  004250  005037  000746                  CLR     BTFLG           ;CLEAR BAD TAPE FLAG
1814  004254  000427                          BR      REOT1B
1815  004256  005737  021624          REOT1D: TST     ASEQF           ;IS IT AUTO SEQ?
1816  004262  001406                          BEQ     REOT1A          ;IF NOT:  BR
1817  004264  005737  000624                  TST     PATRN           ;IS IT RANDOM DATA?
1818  004270  100403                          BMI     REOT1A          ;IF SO:  BR
1819  004272  012704  025334                  MOV     #MSG87,R4       ;PRINT EARLY ASEQ EOT MESSG.
1820  004276  000416                          BR      REOT1B
1821  004300  012704  022572          REOT1A: MOV     #MSG20,R4
1822  004304  004737  020530                  JSR     PC,TTOUT        ;PRINT EOT MESSAGE
1823  004310  013704  000734                  MOV     UNP,R4
1824  004314  005264  001234                  INC     EOTCT1(R4)      ;BUMP EOT COUNTER
1825  004320  016403  001234                  MOV     EOTCT1(R4),R3
1826  004324  004737  020716                  JSR     PC,OCTP         ;PRINT EOT COUNT
1827  004330  012704  022606                  MOV     #MSG20A,R4
1828  004334  004737  020530          REOT1B: JSR     PC,TTOUT        ;PRINT REWIND MSG
1829  004340  004737  015400                  JSR     PC,PRSTA2       ;PRINT STATS WITHOUT HEADER
1830  004344  032777  000200  174230  REOT2:  BIT     #200,@MTC
1831  004352  001774                          BEQ     REOT2           ;AWAIT CUR
1832  004354  105337  004716                  DECB    REOTC           ;SEE IF LAST UNIT TO REACH EOT
1833  004360  001410                          BEQ     REOT3           ;IF SO: BR
1834  004362  013700  000734                  MOV     UNP,R0
1835  004366  052760  100000  001012          BIS     #100000,UN1(R0) ;SET EOT FLAG
1836  004374  005726                          TST     (SP)+
1837  004376  000137  004072                  JMP     START7          ;GO TO NEXT UNIT
1838  004402  000337  004716          REOT3:  SWAB    REOTC
```

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1839  004406  013700  004716                  MOV     REOTC,R0
1840  004412  000337  004716                  SWAB    REOTC
1841  004416  110037  004716                  MOVB    R0,REOTC        ;RESTORE EOT UNIT COUNTER
1842  004422  005037  000734                  CLR     UNP
1843  004426  013700  000734                  MOV     UNP,R0          ;POINT TO FIRST UNIT
1844  004432  016037  001012  000616  REOT4:  MOV     UN1(R0),UDES    ;LOAD UNIT DESCRIPTION
1845  004440  032737  000200  000616          BIT     #200,UDES       ;SEE IF UNIT IS DROPPED
1846  004446  001034                          BNE     REOT6A          ;IF SO: BR
1847  004450  013777  000616  174124          MOV     UDES,@MTC       ;LOAD COMMAND REGISTER
1848  004456  032777  000002  174114  REOT5:  BIT     #2,@MTS
1849  004464  001374                          BNE     REOT5           ;AWAIT RWS RESET
1850  004466  032777  000040  174104          BIT     #40,@MTS        ;SEE IF HAVE BOT
1851  004474  001012                          BNE     REOT6           ;IF SO: BR
1852  004476  012700  000001                  MOV     #1,R0
1853  004502  004737  017506                  JSR     PC,PAPRT        ;PRINT HEADER
1854  004506  012704  023655                  MOV     #MSG48,R4
1855  004512  004737  020530                  JSR     PC,TTOUT        ;PRINT BOT ERROR
1856  004516  000137  020050                  JMP     DRPDRV          ;GO DROP DRIVE
1857  004522  032777  000010  174050  REOT6:  BIT     #10,@MTS        ;SEE IF SWDN IS RESET
1858  004530  001374                          BNE     REOT6           ;IF NOT: AWAIT SWDN RESET
1859  004532  042760  100200  001012          BIC     #100200,UN1(R0) ;CLEAR EOT/DROPPED FLAG
1860  004540  062737  000002  000734  REOT6A: ADD     #2,UNP
1861  004546  013700  000734                  MOV     UNP,R0          ;POINT TO NEXT UNIT
1862  004552  005160  001012                  COM     UN1(R0)         ;SEE IF LAST UNIT
1863  004556  001404                          BEQ     REOT7           ;IF SO: BR
1864  004560  005160  001012                  COM     UN1(R0)
1865  004564  000137  004432                  JMP     REOT4           ;DO NEXT UNIT
1866  004570  005160  001012          REOT7:  COM     UN1(R0)
1867  004574  012737  000001  000720          MOV     #1,BLCNTR       ;SET TO BLOCK COUNT 1
1868  004602  005037  000734                  CLR     UNP
1869  004606  005000                          CLR     R0              ;SET TO RESTART WITH FIRST UNIT
1870  004610  005726                          TST     (SP)+           ;RESET STACK
1871  004612  005737  021624                  TST     ASEQF           ;SEE IF AUTO SEQ
1872  004616  001401                          BEQ     REOT8           ;IF NOT: BR
1873  004620  000207                          RTS     PC              ;RETURN
1874  004622  012704  023473          REOT8:  MOV     #MSG39,R4
1875  004626  004737  020530                  JSR     PC,TTOUT        ;PRINT END OF PASS
1876  004632  005737  000630                  TST     SPFLG           ;SEE IF SINGLE PASS
1877  004636  001412                          BEQ     REOTX           ;IF NOT: BR
1878  004640  013704  000042          REOT9:  MOV     @#42,R4
1879  004644  001405                          BEQ     HERE            ;IF NOT CHAIN MODE: BR
1880  004646  000005                          RESET
1881  004650  004714                  $ENDAD: JSR     PC,(R4)
1882  004652  000240                          NOP
1883  004654  000240                          NOP
1884  004656  000240                          NOP
1885  004660  000240                  HERE:   NOP
1886  004662  000000                  REOT10: HALT
1887  004664  012706  000500          REOTX:  MOV     #500,SP         ;RESET STACK
1888  004670  004737  004110                  JSR     PC,RANSET       ;GO RESET RANDOM BASE
1889  004674  012737  177777  012750          MOV     #-1,PATS        ;PRESET PATTERN
1890  004702  005037  013304                  CLR     RDFL            ;CLEAR RANDOM DATA FLAG
1891  004706  005037  001006                  CLR     DUCTR           ;CLEAR DROPPED UNITER COUNTER
1892  004712  000137  003264                  JMP     STAUTO          ;RESTART AT BLOCK NUMBER ONE
1893  004716  000401                  REOTC:  401                     ;EOT UNIT COUNTER(DEFAULT TO ONE UNIT)
```

```
1894                                    ;*****************************************************
1895                                    ;REWIND ALL AVAIL TAPES:
1896                                    ;
1897                                    ;THIS ROUTINE; ENTERED VIA CONSOLE SWITCH NINE (9),
1898                                    ;WILL REWIND ALL AVAILABLE TAPES TO BOT NO MATTER
1899                                    ;WHERE THEY ARE CURRENTLY POSITIONED AND RESUME TESTING
1900                                    ;AT A BLOCK COUNT OF ONE (1).
1901                                    ;*****************************************************
1902
1903  004720  032777  001000  173724  RWND:   BIT     #1000,@SWR      ;SEE IF SHOULD REWIND
1904  004726  001001                          BNE     RWNDA           ;IF SO: BR
1905  004730  000207                          RTS     PC              ;ELSE EXIT
1906  004732  005037  000734          RWNDA:  CLR     UNP             ;CLEAR POINTER
1907  004736  000337  004716                  SWAB    REOTC
1908  004742  013700  004716                  MOV     REOTC,R0
1909  004746  000337  004716                  SWAB    REOTC
1910  004752  110037  004716                  MOVB    R0,REOTC        ;RESTORE EOT UNIT COUNTER
1911  004756  013700  000734          RWND0:  MOV     UNP,R0          ;POINT TO UNIT ENTRY
1912  004762  005160  001012                  COM     UN1(R0)         ;SEE IF LAST ENTRY
1913  004766  001424                          BEQ     RWND2           ;IF SO: BR
1914  004770  005160  001012                  COM     UN1(R0)
1915  004774  016037  001012  000616          MOV     UN1(R0),UDES    ;SET UNIT DESCRIPTION
1916  005002  013777  000616  173572          MOV     UDES,@MTC       ;LOAD COMMAND REGISTER
1917  005010  052777  000017  173564          BIS     #17,@MTC        ;START REWIND
1918  005016  032777  000200  173556  RWND1:  BIT     #200,@MTC
1919  005024  001774                          BEQ     RWND1           ;AWAIT CUR
1920  005026  062737  000002  000734          ADD     #2,UNP          ;BUMP POINTER
1921  005034  000137  004756                  JMP     RWND0           ;DO NEXT UNIT
1922  005040  005160  001012          RWND2:  COM     UN1(R0)
1923  005044  005037  000734                  CLR     UNP             ;CLEAR POINTER
1924  005050  013700  000734          RWND3:  MOV     UNP,R0          ;POINT TO UNIT ENTRY
1925  005054  005160  001012                  COM     UN1(R0)         ;SEE IF LAST ENTRY:
1926  005060  001452                          BEQ     RWNDX           ;IF SO: BR
1927  005062  005160  001012                  COM     UN1(R0)
1928  005066  016037  001012  000616          MOV     UN1(R0),UDES    ;SET UNIT DESCRIPTION
1929  005074  032737  000200  000616          BIT     #200,UDES       ;SEE IF UNIT IS DROPPED
1930  005102  001403                          BEQ     1$              ;IF NOT: BR
1931  005104  005337  004716                  DEC     REOTC           ;ELSE DECREMENT EOT UNIT CNTR
1932  005110  000417                          BR      RWND5
1933  005112  013777  000616  173462  1$:     MOV     UDES,@MTC       ;LOAD COMMAND REGISTER
1934  005120  032777  000002  173452  RWND4:  BIT     #2,@MTS
1935  005126  001374                          BNE     RWND4           ;AWAIT RWS RESET
1936  005130  032777  000040  173442          BIT     #40,@MTS        ;SEE IF HAVE BOT
1937  005136  001411                          BEQ     RWND6           ;IF NOT: BR
1938  005140  032777  000010  173432  1$:     BIT     #10,@MTS        ;SEE IF SDWN SET
1939  005146  001374                          BNE     1$              ;IF SO AWAIT RESET
1940  005150  062737  000002  000734  RWND5:  ADD     #2,UNP          ;BUMP POINTER
1941  005156  000137  005050                  JMP     RWND3           ;DO NEXT UNIT
1942  005162  012700  000001          RWND6:  MOV     #1,R0
1943  005166  004737  017506                  JSR     PC,PAPRT        ;PRINT HEADER
1944  005172  012704  023655                  MOV     #MSG48,R4
1945  005176  004737  020530                  JSR     PC,TTOUT        ;PRINT NO BOT
1946  005202  000137  020050                  JMP     DRPDRV          ;GO DROP DRIVE
1947  005206  005160  001012          RWNDX:  COM     UN1(R0)
1948  005212  005000                          CLR     R0
1949  005214  010037  000734          1$:     MOV     R0,UNP
```

```
 1950  005220  016037  001012  000616          MOV     UN1(R0),UDES
 1951  005226  032737  100200  000616          BIT     #100200,UDES    ;SEE IF UNIT DROPPED
 1952  005234  001403                          BEQ     2$              ;IF NOT: BR
 1953  005236  062700  000002                  ADD     #2,R0
 1954  005242  000764                          BR      1$
 1955  005244  012737  000001  000720  2$:     MOV     #1,BLCNTR
 1956  005252  000207                          RTS     PC
```

```
1957
1958                                    ;*****************************************************
1959                                    ;WRITE ROUTINE:
1960                                    ;
1961                                    ;THIS ROUTINE IS USED TO WRITE ONTO TAPE THE BLOCK
1962                                    ;OF DATA DESCRIBED BY THE OPERATOR AND SET UP
1963                                    ;IN THE SEQUENCE FORMATTER.  THE TAPE UNIT TO BE USED
1964                                    ;HAS BEEN ASSIGNED BY THE SEQUENCE FORMATTER AND
1965                                    ;ITS PARAMETERS SET IN A UNIT DESCRIPTION WORD.
1966                                    ;AS EACH RECORD OF THE BLOCK IS WRITTEN, IT IS CHECKED
1967                                    ;FOR STATUS ERRORS, WORD COUNT ZERO, AND CORRECT CURRENT
1968                                    ;MEMORY ADDRESS.  IF THE WRITE OPERATION CAUSES THE SELECTED
1969                                    ;UNIT TO REACH END OF TAPE (EOT), THE UNIT IS REWOUND
1970                                    ;AND FLAGGED AS UNAVAILABLE FOR TESTING UNTIL ALL AVAILABLE
1971                                    ;UNITS HAVE REACHED EOT AT WHICH TIME ALL UNITS WILL
1972                                    ;BE RESTARTED AT A BLOCK COUNT OF ONE (1).
1973                                    ;ERROR CHECKING MAY BE DISALLOWED VIA CONSOLE SWITCH
1974                                    ;TWELVE (12).
1975                                    ;WRITING TO TAPE MAY BE DISALLOWED VIA CONSOLE SWITCH
1976                                    ;ZERO (0).
1977                                    ;*****************************************************
1978
1979  005254  032777  000001  173370  WRITE:  BIT     #1,@SWR         ;SEE IF SHOULD WRITE
1980  005262  001076                   BNE     W3AD            ;IF NOT: BR
1981  005264  012737  022452  000716           MOV     #MSG5,EMADDR    ;SET ERROR MSG ADDRESS
1982  005272  005077  173304                   CLR     @MTC
1983  005276  005077  173276                   CLR     @MTS
1984  005302  005037  000760                   CLR     EOTREC          ;CLEAR EOT FLAG
1985  005306  013700  000620                   MOV     RCNT,R0         ;R0=RECORD COUNT
1986  005312  013777  000622  173264  W0:      MOV     CARCNT,@MWC     ;LOAD CHAR COUNT
1987  005320  012777  026200  173260           MOV     #WDATA,@MDA     ;SET DATA ADDR
1988  005326  005737  000764                   TST     ERTFL           ;SEE IF SHOULD ERASE
1989  005332  001406                   BEQ     W0A             ;IF NOT: BR
1990  005334  112777  000014  173240           MOVB    #14,@MTC        ;SET OP-CODE: WRITE W/EXTENDED IRG
1991  005342  005037  000764                   CLR     ERTFL           ;CLEAR ERASE FLAG
1992  005346  000403                   BR      W0B
1993  005350  112777  000004  173224  W0A:     MOVB    #4,@MTC         ;SET WRITE OP COMMAND
1994  005356  012737  005370  000724  W0B:     MOV     #W1A,RTRN       ;SET RETURN ADDRESS
1995  005364  000137  017006                   JMP     TAPG            ;GO EXECUTE COMMAND
1996  005370  005737  017402           W1A:    TST     WEOTF           ;SEE IF EOT FOUND
1997  005374  001413                   BEQ     W1              ;IF NOT:  BR
1998  005376  005037  017402                   CLR     WEOTF           ;CLEAR WRITE EOT FLAG
1999  005402  013701  000620                   MOV     RCNT,R1         ;BUILD SHORTENED RECORD COUNT
2000  005406  160001                   SUB     R0,R1
2001  005410  005201                   INC     R1
2002  005412  010137  000760                   MOV     R1,EOTREC
2003  005416  052737  100000  000760           BIS     #100000,EOTREC  ;SET EOT FLAG
2004  005424  032777  010000  173220  W1:      BIT     #10000,@SWR     ;SEE IF SHOULD CHECK ERRORS
2005  005432  001002                   BNE     W3              ;IF NOT: BR
2006  005434  004737  016036                   JSR     PC,ERCHK        ;GO CHECK ERRORS
2007  005440  013737  000634  000730  W3:      MOV     WSTAL,STAL      ;SET DELAY
2008  005446  004737  010634                   JSR     PC,STALL        ;DELAY
2009  005452  005737  000754                   TST     RTYFL           ;SEE IF RETRY
2010  005456  001401                   BEQ     W3A             ;IF NOT:  BR
2011  005460  000207           W3AD:   RTS     PC              ;ELSE RETURN TO RETRY ROUTINE
2012  005462  005737  000742           W3A:    TST     SERFL           ;SEE IF WRITE ERROR
```

```
2013  005466  001453                          BEQ     W3D             ;IF NOT: BR
2014  005470  013704  000734                  MOV     UNP,R4          ;BUMP WRITE ERROR
2015  005474  005264  001074                  INC     WTER1(R4)
2016  005500  005037  000742                  CLR     SERFL           ;CLEAR STATUS ERROR FLAG
2017  005504  032777  000002  173140          BIT     #2,@SWR         ;SEE IF RETRY -- SW1
2018  005512  001041                          BNE     W3D             ;IF NOT: BR
2019  005514  042737  072521  000740          BIC     #072521,ERSAV   ;MASK UNRECOVERABLE ERROR
2020  005522  005737  000740                  TST     ERSAV           ;SEE IF RETRYABLE ERROR
2021  005526  001411                          BEQ     W3B             ;IF SO: BR
2022  005530  012704  023735                  MOV     #MSG52,R4
2023  005534  004737  020530                  JSR     PC,TTOUT        ;PRINT NON-RETRYABLE ERROR FLAG
2024  005540  012704  022452                  MOV     #MSG5,R4
2025  005544  004737  020530                  JSR     PC,TTOUT        ;PRINT WRITE ERROR TAG
2026  005550  000422                          BR      W3D
2027  005552  013704  000734          W3B:    MOV     UNP,R4
2028  005556  005264  001154                  INC     RTY1(R4)        ;BUMP RETRY CNTR
2029  005562  032777  002000  173062          BIT     #2000,@SWR      ;SEE IF PRINT ERRORS
2030  005570  001004                          BNE     W3C             ;IF NOT: BR
2031  005572  012704  023755                  MOV     #MSG53,R4
2032  005576  004737  020530                  JSR     PC,TTOUT        ;PRINT ORIGINAL ERROR TAG
2033  005602  005037  000752          W3C:    CLR     RTCNT           ;CLEAR RETRY NUMBER
2034  005606  005037  000750                  CLR     RPCNT           ;CLEAR REPEAT COUNTER
2035  005612  004737  006142                  JSR     PC,WRTY         ;GO RETRY WRITE ERROR
2036  005616  005037  000754          W3D:    CLR     RTYFL           ;CLEAR RETRY FLAG
2037  005622  005737  000760                  TST     EOTREC          ;WAS EOT REACHED?
2038  005626  100403                          BMI     WEX             ;IF SO:  BR
2039  005630  005300                          DEC     R0              ;SEE IF DONE ALL
2040  005632  001227                          BNE     W0              ;IF NOT: BR
2041  005634  005200                          INC     R0              ;ADJUST FOR REC NO. IN HEADER
2042  005636  005737  000646          WEX:    TST     TMEX            ;SEE IF TM
2043  005642  001402                          BEQ     WEX1            ;IF NOT:  BR
2044  005644  004737  005712                  JSR     PC,WTM          ;WRITE TM
2045  005650  005037  000754          WEX1:   CLR     RTYFL           ;CLEAR RETRY FLAG
2046  005654  005037  000756                  CLR     TMFLG           ;CLEAR TM FLAG
2047  005660  005737  000760                  TST     EOTREC          ;TEST FOR EOT
2048  005664  100401                          BMI     W4              ;IF SO:  BR
2049  005666  000207          WEX2:   RTS     PC              ;EXIT
2050  005670  017704  172756          W4:     MOV     @SWR,R4
2051  005674  042704  177767                  BIC     #177767,R4      ;CHECK IF WRITE ONLY
2052  005700  022704  000010                  CMP     #10,R4
2053  005704  001370                          BNE     WEX2            ;IF NOT:  BR
2054  005706  000137  004142                  JMP     REOT            ;GO REWIND ALL AVAIL TAPES
2055
```

```
2056                                    ;*******************************************************
2057                                    ;WRITE TAPE MARK
2058                                    ;
2059                                    ;THIS ROUTINE, ENABLED THRU TELETYPE RESPONSE
2060                                    ;AT PROGRAM START-UP, WILL WRITE A TAPE MARK
2061                                    ;FOLLOWING THE WRITING OF EACH BLOCK OF DATA.
2062                                    ;THIS OPTION INCREASES THE BLOCK SIZE BY ONE RECORD;
2063                                    ;A BLOCK OF 100 RECORDS WILL HAVE A TAPE MARK
2064                                    ;WRITTEN AS RECORD 101.
2065                                    ;*******************************************************
2066
2067  005712  012737  024457  000716  WTM:    MOV     #MSG62,EMADDR   ;POINT TO TM ERROR MSG
2068  005720  005300                   DEC     R0
2069  005722  005237  000756           INC     TMFLG           ;SET TM FLAG
2070  005726  005077  172652           CLR     @MWC            ;CLEAR BYTE COUNTER
2071  005732  012777  026200  172646           MOV     #WDATA,@MDA
2072  005740  012777  000006  172634           MOV     #6,@MTC         ;SET TM OP CODE
2073  005746  012737  005760  000724           MOV     #WTM0,RTRN      ;SAVE RETURN ADDRESS
2074  005754  000137  017006           JMP     TAPG            ;EXECUTE TM COMMAND
2075  005760  032777  010000  172664  WTM0:   BIT     #10000,@SWR     ;SEE IF SHOULD CHECK ERRORS
2076  005766  001062                   BNE     WTM4            ;IF NOT: BR
2077  005770  004737  016036           JSR     PC,ERCHK        ;CHECK FOR ERRORS
2078  005774  005737  000742           TST     SERFL           ;SEE IF STATUS ERROR
2079  006000  001455                   BEQ     WTM4            ;IF NOT: BR
2080  006002  005737  000754           TST     RTYFL           ;SEE IF RETRY
2081  006006  001401                   BEQ     WTM1            ;IF NOT: BR
2082  006010  000207                   RTS     PC              ;ELSE RETURN TO RETRY ROUTINE
2083  006012  013704  000734  WTM1:   MOV     UNP,R4
2084  006016  005264  001074           INC     WTER1(R4)       ;BUMP WRITE ERROR
2085  006022  032777  000002  172622           BIT     #2,@SWR         ;SEE IF SHOULD RETRY
2086  006030  001041                   BNE     WTM4            ;IF NOT: BR
2087  006032  042737  147377  000740           BIC     #147377,ERSAV   ;MASK UNRECOVERABLE ERROR
2088  006040  005737  000740           TST     ERSAV           ;SEE IF RECOVERABLE
2089  006044  001411                   BEQ     WTM2            ;IF SO: BR
2090  006046  012704  023735           MOV     #MSG52,R4
2091  006052  004737  020530           JSR     PC,TTOUT        ;PRINT UNRETRYABLE TAG
2092  006056  012704  024457           MOV     #MSG62,R4
2093  006062  004737  020530           JSR     PC,TTOUT        ;PRINT TM ERROR TAG
2094  006066  000207                   RTS     PC
2095  006070  005037  000750  WTM2:   CLR     RPCNT           ;CLEAR REPEAT CNTR
2096  006074  013704  000734           MOV     UNP,R4
2097  006100  005264  001154           INC     RTY1(R4)        ;BUMP RETRY CNTR
2098  006104  005037  000752           CLR     RTCNT           ;CLEAR RETRY LOOP CNTR
2099  006110  032777  002000  172534           BIT     #2000,@SWR      ;SEE IF PRINT ERRORS
2100  006116  001004                   BNE     WTM3            ;IF NOT: BR
2101  006120  012704  023755           MOV     #MSG53,R4
2102  006124  004737  020530           JSR     PC,TTOUT        ;PRINT ORIGINAL ERROR TAG
2103  006130  004737  006142  WTM3:   JSR     PC,WRTY         ;GO DO RETRY
2104  006134  005037  000756  WTM4:   CLR     TMFLG           ;CLEAR TM FLAG
2105  006140  000207                   RTS     PC              ;EXIT
2106
```

```
2107                                        ;*************************
2108                                        ;WRITE ERROR RETRY
2109                                        ;
2110                                        ;*************************
2111
2112  006142  012737  000001  000754  WRTY:   MOV   #1,RTYFL        ;SET RETRY FLAG
2113  006150  004737  006504          WRTYO:  JSR   PC,WRTSB        ;GO SPACE BACK FOR REPEAT
2114  006154  005737  000756                  TST   TMFLG           ;SEE IF A TM
2115  006160  001003                          BNE   WRTYTM          ;IF SO: BR
2116  006162  004737  005312                  JSR   PC,WO           ;REWRITE RECORD
2117  006166  000402                          BR    WRTYR           ;CONTINUE
2118  006170  004737  005712          WRTYTM: JSR   PC,WTM          ;GO WRITE TM AGAIN
2119  006174  005737  000742          WRTYR:  TST   SERFL           ;REWRITE GOOD?
2120  006200  001027                          BNE   WRTY2           ;IF NOT: BR
2121  006202  005237  000750                  INC   RPCNT           ;BUMP REPEAT COUNTER
2122  006206  022737  000004  000750        CMP   #4,RPCNT        ;SEE IF FOUR GOOD REPEATS
2123  006214  001355                          BNE   WRTYO           ;IF NOT: DO ANOTHER
2124  006216  032777  002000  172426        BIT   #2000,@SWR      ;SEE IF PRINT
2125  006224  001014                          BNE   WRTY1           ;IF NOT: BR
2126  006226  012704  024003                  MOV   #MSG54,R4
2127  006232  004737  020530                  JSR   PC,TTOUT        ;PRINT RECOVERED MESSAGE
2128  006236  012704  024016                  MOV   #MSG55,R4
2129  006242  004737  020530                  JSR   PC,TTOUT        ;PRINT RETRY TAG
2130  006246  013703  000752                  MOV   RTCNT,R3
2131  006252  004737  020716                  JSR   PC,OCTP         ;PRINT RETRY NUMBER
2132  006256  000207          WRTY1:  RTS   PC                      ;RESUME TESTING
2133  006260  032777  002000  172364  WRTY2:  BIT   #2000,@SWR      ;SEE IF PRINT
2134  006266  001024                          BNE   WRTY3           ;IF NOT: BR
2135  006270  012704  024027                  MOV   #MSG56,R4       ;
2136  006274  004737  020530                  JSR   PC,TTOUT        ;PRINT BAD TAPE SUSPECT
2137  006300  012704  024016                  MOV   #MSG55,R4
2138  006304  004737  020530                  JSR   PC,TTOUT        ;PRINT RETRY TAG
2139  006310  013703  000752                  MOV   RTCNT,R3
2140  006314  004737  020716                  JSR   PC,OCTP         ;PRINT RETRY NUMBER
2141  006320  012704  024051                  MOV   #MSG57,R4
2142  006324  004737  020530                  JSR   PC,TTOUT        ;PRINT REPEAT TAG
2143  006330  013703  000750                  MOV   RPCNT,R3
2144  006334  004737  020716                  JSR   PC,OCTP         ;PRINT REPEAT NUMBER
2145  006340  005737  000752          WRTY3:  TST   RTCNT           ;SEE IF FIRST RETRY
2146  006344  001004                          BNE   WRTY3A          ;IF NOT: BR
2147  006346  013704  000734                  MOV   UNP,R4
2148  006352  005364  001074                  DEC   WTER1(R4)       ;DECREMENT WRITE ERROR CNTR
2149  006356  013704  000734          WRTY3A: MOV   UNP,R4          ;GET UNIT NUMBER
2150  006362  016437  002714  000762        MOV   BTADDR(R4),BTPT ;GET ADDRESS OF UNIT BAD TAPE CNTR
2151  006370  017704  172366                  MOV   @BTPT,R4        ;GET COUNTER
2152  006374  005724                          TST   (R4)+           ;SET POINTER OFFSET
2153  006376  010477  172360                  MOV   R4,@BTPT
2154  006402  013703  000762                  MOV   BTPT,R3
2155  006406  060304                          ADD   R3,R4           ;SET ABSOLUTE POINTER
2156  006410  013714  000720                  MOV   BLCNTR,(R4)     ;SET BLOCK NUMBER
2157  006414  062704  000040                  ADD   #40,R4          ;ADD RCNT OFFSET
2158  006420  013714  000620                  MOV   RCNT,(R4)
2159  006424  160014                          SUB   R0,(R4)         ;SET RECORD NUMBER
2160  006426  005214                          INC   (R4)            ;CORRECT RECORD NUMBER
2161  006430  022777  000040  172324        CMP   #40,@BTPT       ;SEE IF TOO MANY BAD SPOTS
2162  006436  001002                          BNE   WRTY4           ;IF NOT: BR
```

```
2163  006440  000137  006570                    JMP     BTOV            ;ELSE GO TO BAD TAPE OVERFLOW
2164  006444  005237  000752            WRTY4:  INC     RTCNT           ;BUMP RETRY COUNTER
2165  006450  022737  000004  000752            CMP     #4,RTCNT        ;SEE IF DONE 4 RETRIES
2166  006456  001410                            BEQ     WRTY5           ;IF SO: BR
2167  006460  013704  000734                    MOV     UNP,R4
2168  006464  005264  001154                    INC     RTY1(R4)        ;BUMP RETRY COUNTER
2169  006470  005237  000764                    INC     ERTFL           ;SET ERASE FLAG
2170  006474  000137  006150                    JMP     WRTY0           ;DO NEXT RETRY
2171  006500  000137  006614            WRTY5:  JMP     BTUR            ;ELSE GO TO BAD TAPE UNRECOVERABLE
2172
2173                                            ;WRITE RETRY BACKSPACE-ERASE SUBROUTINE
2174
2175  006504  005037  000742            WRTSB:  CLR     SERFL           ;CLEAR FLAG
2176  006510  012777  177777  172066            MOV     #-1,@MWC        ;SET FOR 1 RECORD
2177  006516  012737  024553  000716            MOV     #MSG69,EMADDR
2178  006524  004737  010466                    JSR     PC,SPBK         ;DO SPACE BACK
2179  006530  012737  022452  000716            MOV     #MSG5,EMADDR
2180  006536  032737  000002  000746            BIT     #2,BTFLG        ;SEE IF ERROR ON BACKSPACE
2181  006544  001410                            BEQ     WRTSB0          ;IF NOT:  BR
2182  006546  005037  000754                    CLR     RTYFL
2183  006552  022626                            CMP     (SP)+,(SP)+     ;RESET STACK
2184  006554  052737  000004  000746            BIS     #4,BTFLG        ;MARK RETRY ERROR
2185  006562  000137  004142                    JMP     REOT            ;REWIND AND REMOVE FROM TESTING
2186  006566  000207                    WRTSB0: RTS     PC              ;RETURN
2187
2188                                            ;BAD TAPE OVERFLOW SUBROUTINE**********
2189
2190  006570  013704  000734            BTOV:   MOV     UNP,R4
2191  006574  005264  001154                    INC     RTY1(R4)        ;BUMP RETRY COUNTER
2192  006600  012737  000001  000746            MOV     #1,BTFLG        ;SET BAD TAPE OVERFLOW FLAG
2193  006606  005726                            TST     (SP)+           ;RESET STACK
2194  006610  000137  004142                    JMP     REOT            ;GO REWIND AND REMOVE FROM TESTING
2195
2196                                            ;BAD TAPE UNRECOVERABLE SUBROUTINE**********
2197
2198  006614  012704  024063            BTUR:   MOV     #MSG58,R4
2199  006620  004737  020530                    JSR     PC,TTOUT        ;PRINT UNRECOVERABLE BAD SPOT MSG
2200  006624  000207                            RTS     PC              ;RESUME TESTING
```

```
2201
2202                                    ;*******************************************************
2203                                    ;READ SEQUENCER:
2204                                    ;
2205                                    ;THIS ROUTINE IS USED TO DETERMINE THE SEQUENCE
2206                                    ;IN WHICH READ TAPE OPERATIONS ARE TO BE PERFORMED.
2207                                    ;SWITCH THREE (3) DISALLOWS READING.
2208                                    ;IF THE PROGRAM IS BEING RUN IN THE READ ONLY MODE,
2209                                    ;CONSOLE SWITCH ZERO (0) SET TO A ONE (1), THEN SETTING
2210                                    ;CONSOLE SWITCH FOURTEEN (14) WILL CAUSE READING OF
2211                                    ;THE SAME BLOCK OF DATA CONTINUOUSLY,
2212                                    ;WHEN SET TO A ONE (1), AND ALLOW TAPE
2213                                    ;TO READ BLOCKS PROGRESSIVELY WHEN SET TO A ZERO (0).
2214                                    ;*******************************************************
2215
2216  006626  032777  000010  172016  RSEQ:   BIT     #10,@SWR        ;SEE IF SHOULD READ FORWARD
2217  006634  001031                          BNE     RSEX            ;IF NOT: BR
2218  006636  032777  000001  172006          BIT     #1,@SWR         ;SEE IF WRITE
2219  006644  001404                          BEQ     RSFROA          ;IF SO: BR
2220  006646  032777  040000  171776          BIT     #40000,@SWR     ;SEE IF SHOULD REMAIN IN PLACE
2221  006654  001410                          BEQ     RSFRO           ;IF NOT: BR
2222  006656  004737  010132          RSFROA: JSR     PC,BKSP         ;GO BACKSPACE TO START
2223  006662  032737  000002  000746          BIT     #2,BTFLG        ;ERROR ON BACKSPACE?
2224  006670  001402                          BEQ     RSFRO           ;IF NOT:  BR
2225  006672  000137  004142                  JMP     REOT            ;REWIND AND REMOVE FROM TESTING
2226  006676  012737  000002  000626  RSFRO:  MOV     #2,RDCMD        ;LOAD READ FORWARD COMMAND
2227  006704  004737  006722                  JSR     PC,READ         ;GO READ FORWARD
2228  006710  032777  040000  171734          BIT     #40000,@SWR     ;SEE IF SHOULD READ SAME BLOCK
2229  006716  001357                          BNE     RSFROA          ;IF SO: BR
2230  006720  000207                  RSEX:   RTS     PC              ;EXIT
2231
```

```
2232                                    ;*********************************************************
2233                                    ;READ ROUTINE:
2234                                    ;
2235                                    ;THIS ROUTINE PERFORMS THE READ OPERATION DETERMINED
2236                                    ;BY THE READ SEQUENCE ROUTINE ONE RECORD AT A TIME.
2237                                    ;AT THE END OF EACH READ OPERATION THE STATUS REGISTER
2238                                    ;IS SCANNED FOR EITHER END OF TAPE OR BEGINNING OF TAPE.
2239                                    ;IF EOT WAS REACHED, CONTROL WILL BE PASSED TO
2240                                    ;THE EOT SUBROUTINE TO REWIND THE UNIT AND FLAG IT
2241                                    ;UNAVAILABLE UNTIL ALL UNITS HAVE REACHED EOT.
2242                                    ;IF BOT WAS REACHED AND ERROR IS PRINTED AND THE
2243                                    ;PROGRAM WILL HALT.  TESTING MAY BE RESUMED BY PRESSING
2244                                    ;THE CONTINUE SWITCH TWICE.
2245                                    ;CONSOLE SWITCHES ELEVEN (11) AND THIRTEEN (13) DETERMINE WHETHER
2246                                    ;OR NOT TO CHECK FOR STATUS ERRORS (11) OR DATA ERRORS (13),
2247                                    ;CONSOLE SWITCH FIVE (5) IS USED TO CAUSE A CONTINUOUS
2248                                    ;READ AND SPACE (FORWARD OR REVERSE) OF THE CURRENT
2249                                    ;RECORD ON TAPE (YOZZLE).
2250                                    ;*********************************************************
2251
2252  006722  013700  000620           READ:   MOV     RCNT,R0         ;LOAD REC CNTR
2253  006726  012737  022457  000716           MOV     #MSG6,EMADDR    ;SET ERROR MSG ADDRESS
2254  006734  005037  000756                   CLR     TMFLG           ;CLEAR TM FLAG
2255  006740  052777  040000  171644           BIS     #40000,@MTRD    ;SET TO READ LPC ON READ
2256  006746  005077  171630           RD0:    CLR     @MTC
2257  006752  005077  171622                   CLR     @MTS
2258  006756  013777  000622  171620   RD1:    MOV     CARCNT,@MWC     ;LOAD CHAR CNTR
2259  006764  012777  032212  171614   RD1A:   MOV     #RDATA,@MDA     ;LOAD DATA ADDR
2260  006772  053777  000626  171602           BIS     RDCMD,@MTC      ;LOAD READ OP COMMAND
2261  007000  012737  007012  000724           MOV     #RD2,RTRN       ;SET INTERRUPT RETURN ADDRESS
2262  007006  000137  017006                   JMP     TAPG            ;GO EXECUTE TAPE COMMAND
2263  007012  032777  002000  171560   RD2:    BIT     #2000,@MTS      ;SEE IF AT EOT
2264  007020  001405                           BEQ     RD3             ;IF NOT: BR
2265  007022  052737  100000  000760           BIS     #100000,EOTREC  ;MARK EOT FOUND
2266  007030  000137  007350                   JMP     RDEX            ;GO REWIND
2267  007034  032777  000040  171536   RD3:    BIT     #40,@MTS        ;SEE IF AT LOAD POINT
2268  007042  001411                           BEQ     RD4             ;IF NOT: BR
2269  007044  004737  017506                   JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
2270  007050  012704  022725                   MOV     #MSG22,R4
2271  007054  004737  020530                   JSR     PC,TTOUT        ;PRINT BOT ERROR
2272  007060  000240                           NOP
2273  007062  000137  020050                   JMP     DRPDRV          ;DROP DRIVE
2274  007066  032777  004000  171556   RD4:    BIT     #4000,@SWR      ;SEE IF SHOULD CHECK ERRORS
2275  007074  001037                           BNE     RD5             ;IF NOT: BR
2276  007076  004737  016036                   JSR     PC,ERCHK        ;GO CHECK ERRORS
2277  007102  005737  000742                   TST     SERFL           ;SEE IF STATUS ERROR
2278  007106  001432                           BEQ     RD5             ;IF NOT:  BR
2279  007110  013704  000734                   MOV     UNP,R4
2280  007114  005264  001114                   INC     RDER1(R4)       ;BUMP READ ERROR
2281  007120  032777  000002  171524           BIT     #2,@SWR         ;SEE IF SHOULD DO READ RETRY
2282  007126  001022                           BNE     RD5             ;IF NOT:  BR
2283  007130  017737  171444  000740           MOV     @MTS,ERSAV
2284  007136  042737  073525  000740           BIC     #073525,ERSAV   ;MASK NON-RETRYABLE ERRORS
2285  007144  001411                           BEQ     RD4A            ;IF RETRYABLE:  BR
2286  007146  012704  023735                   MOV     #MSG52,R4
2287  007152  004737  020530                   JSR     PC,TTOUT        ;PRINT NON-RETRYABLE MESSG.
```

```
2288  007156  012704  022457                  MOV     #MSG6,R4
2289  007162  004737  020530                  JSR     PC,TTOUT        ;PRINT READ ERROR TAG
2290  007166  000402                          BR      RD5
2291  007170  004737  007376          RD4A:   JSR     PC,RRTY         ;DO RETRY
2292  007174  032777  020000  171450  RD5:    BIT     #20000,@SWR     ;SEE IF SHOULD DO DATA CHECK
2293  007202  001007                          BNE     RD6             ;IF NOT: BR
2294  007204  005737  000756                  TST     TMFLG           ;IS IT TM?
2295  007210  001004                          BNE     RD6             ;IF SO:  BR
2296  007212  004737  013712                  JSR     PC,DCHK         ;GO CHECK DATA
2297  007216  005037  000742                  CLR     SERFL           ;CLEAR STATUS ERROR FLAG
2298  007222  004737  012516          RD6:    JSR     PC,DS3          ;CLEAR BUFFER
2299  007226  032777  000040  171416          BIT     #40,@SWR        ;SEE IF SHOULD YOZZLE
2300  007234  001402                          BEQ     RD7             ;IF NOT: BR
2301  007236  004737  007600                  JSR     PC,YOZ          ;ELSE GO YOZZLE
2302  007242  013737  000632  000730  RD7:    MOV     RSTAL,STAL      ;SET DELAY
2303  007250  004737  010634                  JSR     PC,STALL        ;STALL
2304  007254  005737  000756                  TST     TMFLG           ;JUST DONE TM?
2305  007260  001033                          BNE     RDEX            ;IF SO:  BR
2306  007262  005737  000760                  TST     EOTREC          ;WAS EOT REACHED
2307  007266  100430                          BMI     RDEX            ;IF SO:  BR
2308  007270  005300                          DEC     R0
2309  007272  001225                          BNE     RD0             ;IF NOT DONE ALL: BR
2310  007274  005200                          INC     R0              ;ADJUST FOR REC NO IN HEADER
2311  007276  005737  000646          RD10:   TST     TMEX            ;EXPECT A TAPE MARK?
2312  007302  001422                          BEQ     RDEX            ;IF NOT:  BR
2313  007304  005300                          DEC     R0              ;ELSE READ TM
2314  007306  012777  177776  171270          MOV     #-2,@MWC        ;SET BYTE COUNT
2315  007314  005737  001010                  TST     STCDFL          ;SEE IF 7 TRK CORE DUMP
2316  007320  001402                          BEQ     1$              ;IF NOT: BR
2317  007322  005277  171256                  INC     @MWC            ;SET TO ONE CHAR
2318  007326  005237  000756          1$:     INC     TMFLG           ;SET TM FLAG
2319  007332  012737  024563  000716          MOV     #MSG70,EMADDR
2320  007340  042777  040000  171244          BIC     #40000,@MTRD    ;SET TO READ LPC ON READ TM
2321  007346  000606                          BR      RD1A            ;GO READ
2322  007350  005037  000756          RDEX:   CLR     TMFLG
2323  007354  005737  000760                  TST     EOTREC          ;WAS EOT REACHED
2324  007360  100005                          BPL     RDEXX           ;IF NOT:  BR
2325  007362  005726                          TST     (SP)+           ;RESET STACK
2326  007364  005037  000760                  CLR     EOTREC          ;CLEAR EOT IND.
2327  007370  000137  004142                  JMP     REOT            ;GO REWIND
2328  007374  000207                  RDEXX:  RTS     PC              ;EXIT
2329
2330
2331
2332                                          ;*****************************************
2333                                          ;READ ERROR RETRY
2334                                          ;
2335                                          ;*****************************************
2336
2337  007376  005237  000774          RRTY:   INC     RRTYFL          ;SET READ RETRY FLAG
2338  007402  032777  002000  171242          BIT     #2000,@SWR      ;SEE IF PRINT?
2339  007410  001004                          BNE     RRTY0           ;IF NOT:  BR
2340  007412  012704  023755                  MOV     #MSG53,R4
2341  007416  004737  020530                  JSR     PC,TTOUT        ;PRINT ORIGINAL ERROR MESSG
2342  007422  005037  000752          RRTY0:  CLR     RTCNT           ;CLEAR RETRY COUNT
2343  007426  004737  007600          RRTY1:  JSR     PC,YOZ          ;GO REREAD
```

```
2344  007432  005237  000752                  INC     RTCNT           ;BUMP RETRY COUNT
2345  007436  005737  000742                  TST     SERFL           ;SEE IF ERROR?
2346  007442  001431                          BEQ     RRTY4           ;IF NOT:  BR
2347  007444  032777  002000  171200          BIT     #2000,@SWR      ;SEE IF PRINT?
2348  007452  001010                          BNE     RRTY2           ;IF NOT:  BR
2349  007454  012704  024572                  MOV     #MSG71,R4
2350  007460  004737  020530                  JSR     PC,TTOUT        ;PRINT FAILED RETRY MESSG.
2351  007464  013703  000752                  MOV     RTCNT,R3
2352  007470  004737  020716                  JSR     PC,OCTP         ;PRINT RETRY NUMBER
2353  007474  022737  000004  000752  RRTY2:  CMP     #4,RTCNT        ;DONE 4 RETRYS?
2354  007502  001351                          BNE     RRTY1           ;IF NOT:  BR
2355  007504  012704  024620                  MOV     #MSG72,R4
2356  007510  004737  020530                  JSR     PC,TTOUT        ;PRINT SUSPECT HARD ERROR MESSG.
2357  007514  013704  000734          RRTY3:  MOV     UNP,R4
2358  007520  005264  001214                  INC     BDRTY1(R4)      ;BUMP HARD ERROR COUNT
2359  007524  000420                          BR      RRTYX
2360  007526  032777  002000  171116  RRTY4:  BIT     #2000,@SWR      ;SEE IF SHOULD PRINT?
2361  007534  001010                          BNE     RRTY5           ;IF NOT:  BR
2362  007536  012704  024644                  MOV     #MSG73,R4
2363  007542  004737  020530                  JSR     PC,TTOUT        ;TYPE SUCCESSFUL RETRY MESSAGE
2364  007546  013703  000752                  MOV     RTCNT,R3
2365  007552  004737  020716                  JSR     PC,OCTP         ;PRINT RETRY COUNT
2366  007556  013704  000734          RRTY5:  MOV     UNP,R4
2367  007562  005264  001174                  INC     GDRTY1(R4)      ;INCREASE SOFT ERROR COUNT
2368  007566  005037  000774          RRTYX:  CLR     RRTYFL          ;CLEAR RETRY FLAG
2369  007572  004737  022120                  JSR     PC,CKSWR        ;GO CHECK FOR ^G
2370  007576  000207                          RTS     PC              ;RETURN
2371
```

```
2372
2373                                    ;*****************************************************
2374                                    ;YOZZLE SUBROUTINE:
2375                                    ;
2376                                    ;THIS SUBROUTINE, ENTERED VIA SWITCH FIVE (5), IS USED TO PERFORM
2377                                    ;A CONTINUOUS READ AND SPACE OVER OF THE CURRENT RECORD ON TAPE.
2378                                    ;FULL STATUS AND DATA CHECKING MAY BE PERFORMED
2379                                    ;OR NOT VIA CONSOLE SWITCHES ELEVEN (11) AND THIRTEEN (13).
2380                                    ;A SOFTWARE DELAY IS PERFORMED BETWEEN EACH READ
2381                                    ;AND SPACE OPERATION AND MAY BE VARIED BY TYPING
2382                                    ;CNTRL C ON THE TTY AND ENTERING A VALUE IN RESPONSE
2383                                    ;TO THE PRINTED REQUEST.
2384                                    ;*****************************************************
2385
2386  007600  012777  000001  171050  YOZ:    MOV     #1,@TKS         ;SET TTY ENABLE
2387  007606  013737  000640  000730          MOV     YSTAL,STAL
2388  007614  004737  010634                  JSR     PC,STALL        ;DO YOZZLE STALL
2389  007620  012777  177777  170756  YOZ0:   MOV     #-1,@MWC        ;SET TO 1 RECORD SPACING
2390  007626  112777  000012  170746  YOZA:   MOVB    #12,@MTC        ;SET TO SPACE REVERSE
2391  007634  012737  007654  000724  YOZB:   MOV     #YOZC,RTRN      ;SET RETURN ADDRESS
2392  007642  012737  177775  000730          MOV     #177775,STAL    ;SET TIME MULTIPLIER
2393  007650  000137  017006                  JMP     TAPG            ;GO YOZZLE
2394  007654  013737  000640  000730  YOZC:   MOV     YSTAL,STAL
2395  007662  004737  010634                  JSR     PC,STALL        ;DO YOZZLE STALL
2396  007666  113777  000626  170706          MOVB    RDCMD,@MTC      ;SET READ COMMAND F OR R
2397  007674  012777  032212  170704          MOV     #RDATA,@MDA     ;SET READ ADDRESS
2398  007702  013777  000622  170674          MOV     CARCNT,@MWC     ;SET CHARACTER COUNT
2399  007710  005737  000756                  TST     TMFLG           ;IS IT A TM?
2400  007714  001410                          BEQ     YOZC1           ;IF NOT:  BR
2401  007716  012777  177776  170660          MOV     #-2,@MWC        ;SET FOR TM
2402  007724  005737  001010                  TST     STCDFL          ;SEE IF 7 TRK CORE DUMP
2403  007730  001402                          BEQ     YOZC1           ;IF NOT: BR
2404  007732  005277  170646                  INC     @MWC            ;SET TO ONE CHARACTER
2405  007736  012737  007750  000724  YOZC1:  MOV     #YOZD,RTRN      ;SET RETURN ADDRESS
2406  007744  000137  017006                  JMP     TAPG            ;GO YOZZLE
2407  007750  032777  004000  170674  YOZD:   BIT     #4000,@SWR      ;SEE IF ERROR CHECK
2408  007756  001002                          BNE     YOZE            ;IF NOT: BR
2409  007760  004737  016036                  JSR     PC,ERCHK        ;ELSE GO CHECK ERRORS
2410  007764  005737  000774          YOZE:   TST     RRTYFL          ;IS IT A READ RETRY?
2411  007770  001401                          BEQ     YOZE1           ;IF NOT:  BR
2412  007772  000207                          RTS     PC
2413  007774  032777  020000  170650  YOZE1:  BIT     #20000,@SWR     ;SEE IF SHOULD CHECK DATA
2414  010002  001002                          BNE     YOZF            ;IF NOT: BR
2415  010004  004737  013712                  JSR     PC,DCHK         ;ELSE GO CHECK DATA
2416  010010  004737  012516          YOZF:   JSR     PC,DS3          ;GO CLEAR DATA AREA
2417  010014  105777  170636                  TSTB    @TKS            ;SEE IF HAVE NEW STALL VALUE
2418  010020  100034                          BPL     YOZG            ;IF NOT: BR
2419  010022  122777  000203  170630          CMPB    #203,@TKB       ;SEE IF CONT C
2420  010030  001030                          BNE     YOZG            ;IF NOT: BR
2421  010032  012704  023602                  MOV     #MSG44,R4
2422  010036  004737  020530                  JSR     PC,TTOUT        ;PRINT YSTALL REQUEST
2423  010042  013703  000640                  MOV     YSTAL,R3
2424  010046  004737  020716                  JSR     PC,OCTP         ;PRINT PRESENT STALL
2425  010052  010037  000712                  MOV     R0,TEMP3        ;SAVE R0(REC CNT)
2426  010056  012705  000640                  MOV     #YSTAL,R5       ;SET ADDRESS OF YSTL
2427  010062  012701  000006                  MOV     #6,R1           ;SET NUMBER OF CHAR TO INPUT
```

```
 2428  010066  012702  177777                 MOV     #-1,R2          ;SET MAXIMUM LIMIT
 2429  010072  012703  001000                 MOV     #1000,R3        ;SET MINIMUM LIMIT
 2430  010076  004737  020272                 JSR     PC,TTR          ;GO GET VALUE
 2431  010102  013700  000712                 MOV     TEMP3,R0        ;RESTORE R0(REC CNTR)
 2432  010106  000137  007600                 JMP     YOZ             ;RESTART YOZZLE
 2433  010112  032777  000040  170532  YOZG:  BIT     #40,@SWR        ;SEE IF SHOULD CONTINUE YOZZLE
 2434  010120  001227                         BNE     YOZ             ;IF SO: BR
 2435  010122  012777  000100  170526         MOV     #100,@TKS       ;SET TTY INTERRUPT ENABLE
 2436  010130  000207                         RTS     PC              ;EXIT
 2437
```

```
2438
2439                                    ;*******************************************************
2440                                    ;BACKSPACE SUBROUTINE:
2441                                    ;
2442                                    ;THIS SUBROUTINE IS USED TO PERFORM THE
2443                                    ;BACKSPACE OPERATION REQUIRED BY THE READ
2444                                    ;ROUTINE EITHER FOR READ FORWARD AFTER WRITING,
2445                                    ;OR FOR CONTINUOUS READING OF A DATA BLOCK
2446                                    ;WHEN IN READ ONLY MODE WITH SWITCH FOURTEEN (14)
2447                                    ;SET TO A ONE.
2448                                    ;A CHECK FOR RECORD COUNT ZERO IS MADE AT THE
2449                                    ;END OF THE SPACE OPERATION TO ASSURE THAT PROPER
2450                                    ;TAPE POSITIONING WAS DONE.
2451                                    ;*******************************************************
2452
2453  010132  005037  000726    BKSP:   CLR     HDRFL           ;CLEAR HEADER FLAG
2454  010136  013700  000620    BO:     MOV     RCNT,R0
2455  010142  005100                    COM     R0              ;BUILD SPACE AMOUNT
2456  010144  005200                    INC     R0
2457  010146  005737  000760            TST     EOTREC          ;SEE IF EOT WAS REACHED
2458  010152  001407                    BEQ     BK0             ;IF NOT:  BR
2459  010154  013700  000760            MOV     EOTREC,R0       ;GET SHORTENED BLOCK COUNT
2460  010160  042700  100000            BIC     #100000,R0
2461  010164  005400                    NEG     R0
2462  010166  005037  000760            CLR     EOTREC          ;CLEAR EOT FLAG
2463  010172  010037  000714    BK0:    MOV     R0,TEMP4        ;SAVE BACKSPACE COUNT
2464  010176  005737  000646            TST     TMEX            ;IS THERE A TM?
2465  010202  001520                    BEQ     BOA             ;IF NOT: BR
2466  010204  012737  024466  000716    MOV     #MSG63,EMADDR   ;POINT TO TM SP ERROR MESG
2467  010212  012777  177777  170364    MOV     #-1,@MWC        ;SET FOR 1 RECORD
2468  010220  013700  000620            MOV     RCNT,R0         ;R0=RECORD COUNT
2469  010224  063700  000714            ADD     TEMP4,R0        ;R0=RCNT-BACKSPACE CNT FOR HEADER
2470  010230  004737  010466            JSR     PC,SPBK         ;BACKSPACE OVER TM
2471  010234  032737  000002  000746    BIT     #2,BTFLG        ;WAS THERE AN ERROR
2472  010242  001401                    BEQ     BK1             ;IF NOT: BR
2473  010244  000207                    RTS     PC              ;ELSE RETURN WITH ERROR FLAG SET
2474  010246  017737  170326  000740    MOV     @MTS,ERSAV      ;GET STATUS
2475  010254  032737  040000  000740    BIT     #40000,ERSAV    ;IS TM SET
2476  010262  001053                    BNE     BK3             ;IF SET: BR
2477  010264  005737  000726    BK1C:   TST     HDRFL           ;ALREADY PRINTED HEADER?
2478  010270  001014                    BNE     BK2             ;IF SO: BR
2479  010272  032777  002000  170352    BIT     #2000,@SWR      ;SHOULD PRINT?
2480  010300  001040                    BNE     BK1B            ;IF NOT:  BR
2481  010302  004737  017506            JSR     PC,PAPRT        ;PRINT HEADER
2482  010306  013704  000716            MOV     EMADDR,R4       ;POINT TO TM SP ERROR
2483  010312  004737  020530            JSR     PC,TTOUT        ;PRINT ERROR
2484  010316  012704  022750            MOV     #MSG23,R4
2485  010322  004737  020530    BK2:    JSR     PC,TTOUT        ;PRINT COMMAND HEADER
2486  010326  017703  170250            MOV     @MTC,R3
2487  010332  005037  000712            CLR     TEMP3
2488  010336  000303            BK1A:   SWAB    R3              ;POSITION MOST SIGNIFICANT
2489  010340  004737  021144            JSR     PC,DOUT         ;PRINT
2490  010344  000303                    SWAB    R3              ;POSITION LEAST SIGNIFICANT
2491  010346  004737  021144            JSR     PC,DOUT         ;PRINT
2492  010352  005737  000712            TST     TEMP3           ;SEE IF PRINTED STATUS
2493  010356  001011                    BNE     BK1B            ;IF SO: BR
```

```
2494  010360  005237  000712                    INC     TEMP3           ;SET FLAG
2495  010364  012704  023135                    MOV     #MSG30,R4       ;PRINT STATUS HEADER
2496  010370  004737  020530                    JSR     PC,TTOUT
2497  010374  017703  170200                    MOV     @MTS,R3         ;LOAD STATUS
2498  010400  000756                            BR      BK1A            ;GO PRINT STATUS
2499  010402  052737  000002  000746  BK1B:     BIS     #2,BTFLG        ;SET BT FLAG (POSITION ERROR)
2500  010410  000207                            RTS     PC              ;RETURN
2501  010412  042737  142121  000740  BK3:      BIC     #142121,ERSAV   ;LOOK FOR NON-TM ERRORS
2502  010420  001407                            BEQ     BOB             ;IF NOT:  BR
2503  010422  005737  000760                    TST     EOTREC          ;WAS EOT REACHED
2504  010426  001716                            BEQ     BK1C            ;IF NOT:  BR
2505  010430  042737  002000  000740            BIC     #2000,ERSAV     ;CHECK FOR NON-EOT ERRORS
2506  010436  001312                            BNE     BK1C            ;IF ANY: BR
2507
2508  010440  163700  000620          BOB:      SUB     RCNT,R0         ;AGAIN R0=BACKSPACE COUNT
2509  010444  012737  022471  000716  BOA:      MOV     #MSG10,EMADDR   ;POINT TO SE MESSG
2510  010452  005200                            INC     R0              ;R0=BACKSPACE COUNT+1
2511  010454  063700  000620                    ADD     RCNT,R0         ;R0=RCNT-BACKSPACE CNT + 1 FOR HEADER
2512  010460  013777  000714  170116            MOV     TEMP4,@MWC
2513  010466  013737  000636  000730  SPBK:     MOV     TSTAL,STAL
2514  010474  004737  010634                    JSR     PC,STALL        ;DO STALL
2515  010500  005077  170074                    CLR     @MTS
2516  010504  105077  170072                    CLRB    @MTC
2517  010510  052777  000012  170064            BIS     #12,@MTC        ;SET BACKSPACE OP
2518  010516  012737  010536  000724            MOV     #B1,RTRN        ;SET RETURN ADDRESS
2519  010524  012737  177377  000730            MOV     #177377,STAL    ;SET INTERRUPT TIME MULTIPLIER
2520  010532  000137  017006                    JMP     TAPG            ;GO DO SPACE
2521  010536  017701  170042          B1:       MOV     @MWC,R1         ;LOAD SPACE COUNTER
2522  010542  001426                            BEQ     B2              ;IF COUNT IS ZERO: BR
2523  010544  032777  002000  170100            BIT     #2000,@SWR      ;SEE IF PRINT
2524  010552  001017                            BNE     B1A             ;IF NOT:  BR
2525  010554  004737  017506                    JSR     PC,PAPRT        ;ELSE PRINT SPACE ERROR
2526  010560  013704  000716                    MOV     EMADDR,R4
2527  010564  004737  020530                    JSR     PC,TTOUT
2528  010570  012704  023631                    MOV     #MSG45,R4
2529  010574  004737  020530                    JSR     PC,TTOUT        ;PRINT SPACE COUNT HEADER
2530  010600  005301                            DEC     R1
2531  010602  005101                            COM     R1
2532  010604  010103                            MOV     R1,R3
2533  010606  004737  020716                    JSR     PC,OCTP         ;PRINT NUMBER OF RECORDS LEFT TO SPACE
2534  010612  012737  000002  000746  B1A:      MOV     #2,BTFLG        ;SET BAD TAPE FLAG
2535  010620  013737  000636  000730  B2:       MOV     TSTAL,STAL      ;DO STALL
2536  010626  004737  010634                    JSR     PC,STALL        ;STALL
2537  010632  000207                            RTS     PC              ;EXIT
2538
```

```
                                        ;*****************************************************
                                        ;STALL ROUTINE:
                                        ;
                                        ;THIS ROUTINE IS USED TO PROVIDE SOFTWARE DELAYS
                                        ;DURING READ, WRITE, TURN AROUND, AND YOZZLE.
                                        ;THE DELAY TIMES MAY BE SET BY THE OPERATOR AT
                                        ;INITIAL START FROM 200(8) OR MAY BE MODIFIED
                                        ;AT ANY TIME BY ENTERING CNTRL C ON THE TTY AND
                                        ;INSERTING NEW VALUES IN RESPONSE TO THE REQUEST
                                        ;PRINTED.
                                        ;THE READ STALL AND THE WRITE STALL ARE DELAYS
                                        ;EXECUTED BETWEEN EACH RECORD OF THE DATA BLOCK.
                                        ;THE TURN AROUND STALL IS EXECUTED EACH TIME
                                        ;THE DIRECTION OF TAPE MOVEMENT IS CHANGED AND
                                        ;ALSO EACH TIME THE TAPE OPERATION CHANGES FROM
                                        ;WRITE TO READ OR READ TO WRITE.
                                        ;THE YOZZLE STALL IS EXECUTED ONLY DURING THE
                                        ;YOZZLE ROUTINE.
                                        ;*****************************************************

010634  005337  000730          STALL:  DEC     STAL
010640  001375                          BNE     STALL           ;DELAY
010642  000207                          RTS     PC              ;EXIT

                                        ;*****************************************************
                                        ;RANDOM CHARACTER COUNT GENERATOR:
                                        ;
                                        ;THIS ROUTINE ENTERED VIA CONSOLE SWITCH
                                        ;SEVEN (7) IS USED TO GENERATE A RANDOM
                                        ;CHARACTER COUNT FOR EACH DATA BLOCK.
                                        ;ALL RECORDS WITHIN A GIVEN BLOCK WILL BE
                                        ;THE SAME, BUT EACH BLOCK WILL VARY.
                                        ;THE LIMITS ARE TWO (2) TO TWO THOUSAND
                                        ;(2000) OCTAL CHARACTERS PER RECORD.
                                        ;*****************************************************

010644  012701  177776          CCNTR:  MOV     #-2,R1          ;SET HIGH LIMIT
010650  012702  174000                  MOV     #-4000,R2       ;SET LOW LIMIT
010654  004737  020240                  JSR     PC,RANG         ;GO GENERATE NUMBER
010660  013737  000676  000622          MOV     RANSAV,CARCNT   ;SET CHAR COUNT
010666  012737  177777  012750          MOV     #-1,PATS        ;PRESET DATA PATTERN
010674  000207                          RTS     PC              ;EXIT
```

```
2583
2584                                    ;*****************************************************
2585                                    ;RANDOM RECORD COUNT GENERATOR:
2586                                    ;
2587                                    ;THIS ROUTINE ENTERED VIA CONSOLE SWITCH SIX (6)
2588                                    ;IS USED TO GENERATE A RANDOM NUMBER OF RECORDS
2589                                    ;FOR EACH BLOCK OF DATA.
2590                                    ;THE LIMITS ARE ONE (1) TO FIVE HUNDRED (500) OCTAL
2591                                    ;RECORDS PER BLOCK.
2592                                    ;*****************************************************
2593
2594  010676  012702  000001       RCNTR:  MOV     #1,R2           ;SET LOW LIMIT
2595  010702  012701  000500               MOV     #500,R1         ;SET HIGH LIMIT
2596  010706  004737  020240               JSR     PC,RANG         ;GO GENERATE NUMBER
2597  010712  013737  000676  000620       MOV     RANSAV,RCNT     ;SET RECORD COUNT
2598  010720  000207                       RTS     PC              ;EXIT
2599
2600                                    ;*****************************************************
2601                                    ;TEST CONDITION ENTRY ROUTINE:
2602                                    ;
2603                                    ;THIS ROUTINE IS USED TO ALLOW THE OPERATOR
2604                                    ;TO ENTER, AT THE TTY, THE NECESSARY PARAMETERS
2605                                    ;TO RUN THE PROGRAM AS HE WISHES.  THE
2606                                    ;ROUTINE IS ONLY ENTERED UPON INITIAL STARTING
2607                                    ;FROM LOCATION 200(8).
2608                                    ;THE MAIN PURPOSE OF THIS ROUTINE IS TO ESTABLISH
2609                                    ;A TABLE OF DEVICES TO BE TESTED.  THIS TABLE
2610                                    ;CONSISTS OF AN ENTRY FOR EACH OF ONE (1) TO
2611                                    ;EIGHT (8) DEVICES.  EACH ENTRY CONTAINS THE
2612                                    ;DEVICE UNIT NUMBER, DENSITY, PARITY, AND
2613                                    ;NUMBER OF TRACKS.  THE INFORMATION IS ENTERED
2614                                    ;IN RESPONSE TO PRINTED REQUESTS AT THE TTY.
2615                                    ;UNITS MAY BE ENTERED IN ANY ORDER.  EACH
2616                                    ;PARAMETER IS CHECK FOR LEGALITY BEFORE BEING
2617                                    ;SET INTO THE TABLE.
2618                                    ;UPON COMPLETION OF THE DEVICE TABLE, REQUESTS
2619                                    ;ARE PRINTED FOR ENTRY OF THE NUMBER OF CHARACTERS
2620                                    ;PER RECORD AND THE NUMBER OF RECORDS PER BLOCK
2621                                    ;NEXT REQUEST IS FOR A PATTERN NUMBER TO BE USED
2622                                    ;FOR WRITING AND CHECKING OF READ DATA.
2623                                    ;THE LAST REQUESTS ARE FOR ENTRY OF THE DESIRED
2624                                    ;WRITE, READ, AND TURN AROUND STALLS.
2625                                    ;*****************************************************
2626
2627  010722  005737  000700       TINP:   TST     TINF            ;SEE IF SHOULD INPUT FROM TTY
2628  010726  001001                       BNE     TINPA           ;IF SO: BR
2629  010730  000207                       RTS     PC              ;EXIT
2630  010732  005037  000734       TINPA:  CLR     UNP             ;CLEAR TABLE POINTER
2631  010736  005037  004716               CLR     REOTC           ;CLEAR EOT UNIT COUNTER
2632  010742  012700  000010               MOV     #10,R0          ;SET SIZE OF TABLE
2633  010746  012701  001012               MOV     #UN1,R1         ;SET START OF TABLE
2634  010752  005021               TINPB:  CLR     (R1)+           ;CLEAR TABLE
2635  010754  005300                       DEC     R0              ;SEE IF DONE
2636  010756  001375                       BNE     TINPB           ;IF NOT: BR
2637  010760  005737  021624               TST     ASEQF           ;SEE IF AUTO SEQUENCE
2638  010764  001405                       BEQ     TINPB1          ;IF NOT:  BR
```

```
2639  010766  012704  024733                    MOV     #MSG77,R4
2640  010772  004737  020530                    JSR     PC,TTOUT        ;PRINT AUTO SEQ PROGRAM NAME
2641  010776  000410                            BR      TINPO
2642  011000  012704  023144            TINPB1: MOV     #MSG31,R4
2643  011004  004737  020530                    JSR     PC,TTOUT        ;PRINT PROGRAM NAME
2644  011010  012704  023261                    MOV     #MSG31A,R4
2645  011014  004737  020530                    JSR     PC,TTOUT        ;PRINT REST OF TITLE
2646  011020  122737  000004  000041  TINPO:   CMPB    #4,@#41         ;SEE IF LOAD MEDIUN
2647  011026  001006                            BNE     1$              ;IF NOT: BR
2648  011030  012704  026120                    MOV     #MSG97,R4
2649  011034  004737  020530                    JSR     PC,TTOUT        ;ELSE PRINT NO TEST
2650  011040  000137  004662                    JMP     REOT10          ;END TEST
2651  011044  012704  025255            1$:     MOV     #MSG84,R4
2652  011050  004737  020530                    JSR     PC,TTOUT        ;REQUEST STARTING REGISTER ADDRESS
2653  011054  013703  000600                    MOV     MTS,R3
2654  011060  004737  020716                    JSR     PC,OCTP         ;PRINT CURRINT REGISTER START
2655  011064  013705  000674                    MOV     REGST,R5        ;SAVE ADDRESS LOCATION
2656  011070  012701  000006                    MOV     #6,R1           ;SET SIZE OF ENTRY
2657  011074  012702  177770                    MOV     #177770,R2      ;SET UPPER LIMIT
2658  011100  012703  170000                    MOV     #170000,R3      ;SET LOWER LIMIT
2659  011104  004737  020272                    JSR     PC,TTR          ;GO GET RESPONSE
2660  011110  012705  000602                    MOV     #MTC,R5         ;SET TABLE BASE
2661  011114  013704  000600                    MOV     MTS,R4          ;GET INITIAL ADDRESS
2662  011120  062704  000002            2$:     ADD     #2,R4           ;BUMP ADDRESS
2663  011124  010425                            MOV     R4,(R5)+        ;FILL TABLE
2664  011126  020527  000614                    CMP     R5,#MTRD+2      ;DONE?
2665  011132  001372                            BNE     2$              ;IF NOT: BR
2666  011134  012704  025300                    MOV     #MSG85,R4
2667  011140  004737  020530                    JSR     PC,TTOUT        ;REQUEST VECTOR ADDR.
2668  011144  013703  000614                    MOV     VECT,R3
2669  011150  004737  020716                    JSR     PC,OCTP         ;PRINT CURRENT VECTOR
2670  011154  012705  000614                    MOV     #VECT,R5        ;SET SAVE LOCATION
2671  011160  012701  000003                    MOV     #3,R1           ;SET SIZE OF RSPONSE
2672  011164  012702  000476                    MOV     #476,R2         ;SET UPPER LIMIT
2673  011170  012703  000060                    MOV     #60,R3          ;SET LOWER LIMIT
2674  011174  004737  020272                    JSR     PC,TTR          ;GO GET RESPONSE
2675  011200  013700  000614                    MOV     VECT,R0         ;GET VECTOR ADDRESS
2676  011204  012720  017466                    MOV     #MTINT,(R0)+    ;LOAD VECTOR WITH HANDLER ADDR.
2677  011210  012710  000340                    MOV     #340,(R0)       ;LOAD PRIORITY LEVEL
2678  011214  005737  021624                    TST     ASEQF           ;SEE IF AUTO SEQ
2679  011220  001403                            BEQ     TINPOO          ;IF NOT: BR
2680  011222  005726                            TST     (SP)+           ;RESET STACK
2681  011224  000137  021252                    JMP     ASEQ            ;GO TO AUTO SEQ
2682  011230  012704  023314            TINPOO: MOV     #MSG32,R4
2683  011234  004737  020530                    JSR     PC,TTOUT        ;PRINT UNIT NUMBER REQUEST
2684  011240  005037  000710                    CLR     TEMP2           ;CLEAR BUFFER
2685  011244  012705  000710                    MOV     #TEMP2,R5       ;SET UNIT DESCRIPTION BUFFER ADDRESS
2686  011250  012701  000001                    MOV     #1,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2687  011254  012702  000007                    MOV     #7,R2           ;SET MAXIMUM LIMIT
2688  011260  012703  000000                    MOV     #0,R3           ;SET MINIMUM LIMIT
2689  011264  004737  020272                    JSR     PC,TTR          ;GO GET UNIT NUMBER
2690  011270  005737  000706                    TST     TEMP1           ;SEE IF HAVE NEW PARAMETER
2691  011274  001014                            BNE     TINPOB          ;IF SO: BR
2692  011276  005737  000734                    TST     UNP             ;SEE IF FIRST ENTRY
2693  011302  001002                            BNE     TINPOA          ;IF NOT: BR
2694  011304  000137  011230                    JMP     TINPOO          ;ELSE RETRY
```

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2695  011310  013700  000734          TINPOA: MOV     UNP,R0
2696  011314  012760  177777  001012          MOV     #-1,UN1(R0)     ;SET END UNIT TABLE
2697  011322  000137  011634                  JMP     TINP2B          ;GO GET RECORD COUNT
2698  011326  013700  000734          TINPOB: MOV     UNP,R0
2699  011332  042760  003400  001012          BIC     #3400,UN1(R0)   ;CLEAR UNIT NUMBER
2700  011340  012703  000010                  MOV     #10,R3          ;SET ROTATION FACTOR
2701  011344  004737  012342                  JSR     PC,TPOS         ;GO LOAD UNIT NUMBER TO PROPER POSITION
2702  011350  016037  001012  000616          MOV     UN1(R0),UDES    ;SELECT UNIT
2703  011356  013777  000616  167216          MOV     UDES,@MTC       ;LOAD UNIT NUMBER
2704  011364  032777  000100  167206  TINPOC: BIT     #100,@MTS       ;SEE IF UNIT AVAILABLE
2705  011372  001011                          BNE     TINPOD          ;IF RO: BR
2706  011374  005337  000730                  DEC     STAL
2707  011400  001371                          BNE     TINPOC          ;DELAY
2708  011402  012704  023703                  MOV     #MSG49,R4
2709  011406  004737  020530                  JSR     PC,TTOUT        ;PRINT UNIT NOT AVAILABLE
2710  011412  000137  011230                  JMP     TINPOO          ;REDO
2711  011416  032777  000020  167154  TINPOD: BIT     #20,@MTS        ;SEE IF 7 CHANNEL
2712  011424  001404                          BEQ     TINPOE          ;IF NOT: BR
2713  011426  012704  023717                  MOV     #MSG50,R4       ;7 CHANNEL MSG
2714  011432  000137  011442                  JMP     TINPOF
2715  011436  012704  023726          TINPOE: MOV     #MSG51,R4       ;9 CHANNEL MSG
2716  011442  004737  020530          TINPOF: JSR     PC,TTOUT        ;GO PRINT 7 OR 9 CHANNEL
2717  011446  012704  023334          TINP1:  MOV     #MSG33,R4
2718  011452  004737  020530                  JSR     PC,TTOUT        ;PRINT DENSITY REQUEST
2719  011456  005037  000710                  CLR     TEMP2           ;CLEAR BUFFER
2720  011462  012701  000001                  MOV     #1,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2721  011466  012702  000003                  MOV     #3,R2           ;SET MAXIMUM LIMIT
2722  011472  012703  000000                  MOV     #0,R3           ;SET MINIMUM LIMIT
2723  011476  004737  020272                  JSR     PC,TTR          ;GO GET DENSITY
2724  011502  005737  000706                  TST     TEMP1           ;SEE IF HAVE NEW PARAMETER
2725  011506  001407                          BEQ     TINP2           ;IF NOT: BR
2726  011510  042737  060000  000616          BIC     #60000,UDES     ;ELSE CLEAR OLD PARAMETER
2727  011516  012703  000015                  MOV     #15,R3          ;SET POSITION FACTOR
2728  011522  004737  012342                  JSR     PC,TPOS         ;GO LOAD DENSITY INTO PROPER POSITION
2729  011526  012704  023350          TINP2:  MOV     #MSG34,R4
2730  011532  004737  020530                  JSR     PC,TTOUT        ;PRINT PARITY REQUEST
2731  011536  005037  000710                  CLR     TEMP2           ;CLR BUFFER
2732  011542  012701  000001                  MOV     #1,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2733  011546  012702  000001                  MOV     #1,R2           ;SET MAXIMUM LIMIT
2734  011552  012703  000000                  MOV     #0,R3           ;SET MINIMUM LIMIT
2735  011556  004737  020272                  JSR     PC,TTR          ;GO INPUT PARITY
2736  011562  005737  000706                  TST     TEMP1           ;SEE IF HAVE NEW PARAMETER
2737  011566  001407                          BEQ     TINP2A          ;IF NOT: BR
2738  011570  042737  004000  000616          BIC     #4000,UDES      ;ELSE CLEAR OLD PARAMETER
2739  011576  012703  000013                  MOV     #13,R3          ;SET POSITION FACTOR
2740  011602  004737  012342                  JSR     PC,TPOS         ;GO LOAD PARITY TO PROPER POSITION
2741  011606  005237  004716          TINP2A: INC     REOTC           ;BUMP EOT UNIT COUNTER
2742  011612  022737  000016  000734          CMP     #16,UNP         ;SEE IF DONE UNITS
2743  011620  001405                          BEQ     TINP2B          ;IF SO: BR
2744  011622  062737  000002  000734          ADD     #2,UNP          ;POINT TO NEXT UNIT
2745  011630  000137  011230                  JMP     TINPOO          ;ELSE LOOK FOR NEXT UNIT
2746  011634  005037  000734          TINP2B: CLR     UNP             ;CLEAR UNIT POINTER
2747  011640  013700  004716                  MOV     REOTC,R0
2748  011644  000337  004716                  SWAB    REOTC
2749  011650  110037  004716                  MOVB    R0,REOTC        ;SET UNIT EOT COUNTER
2750  011654  012704  023363          TINP3:  MOV     #MSG35,R4
```

```
2751  011660  004737  020530                 JSR     PC,TTOUT        ;PRINT RECORD COUNT REQUEST
2752  011664  013703  000620                 MOV     RCNT,R3
2753  011670  004737  020716                 JSR     PC,OCTP         ;PRINT RECORD COUNT
2754  011674  012705  000620                 MOV     #RCNT,R5        ;SET RECORD COUNT ADDRESS
2755  011700  012701  000006                 MOV     #6,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2756  011704  012702  177777                 MOV     #-1,R2          ;SET MAXIMUM LIMIT
2757  011710  012703  000001                 MOV     #1,R3           ;SET MINIMUM LIMIT
2758  011714  004737  020272                 JSR     PC,TTR          ;GO GET RECORD COUNT
2759  011720  013737  000620  000642         MOV     RCNT,RCSAV      ;SAVE RECORD COUNT
2760  011726  012704  023404                 MOV     #MSG36,R4
2761  011732  004737  020530                 JSR     PC,TTOUT        ;PRINT CHARACTER COUNT REQUEST
2762  011736  005437  000622                 NEG     CARCNT
2763  011742  013703  000622                 MOV     CARCNT,R3
2764  011746  004737  020716                 JSR     PC,OCTP         ;PRINT CHAR COUNT
2765  011752  012705  000622                 MOV     #CARCNT,R5      ;SET CHARACTER COUNT ADDRESS
2766  011756  012701  000006                 MOV     #6,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2767  011762  012702  004000                 MOV     #4000,R2        ;SET MAXIMUM LIMIT
2768  011766  012703  000004                 MOV     #4,R3           ;SET MINIMUM LIMIT
2769  011772  004737  020272                 JSR     PC,TTR          ;GO GET CHARACTER COUNT
2770  011776  005437  000622                 NEG     CARCNT          ;SET TO TWO'S COMPLEMENT
2771  012002  013737  000622  000644         MOV     CARCNT,CCSAV    ;SAVE CHAR COUNT
2772  012010  012704  023430                 MOV     #MSG37,R4       ;PRINT PATTERN NUMBER REQUEST
2773  012014  004737  020530                 JSR     PC,TTOUT
2774  012020  013703  000624                 MOV     PATRN,R3
2775  012024  004737  020716                 JSR     PC,OCTP         ;PRINT PATTERN
2776  012030  005037  012746                 CLR     DOFL            ;CLEAR EXTERNAL DATA FLAG
2777  012034  012705  000624                 MOV     #PATRN,R5       ;SET PATTERN NUMBER ADDRESS
2778  012040  012701  000002                 MOV     #2,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2779  012044  012702  000015                 MOV     #15,R2          ;SET MAXIMUM LIMIT
2780  012050  012703  000000                 MOV     #0,R3           ;SET MINIMUM LIMIT
2781  012054  004737  020272                 JSR     PC,TTR          ;GO GET PATTERN NUMBER
2782  012060  012704  024270                 MOV     #MSG60,R4       ;PRINT TM REQUEST
2783  012064  004737  020530                 JSR     PC,TTOUT
2784  012070  013703  000646                 MOV     TMEX,R3
2785  012074  004737  020716                 JSR     PC,OCTP         ;PRINT TMEX VALUE
2786  012100  012705  000646                 MOV     #TMEX,R5        ;SE TMEX ADDRESS
2787  012104  012701  000001                 MOV     #1,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2788  012110  010102                         MOV     R1,R2           ;SET MAXIMUM LIMIT
2789  012112  005003                         CLR     R3              ;SET MINIMUM LIMIT
2790  012114  004737  020272                 JSR     PC,TTR          ;GO GET RESPONSE
2791  012120  012704  023453                 MOV     #MSG39,R4
2792  012124  004737  020530                 JSR     PC,TTOUT        ;PRINT SINGLE PASS REQUEST
2793  012130  013703  000630                 MOV     SPFLG,R3
2794  012134  004737  020716                 JSR     PC,OCTP         ;PRINT CURRENT FLAG SETTING
2795  012140  012705  000630                 MOV     #SPFLG,R5       ;GET ADDRESS OF FLAG
2796  012144  012701  000001                 MOV     #1,R1           ;SET SIZE OF RESPONSE
2797  012150  012702  000001                 MOV     #1,R2           ;SET UPPER LIMIT
2798  012154  012703  000000                 MOV     #0,R3           ;SET LOWER LIMIT
2799  012160  004737  020272                 JSR     PC,TTR          ;GO GET RESPONSE
2800  012164  012704  023515         TINP4:  MOV     #MSG40,R4
2801  012170  004737  020530                 JSR     PC,TTOUT        ;PRINT READ STALL REQUEST
2802  012174  013703  000632                 MOV     RSTAL,R3
2803  012200  004737  020716                 JSR     PC,OCTP         ;PRINT READ STALL
2804  012204  012705  000632                 MOV     #RSTAL,R5       ;SET READ STALL ADDRESS
2805  012210  012701  000006                 MOV     #6,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2806  012214  012702  177777                 MOV     #-1,R2          ;SET MAXIMUM LIMIT
```

```
2807  012220  012703  000001                    MOV     #1,R3           ;SET MINIMUM LIMIT
2808  012224  004737  020272                    JSR     PC,TTR          ;GO GET READ STALL
2809  012230  012704  023544                    MOV     #MSG41,R4
2810  012234  004737  020530                    JSR     PC,TTOUT        ;PRINT WRITE STALL REQUEST
2811  012240  013703  000634                    MOV     WSTAL,R3
2812  012244  004737  020716                    JSR     PC,OCTP         ;PRINT READ STALL
2813  012250  012705  000634                    MOV     #WSTAL,R5       ;SET WRITE STALL ADDRESS
2814  012254  012701  000006                    MOV     #6,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2815  012260  012702  177777                    MOV     #-1,R2          ;SET MAXIMUM LIMIT
2816  012264  012703  000001                    MOV     #1,R3           ;SET MINIMUM LIMIT
2817  012270  004737  020272                    JSR     PC,TTR          ;GO GET WRITE STALL
2818  012274  012704  023556                    MOV     #MSG42,R4
2819  012300  004737  020530                    JSR     PC,TTOUT        ;PRINT TURN AROUND STALL REQUEST
2820  012304  013703  000636                    MOV     TSTAL,R3
2821  012310  004737  020716                    JSR     PC,OCTP         ;PRINT TA STALL
2822  012314  012705  000636                    MOV     #TSTAL,R5       ;SET TURN AROUND STALL ADDRESS
2823  012320  012701  000006                    MOV     #6,R1           ;SET NUMBER OF CHARACTERS TO INPUT
2824  012324  012702  177777                    MOV     #-1,R2          ;SET MAXIMUM LIMIT
2825  012330  012703  000001                    MOV     #1,R3           ;SET MINIMUM LIMIT
2826  012334  004737  020272                    JSR     PC,TTR          ;GO GET TURN AROUND STALL
2827  012340  000207                            RTS     PC              ;EXIT
2828
2829                                            ;UNIT DESCRIPTION POSITIONING SUBROUTINE**********
2830
2831  012342  000241                    TPOS:   CLC
2832  012344  006137  000710                    ROL     TEMP2           ;POSITION CHARACTER
2833  012350  005303                            DEC     R3              ;SEE IF DONE
2834  012352  001373                            BNE     TPOS            ;IF NOT: BR
2835  012354  013700  000734                    MOV     UNP,R0          ;LOAD UNIT POINTER
2836  012360  053760  000710  001012            BIS     TEMP2,UN1(R0)   ;LOAD CHARACTER INTO UN1(R0)
2837  012366  000207                            RTS     PC              ;EXIT
2838
```

```
2839
2840                                    ;*********************************************************
2841                                    ;DATA SETUP ROUTINE:
2842                                    ;
2843                                    ;THIS ROUTINE IS USED TO GENERATE INTO THE ENTIRE
2844                                    ;WRITE BUFFER (4000 OCTAL CHARACTERS) THE DATA PATTERN
2845                                    ;SELECTED BY THE OPERATOR.  THESE ARE 20 (8) FIXED
2846                                    ;DATA PATTERNS AVAILABLE AND ONE SELECTION (DATA PATTERN 0)
2847                                    ;WHICH WILL READ ANY PATTERN PRESENTED AT THE
2848                                    ;HIGH SPEED PAPER TAPE READER.  THIS TAPE MUST BE PREPARED
2849                                    ;BY USING THE PROGRAM CALLED DTC.
2850                                    ;RANDOM DATA MAY ALSO BE USED VIA CONSOLE
2851                                    ;SWITCH EIGHT (8).
2852                                    ;THIS ROUTINE IS ALSO USED TO CLEAR OUT THE
2853                                    ;READ BUFFER (4000 OCTAL CHARACTERS) BEFORE EACH
2854                                    ;RECORD IS READ.
2855                                    ;*********************************************************
2856
2857  012370  005737  013304        DSUP:  TST     RDFL            ;SEE IF DID RANDOM DATA
2858  012374  001045                       BNE     DS1             ;IF SO: BR
2859  012376  005737  021624        DSO:   TST     ASEQF           ;SEE IF AUTO SEQ
2860  012402  001406                       BEQ     DSOA            ;IF NOT: BR
2861  012404  005737  000624               TST     PATRN           ;SEE IF AUTO RANDOM
2862  012410  100003                       BPL     DSOA            ;IF NOT: BR
2863  012412  004737  013236               JSR     PC,DATR         ;ELSE GO GENERATE RANDOM DATA
2864  012416  000207                       RTS     PC              ;RETURN
2865  012420  023737  000624  012750 DSOA:  CMP     PATRN,PATS      ;NEW PATTERN?
2866  012426  001014                       BNE     DSOC            ;IF SO: BR
2867  012430  013703  000616               MOV     UDES,R3         ;GET UNIT DESCRIPTION
2868  012434  042703  173777               BIC     #173777,R3      ;MASK PARITY
2869  012440  023703  012752               CMP     PARS,R3         ;SEE IF SAME AS LAST TIME
2870  012444  001404                       BEQ     DSOB            ;IF SO, BR
2871  012446  010337  012752               MOV     R3,PARS         ;SAVE PARITY
2872  012452  004737  013306               JSR     PC,CRCLRC       ;GO GENERATE EXPECTED CRC/LRC
2873  012456  000207                DSOB:  RTS     PC
2874  012460                         DSOC:
2875  012460  012703  026200               MOV     #WDATA,R3       ;R3 = ADDRS OF WRITE BUFFER
2876  012464  013701  000624               MOV     PATRN,R1        ;R1 = PATTERN SELECTOR
2877  012470  010137  012750               MOV     R1,PATS
2878  012474  062701  000001               ADD     #1,R1           ;BUMP POINTER
2879  012500  000241                       CLC
2880  012502  006101                       ROL     R1              ;MAKE PATTERN SELECTOR EVEN
2881  012504  000171  002734               JMP     @DATBL(R1)      ;GO GENERATE PATTERN
2882  012510  000240                DS1:   NOP
2883  012512  004737  013306               JSR     PC,CRCLRC
2884  012516  012702  002002        DS3:   MOV     #2002,R2        ;R2=BUFFER SIZE +2
2885  012522  012701  032212               MOV     #RDATA,R1       ;R1=READ DATA START
2886  012526  005021                DS4:   CLR     (R1)+           ;CLEAR BUFFER
2887  012530  005302                       DEC     R2              ;SEE IF DONE ALL
2888  012532  001375                       BNE     DS4             ;IF NOT: BR
2889  012534  013737  000616  012752       MOV     UDES,PARS       ;SET PARITY
2890  012542  042737  173777  012752       BIC     #173777,PARS
2891  012550  000207                       RTS     PC              ;EXIT
2892
2893
```

```
2894
2895                                        ;EXTERNAL DATA INPUT FROM H/S READER (256 CHARACTER MAXIMUM)
2896
2897  012552  005737  012746        DATO:   TST     DOFL            ;SEE IF SHOULD DO EXTERNAL INPUT
2898  012556  001354                        BNE     DS1             ;IF NOT: BR
2899  012560  012737  000001  012746        MOV     #1,DOFL         ;SET EXTERNAL FLAG
2900  012566  005077  166076                CLR     @PRB            ;CLEAR READER BUFFER
2901  012572  005077  166070                CLR     @PRS            ;CLEAR READER STATUS
2902  012576  005037  000706                CLR     TEMP1           ;CLEAR FOR USE AS CHARACTER FLAG
2903  012602  052777  000001  166056 DATOA: BIS     #1,@PRS         ;START READER
2904  012610  005037  000714                CLR     TEMP4
2905  012614  012704  000004                MOV     #4,R4           ;SET UP READER DONE DELAY
2906  012620  032777  000200  166040 DATOB: BIT     #200,@PRS       ;SEE IF DONE
2907  012626  001006                        BNE     1$              ;IF SO :BR
2908  012630  005337  000714                DEC     TEMP4
2909  012634  001371                        BNE     DATOB           ;DELAY FOR READER DONE
2910  012636  005304                        DEC     R4
2911  012640  001367                        BNE     DATOB           ;CONTINUE DELAY
2912  012642  000722                        BR      DS1             ;IF READER NEVER DONE: BR
2913  012644  005001                1$:     CLR     R1              ;CLEAR SAVE LOCATION
2914  012646  117701  166016                MOVB    @PRB,R1         ;SAVE CHARACTER
2915  012652  005737  000706                TST     TEMP1           ;SEE IF HAVE FOUND START CHARACTER
2916  012656  001012                        BNE     DATOC           ;IF SO : BR
2917  012660  105701                        TSTB    R1              ;SEE IF CHARACTER IS 0
2918  012662  001747                        BEQ     DATOA           ;IF SO : BR
2919  012664  012737  000001  000706        MOV     #1,TEMP1        ;ELSE SET CHARACTER FOUND FLAG
2920  012672  010137  000710                MOV     R1,TEMP2        ;SAVE DATA SIZE
2921  012676  010102                        MOV     R1,R2           ;SAVE DATA SIZE
2922  012700  000137  012602                JMP     DATOA           ;GO GET FIRST DATA CHAR
2923  012704  110123                DATOC:  MOVB    R1,(R3)+        ;LOAD BUFFER
2924  012706  005302                        DEC     R2              ;SEE IF READ ALL
2925  012710  001334                        BNE     DATOA           ;IF NOT : BR
2926  012712  012701  026200        DATOD:  MOV     #WDATA,R1       ;R1 = START OF WRITE BUFFER
2927  012716  013702  000710                MOV     TEMP2,R2        ;R2 = SIZE OF DATA FIELD
2928  012722  112123                DATOE:  MOVB    (R1)+,(R3)+     ;REPEAT LOAD OF DATA FIELD
2929  012724  022703  032212                CMP     #RDATA,R3       ;SEE IF DONE
2930  012730  003002                        BGT     DATOF           ;IF NOT: BR
2931  012732  000137  012510                JMP     DS1             ;EXIT
2932  012736  005302                DATOF:  DEC     R2              ;SEE IF AT END OF DATA FIELD
2933  012740  001370                        BNE     DATOE           ;IF NOT : BR
2934  012742  000137  012712                JMP     DATOD           ;ELSE RESTART FILL
2935  012746  000000                DOFL:   0                       ;EXTERNAL DATA FLAG=1 IF ALREADY DONE
2936  012750  177777                PATS:   -1
2937  012752  177777                PARS:   -1
2938
```

```
2939
2940                                        ;ALL ONES**********
2941
2942  012754  012701  177777    DAT1:   MOV     #-1,R1          ;R1=DATA
2943  012760  012702  002002    DAT1A:  MOV     #2002,R2        ;R2=WORD COUNT +2
2944  012764  010123            DAT1B:  MOV     R1,(R3)+        ;LOAD BUFFER
2945  012766  005302                    DEC     R2              ;SEE IF DONE
2946  012770  001375                    BNE     DAT1B           ;IF NOT: BR
2947  012772  000137  012510            JMP     DS1             ;RETURN
2948
2949                                        ;ALL ZEROS**********
2950
2951  012776  005001    DAT2:   CLR     R1              ;R1=DATA
2952  013000  000137  012760            JMP     DAT1A           ;LOAD BUFFER
2953
2954                                        ;WALKING ONE**********
2955
2956  013004  012701  000001    DAT3:   MOV     #1,R1           ;R1=DATA
2957  013010  000241                    CLC
2958  013012  012702  004004    DAT3A:  MOV     #4004,R2        ;R2=CHARACTER COUNT+4
2959  013016  110123            DAT3B:  MOVB    R1,(R3)+        ;LOAD BUFFER
2960  013020  106101                    ROLB    R1              ;SET NEXT CHARACTER
2961  013022  005302                    DEC     R2              ;SEE IF DONE
2962  013024  001374                    BNE     DAT3B           ;IF NOT: BR
2963  013026  000137  012510            JMP     DS1             ;RETURN
2964
2965                                        ;WALKING ZERO**********
2966
2967  013032  012701  000376    DAT4:   MOV     #376,R1         ;R1=START OF DATA
2968  013036  000261                    SEC
2969  013040  000137  013012            JMP     DAT3A           ;LOAD BUFFER
2970
2971                                        ;ALTERNATING ONE/ZERO**********
2972
2973
2974  013044  012701  052525    DAT5:   MOV     #52525,R1       ;R1=DATA
2975  013050  000137  012760            JMP     DAT1A           ;LOAD BUFFER
2976
2977                                        ;ALTERNATING ZERO/ONE**********
2978
2979  013054  012701  125252    DAT6:   MOV     #125252,R1      ;R1=DATA
2980  013060  000137  012760            JMP     DAT1A           ;LOAD BUFFER
2981
2982                                        ;ONE/ZERO IN ALTERNATING CHARACTERS**********
2983
2984  013064  012701  125125    DAT7:   MOV     #125125,R1      ;R1=DATA
2985  013070  000137  012760            JMP     DAT1A           ;LOAD BUFFER
2986
2987                                        ;ZERO/ONE IN ALTERNATING CHARACTERS**********
2988
2989  013074  012701  052652    DAT10:  MOV     #52652,R1       ;R1=DATA
2990  013100  000137  012760            JMP     DAT1A           ;LOAD BUFFER
2991
```

```
2992
2993                                        ;ALL BITS 0-377**********
2994
2995  013104  005001            DAT11:  CLR     R1              ;R1=STARTING DATA
2996  013106  012702  004004            MOV     #4004,R2        ;R2=CHARACTER COUNT+4
2997  013112  110123            DAT11A: MOVB    R1,(R3)+        ;LOAD BUFFER
2998  013114  105201                    INCB    R1              ;BUMP DATA
2999  013116  005302                    DEC     R2              ;SEE IF DONE
3000  013120  001374                    BNE     DAT11A          ;IF NOT: BR
3001  013122  000137  012510            JMP     DS1             ;RETURN
3002
3003                                        ;ALL BITS 377-0**********
3004
3005  013126  012701  000377    DAT12:  MOV     #377,R1         ;R1=STARTING DATA
3006  013132  012702  004004            MOV     #4004,R2        ;R2=CHARACTER COUNT+4
3007  013136  110123            DAT12A: MOVB    R1,(R3)+        ;LOAD BUFFER
3008  013140  105301                    DECB    R1              ;BUMP DATA
3009  013142  005302                    DEC     R2              ;SEE IF DONE
3010  013144  001374                    BNE     DAT12A          ;IF NOT: BR
3011  013146  000137  012510            JMP     DS1             ;RETURN
3012
3013                                        ;ALTERNATING CHARACTERS 0 AND 377**********
3014
3015  013152  012701  000377    DAT13:  MOV     #377,R1         ;R1 = DATA
3016  013156  000137  012760            JMP     DAT1A           ;LOAD BUFFER
3017
3018                                        ;ALTERNATING CHARACTERS 377 AND 0**********
3019
3020  013162  012701  177400    DAT14:  MOV     #177400,R1      ;R1 = DATA
3021  013166  000137  012760            JMP     DAT1A           ;LOAD BUFFER
3022
3023                                        ;WALKING ZERO REPEATED FOUR TIMES**********
3024
3025  013172  012702  002002    DAT15:  MOV     #2002,R2        ;SET NUMBER OF WORDS
3026  013176  012701  177376    DAT15R: MOV     #177376,R1      ;SET START OF DATA
3027  013202  012704  000002    DAT15A: MOV     #2,R4           ;SET NUMBER OF REPEATS
3028  013206  010123            DAT15B: MOV     R1,(R3)+        ;LOAD DATA
3029  013210  005302                    DEC     R2              ;SEE IF DONE
3030  013212  001002                    BNE     DAT15C          ;IF NOT: BR
3031  013214  000137  012510            JMP     DS1             ;RETURN
3032  013220  005304            DAT15C: DEC     R4              ;SEE IF DONE REPEATS
3033  013222  001371                    BNE     DAT15B          ;IF NOT: BR
3034  013224  000261                    SEC
3035  013226  006101                    ROL     R1              ;SET NEXT PATTERN
3036  013230  103764                    BCS     DAT15A          ;SEE IF SHOULD RESTART
3037  013232  000137  013176            JMP     DAT15R          ;IF SO: BR
3038
```

```
3039
3040                                        ;RANDOM DATA GENERATOR SUBROUTINE*********
3041
3042  013236  013704  000622        DATR:   MOV     CARCNT,R4       ;SET SIZE OF RECORD
3043  013242  012703  026200                MOV     #WDATA,R3       ;SET ADDRESS OF START OF BUFFER
3044  013246  012701  177777                MOV     #-1,R1          ;SET HIGH LIMIT
3045  013252  005002                         CLR     R2              ;SET LOW LIMIT
3046  013254  004737  020240        DATRO:  JSR     PC,RANG         ;GO GENERATE NUMBER
3047  013260  013723  000676                MOV     RANSAV,(R3)+    ;LOAD BUFFER
3048  013264  005204                         INC     R4              ;SEE IF DONE ALL
3049  013266  001372                         BNE     DATRO           ;IF NOT: BR
3050  013270  004737  012510                JSR     PC,DS1          ;GO CHECK FOR 7 CH
3051  013274  012737  000001  013304        MOV     #1,RDFL         ;SET RANDOM DATA FLAG
3052  013302  000207                         RTS     PC              ;EXIT
3053  013304  000000                RDFL:   0                       ;RANDOM DATA SELECT FLAG
```

```
3054
3055                                    ;*********************************************************
3056                                    ;CRC/LRC CHARACTER BUILD;
3057                                    ;
3058                                    ;THIS ROUTINE WILL CONSTRUCT AND SAVE THE EXPECTED
3059                                    ;CRC AND LRC CHARACTERS ACCORDING TO DATA AND
3060                                    ;RECORD SIZE IF OPERATING IN NRZ MODE
3061                                    ;*********************************************************
3062
3063  013306  000240            CRCLRC: NOP
3064  013310  013700  000622    CRLR:   MOV     CARCNT,R0       ;SET RECORD SIZE
3065  013314  005400                    NEG     R0
3066  013316  012701  026200            MOV     #WDATA,R1       ;SET START OF BUFFER
3067  013322  005037  013674            CLR     XORS
3068  013326  111104            CLO:    MOVB    (R1),R4         ;GET CHARACTER
3069  013330  004737  013522            JSR     PC,CLP          ;GO GET PARITY OF CHARACTER
3070  013334  004737  013650            JSR     PC,XOR          ;XOR CHARACTER
3071  013340  000241                    CLC
3072  013342  006004                    ROR     R4              ;ROTATE 1 RIGHT
3073  013344  103014                    BCC     CL2             ;IF NO CARRY: BR
3074  013346  052704  000400            BIS     #400,R4         ;SET BIT NINE
3075  013352  000241                    CLC
3076  013354  010405            CL1:    MOV     R4,R5           ;SAVE CHARACTER
3077  013356  042705  177703            BIC     #177703,R5
3078  013362  005105                    COM     R5
3079  013364  042705  177703            BIC     #177703,R5
3080  013370  042704  000074            BIC     #74,R4
3081  013374  050504                    BIS     R5,R4           ;COMPLEMENT BITS 2,3,4,5
3082  013376  010437  013674    CL2:    MOV     R4,XORS
3083  013402  005300                    DEC     R0
3084  013404  001402                    BEQ     CLLAST          ;IF LAST CHARACTER: BR
3085  013406  000137  013326            JMP     CLO             ;GET NEXT
3086  013412  013704  013674    CLLAST: MOV     XORS,R4
3087  013416  005137  013674            COM     XORS
3088  013422  042737  177050  013674    BIC     #177050,XORS
3089  013430  042704  177727            BIC     #177727,R4      ;COMPLEMENT ALL BUT BITS 3&5
3090  013434  050437  013674            BIS     R4,XORS
3091  013440  013737  013674  013676    MOV     XORS,EXCRC      ;SAVE EXPECTED CRC
3092  013446  013700  000622            MOV     CARCNT,R0
3093  013452  005400                    NEG     R0
3094  013454  012701  026200            MOV     #WDATA,R1       ;DO EXPT LRC
3095  013460  005037  013674            CLR     XORS
3096  013464  111104            CL3:    MOVB    (R1),R4
3097  013466  004737  013522            JSR     PC,CLP          ;GET PARITY
3098  013472  004737  013650            JSR     PC,XOR          ;XOR CHARACTER
3099  013476  005300                    DEC     R0
3100  013500  001371                    BNE     CL3             ;DO ALL FOR LRC
3101  013502  013704  013676            MOV     EXCRC,R4
3102  013506  004737  013650            JSR     PC,XOR          ;XOR CRC TO DATA
3103  013512  013737  013674  013700    MOV     XORS,EXLRC      ;SAVE EXPT LRC
3104  013520  000207                    RTS     PC              ;RETURN
3105  013522  005704            CLP:    TST     R4              ;SEE IF 0 CHAR
3106  013524  001010                    BNE     CLPE            ;IF NOT: BR
3107  013526  032737  004000  000616    BIT     #4000,UDES      ;SEE IF EVEN PARITY
3108  013534  001404                    BEQ     CLPE            ;IF NOT: BR
3109  013536  012704  000420            MOV     #420,R4         ;SET 0 CHAR EVEN PARITY
```

```
3110  013542  005201                        INC     R1              ;BUMP POINTER
3111  013544  000207                        RTS     PC              ;RETURN
3112  013546  005037  013710        CLPE:   CLR     PARCNT          ;CLEAR BIT COUNTER
3113  013552  012703  000010                MOV     #10,R3          ;SET NUMBER OF BITS
3114  013556  032704  000001        CLP0:   BIT     #1,R4           ;SEE IF ONE BIT
3115  013562  001402                        BEQ     CLP1            ;IF NOT: BR
3116  013564  005237  013710                INC     PARCNT          ;BUMP COUNTER
3117  013570  000241                CLP1:   CLC
3118  013572  006004                        ROR     R4              ;ROTATE TO NEXT BIT
3119  013574  005303                        DEC     R3
3120  013576  001367                        BNE     CLP0            ;CONTINUE FOR ALL BITS
3121  013600  112104                        MOVB    (R1)+,R4
3122  013602  042704  177400                BIC     #177400,R4
3123  013606  032737  000001  013710        BIT     #1,PARCNT       ;SEE IF ODD NUMBER OF ONE BITS
3124  013614  001005                        BNE     CLP2            ;IF SO: BR
3125  013616  032737  004000  000616        BIT     #4000,UDES      ;SEE IF SHOULD BE EVEN PARITY
3126  013624  001406                        BEQ     CLP3            ;IF NOT: BR
3127  013626  000207                        RTS     PC              ;ELSE EXIT
3128  013630  032737  004000  000616  CLP2:  BIT     #4000,UDES      ;SEE IF SHOULD BE ODD PARITY
3129  013636  001001                        BNE     CLP3            ;IF NOT: BR
3130  013640  000207                        RTS     PC              ;ELSE EXIT
3131  013642  052704  000400        CLP3:   BIS     #400,R4         ;SET PARITY BIT
3132  013646  000207                        RTS     PC
3133  013650  010446                XOR:    MOV     R4,-(SP)
3134  013652  043716  013674                BIC     XORS,(SP)
3135  013656  040437  013674                BIC     R4,XORS         ;XOR SUBROUTINE: R4 WITH XORS
3136  013662  052637  013674                BIS     (SP)+,XORS
3137  013666  013704  013674                MOV     XORS,R4
3138  013672  000207                        RTS     PC
3139
3140  013674  000000                XORS:   0                       ;XOR SAVE
3141  013676  000000                EXCRC:  0                       ;EXPECTED CRC
3142  013700  000000                EXLRC:  0                       ;EXPECTED LRC
3143  013702  000000                ACTLRC: 0                       ;ACTUAL LRC
3144  013704  000000                LRCSV:  0                       ;LRC SAVE
3145  013706  000000                LRCPT:  0                       ;CRC PRINT FLAG
3146  013710  000000                PARCNT: 0                       ;PARITY COUNTER
3147
```

```
3148
3149                                    ;*******************************************************
3150                                    ;DATA CHECK SUBROUTINE:
3151                                    ;
3152                                    ;THIS SUBROUTINE IS USED TO COMPARE EACH CHARACTER
3153                                    ;OF DATA READ FROM TAPE WITH THE EXPECTED CHARACTER.
3154                                    ;ANY ERROR DETECTED WILL CAUSE CONTROL TO BE
3155                                    ;PASSED TO AN ERROR PRINT SUBROUTINE AND A
3156                                    ;SUBROUTINE TO ACCUMULATE THE NUMBER OF BITS
3157                                    ;DROPPED AND PICKED UP FROM EACH CHARACTER.
3158                                    ;DATA CHECKING MAY BE TERMINATED BY USE OF
3159                                    ;CONSOLE SWITCH THIRTEEN (13).
3160                                    ;*******************************************************
3161
3162  013712  005037  000722       DCHK:   CLR     BBC             ;CLEAR BAD RECORD CNTR
3163  013716  005037  000744               CLR     DERFL           ;CLEAR DATA ERROR FLAG
3164  013722  005037  000726               CLR     HDRFL           ;CLEAR HEADER FLAG
3165  013726  013705  000622               MOV     CARCNT,R5       ;LOAD CHAR COUNT
3166  013732  012701  026200               MOV     #WDATA,R1       ;SET WRITE DATA ADDR
3167  013736  012702  032212               MOV     #RDATA,R2       ;SET READ DATA ADDR
3168  013742  032737  004000  000616       BIT     #4000,@DES      ;SEE IF EVEN PARITY
3169  013750  001435                       BEQ     DF0             ;IF NOT: BR
3170  013752  005737  001010               TST     STCDFL          ;SEE IF 7 TRK CORE DUMP
3171  013756  001032                       BNE     DF0             ;IF SO: BR
3172  013760  012703  000377               MOV     #377,R3
3173  013764  042703  177400               BIC     #177400,R3      ;BACKGROUND DATA MASK
3174  013770  032777  000020  164602       BIT     #20,@MTS        ;SEE IF 7 TRK DRIVE(NORMAL)
3175  013776  001402                       BEQ     DFA             ;IF NOT: BR
3176  014000  042703  000300               BIC     #300,R3         ;MASK FOR 7 TRK NORMAL DATA
3177  014004  130311               DFA:    BITB    R3,(R1)         ;SEE IF ZERO CHARACTER
3178  014006  001404                       BEQ     DFC
3179  014010  005201                       INC     R1              ;BUMP POINTER
3180  014012  005205               DFB:    INC     R5              ;SEE IF DONE
3181  014014  001373                       BNE     DFA             ;IF NOT: BR
3182  014016  000406                       BR      DFD
3183  014020  112721  000020       DFC:    MOVB    #20,(R1)+       ;REPLACE 0 WITH 20
3184  014024  012737  177777  012750       MOV     #-1,PATS        ;SET TO GENERATE NEW PATTERN
3185  014032  000767                       BR      DFB
3186  014034  013705  000622       DFD:    MOV     CARCNT,R5       ;RESET COUNT
3187  014040  012701  026200               MOV     #WDATA,R1       ;RESET ADDRESS
3188  014044  032777  000020  164526 DF0:  BIT     #20,@MTS        ;SEE IF 7 TRACK
3189  014052  001403                       BEQ     DF9             ;IF NOT: BR
3190  014054  005737  001010               TST     STCDFL          ;SEE IF 7 TRK CORE DUMP
3191  014060  001417                       BEQ     DF7             ;IF NOT: BR
3192  014062  122122               DF9:    CMPB    (R1)+,(R2)+     ;SEE IF DATA IS GOOD
3193  014064  001003                       BNE     DF91            ;IF NOT: BR
3194  014066  105037  000722               CLRB    BBC             ;ELSE CLEAR BAD RECORD COUNTER
3195  014072  000407                       BR      DF92
3196  014074  004737  014656       DF91:   JSR     PC,DRPKF        ;GO DO DROPS AND PICKS
3197  014100  004737  014242               JSR     PC,DERR         ;GO PRINT ERROR
3198  014104  012737  000001  000744       MOV     #1,DERFL        ;SET DATA ERROR FLAG
3199  014112  005205               DF92:   INC     R5              ;SEE IF DONE ALL CHARACTERS
3200  014114  001362                       BNE     DF9             ;IF NOT: DO ALL
3201  014116  000432                       BR      DF3
3202  014120  000240               DF7:    NOP
3203  014122  010137  014240               MOV     R1,STAS         ;SAVE CHARACTER ADDRESS
```

```
3204  014126  117737  000106  014236          MOVB    @STAS,STCS      ;SAVE CHARACTER
3205  014134  142711  000300                  BICB    #300,(R1)       ;MASK FOR 7 TRACK DRIVE
3206  014140  122122                          CMPB    (R1)+,(R2)+     ;SEE IF DATA IS GOOD
3207  014142  001003                          BNE     DF71            ;IF NOT: BR
3208  014144  105037  000722                  CLRB    BBC             ;CLEAR BAD RECORD COUNTER
3209  014150  000407                          BR      DF72
3210  014152  004737  014656          DF71:   JSR     PC,DRPKF        ;GO DO DROPS AND PICKS
3211  014156  004737  014242                  JSR     PC,DERR         ;GO PRINT ERROR
3212  014162  012737  000001  000744          MOV     #1,DERFL        ;SET DATA ERROR FLAG
3213  014170  000240                  DF72:   NOP
3214  014172  153777  014236  000040          BISB    STCS,@STAS      ;RESET DATA
3215  014200  005205                          INC     R5              ;SEE IF DONE ALL
3216  014202  001346                          BNE     DF7             ;IF NOT: DO ALL
3217  014204  005737  000744          DF3:    TST     DERFL           ;SEE IF HAD DATA ERROR
3218  014210  001411                          BEQ     DFX             ;IF NOT: BR
3219  014212  005737  000742                  TST     SERFL
3220  014216  001006                          BNE     DFX             ;IF NOT DATA ERROR ONLY: BR
3221  014220  013704  000734                  MOV     UNP,R4
3222  014224  005264  001134                  INC     DATER1(R4)      ;BUMP DATA ERROR COUNTER
3223  014230  004737  022120                  JSR     PC,CKSWR        ;CHECK FOR ↑G
3224  014234  000207                  DFX:    RTS     PC              ;EXIT
3225  014236  000000                  STCS:   0                       ;7 TRACK DATA SAVE
3226  014240  000000                  STAS:   0                       ;7 TRACK ADDRESS SAVE
```

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3227
3228                                    ;*****************************************************
3229                                    ;DATA ERROR SUBROUTINE:
3230                                    ;
3231                                    ;THIS SUBROUTINE IS USED TO PRINT OUT ANY
3232                                    ;ERRORS FOUND DURING THE DATA CHECK.
3233                                    ;EACH CHARACTER FOUND BAD WILL BE PRINTED
3234                                    ;IN BIT FORMAT ALONG WITH ITS EXPECTED CHARACTER.
3235                                    ;AN ERROR HEADER CONSISTING OF THE UNIT NUMBER,
3236                                    ;BLOCK NUMBER, RECORD NUMBER, SIZE OF RECORD, AND
3237                                    ;ERROR TYPE (READ FORWARD, WRITE, ETC)
3238                                    ;IS PRINTED ONLY ONCE FOR EACH RECORD FOUND BAD.
3239                                    ;A COUNT IS MADE OF THE NUMBER OF SUCCESSIVE BAD
3240                                    ;CHARACTERS, AND IF TEN (10) SUCCESSIVE BAD CHARACTERS
3241                                    ;ARE FOUND IN A SINGLE RECORD, A MESSAGE INDICATING
3242                                    ;A BAD RECORD CONDITION IS PRINTED AND THE NEXT
3243                                    ;TWENTY (20) CHARACTERS ARE SKIPPED BEFORE CHECKING
3244                                    ;IS RESUMED.  IF THE BAD RECORD CONDITION IS FOUND
3245                                    ;THREE TIMES IN A RECORD, ALL REMAINING DATA IS
3246                                    ;SKIPPED EXCEPT THE FINAL TEN (10) CHARACTERS.
3247                                    ;THIS SKIPPING IS OF COURSE ONLY POSSIBLE IN
3248                                    ;RECORDS WHICH CONTAIN A SUFFICIENT NUMBER OF CHARACTERS.
3249                                    ;PRINTING OF ERRORS MAY BE DISALLOWED AT ANY TIME
3250                                    ;BY SETTING CONSOLE SWITCH TEN (10) TO A ONE.
3251                                    ;THE OPERATOR MAY CAUSE THE PROGRAM TO HALT ON ANY ERROR
3252                                    ;BY SETTING CONSOLE SWITCH FIFTEEN (15) TO A ONE.
3253                                    ;*****************************************************
3254
3255  014242  032777  002000  164402  DERR:   BIT     #2000,@SWR      ;SEE IF SHOULD PRINT ERRORS
3256  014250  001402                  BEQ     DERR0           ;IF SO: BR
3257  014252  000137  014400          JMP     DERR4           ;ELSE SKIP PRINT
3258  014256  005237  000732          DERR0:  INC     PFLG            ;SET PRINT FLAG
3259  014262  005737  000726          TST     HDRFL           ;SEE IF HAVE PRINTED HEADER
3260  014266  001013                  BNE     DERR0A          ;IF SO: BR
3261  014270  005737  000742          TST     SERFL           ;ALREADY PRINTED HEADER?
3262  014274  001010                  BNE     DERR0A          ;IF SO:  BR
3263  014276  004737  017506          JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3264  014302  012704  022426          MOV     #MSG1,R4        ;LOAD ERROR MSG ADDR
3265  014306  004737  020530          JSR     PC,TTOUT        ;PRINT ERROR
3266  014312  004737  016742          JSR     PC,FRPRT        ;PRINT F OR R
3267  014316  012704  022445          DERR0A: MOV     #MSG4,R4
3268  014322  004737  020530          JSR     PC,TTOUT        ;PRINT CHAR NO. HEADER
3269  014326  010203                  MOV     R2,R3
3270  014330  162703  032212          SUB     #RDATA,R3       ;POINT TO CHAR
3271  014334  005303                  DEC     R3
3272  014336  004737  020716          DERR0B: JSR     PC,OCTP         ;PRINT CHAR NUMBER
3273  014342  012704  022433          MOV     #MSG2,R4
3274  014346  004737  020530          JSR     PC,TTOUT        ;PRINT EXPECTED DATA
3275  014352  114103                  MOVB    -(R1),R3        ;LOAD EXPECTED DATA
3276  014354  004737  021144          JSR     PC,DOUT         ;GO PRINT CHAR
3277  014360  012704  022440          MOV     #MSG3,R4
3278  014364  004737  020530          JSR     PC,TTOUT        ;PRINT RECEIVED DATA
3279  014370  114203                  DERR1:  MOVB    -(R2),R3
3280  014372  004737  021144          DERR2:  JSR     PC,DOUT         ;PRINT BAD CHAR
3281  014376  122122                  DERR3:  CMPB    (R1)+,(R2)+     ;RESET POINTERS
3282  014400  105237  000722          DERR4:  INCB    BBC             ;BUMP BAD RECORD CNTR
```

```
3283   014404  122737  000010  000722          CMPB    #10,BBC         ;SEE IF BLD BTH
3284   014412  001076                          BNE     DEREX           ;IF NOT: BR
3285   014414  032777  002000  164230          BIT     #2000,@SWR      ;SEE IF PRINT INHIBIT
3286   014422  001004                          BNE     1$              ;IF SO: BR
3287   014424  012704  022526                  MOV     #MSG15,R4
3288   014430  004737  020530                  JSR     PC,TTOUT        ;PRINT BLD BTH
3289   014434  105037  000722          1$:     CLRB    BBC             ;RESET BAD RECORD CNTR
3290   014440  000337  000722                  SWAB    BBC             ;POSITION BLD BTH AMOUNT
3291   014444  105237  000722                  INCB    BBC             ;BUMP AMOUNT
3292   014450  122737  000003  000722          CMPB    #3,BBC          ;SEE IF HAD 3 BLD BTHS
3293   014456  101037                          BHI     DERR4B          ;IF NOT: BR
3294   014460  000337  000722                  SWAB    BBC             ;REPOSITION BBC
3295   014464  022705  177767                  CMP     #177767,R5      ;SEE IF ON LAST EIGHT CHARS
3296   014470  101445                          BLOS    DERR6           ;IF SO: BR
3297   014472  012705  177767                  MOV     #177767,R5      ;SET CHAR CNTR TO 8
3298   014476  013737  000622  000706          MOV     CARCNT,TEMP1    ;LOAD CHAR COUNT
3299   014504  005137  000706                  COM     TEMP1
3300   014510  005237  000706                  INC     TEMP1
3301   014514  162737  000010  000706          SUB     #10,TEMP1       ;POINT TO BUFFER -8
3302   014522  013701  000706                  MOV     TEMP1,R1        ;POINT TO NEXT CHAR
3303   014526  062701  026200                  ADD     #WDATA,R1       ;POINT TO NEXT WRITE CHAR
3304   014532  013702  000706                  MOV     TEMP1,R2        ;POINT TO END OF READ DATA -8 FORWARD
3305   014536  062702  032212                  ADD     #RDATA,R2       ;POINT TO NEXT CHAR
3306   014542  000422                          BR      DEREX           ;EXIT
3307   014544  012702  000010          DERR4A: MOV     #10,R2          ;POINT TO THE END OF READ DATA -8 REVERSE
3308   014550  062702  032212                  ADD     #RDATA,R2       ;POINT TO THE NEXT CHAR
3309   014554  000415                          BR      DEREX           ;EXIT
3310   014556  000337  000722          DERR4B: SWAB    BBC             ;REPOSITION BBC
3311   014562  000241                          CLC
3312   014564  062705  000024                  ADD     #24,R5          ;SKIP 20 CHARS
3313   014570  103405                          BCS     DERR6           ;IF EXCEED RECORD SIZE: BR
3314   014572  062701  000024                  ADD     #24,R1          ;SKIP 20 CHARS
3315   014576  062702  000024          DERR5:  ADD     #24,R2          ;SKIP FORWARD 20 CHARS
3316   014602  000402                          BR      DEREX
3317   014604  012705  177777          DERR6:  MOV     #-1,R5          ;SET TO EOR
3318   014610  032777  100000  164034  DEREX:  BIT     #100000,@SWR    ;SEE IF SHOULD HALT ON ERROR
3319   014616  001412                          BEQ     DEREX1          ;IF NOT: BR
3320   014620  000000                          HALT
3321   014622  005737  000732                  TST     PFLG            ;SEE IF PRINTED
3322   014626  001006                          BNE     DEREX1          ;IF SO: BR
3323   014630  032777  002000  164014          BIT     #2000,@SWR      ;SEE IF SHOULD PRINT
3324   014636  001002                          BNE     DEREX1          ;IF NOT: BR
3325   014640  000137  014256                  JMP     DERR0           ;ELSE PRINT
3326   014644  004737  022120          DEREX1: JSR     PC,CKSWR        ;TEST FOR ↑G
3327   014650  005037  000732                  CLR     PFLG            ;CLEAR FLAG
3328   014654  000207                          RTS     PC              ;RETURN
3329
```

```
3330
3331                                    ;*********************************************************
3332                                    ;DROPS AND PICKS SUBROUTINE:
3333                                    ;
3334                                    ;THIS SUBROUTINE IS USED TO ACCUMULATE FROM
3335                                    ;EACH BAD DATA CHARACTER FOUND THE NUMBER
3336                                    ;OF BITS WHICH WERE EITHER DROPPED OR PICKED UP.
3337                                    ;TWO COUNTERS  ARE USED TO ACCUMULATE THIS
3338                                    ;INFORMATION AND CAN STORE UP TO 32K DROPS
3339                                    ;OR PICKS BEFORE OVERFLOWING.  IF OVERFLOW IS
3340                                    ;ABOUT TO OCCUR, THESE ACCUMULATORS ARE
3341                                    ;PRINTED IN OCTAL AND RESET TO ZERO.
3342                                    ;THE CONTENTS OF THE ACCUMULATORS MAY BE
3343                                    ;DISPLAYED AT ANY TIME BY SETTING CONSOLE
3344                                    ;SWITCH FOURTEEN TO A ONE (1). THE PRINTOUT WILL OCCUR
3345                                    ;AT THE END OF THE CURRENT BLOCK CYCLE.
3346                                    ;*********************************************************
3347
3348  014656  005037  000706        DRPKF:  CLR     TEMP1
3349  014662  005037  000710                CLR     TEMP2
3350  014666  005037  000712                CLR     TEMP3
3351  014672  013704  000734                MOV     UNP,R4
3352  014676  016437  001034  000770        MOV     PIK1(R4),BPKP
3353  014704  016437  001054  000766        MOV     DRP1(R4),BDPP
3354  014712  124142                        CMPB    -(R1),-(R2)     ;POINT TO CHAR
3355  014714  112137  000706                MOVB    (R1)+,TEMP1     ;LOAD GOOD CHAR
3356  014720  112237  000710                MOVB    (R2)+,TEMP2     ;LOAD BAD CHAR
3357  014724  004737  014736        DRPK:   JSR     PC,DROP         ;GET DROPS
3358  014730  004737  015156                JSR     PC,PICK         ;GET PICKS
3359  014734  000207                        RTS     PC              ;EXIT
3360  014736  113703  000706        DROP:   MOVB    TEMP1,R3        ;R3 = GOOD CHAR
3361  014742  113704  000710                MOVB    TEMP2,R4        ;R4 = BAD CHAR
3362  014746  140403                DPC:    BICB    R4,R3           ;GET DROPS/PICKS
3363  014750  001001                        BNE     DPCG            ;IF SOME: BR
3364  014752  000207                        RTS     PC              ;RETURN
3365  014754  012737  000010  000736 DPCG:  MOV     #10,BCNT        ;SET NUMBER TO CHECK
3366  014762  132703  000001        DPC0:   BITB    #1,R3           ;SEE IF DROPPED OR PICKED THIS BIT
3367  014766  001455                        BEQ     DPC2            ;IF NOT: BR
3368  014770  105737  000712                TSTB    TEMP3           ;SEE IF ON PICKS
3369  014774  001016                        BNE     DPC1            ;IF SO: BR
3370  014776  005277  163764                INC     @BDPP           ;BUMP DROP CNTR
3371  015002  005777  163760                TST     @BDPP
3372  015006  100045                        BPL     DPC2            ;IF NO OVERFLOW: BR
3373  015010  032777  002000  163634        BIT     #2000,@SWR      ;SEE IF HAVE PRINTED DATA
3374  015016  001402                        BEQ     DPC0A           ;IF SO: BR
3375  015020  004737  017506                JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3376  015024  004737  015222        DPC0A:  JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
3377  015030  000415                        BR      DPC2A
3378  015032  005277  163732        DPC1:   INC     @BPKP           ;BUMP PICK CNTR
3379  015036  005777  163726                TST     @BPKP           ;SEE IF OVERFLOW
3380  015042  100027                        BPL     DPC2            ;IF NOT: BR
3381  015044  032777  002000  163600        BIT     #2000,@SWR      ;SEE IF HAVE PRINTED DATA
3382  015052  001402                        BEQ     DPC1A           ;IF SO: BR
3383  015054  004737  017506                JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3384  015060  004737  015222        DPC1A:  JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
3385  015064  013704  000734        DPC2A:  MOV     UNP,R4
```

```
3386  015070  016403  001054                 MOV     DRP1(R4),R3     ;SET DROP POINTER
3387  015074  016404  001034                 MOV     PIK1(R4),R4     ;SET PICK POINTER
3388  015100  012737  000010  000736         MOV     #10,BCNT        ;SET NUMBER OF BITS
3389  015106  005023                 DPC2B:   CLR     (R3)+           ;CLEAR DROPS
3390  015110  005024                          CLR     (R4)+           ;CLEAR PICK
3391  015112  005337  000736                 DEC     BCNT            ;SEE IF DONE
3392  015116  001373                          BNE     DPC2B           ;IF NOT: BR
3393  015120  000207                          RTS     PC              ;EXIT
3394  015122  000241                 DPC2:    CLC
3395  015124  106003                          RORB    R3              ;GET NEXT BIT
3396  015126  005337  000736                 DEC     BCNT            ;SEE IF DONE
3397  015132  001410                          BEQ     DPC3
3398  015134  062737  000002  000770         ADD     #2,BPKP
3399  015142  062737  000002  000766         ADD     #2,BDPP
3400  015150  000137  014762                 JMP     DPC0            ;CONTINUE
3401  015154  000207                 DPC3:    RTS     PC              ;RETURN
3402  015156  013704  000734         PICK:    MOV     UNP,R4          ;SET UNIT POINTER
3403  015162  016437  001034  000770         MOV     PIK1(R4),BPKP   ;SET PICK POINTER
3404  015170  016437  001054  000766         MOV     DRP1(R4),BDPP   ;SET DROP POINTER
3405  015176  113704  000706                 MOVB    TEMP1,R4        ;R4 = GOOD CHAR
3406  015202  113703  000710                 MOVB    TEMP2,R3        ;R3 = BAD CHAR
3407  015206  112737  000001  000712         MOVB    #1,TEMP3        ;SET PICK FLAG
3408  015214  004737  014746                 JSR     PC,DPC          ;GO CHECK PICKS
3409  015220  000207                          RTS     PC              ;EXIT
3410  015222  012704  023113         DPPRT:   MOV     #MSG26,R4
3411  015226  004737  020530                 JSR     PC,TTOUT        ;PRINT DROP HEADER
3412  015232  013704  000734                 MOV     UNP,R4
3413  015236  016437  001054  000766         MOV     DRP1(R4),BDPP   ;SET DROP POINTER
3414  015244  016437  001034  000770         MOV     PIK1(R4),BPKP   ;SET PICK POINTER
3415  015252  062737  000016  000766         ADD     #16,BDPP
3416  015260  062737  000016  000770         ADD     #16,BPKP
3417  015266  012737  000010  000736         MOV     #10,BCNT        ;SET NUMBER TO PRINT
3418  015274  017703  163466         DPPRT0:  MOV     @BDPP,R3
3419  015300  004737  020716                 JSR     PC,OCTP         ;PRINT DROPS
3420  015304  005337  000736                 DEC     BCNT            ;SEE IF DONE
3421  015310  001404                          BEQ     DPPRT1          ;IF NOT: BR
3422  015312  162737  000002  000766         SUB     #2,BDPP         ;BUMP POINTER
3423  015320  000765                          BR      DPPRT0          ;CONTINUE FOR ALL 8 BITS
3424  015322  012737  000010  000736  DPPRT1: MOV     #10,BCNT        ;SET NUMBER TO PRINT
3425  015330  012704  023124                 MOV     #MSG27,R4
3426  015334  004737  020530                 JSR     PC,TTOUT        ;PRINT PICK HEADER
3427  015340  017703  163424         DPPRT2:  MOV     @BPKP,R3
3428  015344  004737  020716                 JSR     PC,OCTP         ;PRINT PICKS
3429  015350  005337  000736                 DEC     BCNT            ;SEE IF DONE
3430  015354  001404                          BEQ     DPPRTX          ;IF SO: BR
3431  015356  162737  000002  000770         SUB     #2,BPKP         ;BUMP POINTER
3432  015364  000765                          BR      DPPRT2          ;CONTINUE FOR ALL 8 BITS
3433  015366  000207                 DPPRTX:  RTS     PC              ;RETURN
```

```
3434                                    ;*************************************************************
3435                                    ;STATICSTICS PRINT
3436                                    ;
3437                                    ;THIS SUBROUTINE PRINTS THE ACCUMULATED
3438                                    ;ERROR STATISTICS FOR EACH DRIVE.
3439                                    ;THE ROUTINE CAN BE CALLED TO PRINT
3440                                    ;AT THE END OF EACH BLOCK BY SELECTING
3441                                    ;SW14=1.  THE SUMMARY IS AUTOMATICALLY
3442                                    ;PRINTED FOR A DRIVE WHENEVER A TAPE
3443                                    ;IS REWOUND FROM EOT OR DROPPED.
3444                                    ;*************************************************************
3445
3446  015370  012700  000001   PRSTAT: MOV     #1,R0           ;SET RECORD COUNTER TO 1
3447  015374  004737  017506           JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3448  015400  004737  015222   PRSTA2: JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
3449  015404  012704  024475           MOV     #MSG64,R4
3450  015410  004737  020530           JSR     PC,TTOUT        ;PRINT WRITE ERROR TAG
3451  015414  013704  000734           MOV     UNP,R4
3452  015420  016403  001074           MOV     WTER1(R4),R3
3453  015424  004737  020716           JSR     PC,OCTP         ;PRINT WRITE ERRORS
3454  015430  012704  024722           MOV     #MSG76,R4
3455  015434  004737  020530           JSR     PC,TTOUT        ;PRINT RETRY TOTAL
3456  015440  013704  000734           MOV     UNP,R4
3457  015444  016403  001154           MOV     RTY1(R4),R3
3458  015450  004737  020716           JSR     PC,OCTP         ;PRINT RETRIES
3459  015454  012704  024506           MOV     #MSG65,R4
3460  015460  004737  020530           JSR     PC,TTOUT        ;PRINT READ ERROR TAG
3461  015464  013704  000734           MOV     UNP,R4
3462  015470  016403  001114           MOV     RDER1(R4),R3
3463  015474  004737  020716           JSR     PC,OCTP         ;PRINT READ ERRORS
3464  015500  012704  024700           MOV     #MSG74,R4
3465  015504  004737  020530           JSR     PC,TTOUT        ;PRINT SOFT ERROR MESSAGE
3466  015510  013704  000734           MOV     UNP,R4
3467  015514  016403  001174           MOV     GDRTY1(R4),R3
3468  015520  004737  020716           JSR     PC,OCTP         ;PRINT SOFT ERROR NUMBER
3469  015524  012704  024711           MOV     #MSG75,R4
3470  015530  004737  020530           JSR     PC,TTOUT        ;PRINT HARD RD ERROR MESSG
3471  015534  013704  000734           MOV     UNP,R4
3472  015540  016403  001214           MOV     BDRTY1(R4),R3
3473  015544  004737  020716           JSR     PC,OCTP         ;PRINT HARD RD ERROR COUNT
3474  015550  012704  024517           MOV     #MSG66,R4
3475  015554  004737  020530           JSR     PC,TTOUT        ;PRINT DATA ERROR TAG
3476  015560  013704  000734           MOV     UNP,R4
3477  015564  016403  001134           MOV     DATER1(R4),R3
3478  015570  004737  020716           JSR     PC,OCTP         ;PRINT DATA ERROR NUMBER
3479  015574  004737  015606           JSR     PC,BTPRT        ;PRINT BAD TAPE STATS
3480  015600  004737  022120           JSR     PC,CKSWR        ;CHECK FOR ↑G
3481  015604  000207                   RTS     PC              ;RETURN
3482
```

```
3483
3484                                        ;BAD TAPE STATISTICS PRINT**********
3485
3486  015606  005037  000754        BTPRT:  CLR     RTYFL
3487  015612  012704  024530                MOV     #MSG67,R4
3488  015616  004737  020530                JSR     PC,TTOUT        ;DO CR/LF
3489  015622  013704  000734                MOV     UNP,R4
3490  015626  016437  002714  000762        MOV     BTADDR(R4),BTPT ;SET TABLE POINTER
3491  015634  017703  163122                MOV     @BTPT,R3
3492  015640  000241                        CLC
3493  015642  006003                        ROR     R3              ;CORRECT NUMBER
3494  015644  004737  020716                JSR     PC,OCTP         ;PRINT NUMBER OF BAD SPOTS
3495  015650  012704  024532                MOV     #MSG68,R4
3496  015654  004737  020530                JSR     PC,TTOUT        ;PRINT BAD TAPE TAG
3497  015660  005777  163076                TST     @BTPT           ;SEE IF ANY BAD SPOTS
3498  015664  001001                        BNE     BTOV0           ;IF SO: BR
3499  015666  000207                        RTS     PC
3500  015670  013701  000762        BTOV0:  MOV     BTPT,R1         ;SET TABLE POINTER
3501  015674  005721                        TST     (R1)+
3502  015676  005000                        CLR     R0
3503  015700  010003                BTOV1:  MOV     R0,R3
3504  015702  000241                        CLC
3505  015704  006003                        ROR     R3              ;R3=R3/2 FOR CORRECT NUMBER
3506  015706  004737  020716                JSR     PC,OCTP         ;PRINT ENTRY NUMBER
3507  015712  012704  022513                MOV     #MSG13,R4
3508  015716  105724                        TSTB    (R4)+           ;SKIP CR/LF
3509  015720  004737  020530                JSR     PC,TTOUT        ;PRINT BLOCK NUMBER TAG
3510  015724  011103                        MOV     (R1),R3
3511  015726  004737  020716                JSR     PC,OCTP         ;PRINT BLOCK NUMBER
3512  015732  012704  022521                MOV     #MSG14,R4
3513  015736  004737  020530                JSR     PC,TTOUT        ;PRINT RECORD NUMBER TAG
3514  015742  062701  000040                ADD     #40,R1
3515  015746  012103                        MOV     (R1)+,R3
3516  015750  004737  020716                JSR     PC,OCTP         ;PRINT RECORD NUMBER
3517  015754  162701  000040                SUB     #40,R1          ;RESET POINTER FOR BLOCK NUMBER
3518  015760  005720                        TST     (R0)+
3519  015762  020077  162774                CMP     R0,@BTPT        ;SEE IF DONE
3520  015766  001405                        BEQ     BTOV2
3521  015770  012704  024530                MOV     #MSG67,R4
3522  015774  004737  020530                JSR     PC,TTOUT        ;DO CR/LF
3523  016000  000737                        BR      BTOV1           ;CONTINUE
3524  016002  005737  000772        BTOV2:  TST     BTSTF           ;SEE IF STAT ONLY PRINT
3525  016006  001002                        BNE     BTOVX           ;IF SO:  BR
3526  016010  004737  016016                JSR     PC,BTCLR        ;CLEAR TABLE
3527  016014  000207                BTOVX:  RTS     PC              ;RETURN
3528
3529                                        ;CLEAR BAD TAPE TABLE
3530
3531  016016  012703  000041        BTCLR:  MOV     #41,R3          ;SET SIZE OF TABLE
3532  016022  013704  000762                MOV     BTPT,R4         ;SET POINTER
3533  016026  005024                BTCLR1: CLR     (R4)+           ;CLEAR ENTRY
3534  016030  005303                        DEC     R3              ;DONE?
3535  016032  001375                        BNE     BTCLR1          ;IF NOT: BR
3536  016034  000207                        RTS     PC              ;RETURN
```

```
3537                                    ;*******************************************************
3538                                    ;READ/WRITE STATUS CHECK SUBROUTINE:
3539                                    ;
3540                                    ;THIS SUBROUTINE IS USED TO PERFORM A CHECK
3541                                    ;OF THE TAPE STATUS REGISTER FOR ERRORS AND
3542                                    ;TO ASSURE A CORRECT CURRENT MEMORY ADDRESS
3543                                    ;AND CHARACTER COUNT AT THE END OF EACH TAPE
3544                                    ;OPERATION (READ OR WRITE).
3545                                    ;IF A STATUS ERROR IS INDICATED BY BIT FIFTEEN (15)
3546                                    ;OF THE COMMAND REGISTER BEING SET, THEN AN ERROR
3547                                    ;HEADER CONSISTING OF UNIT NUMBER, BLOCK NUMBER,
3548                                    ;RECORD NUMBER, RECORD SIZE, AND TYPE OF ERROR
3549                                    ;WILL BE PRINTED FOLLOWED BY THE CONTENTS OF
3550                                    ;THE COMMAND REGISTER AND STATUS REGISTER PLUS
3551                                    ;THE CURRENT MEMORY ADDRESS AND CHARACTER COUNT.
3552                                    ;IF NO STAUTS ERROR IS INDICATED, THE CHARACTER COUNT
3553                                    ;AND CURRENT MEMORY ADDRESS ARE BOTH CHECKED AND
3554                                    ;THE ENTIRE PRINT OUT IS DONE IF EITHER IS IN ERROR.
3555                                    ;ERROR PRINT OUTS MAY BE DISALLOWED BY SETTING CONSOLE
3556                                    ;SWITCH TEN (10) TO A ONE (1).
3557                                    ;THE PROGRAM MAY BE HALTED ON ANY ERROR BY SETTING
3558                                    ;CONSOLE SWITCH FIFTEEN TO A ONE (1).
3559                                    ;*******************************************************
3560
3561  016036  013703  000622   ERCHK:  MOV     CARCNT,R3       ;GET CHARACTER COUNT
3562  016042  004737  022120           JSR     PC,CKSWR        ;CHECK FOR ↑G
3563  016046  005037  000742           CLR     SERFL           ;CLEAR STATUS ERROR FLAG
3564  016052  005403                   NEG     R3
3565  016054  005737  000756           TST     TMFLG           ;A TM OPERATION?
3566  016060  001413                   BEQ     ERDA            ;IF NOT:  BR
3567  016062  012703  000002           MOV     #2,R3
3568  016066  005737  001010           TST     STCDFL          ;SEE IF 7 TRK CORE DUMP
3569  016072  001401                   BEQ     1$              ;IF NOT: BR
3570  016074  005303                   DEC     R3              ;SET TO ONE CHARACTER
3571  016076  032777  000004  162476  1$:     BIT     #4,@MTC         ;SEE IF A WRITE TM?
3572  016104  001401                   BEQ     ERDA            ;IF NOT: BR
3573  016106  005003                   CLR     R3              ;ELSE CLEAR R3
3574  016110  032777  000004  162464  ERDA:   BIT     #4,@MTC         ;SEE IF WRITE OP
3575  016116  001404                   BEQ     ER0
3576  016120  062703  026200           ADD     #WDATA,R3
3577  016124  000137  016134           JMP     ER1
3578  016130  062703  032212   ER0:    ADD     #RDATA,R3       ;ADD START OF BUFFER
3579  016134  010337  016740   ER1:    MOV     R3,CADER        ;SAVE EXPT ADDRESS
3580  016140  020377  162442           CMP     R3,@MDA         ;SEE IF ADDRESS OK
3581  016144  001105                   BNE     ER2             ;IF NOT: BR
3582  016146  017703  162432           MOV     @MWC,R3         ;GET CHARACTER COUNT
3583  016152  001102                   BNE     ER2             ;IF NOT ZERO: BR
3584  016154  005037  013706           CLR     LRCPT           ;CLEAR LPC PRINT FLAG
3585  016160  032777  000004  162414   BIT     #4,@MTC         ;A WRITE OP?
3586  016166  001045                   BNE     ER1B            ;IF SO:  BR
3587  016170  032777  000020  162402   BIT     #20,@MTS        ;SEE IF SEVEN TRACK DRIVE
3588  016176  001041                   BNE     ER1B            ;IF SO: BR
3589  016200  013737  013700  013704   MOV     EXLRC,LRCSV     ;SET FOR EXPECTED LPC
3590  016206  005737  000756           TST     TMFLG           ;IS IT A TM?
3591  016212  001404                   BEQ     1$              ;IF NOT:  BR
3592  016214  000432                   BR      ER1B
```

```
3593  016216  012737  000023  013704          MOV     #23,LRCSV       ;USE TM LPC
3594  016224  013704  000616          1$:     MOV     UDES,R4         ;GET UNIT DESCRIPTION
3595  016230  042704  117777                  BIC     #117777,R4      ;MASK DENSITY
3596  016234  022704  060000                  CMP     #60000,R4       ;SEE IF9 TRK DENSITY AT 800 BPI
3597  016240  001020                          BNE     ER1B            ;IF NOT: BR
3598  016242  017737  162342  013702          MOV     @MTD,ACTLRC     ;GET ACTUAL LPC
3599  016250  032777  020000  162374          BIT     #20000,@SWR     ;SEE IF NO DATA CHECK
3600  016256  001011                          BNE     ER1B            ;IF NOT: BR (ALLOW READ OF UNKNOWN TAPES)
3601  016260  005237  013706                  INC     LRCPT           ;SET LPC PRINT FLAG
3602  016264  042737  177000  013702          BIC     #177000,ACTLRC  ;JUST 9 BITS
3603  016272  023737  013702  013704          CMP     ACTLRC,LRCSV    ;DOES ACTUAL AGREE WITH EXPECTED?
3604  016300  001027                          BNE     ER2             ;IF NOT:  BR
3605  016302  032777  100000  162272  ER1B:   BIT     #100000,@MTC    ;SEE IF HAVE ERROR
3606  016310  001002                          BNE     1$              ;IF SO:  BR
3607  016312  000137  016720                  JMP     EREX
3608  016316  017737  162256  000740  1$:     MOV     @MTS,ERSAV      ;GET STATUS
3609  016324  005737  000756                  TST     TMFLG           ;A TM OPERATION?
3610  016330  001404                          BEQ     ER1A            ;IF NOT:  BR
3611  016332  042737  042125  000740          BIC     #42125,ERSAV    ;IGNORE TM INDICATOR AND WRL
3612  016340  001567                          BEQ     EREX            ;IF NO OTHER ERRORS: BR
3613  016342  005737  000760          ER1A:   TST     EOTREC          ;IS IT EOT
3614  016346  100004                          BPL     ER2             ;IF NOT:  BR
3615  016350  042737  032125  000740          BIC     #32125,ERSAV    ;IGNORE EOT INDICATOR
3616  016356  001560                          BEQ     EREX            ;IF NO OTHER ERRORS:  BR
3617  016360  005237  000742          ER2:    INC     SERFL           ;SET STATUS ERROR FLAG
3618  016364  032777  002000  162260          BIT     #2000,@SWR      ;SEE IF SHOULD PRINT ERRORS
3619  016372  001411                          BEQ     ER3             ;IF SO: BR
3620  016374  005737  000774                  TST     RRTYFL          ;SEE IF READ RETRY
3621  016400  001404                          BEQ     ER2A            ;IF NOT: BR
3622  016402  022737  000003  000752          CMP     #3,RTCNT        ;SEE IF LAST RETRY
3623  016410  001402                          BEQ     ER3             ;IF SO: BR
3624  016412  000137  016664          ER2A:   JMP     EREXO           ;ELSE EXIT
3625  016416  005237  000732          ER3:    INC     PFLG            ;SET PRINT FLAG
3626  016422  004737  017506                  JSR     PC,PAPRT        ;PRINT HEADER
3627  016426  013704  000716          ER3A:   MOV     EMADDR,R4
3628  016432  004737  020530          ER3B:   JSR     PC,TTOUT        ;PRINT ERROR HEADER
3629  016436  004737  016742                  JSR     PC,FRPRT        ;PRINT F OR R
3630  016442  005037  000712                  CLR     TEMP3
3631  016446  012704  022750                  MOV     #MSG23,R4
3632  016452  004737  020530                  JSR     PC,TTOUT        ;PRINT COMMAND HEADER
3633  016456  017703  162120                  MOV     @MTC,R3
3634  016462  000303          ER7:    SWAB    R3              ;POSITION MOST SIGNIFICANT
3635  016464  004737  021144                  JSR     PC,DOUT         ;PRINT REGISTER
3636  016470  000303                          SWAB    R3              ;POSITION LEAST SIGNIFICANT
3637  016472  004737  021144                  JSR     PC,DOUT         ;PRINT REGISTER
3638  016476  005737  000712                  TST     TEMP3           ;SEE IF PRINTED STATUS REGISTER
3639  016502  001012                          BNE     ER10            ;IF SO: BR
3640  016504  005237  000712                  INC     TEMP3           ;SET FLAG
3641  016510  012704  023135                  MOV     #MSG30,R4
3642  016514  004737  020530                  JSR     PC,TTOUT        ;PRINT STATUS HEADER
3643  016520  017703  162054                  MOV     @MTS,R3         ;LOAD STATUS REGISTER
3644  016524  000137  016462                  JMP     ER7             ;GO PRINT STATUS
3645  016530  012704  023643          ER10:   MOV     #MSG46,R4
3646  016534  004737  020530                  JSR     PC,TTOUT        ;PRINT CHARACTER COUNT HEADER
3647  016540  017703  162040                  MOV     @MWC,R3
3648  016544  005403                          NEG     R3              ;SET TO TRUE VALUE
```

```
3649  016546  004737  020716                  JSR     PC,OCTP         ;PRINT CHARACTER COUNT
3650  016552  012704  023650                  MOV     #MSG47,R4
3651  016556  004737  020530                  JSR     PC,TTOUT        ;PRINT ADDRESS HEADER
3652  016562  017703  162020                  MOV     @MDA,R3
3653  016566  004737  020716                  JSR     PC,OCTP         ;PRINT ADDRESS
3654  016572  012737  000255  000702          MOV     #255,TOB
3655  016600  004737  020670                  JSR     PC,TOG          ;PRINT /
3656  016604  013703  016740                  MOV     CADER,R3
3657  016610  004737  020716                  JSR     PC,OCTP         ;PRINT EXPT ADDRESS
3658  016614  005737  013706                  TST     LRCPT           ;WAS LPC CHECKED?
3659  016620  001421                          BEQ     EREXO           ;IF NOT:  BR
3660  016622  012704  025247                  MOV     #MSG83,R4
3661  016626  004737  020530                  JSR     PC,TTOUT        ;PRINT LPC TAG
3662  016632  013703  013702                  MOV     ACTLRC,R3
3663  016636  004737  020716                  JSR     PC,OCTP         ;PRINT ACTUAL  LPC
3664  016642  012737  000255  000702          MOV     #255,TOB
3665  016650  004737  020670                  JSR     PC,TOG          ;PRINT -
3666  016654  013703  013704                  MOV     LRCSV,R3
3667  016660  004737  020716                  JSR     PC,OCTP         ;PRINT EXPECTED LPC
3668  016664  032777  100000  161760  EREXO:  BIT     #100000,@SWR    ;SEE IF STOP ON ERROR
3669  016672  001412                          BEQ     EREX            ;IF NOT: BR
3670  016674  000000                          HALT
3671  016676  005737  000732                  TST     PFLG            ;SEE IF PRINT
3672  016702  001006                          BNE     EREX            ;IF SO: BR
3673  016704  032777  002000  161740          BIT     #2000,@SWR      ;SEE IF SHOULD PRINT
3674  016712  001002                          BNE     EREX            ;IF NOT: BR
3675  016714  000137  016416                  JMP     ER3             ;PRINT ERROR
3676  016720  004737  022120          EREX:   JSR     PC,CKSWR        ;GO TEST FOR ↑G
3677  016724  005037  000732                  CLR     PFLG            ;CLEAR FLAG
3678  016730  017737  161644  000740          MOV     @MTS,ERSAV      ;SAVE STATUS REGISTER
3679  016736  000207                          RTS     PC              ;RETURN
3680  016740  000000          CADER:  0                               ;EXPT ADDRESS SAVE LOCATION
3681
3682                                          ;*****************************************************
3683                                          ;F FOR FORWARD/R FOR REVERSE PRINT SUBROUTINE:
3684                                          ;
3685                                          ;THIS SUBROUTINE IS USED TO PRINT OUT THE
3686                                          ;TAPE DIRECTION USED WHEN ANY ERROR IS
3687                                          ;DETECTED IN STATUS OF READ OR WRITE, DATA, OR
3688                                          ;SPACING OPERATIONS.
3689                                          ;*****************************************************
3690
3691  016742  032777  000004  161632  FRPRT:  BIT     #4,@MTC         ;SEE IF WRITE COMMAND
3692  016750  001015                          BNE     FREX            ;IF SO: BR
3693  016752  032737  010000  000626          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3694  016760  001405                          BEQ     FRO             ;IF NOT: BR
3695  016762  012704  022564                  MOV     #MSG17,R4
3696  016766  004737  020530                  JSR     PC,TTOUT        ;PRINT R
3697  016772  000404                          BR      FREX
3698  016774  012704  022556          FRO:    MOV     #MSG16,R4
3699  017000  004737  020530                  JSR     PC,TTOUT        ;PRINT F
3700  017004  000207          FREX:   RTS     PC                      ;EXIT
```

```
3701
3702                                    ;*******************************************************
3703                                    ;TAPE COMMAND EXECUTE SUBROUTINE:
3704                                    ;
3705                                    ;THIS SUBROUTINE IS USED TO EXECUTE THE
3706                                    ;MAG TAPE COMMAND DESCRIBED BY THE READ
3707                                    ;OR WRITE ROUTINE.  THE FINAL COMMAND IS
3708                                    ;SENT TO THE DEVICE REGISTER ALONG WITH THE
3709                                    ;INTERRUPT ENABLE AND GO BITS.
3710                                    ;ONCE THE COMMAND IS ISSUED, AN INTERRUPT
3711                                    ;TIMER IS STARTED AND IF NO INTERRUPT IS RETURNED
3712                                    ;BEFORE TIME OUT OCCURS, AN ERROR WILL BE
3713                                    ;PRINTED AND THE PROGRAM STOPPED.  TESTING MAY
3714                                    ;BE RESUMED BY PRESSING THE CONTINUE BUTTON.
3715                                    ;TWO INTERRUPT HANDLERS ARE USED, ONE FOR MAG TAPE
3716                                    ;AND ANOTHER FOR TELETYPE (TTY).
3717                                    ;UPON RECEIPT OF A MAG TAPE INTERRUPT, HOUSEKEEPING
3718                                    ;IS PERFORMED AND CONTROL RETURNED TO THE CALLING
3719                                    ;ROUTINE (READ,WRITE,ETC).
3720                                    ;RECEIPT OF A TTY INTERRUPT WILL CAUSE THE
3721                                    ;PROGRAM TO CHECK FOR ENTRY OF A CNTRL C CHARACTER.
3722                                    ;IF NOT CNTRL C, THEN CONTINUATION OF WAIT FOR MAG
3723                                    ;TAPE INTERRUPT IS RETURNED.  IF, HOWEVER, THE TTY
3724                                    ;INTERRUPT WAS CAUSED BY ENTRY OF A CNTRL C,
3725                                    ;THEN AT THIS TIME REQUESTS FOR NEW STALL VALUES
3726                                    ;ARE PRINTED AND THE RESPONSES ENTERED.  RESUMPTION
3727                                    ;OF TAPE INTERRUPT WAIT IS THEN RESUMED.
3728                                    ;*******************************************************
3729
3730  017006  005037  000706           TAPG:   CLR     TEMP1
3731  017012  013704  000602                   MOV     MTC,R4          ;GET COMD REGISTER ADDRESS
3732  017016  005204                           INC     R4              ;BUMP TO HIGH BYTE
3733  017020  113714  000617                   MOVB    UDES+1,(R4)     ;LOAD UNIT DESCRIPTION
3734  017024  032777  000200  161550   TAPG0:  BIT     #200,@MTC       ;SEE IF HAVE READY
3735  017032  001035                           BNE     TAPG3           ;IF SO: BR
3736  017034  005237  000706                   INC     TEMP1           ;SEE IF TIMED OUT
3737  017040  001371                           BNE     TAPG0           ;WAIT FOR READY
3738  017042  004737  017506                   JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3739  017046  032777  000004  161526           BIT     #4,@MTC         ;SEE IF WRITE OP
3740  017054  001405                           BEQ     TAPG1           ;IF NOT: BR
3741  017056  012704  022452                   MOV     #MSG5,R4
3742  017062  004737  020530                   JSR     PC,TTOUT        ;PRINT WRITE ERR
3743  017066  000406                           BR      TAPG2
3744  017070  012704  022457           TAPG1:  MOV     #MSG6,R4
3745  017074  004737  020530                   JSR     PC,TTOUT        ;PRINT READ ERR
3746  017100  004737  016742                   JSR     PC,FRPRT        ;PRINT F OR R
3747  017104  012704  023007           TAPG2:  MOV     #MSG25,R4
3748  017110  004737  020530                   JSR     PC,TTOUT        ;PRINT NO READY ERR
3749  017114  000000           TAPG2A: HALT
3750  017116  005037  000734                   CLR     UNP             ;RESET UNIT POINTER
3751  017122  000137  003264                   JMP     STAUTO          ;RESTART
3752  017126  000240           TAPG3:  NOP
3753  017130  000240                   NOP
3754  017132  005037  000706                   CLR     TEMP1           ;SET DELAY
3755  017136  032777  000100  161434   1$:     BIT     #100,@MTS       ;SEE IF SELR
3756  017144  001013                           BNE     2$              ;IF SO: BR
```

```
3757  017146  005237  000706                  INC     TEMP1
3758  017152  001371                          BNE     1$              ;DELAY
3759  017154  004737  017506                  JSR     PC,PAPRT        ;PRINT HEADER
3760  017160  012704  026020                  MOV     #MSG95,R4
3761  017164  004737  020530                  JSR     PC,TTOUT        ;PRINT SELR LOST
3762  017170  000137  020050                  JMP     DRPDRV          ;GO DROP DRIVE
3763  017174  005077  161450          2$:     CLR     @PSW            ;SET TO PRIORITY 0
3764  017200  000240                          NOP
3765  017202  000240                          NOP
3766  017204  052777  000101  161370          BIS     #101,@MTC       ;SET INTERRUPT ENABLE AND GO
3767  017212  012704  020000                  MOV     #20000,R4
3768  017216  005003                          CLR     R3
3769  017220  032777  000004  161354          BIT     #4,@MTC         ;SEE IF WRITE OP
3770  017226  001042                          BNE     TAPG8           ;IF SO GO TO WRITE EOT WATCH
3771  017230  005303                  TAPG4:  DEC     R3
3772  017232  001376                          BNE     TAPG4
3773  017234  005304                          DEC     R4              ;SEE IF TIMED OUT
3774  017236  001374                          BNE     TAPG4
3775  017240  012777  000340  161402  TAPG5:  MOV     #340,@PSW       ;RESET PRIORITY
3776  017246  042777  000100  161326          BIC     #100,@MTC       ;CLEAR INTERRUPT ENABLE
3777  017254  032777  002000  161370          BIT     #2000,@SWR      ;SEE IF SHOULD PRINT ERRORS
3778  017262  001014                          BNE     TAPG6           ;IF NOT: BR
3779  017264  004737  017506                  JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3780  017270  013704  000716                  MOV     EMADDR,R4
3781  017274  004737  020530                  JSR     PC,TTOUT        ;PRINT ERROR OP
3782  017300  004737  016742                  JSR     PC,FRPRT        ;PRINT F OR R
3783  017304  012704  022757                  MOV     #MSG24,R4
3784  017310  004737  020530                  JSR     PC,TTOUT        ;PRINT NO INTERRUPT
3785  017314  032777  100000  161330  TAPG6:  BIT     #100000,@SWR    ;SEE IF SHOULD HALT ON ERROR
3786  017322  001401                          BEQ     TAPG7           ;IF NOT: BR
3787  017324  000000                          HALT
3788  017326  000240                  TAPG7:  NOP
3789  017330  000177  161370                  JMP     @RTRN           ;RETURN TO CALLING ROUTINE
3790  017334  032777  000010  161236  TAPG8:  BIT     #10,@MTS        ;SEE IF SDWN SET
3791  017342  001012                          BNE     2$              ;IF SO: BR
3792  017344  032777  002000  161226          BIT     #2000,@MTS      ;SEE IF EOT REACHED
3793  017352  001404                          BEQ     1$              ;IF NOT: BR
3794  017354  052737  000001  017402          BIS     #1,WEOTF        ;SET EOT FLAG
3795  017362  000402                          BR      2$
3796  017364  005037  017402          1$:     CLR     WEOTF           ;CLEAR FLAG
3797  017370  005303                  2$:     DEC     R3
3798  017372  001360                          BNE     TAPG8           ;DELAY
3799  017374  005304                          DEC     R4
3800  017376  001356                          BNE     TAPG8           ;DELAY
3801  017400  000717                          BR      TAPG5
3802  017402  000000                  WEOTF:  0
3803
```

```
                                        ;TTY INTERRUPT HANDLER**********
                                        
017404  012777  000340  161236  TTINT:  MOV     #340,@PSW       ;RESET PSW
017412  005077  161240                  CLR     @TKS            ;CLEAR TTY STATUS
017416  122777  000203  161234          CMPB    #203,@TKB       ;SEE IF CONT C
017424  001404                          BEQ     TTINT0          ;IF SO: BR
017426  004737  022120                  JSR     PC,CKSWR        ;GO CHECK FOR ↑G
017432  000240                          NOP
017434  000002                          RTI                     ;ELSE RETURN
017436  010037  000712          TTINT0: MOV     R0,TEMP3        ;SAVE R0(REC CNTR)
017442  004737  012164                  JSR     PC,TINP4        ;GO GET STALL VALUES
017446  013700  000712                  MOV     TEMP3,R0        ;RESTORE R0(REC CNTR)
017452  005077  161202                  CLR     @TKB            ;CLEAR TTY BUFFER
017456  012777  000100  161172          MOV     #100,@TKS       ;RESET INTERRUPT ENABLE
017464  000002                          RTI                     ;RETURN
                                        
                                        ;MAG TAPE INTERRUPT HANDLER**********
                                        
017466  022626                  MTINT:  CMP     (SP)+,(SP)+     ;RESET STACK POINTER
017470  042777  000100  161104          BIC     #100,@MTC       ;RESET INTERRUPT ENABLE
017476  000240                          NOP
017500  000240                          NOP
017502  000177  161216                  JMP     @RTRN           ;RETURN
                                        
                                        ;*****************************************************
                                        ;ERROR HEADER PRINT SUBROUTINE:
                                        ;
                                        ;THIS ROUTINE IS USED TO PRINT OUT A HEADER
                                        ;WITH EACH ERROR MESSAGE.  THE PRINT IS IN TWO
                                        ;LINES AND CONTAINS THE FOLLOWING INFORMATION.
                                        ;LINE 1:  UNIT NUMBER, DATA PATTERN NUMBER
                                        ;LINE 2:  CURRENT BLOCK NUMBER, RECORD NUMBER IN
                                        ;WHICH THE ERROR OCCURED PLUS THE TOTAL NUMBER
                                        ;OF RECORDS IN THIS BLOCK, THE RECORD SIZE (NUMBER
                                        ;OF CHARACTERS), AND THE ERROR TYPE (READ,WRITE, SPACE, ETC)
                                        ;PLUS THE TAPE DIRECTION (FORWARD OR REVERSE).
                                        ;ALL NUMBERS ARE IN OCTAL.
                                        ;*****************************************************
                                        
017506  012704  022476          PAPRT:  MOV     #MSG11,R4
017512  004737  020530                  JSR     PC,TTOUT        ;PRINT UNIT HEADER
017516  013703  000616                  MOV     UDES,R3
017522  000303                          SWAB    R3
017524  042703  177770                  BIC     #177770,R3
017530  004737  020716                  JSR     PC,OCTP         ;PRINT UNIT NUMBER
017534  012704  025560                  MOV     #MSG90,R4
017540  004737  020530                  JSR     PC,TTOUT        ;PRINT DENSITY TAG
017544  005003                          CLR     R3
017546  032737  020000  000616          BIT     #20000,UDES     ;SEE IF BIT 1 OF DENSITY=1
017554  001401                          BEQ     1$              ;IF NOT: BR
017556  005203                          INC     R3              ;ELSE SET BIT 1
017560  032737  040000  000616  1$:     BIT     #40000,UDES     ;SEE IF BIT 2 OF DENSITY=1
017566  001402                          BEQ     2$              ;IF NOT: BR
017570  052703  000002                  BIS     #2,R3           ;ELSE SET BIT 2
017574  004737  020716          2$:     JSR     PC,OCTP         ;PRINT DENSITY SETTING
```

```
3860  017600  012704  025566                    MOV     #MSG91,R4
3861  017604  004737  020530                    JSR     PC,TTOUT        ;PRINT PARITY TAG
3862  017610  005003                            CLR     R3
3863  017612  032737  004000  000616            BIT     #4000,UDES      ;SEE IF EVEN PARITY
3864  017620  001401                            BEQ     3$              ;IF NOT: BR
3865  017622  005203                            INC     R3              ;ELSE SET TO A ONE
3866  017624  004737  020716          3$:       JSR     PC,OCTP         ;PRINT PARITY
3867  017630  012704  025323                    MOV     #MSG86,R4
3868  017634  004737  020530                    JSR     PC,TTOUT        ;PRINT PATTRN TAG
3869  017640  032777  000400  161004            BIT     #400,@SWR       ;SEE IF RANDOM DATA
3870  017646  001406                            BEQ     PAPRTB          ;IF NOT:  BR
3871  017650  012737  000122  000702  PAPRTA:   MOV     #122,TOB
3872  017656  004737  020670                    JSR     PC,TOG          ;PRINT R
3873  017662  000412                            BR      PAPRTD
3874  017664  005737  021624          PAPRTB:   TST     ASEQF           ;SEE IF AUTO SEQ
3875  017670  001403                            BEQ     PAPRTC          ;IF NOT:  BR
3876  017672  005737  000624                    TST     PATRN           ;SEE IF AUTO RANDOM
3877  017676  100764                            BMI     PAPRTA          ;IF SO:  BR
3878  017700  013703  000624          PAPRTC:   MOV     PATRN,R3
3879  017704  004737  020716                    JSR     PC,OCTP         ;PRINT PATTRN NUMBER
3880  017710  012704  022513          PAPRTD:   MOV     #MSG13,R4
3881  017714  004737  020530                    JSR     PC,TTOUT        ;PRINT BLOCK NO. HEADER
3882  017720  013703  000720                    MOV     BLCNTR,R3
3883  017724  004737  020716                    JSR     PC,OCTP         ;PRINT NUMBER
3884  017730  012704  022521                    MOV     #MSG14,R4
3885  017734  004737  020530                    JSR     PC,TTOUT        ;PRINT REC NO. HEADER
3886  017740  010003                            MOV     R0,R3
3887  017742  032777  000004  160632            BIT     #4,@MTC         ;SEE IF WRITE OPERATION
3888  017750  001000                            BNE     PAPRT1          ;IF SO: BR
3889  017752  013703  000620          PAPRT1:   MOV     RCNT,R3
3890  017756  160003                            SUB     R0,R3           ;GET RECORD NUMBER
3891  017760  005203                            INC     R3
3892  017762  004737  020716          PAPRT2:   JSR     PC,OCTP         ;PRINT RECORD NUMBER
3893  017766  012737  000055  000702            MOV     #55,TOB         ;LOAD DASH (-)
3894  017774  004737  020670                    JSR     PC,TOG          ;PRINT DASH (-)
3895  020000  013703  000620                    MOV     RCNT,R3
3896  020004  004737  020716                    JSR     PC,OCTP         ;PRINT RECORD COUNT
3897  020010  012704  022464                    MOV     #MSG7,R4
3898  020014  004737  020530                    JSR     PC,TTOUT        ;PRINT RECORD SIZE HEADER
3899  020020  013703  000622                    MOV     CARCNT,R3       ;GET CHARACTER COUNT
3900  020024  005303                            DEC     R3
3901  020026  005103                            COM     R3              ;REMOVE TWOS COMPLEMENT
3902  020030  004737  020716                    JSR     PC,OCTP         ;PRINT RECORD SIZE
3903  020034  012737  000001  000726            MOV     #1,HDRFL        ;SET HEADER FLAG
3904  020042  004737  022120                    JSR     PC,CKSWR        ;TEST FOR ↑G
3905  020046  000207                            RTS     PC              ;RETURN
3906
```

```
3907
3908                                        ;DROP UNIT SUBROUTINE**********
3909
3910  020050  000240                DRPDRV: NOP
3911  020052  012777  010000  160522        MOV     #10000,@MTC     ;POWER CLEAR CONTROLLER
3912  020060  012704  025574                MOV     #MSG92,R4
3913  020064  004737  020530                JSR     PC,TTOUT        ;PRINT UNIT DROPPED
3914  020070  013703  000616                MOV     UDES,R3         ;GET UNIT DESCRIPTION
3915  020074  000303                        SWAB    R3
3916  020076  042703  177770                BIC     #177770,R3      ;MASK UNIT NUMBER
3917  020102  004737  020716                JSR     PC,OCTP         ;PRINT DROPPED UNIT NUMBER
3918  020106  012704  025620                MOV     #MSG93,R4
3919  020112  004737  020530                JSR     PC,TTOUT        ;PRINT REST OF MSG
3920  020116  013700  000734                MOV     UNP,R0          ;SET UNIT POINTER
3921  020122  052760  100200  001012        BIS     #100200,UN1(R0) ;SET DROPPED FLAG
3922  020130  005337  004716                DEC     REOTC           ;DECREMENT EOT UNIT COUTER
3923  020134  004737  015370                JSR     PC,PRSTAT       ;PRINT CURRENT STATS
3924  020140  005237  001006                INC     DUCTR           ;BUMP DROPPED UNIT COUNTER
3925  020144  123737  001006  004717        CMPB    DUCTR,REOTC+1   ;SEE IF DROPPED ALL UNITS
3926  020152  103406                        BLO     1$              ;IF NOT: BR
3927  020154  012704  026047                MOV     #MSG96,R4
3928  020160  004737  020530                JSR     PC,TTOUT        ;PRINT ALL DROPPED: STOP
3929  020164  000137  004640                JMP     REOT9           ;GO TO END ROUTINE
3930  020170  000240                1$:     NOP
3931  020172  005000                        CLR     R0
3932  020174  032760  100200  001012  2$:   BIT     #100200,UN1(R0) ;SEE IF ANY DRIVES LEFT IN THIS PASS
3933  020202  001414                        BEQ     3$              ;IF SO: BR
3934  020204  062700  000002                ADD     #2,R0           ;BUMP POINTER
3935  020210  022760  177777  001012        CMP     #-1,UN1(R0)     ;SEE IF LAST ENTRY
3936  020216  001366                        BNE     2$              ;IF NOT: BR
3937  020220  012704  025712                MOV     #MSG94,R4
3938  020224  004737  020530                JSR     PC,TTOUT        ;PRINT NO MORE UNITS
3939  020230  000137  004622                JMP     REOT8           ;GO TO END OF PASS ROUTINE
3940  020234  000137  004072          3$:   JMP     START7          ;GO TO NEXT UNIT
3941
3942                                        ;*****************************************************
3943                                        ;RANDOM NUMBER GENERATOR SUBROUTINE:
3944                                        ;
3945                                        ;THIS SUBROUTINE IS USED TO GENERATE THE RANDOM
3946                                        ;NUMBERS REQUIRED FOR USE AS RANDOM DATA,
3947                                        ;RECORD COUNT, AND CHARACTER COUNT.
3948                                        ;*****************************************************
3949
3950  020240  063737  000676  000672  RANG: ADD     RANSAV,RANBAS
3951  020246  063737  000672  000676        ADD     RANBAS,RANSAV   ;GET NEW NUMBER
3952  020254  023701  000676                CMP     RANSAV,R1       ;SEE IF NUMBER TOO BIG
3953  020260  101367                        BHI     RANG            ;IF SO: BR
3954  020262  020237  000676                CMP     R2,RANSAV       ;SEE IF NUMBER TOO SMALL
3955  020266  101364                        BHI     RANG            ;IF SO: BR
3956  020270  000207                        RTS     PC              ;EXIT
3957
```

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3958
3959                                    ;*********************************************************
3960                                    ;TTY ENTRY SUBROUTINE:
3961                                    ;
3962                                    ;THIS SUBROUTINE IS USED BY THE TEST CONDITION
3963                                    ;ENTRY ROUTINE TO READ THE RESPONSE ENTERED
3964                                    ;AT THE TTY AND CHECK THEM FOR LEGALITY AND
3965                                    ;LIMITS.  ALL RESPONSE MUST BE TYPED IN OCTAL
3966                                    ;(0-7) AND MUST FALL WITHIN THE LIMITS SET BY
3967                                    ;THE CALLING ROUTINE.
3968                                    ;IF AN ENTRY IS ILLEGAL OR OUTSIDE THE LIMITS,
3969                                    ;A QUESTION MARK IS TYPED (?) AND THE RESPONSE
3970                                    ;MAY BE REENTERED.
3971                                    ;ENTRIES MAY NOT EXCEED SIX (6) CHARACTERS AND
3972                                    ;MAY BE TERMINATED AT LESS THAN SIX BY TYPING A
3973                                    ;CARRIAGE RETURN
3974                                    ;*********************************************************
3975
3976  020272  005037  000706           TTR:    CLR     TEMP1           ;CLEAR FIRST CHARACTER FLAG
3977  020276  005000                    CLR     R0
3978  020300  004737  020456           TTR0:   JSR     PC,TTIN         ;GO READ CHARACTER
3979  020304  122737  000215  000704           CMPB    #215,TIB        ;SEE IF CR
3980  020312  001005                    BNE     TTR1            ;IF NOT: BR
3981  020314  005737  000706                    TST     TEMP1           ;SEE IF FIRST CHARACTER
3982  020320  001446                    BEQ     TTR5            ;IF SO: BR
3983  020322  000137  020414                    JMP     TTR2            ;ELSE GO LOAD VALUE
3984  020326  122737  000260  000704  TTR1:   CMPB    #260,TIB        ;SEE IF CHAR IS LESS THAN 0
3985  020334  101402                    BLOS    TTR1A           ;IF NOT: BR
3986  020336  000137  020440                    JMP     TINER           ;ELSE GO TO ERROR
3987  020342  122737  000270  000704  TTR1A:  CMPB    #270,TIB        ;SEE IF CHAR IS GREATER THAN 7
3988  020350  101002                    BHI     TTR1B           ;IF NOT: BR
3989  020352  000137  020440                    JMP     TINER           ;ELSE GO TO ERROR
3990  020356  005237  000706           TTR1B:  INC     TEMP1           ;SET FIRST CHARACTER FLAG
3991  020362  000241                    CLC
3992  020364  006100                    ROL     R0
3993  020366  000241                    CLC
3994  020370  006100                    ROL     R0              ;SHIFT 3 LEFT
3995  020372  000241                    CLC
3996  020374  006100                    ROL     R0
3997  020376  042737  177770  000704           BIC     #177770,TIB     ;STRIP ASCII
3998  020404  053700  000704                    BIS     TIB,R0          ;LOAD CHARACTER
3999  020410  005301                    DEC     R1              ;SEE IF DONE
4000  020412  001332                    BNE     TTR0            ;IF NOT: BR
4001  020414  020002                    TTR2:   CMP     R0,R2           ;SEE IF EXCEEDED MAXIMUM LIMIT
4002  020416  101402                    BLOS    TTR3            ;IF NOT: BR
4003  020420  000137  020440                    JMP     TINER           ;ELSE GO TO ERROR
4004  020424  020300                    TTR3:   CMP     R3,R0           ;SEE IF BELOW MINIMUM LIMIT
4005  020426  101402                    BLOS    TTR4            ;IF NOT: BR
4006  020430  000137  020440                    JMP     TINER           ;ELSE GO TO ERROR
4007  020434  010015                    TTR4:   MOV     R0,(R5)         ;LOAD VALUE
4008  020436  000207                    TTR5:   RTS     PC              ;EXIT
4009
```

```
4010
4011                                        ;TTY ENTRY ERROR SUBROUTINE**********
4012
4013  020440  012704  023576        TINER:  MOV     #MSG43,R4
4014  020444  004737  020530                JSR     PC,TTOUT        ;PRINT?
4015  020450  162716  000020                SUB     #20,(SP)        ;RESET SP TO START OF VALUE ROUTINE
4016  020454  000207                        RTS     PC              ;REDO VALUE ENTRY
4017
4018                                        ;TTY READ SUBROUTINE**********
4019
4020  020456  005077  160174        TTIN:   CLR     @TKS
4021  020462  005077  160172                CLR     @TKB
4022  020466  005037  000704                CLR     TIB
4023  020472  005277  160160                INC     @TKS
4024  020476  105777  160154        TTIN1:  TSTB    @TKS
4025  020502  100375                        BPL     TTIN1
4026  020504  017737  160150  000704        MOV     @TKB,TIB
4027  020512  105777  160144        TTIN2:  TSTB    @TPS
4028  020516  100375                        BPL     TTIN2
4029  020520  113777  000704  160136        MOVB    TIB,@TPB
4030  020526  000207                        RTS     PC
4031
4032                                        ;TTY OUTPUT SUBROUTINE***********
4033
4034  020530  112437  000702        TTOUT:  MOVB    (R4)+,TOB
4035  020534  122737  000043  000702        CMPB    #43,TOB
4036  020542  001460                        BEQ     TEX
4037  020544  122737  000045  000702        CMPB    #45,TOB
4038  020552  001407                        BEQ     TCRLF
4039  020554  122737  000041  000702        CMPB    #41,TOB
4040  020562  001434                        BEQ     TBELL
4041  020564  004737  020670                JSR     PC,TOG
4042  020570  000757                        BR      TTOUT
4043  020572  112737  000015  000702  TCRLF:  MOVB    #15,TOB
4044  020600  004737  020670                JSR     PC,TOG
4045  020604  012703  000004                MOV     #4,R3
4046  020610  005037  000702        TCRLFA: CLR     TOB
4047  020614  004737  020670                JSR     PC,TOG
4048  020620  005303                        DEC     R3
4049  020622  001372                        BNE     TCRLFA          ;DO FILLERS
4050  020624  112737  000012  000702        MOVB    #12,TOB
4051  020632  004737  020670                JSR     PC,TOG
4052  020636  105737  001004                TSTB    RDSW
4053  020642  100401                        BMI     1$
4054  020644  000731                        BR      TTOUT
4055  020646  005037  001004        1$:     CLR     RDSW
4056  020652  000414                        BR      TEX
4057  020654  112737  000007  000702  TBELL:  MOVB    #7,TOB
4058  020662  004737  020670                JSR     PC,TOG
4059  020666  000720                        BR      TTOUT
4060  020670  105777  157766        TOG:    TSTB    @TPS
4061  020674  100375                        BPL     TOG
4062  020676  113777  000702  157760        MOVB    TOB,@TPB
4063  020704  000207                TEX:    RTS     PC
4064
4065
```

```
4066                                                ;OCTAL OUTPUT SUBROUTINE************
4067
4068   020706  012737  000001  021142  OCTPE:  MOV     #1,OFL
4069   020714  000402                  BR      OCTPE1
4070   020716  005037  021142          OCTP:   CLR     OFL             ;CLEAR FLAG FOR LEADING ZERO
4071   020722  010304                  OCTPE1: MOV     R3,R4
4072   020724  001007                          BNE     OCTP0           ;IF NOT ZERO: BR
4073   020726  005737  021142                  TST     OFL
4074   020732  001004                          BNE     OCTP0
4075   020734  004737  021122                  JSR     PC,OCTPG1       ;ELSE PRINT ZERO
4076   020740  000137  021064                  JMP     OCTP3           ;SPACE AND EXIT
4077   020744  032704  100000          OCTP0:  BIT     #100000,R4      ;SEE IF MSD = 1
4078   020750  001406                          BEQ     OCTP1           ;IF NOT: BR
4079   020752  012704  000001                  MOV     #1,R4
4080   020756  004737  021100                  JSR     PC,OCTPG        ;PRINT 1
4081   020762  000137  020774                  JMP     OCTP2
4082   020766  005004                  OCTP1:  CLR     R4
4083   020770  004737  021100                  JSR     PC,OCTPG        ;PRINT 0
4084   020774  010304                  OCTP2:  MOV     R3,R4
4085   020776  006004                          ROR     R4
4086   021000  006004                          ROR     R4
4087   021002  006004                          ROR     R4              ;POSITION DIGIT
4088   021004  006004                          ROR     R4
4089   021006  000304                          SWAB    R4
4090   021010  004737  021100                  JSR     PC,OCTPG        ;PRINT DIGIT 2
4091   021014  010304                          MOV     R3,R4
4092   021016  006004                          ROR     R4
4093   021020  000304                          SWAB    R4
4094   021022  004737  021100                  JSR     PC,OCTPG        ;PRINT DIGIT 3
4095   021026  010304                          MOV     R3,R4
4096   021030  006104                          ROL     R4
4097   021032  006104                          ROL     R4
4098   021034  000304                          SWAB    R4
4099   021036  004737  021100                  JSR     PC,OCTPG        ;PRINT DIGIT 4
4100   021042  010304                          MOV     R3,R4
4101   021044  006004                          ROR     R4
4102   021046  006004                          ROR     R4
4103   021050  006004                          ROR     R4
4104   021052  004737  021100                  JSR     PC,OCTPG
4105   021056  010304                          MOV     R3,R4
4106   021060  004737  021100                  JSR     PC,OCTPG        ;PRINT DIGIT 5
4107   021064  012737  000240  000702  OCTP3:  MOV     #240,TOB
4108   021072  004737  020670                  JSR     PC,TOG          ;PRINT SPACE
4109   021076  000207                          RTS     PC              ;EXIT
4110   021100  042704  177770          OCTPG:  BIC     #177770,R4
4111   021104  001004                          BNE     OCTPGO
4112   021106  005737  021142                  TST     OFL
4113   021112  001001                          BNE     OCTPGO
4114   021114  000207                          RTS     PC
4115   021116  005237  021142          OCTPGO: INC     OFL
4116   021122  052704  000260          OCTPG1: BIS     #260,R4
4117   021126  010437  000702                  MOV     R4,TOB
4118   021132  004737  020670                  JSR     PC,TOG
4119   021136  010304                          MOV     R3,R4
4120   021140  000207                          RTS     PC
4121   021142  000000                  OFL:    0                       ;FIRST CHAR FLAG
```

```
                                                ;DATA CHARACTER OUTPUT SUBROUTINE************
021144  005037  000702          DOUT:   CLR     TOB
021150  012704  000010                  MOV     #10,R4          ;SET NUMBER TO PRINT
021154  110337  000702                  MOVB    R3,TOB
021160  105777  157476          DOUT1:  TSTB    @TPS
021164  100375                          BPL     DOUT1
021166  132737  000200  000702          BITB    #200,TOB
021174  001404                          BEQ     DOUT2
021176  012777  000061  157460          MOV     #061,@TPB
021204  000403                          BR      DOUT3
021206  012777  000060  157450  DOUT2:  MOV     #060,@TPB
021214  006137  000702          DOUT3:  ROL     TOB
021220  005304                          DEC     R4
021222  001356                          BNE     DOUT1
021224  000207                          RTS     PC

                                                ;ASSURE VALID STATUS DELAY SUBROUTINE********
021226  005777  157360          STDLY:  TST     @MTRD
021232  100775                          BMI     STDLY           ;AWAIT TIMER = 0
021234  005777  157352          1$:     TST     @MTRD
021240  100375                          BPL     1$              ;AWAIT TIMER =1
021242  005777  157344          2$:     TST     @MTRD
021246  100775                          BMI     2$              ;AWAIT TIMER = 0
021250  000207                          RTS     PC              ;EXIT
```

```
4150                                        ;AUTO SEQUENCE TEST ROUTINE**********
4151
4152  021252  012704  025036        ASEQ:   MOV     #MSG78,R4
4153  021256  004737  020530                JSR     PC,TTOUT        ;PRINT CONT. REQUEST
4154  021262  013703  021626                MOV     ASEQCF,R3
4155  021266  004737  020716                JSR     PC,OCTP         ;PRINT CURRENT VALUE
4156  021272  012705  021626                MOV     #ASEQCF,R5      ;SET ENTRY ADDRESS
4157  021276  012701  000001                MOV     #1,R1           ;SET SIZE OF ENTRY
4158  021302  012702  000001                MOV     #1,R2           ;SET UPPER LIMIT
4159  021306  005003                       CLR     R3              ;SET LOWER LIMIT
4160  021310  004737  020272                JSR     PC,TTR          ;GET INPUT
4161
4162  021314  004737  021630        ASEQ0:  JSR     PC,HRDS         ;SELECT HARDWARE CONFIGURATION
4163  021320  012704  025053                MOV     #MSG79,R4
4164  021324  004737  020530                JSR     PC,TTOUT        ;PRINT DIVIDER
4165  021330  012704  025121                MOV     #MSG80,R4
4166  021334  004737  020530                JSR     PC,TTOUT        ;PRINT UNITS NUMBER MESSG.
4167  021340  012700  001012                MOV     #UN1,R0         ;POINT TOP OF DRIVE TABLE
4168  021344  005710                ASEQ2:  TST     (R0)            ;SEE IF END
4169  021346  100424                       BMI     AMOD1           ;IF SO: BR
4170  021350  011037  000706                MOV     (R0),TEMP1      ;GET UNIT DESCRIPTION
4171  021354  113703  000707                MOVB    TEMP1+1,R3      ;POSITION AND
4172  021360  042703  177770                BIC     #177770,R3      ;  MASK UNIT NUMBER
4173  021364  004737  020716                JSR     PC,OCTP         ;PRINT DRIVE TABLE
4174  021370  012704  023726                MOV     #MSG51,R4       ;PRESET FOR 9 TRK MSG
4175  021374  032710  020000                BIT     #20000,(R0)     ;SEE IF 7 TRK
4176  021400  001002                       BNE     1$              ;IF NOT: BR
4177  021402  012704  023717                MOV     #MSG50,R4       ;SET TO 7 TRK MSG
4178  021406  004737  020530        1$:     JSR     PC,TTOUT        ;PRINT TRK MSG
4179  021412  062700  000002                ADD     #2,R0           ;BUMP POINTER
4180  021416  000752                       BR      ASEQ2           ;DO ALL
4181  021420  005037  000720        AMOD1:  CLR     BLCNTR
4182
4183  021424  004737  004732        AMOD1B: JSR     PC,RWNDA                ;GO REWIND ALL DRIVES
4184  021430  012737  000006  021622        MOV     #6,ABLCNT       ;SET NUMBER OF BLOCKS
4185  021436  012737  174000  000622        MOV     #-4000,CARCNT   ;SET RECORD SIZE
4186  021444  012737  000100  000620        MOV     #100,RCNT       ;SET RECORD COUNT
4187  021452  012737  000003  000624        MOV     #3,PATRN        ;SELECT PATTERN 3
4188  021460  005037  000646                CLR     TMEX            ;ASSURE NO TM
4189  021464  004737  003264                JSR     PC,STAUTO       ;GO DO THIS PATTERN
4190  021470  012737  000007  000624        MOV     #7,PATRN        ;SELECT PATTERN 7
4191  021476  004737  003264                JSR     PC,STAUTO       ;GO DO THIS PATTERN
4192  021502  012737  000011  000624        MOV     #11,PATRN       ;SELECT PATTERN 11
4193  021510  004737  003264                JSR     PC,STAUTO       ;GO DO THIS PATTERN
4194  021514  012737  177777  021622        MOV     #-1,ABLCNT      ;FORCE TO END OF TAPE
4195  021522  012737  177777  000624        MOV     #-1,PATRN       ;SELECT AUTO RANDOM DATA
4196  021530  012737  152634  000672        MOV     #152634,RANBAS
4197  021536  012737  032561  000676        MOV     #32561,RANSAV   ;RESET RANDOM DATA BASE
4198  021544  004737  003264                JSR     PC,STAUTO       ;GO DO RANDOM
4199  021550  012704  025053                MOV     #MSG79,R4
4200  021554  004737  020530                JSR     PC,TTOUT        ;PRINT DIVIDER
4201  021560  012704  025145        ASEQX:  MOV     #MSG81,R4
4202  021564  004737  020530                JSR     PC,TTOUT
4203  021570  005737  021626                TST     ASEQCF          ;SEE IF CONTINUOUS AUTO SEQ
4204  021574  001001                       BNE     ASEQXX          ;IF SO: BR
4205  021576  000000                       HALT
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 4206  021600  004737  022120          ASEQXX: JSR     PC,CKSWR        ;TEST FOR ↑G
 4207  021604  005237  000776                  INC     SEQCT           ;BUMP PASS COUNT
 4208  021610  013703  000776                  MOV     SEQCT,R3
 4209  021614  004737  020716                  JSR     PC,OCTP         ;PRINT PASS COUNT
 4210  021620  000635                          BR      ASEQO
 4211  021622  000000          ABLCNT: 0
 4212  021624  000000          ASEQF:  0
 4213  021626  000000          ASEQCF: 0
 4214
 4215                                          ;SUBROUTINE TO SELECT AUTO SEQ HARDWARE**********
 4216
 4217  021630  005003          HRDS:   CLR     R3              ;CLEAR TABLE POINTER
 4218  021632  005037  000706          CLR     TEMP1           ;CLEAR UNIT DESCRIPTION HOLDER
 4219  021636  005037  000712          CLR     TEMP3           ;UNIT COUNT
 4220  021642  005037  004716          CLR     REOTC           ;CLEAR EOT COUNTER
 4221  021646  005037  000710          CLR     TEMP2           ;CLEAR UNIT INCREMENT
 4222  021652  012777  010000  156722  HRDS1:  MOV     #10000,@MTC     ;POWER CLEAR CONTROLLER
 4223  021660  113737  000710  000707          MOVB    TEMP2,TEMP1+1   ;POSITION UNIT NUMBER
 4224  021666  013777  000706  156706          MOV     TEMP1,@MTC      ;SELECT DRIVE
 4225  021674  004737  021226                  JSR     PC,STDLY        ;GO ASSURE VALID STATUS
 4226  021700  032777  000001  156672          BIT     #1,@MTS         ;SEE IF AVAIL
 4227  021706  001421                          BEQ     HRDS2           ;IF NOT: BR
 4228  021710  052737  060000  000706          BIS     #60000,TEMP1    ;SET DENSITY AND PARITY
 4229  021716  032777  000020  156654          BIT     #20,@MTS        ;SEE IF 7 TRK
 4230  021724  001403                          BEQ     1$              ;IF NOT: BR
 4231  021726  042737  020000  000706          BIC     #20000,TEMP1    ;ELSE SET TO 7 TRK NORMAL DENSITY
 4232  021734  013763  000706  001012  1$:     MOV     TEMP1,UN1(R3)   ;PUT IN TABLE
 4233  021742  062703  000002                  ADD     #2,R3
 4234  021746  005237  000712                  INC     TEMP3           ;INCREMENT COUNT
 4235
 4236  021752  005237  000710          HRDS2:  INC     TEMP2           ;SET FOR NEXT UNIT
 4237  021756  022737  000010  000710          CMP     #10,TEMP2       ;DONE?
 4238  021764  001335                          BNE     HRDS1           ;IF NOT: BR
 4239  021766  005703                          TST     R3              ;FOUND A UNIT?
 4240  021770  001007                          BNE     HRDSX           ;IF SO: BR
 4241  021772  012704  025173                  MOV     #MSG82,R4
 4242  021776  004737  020530                  JSR     PC,TTOUT        ;TYPE NO UNIT AVAILABLE
 4243  022002  000000                          HALT                    ;HALT
 4244  022004  000137  003106                  JMP     STAUT           ;START AUTO SEQ AGAIN
 4245  022010  012763  177777  001012  HRDSX:  MOV     #-1,UN1(R3)     ;MARK END OF TABLE
 4246  022016  013737  000712  004716          MOV     TEMP3,REOTC     ;SET NUMBER OF UNITS
 4247  022024  000337  000712                  SWAB    TEMP3
 4248  022030  053737  000712  004716          BIS     TEMP3,REOTC     ;SET EOT CNTR
 4249  022036  000207                          RTS     PC              ;RETURN
 4250
 4251
 4252  022040  013746  000006          SUSWR:  MOV     @#6,-(SP)               ;SAVE VECTORS
 4253  022044  013746  000004                  MOV     @#4,-(SP)
 4254  022050  012737  022070  000004          MOV     #1$,@#4                 ;SET UP FOR TIMEOUT
 4255  022056  022777  177777  156566          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
 4256  022064  001402                          BEQ     2$
 4257  022066  000407                          BR      3$
 4258  022070  022626          1$:     CMP     (SP)+,(SP)+             ;ADJUST STACK
 4259  022072  012737  000176  000652  2$:     MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
 4260  022100  012737  000174  000654          MOV     #DISPREG,DISPLAY                ;POINT TO SOFT DISPLAY REG
 4261  022106  012637  000004          3$:     MOV     (SP)+,@#4               ;RESTORE VECTORS
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4262  022112  012637  000006                    MOV     (SP)+,@#6
4263  022116  000207                            RTS     PC                      ;RETURN
4264
4265  022120  022737  000176  000652  CKSWR:    CMP     #SWREG,SWR              ;SOFTWARE SWITCH REG PRESENT
4266  022126  001036                            BNE     OUT                     ;NO, GET OUT
4267  022130  017737  156524  000704            MOV     @TKB,TIB                ;AND STRIP OFF
4268  022136  042737  177600  000704            BIC     #177600,TIB             ;THE GARBAGE
4269  022144  022737  000007  000704            CMP     #7,TIB          ;IS IT A <↑G>
4270  022152  001024                            BNE     OUT
4271  022154  012704  026154                    MOV     #$CNTG,R4
4272  022160  004737  020530                    JSR     PC,TTOUT
4273  022164  012704  026160          CNTLU:    MOV     #$MSWR,R4
4274  022170  004737  020530                    JSR     PC,TTOUT
4275  022174  017703  156452                    MOV     @SWR,R3
4276  022200  004737  020706                    JSR     PC,OCTPE
4277  022204  012704  026170                    MOV     #$MNEW,R4
4278  022210  004737  020530                    JSR     PC,TTOUT
4279  022214  005037  001002                    CLR     @#TEMPST
4280  022220  004737  022226                    JSR     PC,$READ                ;GO READ A LINE
4281  022224  000207                  OUT:      RTS     PC                      ;RETURN TO MAIN BODY OF PROGRAM
4282
4283  022226  005037  001002            $READ:  CLR     TEMPST
4284  022232  012737  000007  001000            MOV     #7,COUNT
4285  022240  004737  020456            1$:     JSR     PC,TTIN         ;GO  READ A CHARACTER
4286  022244  042737  177600  000704            BIC     #177600,TIB     ;STRIP OFF GARBAGE
4287  022252  122737  000025  000704            CMPB    #25,TIB         ;IS IT A ↑U?
4288  022260  001002                            BNE     2$              ;BRANCH IF NOT
4289  022262  005726                  3$:       TST     (SP)+           ;POP THE STACK
4290  022264  000737                            BR      CNTLU           ;START OVER
4291  022266  122737  000015  000704  2$:       CMPB    #15,TIB         ;IS IT A <CR>?
4292  022274  001013                            BNE     4$              ;BRANCH IF NOT
4293  022276  012737  000200  001004            MOV     #200,RDSW
4294  022304  004737  020572                    JSR     PC,TCRLF        ;ECHO IT WITH <LF>
4295  022310  022737  000007  001000            CMP     #7,COUNT        ;WAS IT FIRST CHARACTER
4296  022316  001037                            BNE     7$              ;CHANGE SWR IF NOT FIRST ONE
4297  022320  005726                  8$:       TST     (SP)+           ;POP THE STACK
4298  022322  000740                            BR      OUT             ;GET OUT
4299  022324  122737  000060  000704  4$:       CMPB    #60,TIB
4300  022332  003004                            BGT     5$
4301  022334  122737  000067  000704            CMPB    #67,TIB
4302  022342  002005                            BGE     6$
4303  022344  012704  023576            5$:     MOV     #MSG43,R4
4304  022350  004737  020530                    JSR     PC,TTOUT
4305  022354  000742                            BR      3$              ;START OVER IF NOT LEGAL CHARACTER
4306  022356  006337  001002            6$:     ASL     TEMPST
4307  022362  006337  001002                    ASL     TEMPST
4308  022366  006337  001002                    ASL     TEMPST
4309  022372  142737  000060  000704            BICB    #60,TIB         ;GET NITTY-GRITTY
4310  022400  153737  000704  001002            BISB    TIB,TEMPST
4311  022406  005337  001000                    DEC     COUNT           ;ONLY WANT 6   DIGITS
4312  022412  001754                            BEQ     5$
4313  022414  000711                            BR      1$
4314  022416  013777  001002  156226  7$:       MOV     TEMPST,@SWR     ;CHANGE SWITCH REGISTER CONTENTS
4315  022424  000735                            BR      8$
4316
4317
```

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                                                ;ERROR MESSAGES***********

022426  042052  020105     043  MSG1:   .ASCII  /*DE #/

022433     045  035507  021440  MSG2:   .ASCII  /%G; #/

022440  041045  020073     043  MSG3:   .ASCII  /%B; #/

022445     045  047103  021440  MSG4:   .ASCII  /%CN #/

022452  053452  020105     043  MSG5:   .ASCII  /*WE #/

022457     052  042522  021440  MSG6:   .ASCII  /*RE #/

022464  051052  020123     043  MSG7:   .ASCII  /*RS #/

022471     052  042523  021440  MSG10:  .ASCII  /*SE #/

022476  022445  052445  044516  MSG11:  .ASCII  /%%%UNIT NO. #/
022504  020124  047516  020056
022512     043

022513     045  041052  020116  MSG13:  .ASCII  /%*BN #/
022520     043

022521     052  047122  021440  MSG14:  .ASCII  /*RN #/

022526  020045  020040  020040  MSG15:  .ASCII  /%          BAD RECORD%%#/
022534  020040  020040  041040
022542  042101  051040  041505
022550  051117  022504  021445

022556  043040  025052  021452  MSG16:  .ASCII  / F***#/

022564  051040  025052  021452  MSG17:  .ASCII  / R***#/

022572  042445  052117  020040  MSG20:  .ASCII  /%EOT   NO. #/
022600  047040  027117  021440
022606  052445  044516  020124  MSG20A: .ASCII  /%UNIT WILL REWIND AND BE%/
022614  044527  046114  051040
022622  053505  047111  020104
022630  047101  020104  042502
022636     045
022637     122  051505  040524          .ASCII  /RESTARTED ON BLOCK ONE%/
022644  052122  042105  047440
022652  020116  046102  041517
022660  020113  047117  022505
022666  044127  047105  040440          .ASCII  /WHEN ALL AVAIL UNITS REACH EOT#/
022674  046114  040440  040526
022702  046111  052440  044516
022710  051524  051040  040505
022716  044103  042440  052117
022724     043
```

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4374  022725    045  020441  044441  MSG22:  .ASCII  /%!!!ILLEGAL BOT%%%#/
4375  022732 046114  043505  046101
4376  022740 041040  052117  022445
4377  022746 021445
4378
4379  022750 041445  046517  020104  MSG23:  .ASCII  /%COMD #/
4380  022756    043
4381
4382  022757    045  047516  044440  MSG24:  .ASCII  /%NO INTERRUPT RETURNED%#/
4383  022764 052116  051105  052522
4384  022772 052120  051040  052105
4385  023000 051125  042516  022504
4386  023006    043
4387
4388  023007    045  020441  047041  MSG25:  .ASCII  /%!!!NO CONTROLLER READY !!! STOP:%/
4389  023014 020117  047503  052116
4390  023022 047522  046114  051105
4391  023030 051040  040505  054504
4392  023036 020440  020441  051440
4393  023044 047524  035120    045
4394  023051    120  042522  051523          .ASCII  /PRESS CONTINUE TO RESUME TESTING%#/
4395  023056 041440  047117  044524
4396  023064 052516  020105  047524
4397  023072 051040  051505  046525
4398  023100 020105  042524  052123
4399  023106 047111  022507    043
4400
4401  023113    045  051104  050117  MSG26:  .ASCII  /%DROPS: #/
4402  023120 035123  021440
4403
4404  023124 050045  041511  051513  MSG27:  .ASCII  /%PICKS: #/
4405  023132 020072    043
4406
4407  023135    045  052123  052101  MSG30:  .ASCII  /%STAT #/
4408  023142 021440
4409
4410  023144 022445  046524  040454  MSG31:  .ASCII  /%%TM,A,B-11:TS03 OR TU10,N,W MULTIDRIVE DATA RELIABILTY EXERCISER (DZTM
4411  023152 041054  030455  035061
4412  023160 051524  031460  047440
4413  023166 020122  052524  030061
4414  023174 047054  053454  046440
4415  023202 046125  044524  051104
4416  023210 053111  020105  040504
4417  023216 040524  051040  046105
4418  023224 040511  044502  052114
4419  023232 020131  054105  051105
4420  023240 044503  042523  020122
4421  023246 042050  052132  044115
4422  023254 042055  022451    043
4423  023261    105  052116  051105  MSG31A: .ASCII  /ENTER CONDITIONS IN OCTAL%#/
4424  023266 041440  047117  044504
4425  023274 044524  047117  020123
4426  023302 047111  047440  052103
4427  023310 046101  021445
4428
4429  023314 052445  044516  020124  MSG32:  .ASCII  /%UNIT NUMBER = #/
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 4430  023322  052516  041115  051105
 4431  023330  036440  021440
 4432
 4433  023334  042045  047105  044523  MSG33:  .ASCII  /%DENSITY = #/
 4434  023342  054524  036440  021440
 4435
 4436  023350  050045  051101  052111  MSG34:  .ASCII  /%PARITY = #/
 4437  023356  020131  020075     043
 4438
 4439  023363     045  042522  047503  MSG35:  .ASCII  /%RECORD COUNT = #/
 4440  023370  042122  041440  052517
 4441  023376  052116  036440  021440
 4442
 4443  023404  041445  040510  040522  MSG36:  .ASCII  /%CHARACTER COUNT = #/
 4444  023412  052103  051105  041440
 4445  023420  052517  052116  036440
 4446  023426  021440
 4447
 4448  023430  050045  052101  042524  MSG37:  .ASCII  /%PATTERN NUMBER = #/
 4449  023436  047122  047040  046525
 4450  023444  042502  020122  020075
 4451  023452     043
 4452
 4453  023453     045  044523  043516  MSG38:  .ASCII  /%SINGLE PASS = #/
 4454  023460  042514  050040  051501
 4455  023466  020123  020075     043
 4456  023473     041  042445  042116  MSG39:  .ASCII  /!%END OF PASS  !!#/
 4457  023500  047440  020106  040520
 4458  023506  051523  020040  020441
 4459  023514     043
 4460  023515     045  042445  052116  MSG40:  .ASCII  /%%ENTER STALLS%READ = #/
 4461  023522  051105  051440  040524
 4462  023530  046114  022523  042522
 4463  023536  042101  036440  021440
 4464
 4465  023544  053445  044522  042524  MSG41:  .ASCII  /%WRITE = #/
 4466  023552  036440  021440
 4467
 4468  023556  052045  051125  020116  MSG42:  .ASCII  /%TURN AROUND = #/
 4469  023564  051101  052517  042116
 4470  023572  036440  021440
 4471
 4472  023576  037445  021445          MSG43:  .ASCII  /%?%#/
 4473
 4474  023602  042445  052116  051105  MSG44:  .ASCII  /%ENTER YOZZLE STALL = #/
 4475  023610  054440  055117  046132
 4476  023616  020105  052123  046101
 4477  023624  020114  020075     043
 4478
 4479  023631     045  051105  020122  MSG45:  .ASCII  /%ERR AMT #/
 4480  023636  046501  020124     043
 4481
 4482  023643     045  041527  021440  MSG46:  .ASCII  /%WC #/
 4483
 4484  023650  041445  020101     043  MSG47:  .ASCII  /%CA #/
 4485
```

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4486  023655    045  020441  047041  MSG48:  .ASCII  /%!!!NO BOT ON REWIND:#/
4487  023662  020117  047502  020124
4488  023670  047117  051040  053505
4489  023676  047111  035104    043
4490
4491  023703    040  047516  020124  MSG49:  .ASCII  / NOT AVAIL #/
4492  023710  053101  044501  020114
4493  023716    043
4494  023717    055  052067  045522  MSG50:  .ASCII  /-7TRK #/
4495  023724  021440
4496  023726  034455  051124  020113  MSG51:  .ASCII  /-9TRK #/
4497  023734    043
4498  023735    045  047516  035116  MSG52:  .ASCII  /%NON:RETRYABLE #/
4499  023742  042522  051124  040531
4500  023750  046102  020105    043
4501  023755    045  025052  047452  MSG53:  .ASCII  /%***ORIGINAL ERROR***#/
4502  023762  044522  044507  040516
4503  023770  020114  051105  047522
4504  023776  025122  025052    043
4505  024003    045  042522  047503  MSG54:  .ASCII  /%RECOVERED#/
4506  024010  042526  042522  021504
4507  024016  051045  052105  054522  MSG55:  .ASCII  /%RETRY: #/
4508  024024  020072    043
4509  024027    045  052523  050123  MSG56:  .ASCII  /%SUSPECT BAD TAPE#/
4510  024034  041505  020124  040502
4511  024042  020104  040524  042520
4512  024050    043
4513  024051    045  042522  042520  MSG57:  .ASCII  /%REPEAT: #/
4514  024056  052101  020072    043
4515  024063    045  020441  052441  MSG58:  .ASCII  /%!!!UNRECOVERABLE BAD SPOT#/
4516  024070  051116  041505  053117
4517  024076  051105  041101  042514
4518  024104  041040  042101  051440
4519  024112  047520  021524
4520
4521  024116  020445  020441  040502  MSG59:  .ASCII  /%!!!BAD TAPE OVERFLOW/
4522  024124  020104  040524  042520
4523  024132  047440  042526  043122
4524  024140  047514    127
4525  024143    045  040524  042520          .ASCII  /%TAPE WILL BE REWOUND AND REMOVED FROM/
4526  024150  053440  046111  020114
4527  024156  042502  051040  053505
4528  024164  052517  042116  040440
4529  024172  042116  051040  046505
4530  024200  053117  042105  043040
4531  024206  047522    115
4532  024211    045  042524  052123          .ASCII  /%TESTING UNTIL ALL ARE RESTARTED AT BLOCK ONE.#/
4533  024216  047111  020107  047125
4534  024224  044524  020114  046101
4535  024232  020114  051101  020105
4536  024240  042522  052123  051101
4537  024246  042524  020104  052101
4538  024254  041040  047514  045503
4539  024262  047440  042516  021456
4540  024270  052045  050101  020105  MSG60:  .ASCII  /%TAPE MARK = #/
4541  024276  040515  045522  036440
```

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 4542  024304  021440
 4543
 4544  024306  020445  020441  040502  MSG61:  .ASCII  /%!!!BACKSPACE ERROR/
 4545  024314  045503  050123  041501
 4546  024322  020105  051105  047522
 4547  024330     122
 4548  024331     045  040524  042520          .ASCII  /%TAPE WILL BE REWOUND AND REMOVED FROM /
 4549  024336  053440  046111  020114
 4550  024344  042502  051040  053505
 4551  024352  052517  042116  040440
 4552  024360  042116  051040  046505
 4553  024366  053117  042105  043040
 4554  024374  047522  020115
 4555  024400  052045  051505  044524          .ASCII  /%TESTING UNTIL ALL ARE RESTARTED AT BLOCK ONE.#/
 4556  024406  043516  052440  052116
 4557  024414  046111  040440  046114
 4558  024422  040440  042522  051040
 4559  024430  051505  040524  052122
 4560  024436  042105  040440  020124
 4561  024444  046102  041517  020113
 4562  024452  047117  027105     043
 4563  024457     052  042527  052040  MSG62:  .ASCII  /*WE TM#/
 4564  024464  021515
 4565  024466  051452  020105  046524  MSG63:  .ASCII  /*SE TM#/
 4566  024474     043
 4567  024475     045  052127  051105  MSG64:  .ASCII  /%WTERR: #/
 4568  024502  035122  021440
 4569  024506  051045  042504  051122  MSG65:  .ASCII  /%RDERR: #/
 4570  024514  020072     043
 4571  024517     045  052104  051105  MSG66:  .ASCII  /%DTERR: #/
 4572  024524  035122  021440
 4573  024530  021445                  MSG67:  .ASCII  /%#/
 4574  024532  041040  042101  052040  MSG68:  .ASCII  / BAD TAPE SPOTS%#/
 4575  024540  050101  020105  050123
 4576  024546  052117  022523     043
 4577  024553     052  042523  051040  MSG69:  .ASCII  /*SE RTY#/
 4578  024560  054524     043
 4579  024563     052  042522  052040  MSG70:  .ASCII  /*RE TM#/
 4580  024570  021515
 4581  024572  051045  040505  020104  MSG71:  .ASCII  /%READ FAILED--RETRY: #/
 4582  024600  040506  046111  042105
 4583  024606  026455  042522  051124
 4584  024614  035131  021440
 4585  024620  020445  020441  040510  MSG72:  .ASCII  /%!!!HARD READ ERROR#/
 4586  024626  042122  051040  040505
 4587  024634  020104  051105  047522
 4588  024642  021522
 4589  024644  051045  051105  040505  MSG73:  .ASCII  /%REREAD SUCCESSFUL--RETRY: #/
 4590  024652  020104  052523  041503
 4591  024660  051505  043123  046125
 4592  024666  026455  042522  051124
 4593  024674  035131  021440
 4594  024700  020045  047523  052106  MSG74:  .ASCII  /% SOFT: #/
 4595  024706  020072     043
 4596  024711     045  044040  051101  MSG75:  .ASCII  /% HARD: #/
 4597  024716  035104  021440
```

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4598  024722  020045  052122  054522  MSG76:  .ASCII  /% RTRY: #/
4599  024730  020072     043
4600  024733     045  052045  026115  MSG77:  .ASCII  /%%TM,A,B-11 AUTO SEQUENCE TEST (DZTMH-D)%/
4601  024740  026101  026502  030461
4602  024746  040440  052125  020117
4603  024754  042523  052521  047105
4604  024762  042503  052040  051505
4605  024770  020124  042050  052132
4606  024776  044115  042055  022451
4607  025004  047105  042524  020122          .ASCII  /ENTER RESPONSES IN OCTAL%#/
4608  025012  042522  050123  047117
4609  025020  042523  020123  047111
4610  025026  047440  052103  046101
4611  025034  021445
4612  025036  040445  052125  020117  MSG78:  .ASCII  /%AUTO CONT: #/
4613  025044  047503  052116  020072
4614  025052     043
4615  025053     045  025045  025052  MSG79:  .ASCII  /%%******************/
4616  025060  025052  025052  025052
4617  025066  025052  025052  025052
4618  025074  025052
4619  025076  025052  025052  025052          .ASCII  /******************%#/
4620  025104  025052  025052  025052
4621  025112  025052  025052  022452
4622  025120     043
4623  025121     125  044516  051524  MSG80:  .ASCII  /UNITS TO BE TESTED%#/
4624  025126  052040  020117  042502
4625  025134  052040  051505  042524
4626  025142  022504     043
4627  025145     105  042116  047440  MSG81:  .ASCII  /END OF SEQUENCE  NO. #/
4628  025152  020106  042523  052521
4629  025160  047105  042503  020040
4630  025166  047516  020056     043
4631  025173     045  020441  047041  MSG82:  .ASCII  /%!!!NO DRIVES AVAILABLE FOR AUTO SEQ--HALT%#/
4632  025200  020117  051104  053111
4633  025206  051505  040440  040526
4634  025214  046111  041101  042514
4635  025222  043040  051117  040440
4636  025230  052125  020117  042523
4637  025236  026521  044055  046101
4638  025244  022524     043
4639  025247     045  050114  020103  MSG83:  .ASCII  /%LPC #/
4640  025254     043
4641  025255     045  042522  044507  MSG84:  .ASCII  /%REGISTER START = #/
4642  025262  052123  051105  051440
4643  025270  040524  052122  036440
4644  025276  021440
4645  025300  053045  041505  047524  MSG85:  .ASCII  /%VECTOR ADDRESS = #/
4646  025306  020122  042101  051104
4647  025314  051505  020123  020075
4648  025322     043
4649  025323     052  040520  052124  MSG86:  .ASCII  /*PATTRN #/
4650  025330  047122  021440
4651  025334  050045  042522  040515  MSG87:  .ASCII  /%PREMATURE EOT IN AUTO SEQ/
4652  025342  052524  042522  042440
4653  025350  052117  044440  020116
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 4654  025356  052501  047524  051440
 4655  025364  050505
 4656  025366  052045  050101  020105          .ASCII  /%TAPE WILL BE REWOUND AND AUTO SEQUENCE/
 4657  025374  044527  046114  041040
 4658  025402  020105  042522  047527
 4659  025410  047125  020104  047101
 4660  025416  020104  052501  047524
 4661  025424  051440  050505  042525
 4662  025432  041516     105
 4663  025435     045  044527  046114          .ASCII  /%WILL CONINUE ON THIS UNIT#/
 4664  025442  041440  047117  047111
 4665  025450  042525  047440  020116
 4666  025456  044124  051511  052440
 4667  025464  044516  021524
 4668  025470  051040  052105  054522  MSG88:  .ASCII  / RETRY#/
 4669  025476     043
 4670
 4671  025477     045  020441  052441  MSG89:  .ASCII  /%!!!UNIT IS REWINDING; TEST WILL START WHEN DONE#/
 4672  025504  044516  020124  051511
 4673  025512  051040  053505  047111
 4674  025520  044504  043516  020073
 4675  025526  042524  052123  053440
 4676  025534  046111  020114  052123
 4677  025542  051101  020124  044127
 4678  025550  047105  042040  047117
 4679  025556  021505
 4680  025560  042052  047105  021440  MSG90:  .ASCII  /*DEN #/
 4681  025566  050052  051101  021440  MSG91:  .ASCII  /*PAR #/
 4682  025574  020441  022441  042045  MSG92:  .ASCII  /!!!%%DROPPED UNIT: #/
 4683  025602  047522  050120  042105
 4684  025610  052440  044516  035124
 4685  025616  021440
 4686  025620  040445  052124  046505  MSG93:  .ASCII  /%ATTEMPT TO RESTART UNIT WILL BE/
 4687  025626  052120  052040  020117
 4688  025634  042522  052123  051101
 4689  025642  020124  047125  052111
 4690  025650  053440  046111  020114
 4691  025656  042502
 4692  025660  046445  042101  020105          .ASCII  /%MADE AT END OF PASS!!!%%#/
 4693  025666  052101  042440  042116
 4694  025674  047440  020106  040520
 4695  025702  051523  020441  022441
 4696  025710  021445
 4697  025712  020441  022441  047045  MSG94:  .ASCII  /!!!%%NO MORE UNITS TO TEST IN THIS PASS/
 4698  025720  020117  047515  042522
 4699  025726  052440  044516  051524
 4700  025734  052040  020117  042524
 4701  025742  052123  044440  020116
 4702  025750  044124  051511  050040
 4703  025756  051501     123
 4704  025761     045  046101  020114          .ASCII  /%ALL ARE DROPPED OR REWUOND.%%#/
 4705  025766  051101  020105  051104
 4706  025774  050117  042520  020104
 4707  026002  051117  051040  053505
 4708  026010  047525  042116  022456
 4709  026016  021445
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 4710  026020  020441  022441  047514  MSG95:  .ASCII  /!!!%LOST SELECT REMOTE#/
 4711  026026  052123  051440  046105
 4712  026034  041505  020124  042522
 4713  026042  047515  042524    043
 4714  026047    041   020441  040445  MSG96:  .ASCII  /!!!%ALL ARE DROPPED: END OF PASS STOP!!!#/
 4715  026054  046114  040440  042522
 4716  026062  042040  047522  050120
 4717  026070  042105  020072  047105
 4718  026076  020104  043117  050040
 4719  026104  051501  020123  052123
 4720  026112  050117  020441  021441
 4721  026120  020441  041445  047101  MSG97:  .ASCII  /!!%CANNOT TEST LOAD MEDIUM%#/
 4722  026126  047516  020124  042524
 4723  026134  052123  046040  040517
 4724  026142  020104  042515  044504
 4725  026150  046525  021445
 4726  026154  057045  021507          $CNTG:  .ASCII  /%↑G#/
 4727  026160  022445  053523  036522  $MSWR:  .ASCII  /%%SWR= #/
 4728  026166  021440
 4729  026170  020040  042516  036527  $MNEW:  .ASCII  /  NEW= #/
 4730  026176  021440
 4731                                  .EVEN
 4732  026200  000000          WDATA:  0                       ;WRITE BUFFER
 4733
 4734          032212                  .=.+4010
 4735  032212  000000          RDATA:  0                       ;READ BUFFER
 4736
 4737          000001                  .END
```

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ABLCNT  021622          1699    4184*   4194*   4211#
ACTLRC  013702          3143#   3598*   3602*   3603    3662
AMOD1   021420          4169    4181#
AMOD1B  021424          4183#
ASEQ    021252          2681    4152#
ASEQCF  021626          4154    4156    4203    4213#
ASEQF   021624          1333*   1626*   1697    1815    1871    2637    2678    2859    3874    4212#
ASEQX   021560          4201#
ASEQXX  021600          4204    4206#
ASEQ0   021314          4162#   4210
ASEQ2   021344          4168#   4180
BBC     000722          1383#   3162*   3194*   3208*   3282*   3283    3289*   3290*   3291*   3292    3294*   3310*
BCNT    000736          1389#   3365*   3388*   3391*   3396*   3417*   3420*   3424*   3429*
BDPP    000766          1401#   3353*   3370*   3371    3399*   3404*   3413*   3415*   3418    3422*
BDRTY1  001214          1501#   2358*   3472
BDRTY2  001216          1502#
BDRTY3  001220          1503#
BDRTY4  001222          1504#
BDRTY5  001224          1505#
BDRTY6  001226          1506#
BDRTY7  001230          1507#
BDRTY8  001232          1508#
BD00    001454          1435    1540#
BD10    001474          1436    1542#
BD20    001514          1437    1544#
BD30    001534          1438    1546#
BD40    001554          1439    1548#
BD50    001574          1440    1550#
BD60    001614          1441    1552#
BD70    001634          1442    1554#
BKSP    010132          2222    2453#
BK0     010172          2458    2463#
BK1     010246          2472    2474#
BK1A    010336          2488#   2498
BK1B    010402          2480    2493    2499#
BK1C    010264          2477#   2504    2506
BK2     010322          2478    2485#
BK3     010412          2476    2501#
BLCNTR  000720          1382#   1665*   1696*   1699    1702*   1867*   1955*   2156    3882    4181*
BPKP    000770          1402#   3352*   3378*   3379    3398*   3403*   3414*   3416*   3427    3431*
BP00    001254          1427    1524#
BP10    001274          1428    1526#
BP20    001314          1429    1528#
BP30    001334          1430    1530#
BP40    001354          1431    1532#
BP50    001374          1432    1534#
BP60    001414          1433    1536#
BP70    001434          1434    1538#
BTADDR  002714          1578#   2150    3490
BTCLR   016016          3526    3531#
BTCLR1  016026          3533#   3535
BTFLG   000746          1393#   1800    1805    1808*   1810    1813*   2180    2184*   2192*   2223    2471    2499*   2534*
BTOV    006570          2163    2190#
BTOVX   016014          3525    3527#
BTOV0   015670          3498    3500#
BTOV1   015700          3503#   3523
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STOV2   016002          3520    3524#
BTPRT   015606          3479    3486#
BTPT    000762          1399#   2150*   2151    2153*   2154    2161    3490*   3491    3497    3500    3519    3532
BTSTF   000772          1403#   1757*   1759*   3524
BTUR    006614          2171    2198#
BT00    001654          1559#   1578
BT01    001760          1561#   1579
BT02    002064          1563#   1580
BT03    002170          1565#   1581
BT04    002274          1567#   1582
BT05    002400          1569#   1583
BT06    002504          1571#   1584
BT07    002610          1573#   1585
BO      010136          2454#
BOA     010444          2465    2509#
BOB     010440          2502    2508#
B1      010536          2518    2521#
B1A     010612          2524    2534#
B2      010620          2522    2535#
CADER   016740          3579*   3656    3680#
CARCNT  000622          1347#   1781*   1986    2258    2398    2579*   2762*   2763    2765    2770*   2771    3042    3064
                        3092    3165    3186    3298    3561    3899    4185*
CCNTR   010644          1711    2576#
CCSAV   000644          1356#   1781    2771*
CHAIN   000210          1321#   1644
CKSWR   022120          2369    3223    3326    3480    3562    3676    3811    3904    4206    4265#
CLLAST  013412          3084    3086#
CLP     013522          3069    3097    3105#
CLPE    013546          3106    3108    3112#
CLPO    013556          3114#   3120
CLP1    013570          3115    3117#
CLP2    013630          3124    3128#
CLP3    013642          3126    3129    3131#
CLO     013326          3068#   3085
CL1     013354          3076#
CL2     013376          3073    3082#
CL3     013464          3096#   3100
CNTLU   022164          1678    4273#   4290
COUNT   001000          1406#   4284*   4295    4311*
CRCLRC  013306          2872    2883    3063#
CRLR    013310          3064#
DATA0   002736          1590#
DATA1   002740          1591#
DATA10  002756          1598#
DATA11  002760          1599#
DATA12  002762          1600#
DATA13  002764          1601#
DATA14  002766          1602#
DATA15  002770          1603#
DATA2   002742          1592#
DATA3   002744          1593#
DATA4   002746          1594#
DATA5   002750          1595#
DATA6   002752          1596#
DATA7   002754          1597#
DATBL   002734          1589#   2881
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DATER1  001134          1468#   3222*   3477
DATER2  001136          1469#
DATER3  001140          1470#
DATER4  001142          1471#
DATER5  001144          1472#
DATER6  001146          1473#
DATER7  001150          1474#
DATER8  001152          1475#
DATR    013236          1714    2863    3042#
DATRO   013254          3046#   3049
DATO    012552          1590    2897#
DATOA   012602          2903#   2918    2922    2925
DATOB   012620          2906#   2909    2911
DATOC   012704          2916    2923#
DATOD   012712          2926#   2934
DATOE   012722          2928#   2933
DATOF   012736          2930    2932#
DAT1    012754          1591    2942#
DAT1A   012760          2943#   2952    2975    2980    2985    2990    3016    3021
DAT1B   012764          2944#   2946
DAT10   013074          1598    2989#
DAT11   013104          1599    2995#
DAT11A  013112          2997#   3000
DAT12   013126          1600    3005#
DAT12A  013136          3007#   3010
DAT13   013152          1601    3015#
DAT14   013162          1602    3020#
DAT15   013172          1603    3025#
DAT15A  013202          3027#   3036
DAT15B  013206          3028#   3033
DAT15C  013220          3030    3032#
DAT15R  013176          3026#   3037
DAT2    012776          1592    2951#
DAT3    013004          1593    2956#
DAT3A   013012          2958#   2969
DAT3B   013016          2959#   2962
DAT4    013032          1594    2967#
DAT5    013044          1595    2974#
DAT6    013054          1596    2979#
DAT7    013064          1597    2984#
DCHK    013712          2296    2415    3162#
DEREX   014610          3284    3306    3309    3316    3318#
DEREX1  014644          3319    3322    3324    3326#
DERFL   000744          1392#   3163*   3198*   3212*   3217
DERR    014242          3197    3211    3255#
DERRO   014256          3256    3258#   3325
DERRDA  014316          3260    3262    3267#
DERRDB  014336          3272#
DERR1   014370          3279#
DERR2   014372          3280#
DERR3   014376          3281#
DERR4   014400          3257    3282#
DERR4A  014544          3307#
DERR4B  014556          3293    3310#
DERR5   014576          3315#
DERR6   014604          3296    3313    3317#
```

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DFA     014004          3175    3177#   3181
DFB     014012          3180#   3185
DFC     014020          3178    3183#
DFD     014034          3182    3186#
DFX     014234          3218    3220    3224#
DF0     014044          3169    3171    3188#
DF3     014204          3201    3217#
DF7     014120          3191    3202#   3216
DF71    014152          3207    3210#
DF72    014170          3209    3213#
DF9     014062          3189    3192#   3200
DF91    014074          3193    3196#
DF92    014112          3195    3199#
DISPLA  000654          1360#   4260*
DISPRE  000174          1309#   4260
DOUT    021144          2489    2491    3276    3280    3635    3637    4126#
DOUT1   021160          4129#   4130    4138
DOUT2   021206          4132    4135#
DOUT3   021214          4134    4136#
DPC     014746          3362#   3408
DPCG    014754          3363    3365#
DPC0    014762          3366#   3400
DPC0A   015024          3374    3376#
DPC1    015032          3369    3378#
DPC1A   015060          3382    3384#
DPC2    015122          3367    3372    3380    3394#
DPC2A   015064          3377    3385#
DPC2B   015106          3389#   3392
DPC3    015154          3397    3401#
DPPRT   015222          3376    3384    3410#   3448
DPPRTX  015366          3430    3433#
DPPRT0  015274          3418#   3423
DPPRT1  015322          3421    3424#
DPPRT2  015340          3427#   3432
DROP    014736          3357    3360#
DRPDRV  020050          1737    1771    1856    1946    2273    3762    3910#
DRPK    014724          3357#
DRPKF   014656          3196    3210    3348#
DRP1    001054          1435#   3353    3386    3404    3413
DRP2    001056          1436#
DRP3    001060          1437#
DRP4    001062          1438#
DRP5    001064          1439#
DRP6    001066          1440#
DRP7    001070          1441#
DRP8    001072          1442#
DSUP    012370          1746    2857#
DS0     012376          2859#
DS0A    012420          2860    2862    2865#
DS0B    012456          2870    2873#
DS0C    012460          2866    2874#
DS1     012510          2858    2882#   2898    2912    2931    2947    2963    3001    3011    3031    3050
DS3     012516          2298    2416    2884#
DS4     012526          2886#   2888
DUCTR   001006          1409#   1891*   3924*   3925
DUFL    012746          2776*   2897    2899*   2935#
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EMADDR	000716	1381#	1981*	2067*	2177*	2179*	2253*	2319*	2466*	2482	2509*	2526	3627	3780
EOTCT1	001234	1512#	1824*	1825										
EOTCT2	001236	1513#												
EOTCT3	001240	1514#												
EOTCT4	001242	1515#												
EOTCT5	001244	1516#												
EOTCT6	001246	1517#												
EOTCT7	001250	1518#												
EOTCT8	001252	1519#												
EOTREC	000760	1398#	1984*	2002*	2003*	2037	2047	2265*	2306	2323	2326*	2457	2459	2462*
		2503	3613											
ERCHK	016036	2006	2077	2276	2409	3561#								
EREX	016720	3607	3612	3616	3669	3672	3674	3676#						
EREXO	016664	3624	3659	3668#										
ERSAV	000740	1390#	2019*	2020	2087*	2088	2283*	2284*	2474*	2475	2501*	2505*	3608*	3611*
		3615*	3678*											
ERTFL	000764	1400#	1988	1991*	2169*									
ERO	016130	3575	3578#											
EROA	016110	3566	3572	3574#										
ER1	016134	3577	3579#											
ER1A	016342	3610	3613#											
ER1B	016302	3586	3588	3592	3597	3600	3605#							
ER1O	016530	3639	3645#											
ER2	016360	3581	3583	3604	3614	3617#								
ER2A	016412	3621	3624#											
ER3	016416	3619	3623	3625#	3675									
ER3A	016426	3627#												
ER3B	016432	3628#												
ER7	016462	3634#	3644											
EXCRC	013676	3091*	3101	3141#										
EXLRC	013700	3103*	3142#	3589										
FREX	017004	3692	3697	3700#										
FRPRT	016742	3266	3629	3691#	3746	3782								
FRO	016774	3694	3698#											
GDRTY1	001174	1490#	2367*	3467										
GDRTY2	001176	1491#												
GDRTY3	001200	1492#												
GDRTY4	001202	1493#												
GDRTY5	001204	1494#												
GDRTY6	001206	1495#												
GDRTY7	001210	1496#												
GDRTY8	001212	1497#												
HDRFL	000726	1385#	2453*	2477	3164*	3259	3903*							
HERE	004660	1879	1885#											
HRDS	021630	4162	4217#											
HRDSX	022010	4240	4245#											
HRDS1	021660	4223#	4238											
HRDS2	021752	4227	4236#											
LRCPT	013706	3145#	3584*	3601*	3658									
LRCSV	013704	3144#	3589*	3593*	3603	3666								
MDA	000606	1341#	1987*	2071*	2259*	2397*	3580	3652						
MSG1	022426	3264	4321#											
MSG10	022471	2509	4335#											
MSG11	022476	3844	4337#											
MSG13	022513	3507	3880	4341#										
MSG14	022521	3512	3884	4344#										

MSG15	022526	3287	4346#				
MSG16	022556	3698	4351#				
MSG17	022564	3695	4353#				
MSG2	022433	3273	4323#				
MSG20	022572	1821	4355#				
MSG20A	022606	1827	4357#				
MSG22	022725	2270	4374#				
MSG23	022750	2484	3631	4379#			
MSG24	022757	3783	4382#				
MSG25	023007	3747	4388#				
MSG26	023113	3410	4401#				
MSG27	023124	3425	4404#				
MSG3	022440	3277	4325#				
MSG30	023135	2495	3641	4407#			
MSG31	023144	1631	2642	4410#			
MSG31A	023261	2644	4423#				
MSG32	023314	2682	4429#				
MSG33	023334	2717	4433#				
MSG34	023350	2729	4436#				
MSG35	023363	2750	4439#				
MSG36	023404	2760	4443#				
MSG37	023430	2772	4448#				
MSG38	023453	2791	4453#				
MSG39	023473	1874	4456#				
MSG4	022445	3267	4327#				
MSG40	023515	2800	4460#				
MSG41	023544	2809	4465#				
MSG42	023556	2818	4468#				
MSG43	023576	4013	4303	4472#			
MSG44	023602	2421	4474#				
MSG45	023631	2528	4479#				
MSG46	023643	3645	4482#				
MSG47	023650	3650	4484#				
MSG48	023655	1854	1944	4486#			
MSG49	023703	1735	1769	2708	4491#		
MSG5	022452	1981	2024	2179	3741	4329#	
MSG50	023717	2713	4177	4494#			
MSG51	023726	2715	4174	4496#			
MSG52	023735	2022	2090	2286	4498#		
MSG53	023755	2031	2101	2340	4501#		
MSG54	024003	2126	4505#				
MSG55	024016	2128	2137	4507#			
MSG56	024027	2135	4509#				
MSG57	024051	2141	4513#				
MSG58	024063	2198	4515#				
MSG59	024116	1812	4521#				
MSG6	022457	2253	2288	3744	4331#		
MSG60	024270	2782	4540#				
MSG61	024306	1807	4544#				
MSG62	024457	2067	2092	4563#			
MSG63	024466	2466	4565#				
MSG64	024475	3449	4567#				
MSG65	024506	3459	4569#				
MSG66	024517	3474	4571#				
MSG67	024530	3487	3521	4573#			
MSG68	024532	3495	4574#				

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MSG69   024553          2177    4577#
MSG7    022464          3897    4333#
MSG70   024563          2319    4579#
MSG71   024572          2349    4581#
MSG72   024620          2355    4585#
MSG73   024644          2362    4589#
MSG74   024700          3464    4594#
MSG75   024711          3469    4596#
MSG76   024722          3454    4598#
MSG77   024733          2639    4600#
MSG78   025036          4152    4612#
MSG79   025053          4163    4199    4615#
MSG80   025121          4165    4623#
MSG81   025145          4201    4627#
MSG82   025173          4241    4631#
MSG83   025247          3660    4639#
MSG84   025255          2651    4641#
MSG85   025300          2666    4645#
MSG86   025323          3867    4649#
MSG87   025334          1819    4651#
MSG88   025470          1802    4668#
MSG89   025477          1729    4671#
MSG90   025560          3850    4680#
MSG91   025566          3860    4681#
MSG92   025574          3912    4682#
MSG93   025620          3918    4686#
MSG94   025712          3937    4697#
MSG95   026020          3760    4710#
MSG96   026047          3927    4714#
MSG97   026120          1635    2648    4721#
MTC     000602          1339#   1666*   1667*   1722*   1773*   1795*   1798*   1830    1847*   1916*   1917*   1918    1933*
                        1982*   1990*   1993*   2072*   2256*   2260*   2390*   2396*   2486    2516*   2517*   2660    2703*
                        3571    3574    3585    3605    3633    3691    3731    3734    3739    3766*   3769    3776*   3824*
                        3887    3911*   4222*   4224*
MTD     000610          1342#   3598
MTINT   017466          1328    2676    3823#
MTRD    000612          1343#   2255*   2320*   2664    4143    4145    4147
MTS     000600          1338#   1724    1726    1731    1739    1764    1796    1848    1850    1857    1934    1936    1938
                        1983*   2257*   2263    2267    2283    2474    2497    2515*   2653    2661    2704    2711    3174
                        3188    3587    3608    3643    3678    3755    3790    3792    4226    4229
MWC     000604          1340#   1986*   2070*   2176*   2258*   2314*   2317*   2389*   2398*   2401*   2404*   2467*   2512*
                        2521    3582    3647
NOP   = 000240          1282#
OCTP    020716          1826    2131    2140    2144    2352    2365    2424    2533    2654    2669    2753    2764    2775
                        2785    2794    2803    2812    2821    3272    3419    3428    3453    3458    3463    3468    3473
                        3478    3494    3506    3511    3516    3649    3653    3657    3663    3667    3849    3859    3866
                        3879    3883    3892    3896    3902    3917    4070#   4155    4173    4209
OCTPE   020706          4068#   4276
OCTPE1  020722          4069    4071#
OCTPG   021100          4080    4083    4090    4094    4099    4104    4106    4110#
OCTPGD  021116          4111    4113    4115#
OCTPG1  021122          4075    4116#
OCTPO   020744          4072    4074    4077#
OCTP1   020766          4078    4082#
OCTP2   020774          4081    4084#
OCTP3   021064          4076    4107#
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OFL     021142          4068*  4070*  4073   4112   4115*  4121#
OUT     022224          4266   4270   4281#  4298
PAPRT   017506          1728   1734   1768   1799   1853   1943   2269   2481   2525   3263   3375   3383   3447
                        3626   3738   3759   3779   3844#
PAPRTA  017650          3871#  3877
PAPRTB  017664          3870   3874#
PAPRTC  017700          3875   3878#
PAPRTD  017710          3873   3880#
PAPRT1  017752          3888   3889#
PAPRT2  017762          3892#
PARCNT  013710          3112*  3116*  3123   3146#
PARS    012752          1664*  2869   2871*  2889*  2890*  2937#
PATRN   000624          1348#  1817   2774   2777   2861   2865   2876   3876   3878   4187*  4190*  4192*  4195*
PATS    012750          1663*  1889*  2580*  2865   2877*  2936#  3184*
PC    =%000007          1281#  1632*  1636*  1650*  1669*  1671*  1672*  1678*  1704*  1711*  1714*  1717*  1723*
                        1728*  1730*  1734*  1736*  1746*  1747*  1748*  1750*  1751*  1753*  1758*  1768*  1770*
                        1782*  1799*  1803*  1822*  1826*  1828*  1829*  1853*  1855*  1873*  1875*  1881*  1888*
                        1905*  1943*  1945*  1956*  2006*  2008*  2011*  2023*  2025*  2032*  2035*  2044*  2049*
                        2077*  2082*  2091*  2093*  2094*  2102*  2103*  2105*  2113*  2116*  2118*  2127*  2129*
                        2131*  2132*  2136*  2138*  2140*  2142*  2144*  2178*  2186*  2199*  2200*  2222*  2227*
                        2230*  2269*  2271*  2276*  2287*  2289*  2291*  2296*  2298*  2301*  2303*  2328*  2341*
                        2343*  2350*  2352*  2356*  2363*  2365*  2369*  2370*  2388*  2395*  2409*  2412*  2415*
                        2416*  2422*  2424*  2430*  2436*  2470*  2473*  2481*  2483*  2485*  2489*  2491*  2496*
                        2500*  2514*  2525*  2527*  2529*  2533*  2536*  2537*  2562*  2578*  2581*  2596*  2598*
                        2629*  2640*  2643*  2645*  2649*  2652*  2654*  2659*  2667*  2669*  2674*  2683*  2689*
                        2701*  2709*  2716*  2718*  2723*  2728*  2730*  2735*  2740*  2751*  2753*  2758*  2761*
                        2764*  2769*  2773*  2775*  2781*  2783*  2785*  2790*  2792*  2794*  2799*  2801*  2803*
                        2808*  2810*  2812*  2817*  2819*  2821*  2826*  2827*  2837*  2863*  2864*  2872*  2873*
                        2883*  2891*  3046*  3050*  3052*  3069*  3070*  3097*  3098*  3102*  3104*  3111*  3127*
                        3130*  3132*  3138*  3196*  3197*  3210*  3211*  3223*  3224*  3263*  3265*  3266*  3268*
                        3272*  3274*  3276*  3278*  3280*  3288*  3326*  3328*  3357*  3358*  3359*  3364*  3375*
                        3376*  3383*  3384*  3393*  3401*  3408*  3409*  3411*  3419*  3426*  3428*  3433*  3447*
                        3448*  3450*  3453*  3455*  3458*  3460*  3463*  3465*  3468*  3470*  3473*  3475*  3478*
                        3479*  3480*  3481*  3488*  3494*  3496*  3499*  3506*  3509*  3511*  3513*  3516*  3522*
                        3526*  3527*  3536*  3562*  3626*  3628*  3629*  3632*  3635*  3637*  3642*  3646*  3649*
                        3651*  3653*  3655*  3657*  3661*  3663*  3665*  3667*  3676*  3679*  3696*  3699*  3700*
                        3738*  3742*  3745*  3746*  3748*  3759*  3761*  3779*  3781*  3782*  3784*  3811*  3815*
                        3845*  3849*  3851*  3859*  3861*  3866*  3868*  3872*  3879*  3881*  3883*  3885*  3892*
                        3894*  3896*  3898*  3902*  3904*  3905*  3913*  3917*  3919*  3923*  3928*  3938*  3956*
                        3978*  4008*  4014*  4016*  4030*  4041*  4044*  4047*  4051*  4058*  4063*  4075*  4080*
                        4083*  4090*  4094*  4099*  4104*  4106*  4108*  4109*  4114*  4118*  4120*  4139*  4149*
                        4153*  4155*  4160*  4162*  4164*  4166*  4173*  4178*  4183*  4189*  4191*  4193*  4198*
                        4200*  4202*  4206*  4209*  4225*  4242*  4249*  4263*  4272*  4274*  4276*  4278*  4280*
                        4281*  4285*  4294*  4304*
PFLG    000732          1387#  3258*  3321   3327*  3625*  3671   3677*
PICK    015156          3358   3402#
PIK1    001034          1427#  3352   3387   3403   3414
PIK2    001036          1428#
PIK3    001040          1429#
PIK4    001042          1430#
PIK5    001044          1431#
PIK6    001046          1432#
PIK7    001050          1433#
PIK8    001052          1434#
PRB     000670          1366#  2900*  2914
PRS     000666          1365#  2901*  2903*  2906
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PRSTAT  015370          1758    3446#   3923
PRSTA2  015400          1829    3448#
PSW     000650          1358#   1670*   3763*   3775*   3807*
RANBAS  000672          1367#   1778*   3950*   3951    4196*
RANG    020240          2578    2596    3046    3950#   3953    3955
RANSAV  000676          1369#   1779*   2579    2597    3047    3950    3951*   3952    3954    4197*
RANSET  004110          1672    1778#   1888
RCNT    000620          1346#   1780*   1985    1999    2158    2252    2454    2468    2508    2511    2597*   2752    2754
                        2759    3889    3895    4186*
RCNTR   010676          1717    2594#
RCSAV   000642          1355#   1780    2759*
RDATA   032212          2259    2397    2885    2929    3167    3270    3305    3308    3578    4735#
RDCMD   000626          1349#   2226*   2260    2396    3693
RDER1   001114          1456#   2280*   3462
RDER2   001116          1457#
RDER3   001120          1458#
RDER4   001122          1459#
RDER5   001124          1460#
RDER6   001126          1461#
RDER7   001130          1462#
RDER8   001132          1463#
RDEX    007350          2266    2305    2307    2312    2322#
RDEXX   007374          2324    2328#
RDFL    013304          1321*   1646*   1890*   2857    3051*   3053#
RDSW    001004          1408#   4052    4055*   4293*
RD0     006746          2256#   2309
RD1     006756          2258#
RD1A    006764          2259#   2321
RD1D    007276          2311#
RD2     007012          2261    2263#
RD3     007034          2264    2267#
RD4     007066          2268    2274#
RD4A    007170          2285    2291#
RD5     007174          2275    2278    2282    2290    2292#
RD6     007222          2293    2295    2298#
RD7     007242          2300    2302#
READ    006722          2227    2252#
REGST   000674          1368#   2655
REOT    004142          1795#   2054    2185    2194    2225    2327
REOTC   004716          1642*   1686    1688*   1832*   1838*   1839    1840*   1841*   1893#   1907*   1908    1909*   1910*
                        1931*   2631*   2741*   2747    2748*   2749*   3922*   3925    4220*   4246*   4248*
REOTX   004664          1877    1887#
REOT1   004150          1796#   1797
REOT1A  004300          1816    1818    1821#
REOT1B  004334          1809    1814    1820    1828#
REOT1C  004236          1806    1810#
REOT1D  004256          1811    1815#
REOT1O  004662          1886#   2650
REOT2   004344          1830#   1831
REOT3   004402          1833    1838#
REOT4   004432          1844#   1865
REOT5   004456          1848#   1849
REOT6   004522          1851    1857#   1858
REOT6A  004540          1846    1860#
REOT7   004570          1863    1866#
REOT8   004622          1637    1872    1874#   3939
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RRTY    007376          2291    2337#
RRTYFL  000774          1404#   2337*   2368*   2410    3620
RRTYX   007566          2359    2368#
RRTYO   007422          2339    2342#
RRTY1   007426          2343#   2354
RRTY2   007474          2348    2353#
RRTY3   007514          2357#
RRTY4   007526          2346    2360#
RRTY5   007556          2361    2366#
RSEQ    006626          1751    2216#
RSEX    006720          2217    2230#
RSFRO   006676          2221    2224    2226#
RSFROA  006656          2219    2222#   2229
RSTAL   000632          1351#   2302    2802    2804
RTCNT   000752          1395#   2033*   2098*   2130    2139    2145    2164*   2165    2342*   2344*   2351    2353    2364
                        3622
RTRN    000724          1384#   1994*   2073*   2261*   2391*   2405*   2518*   3789    3827
RTYFL   000754          1396#   2009    2036*   2045*   2080    2112*   2182*   3486*
RTY1    001154          1479#   2028*   2097*   2168*   2191*   3457
RTY2    001156          1480#
RTY3    001160          1481#
RTY4    001162          1482#
RTY5    001164          1483#
RTY6    001166          1484#
RTY7    001170          1485#
RTY8    001172          1486#
RWND    004720          1747    1903#
RWNDA   004732          1904    1906#   4183
RWNDX   005206          1926    1947#
RWND0   004756          1911#   1921
RWND1   005016          1918#   1919
RWND2   005040          1913    1922#
RWND3   005050          1924#   1941
RWND4   005120          1934#   1935
RWND5   005150          1932    1940#
RWND6   005162          1937    1942#
R0      =%000000        1274#   1639*   1640    1653*   1655*   1658*   1661*   1673*   1679*   1681*   1682*   1683*   1685*
                        1690*   1691*   1693*   1694    1701*   1706*   1707*   1708    1718    1756*   1760*   1761*   1762
                        1834*   1835*   1839*   1841    1843*   1844    1852*   1859*   1861*   1862*   1864*   1866*   1869*
                        1908*   1910    1911*   1912*   1914*   1915    1922*   1924*   1925*   1927*   1928    1942*   1947*
                        1948*   1949    1950    1953*   1985*   2000    2039*   2041*   2068*   2159    2252*   2308*   2310*
                        2313*   2425    2431*   2454*   2455*   2456*   2459*   2460*   2461*   2463    2468*   2469*   2508*
                        2510*   2511*   2632*   2635*   2675*   2676*   2677*   2695*   2696*   2698*   2699*   2702    2747*
                        2749    2835*   2836*   3064*   3065*   3083*   3092*   3093*   3099*   3446*   3502*   3503    3518
                        3519    3814    3816*   3886    3890    3920*   3921*   3931*   3932    3934*   3935    3977*   3992*
                        3994*   3996*   3998*   4001    4004    4007    4167*   4168    4170    4175    4179*
R1      =%000001        1275#   1654*   1656*   1659*   1660*   1999*   2000*   2001*   2002    2427*   2521*   2530*   2531*
                        2532    2576*   2595*   2633*   2634*   2656*   2671*   2686*   2720*   2732*   2755*   2766*   2778*
                        2787*   2788    2796*   2805*   2814*   2823*   2876*   2877    2878*   2880*   2881    2885*   2886*
                        2913*   2914*   2917    2920    2921    2923    2926*   2928    2942*   2944    2951*   2956*   2959
                        2960*   2967*   2974*   2979*   2984*   2989*   2995*   2997    2998*   3005*   3007    3008*   3015*
                        3020*   3026*   3028    3035*   3044*   3066*   3068    3094*   3096    3110*   3121    3166*   3177
                        3179*   3183*   3187*   3192    3203    3205*   3206    3275    3281    3302*   3303*   3314*   3354
                        3355    3500*   3501    3510    3514*   3515    3517*   3952    3999*   4157*
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R2      =%000002  1276# 2428* 2577* 2594* 2657* 2672* 2687* 2721* 2733* 2756* 2767* 2779* 2788*
                  2797* 2806* 2815* 2824* 2884* 2887* 2921* 2924* 2927* 2932* 2943* 2945* 2958*
                  2961* 2996* 2999* 3006* 3009* 3025* 3029* 3045* 3167* 3192  3206  3269  3279
                  3281  3304* 3305* 3307* 3308* 3315* 3354  3356  3954  4001  4158*
R3      =%000003  1277# 1686* 1687* 1688  1825* 2130* 2139* 2143* 2154* 2155  2351* 2364* 2423*
                  2429* 2486* 2488* 2490* 2497* 2532* 2653* 2658* 2668* 2673* 2688* 2700* 2722*
                  2727* 2734* 2739* 2752* 2757* 2763* 2768* 2774* 2780* 2784* 2789* 2793* 2798*
                  2802* 2807* 2811* 2816* 2820* 2825* 2833* 2867* 2868* 2869  2871  2875* 2923*
                  2928* 2929  2944* 2959* 2997* 3007* 3028* 3043* 3047* 3113* 3119* 3172* 3173*
                  3176* 3177  3269* 3270* 3271* 3275* 3279* 3360* 3362* 3366  3386* 3389* 3395*
                  3406* 3418* 3427* 3452* 3457* 3462* 3467* 3472* 3477* 3491* 3493* 3503* 3505*
                  3510* 3515* 3531* 3534* 3561* 3564* 3567* 3570* 3573* 3576* 3578* 3579  3580
                  3582* 3633* 3634* 3636* 3643* 3647* 3648* 3652* 3656* 3662* 3666* 3768* 3771*
                  3797* 3846* 3847* 3848* 3852* 3855* 3858* 3862* 3865* 3878* 3882* 3886* 3889*
                  3890* 3891* 3895* 3899* 3900* 3901* 3914* 3915* 3916* 4004  4045* 4048* 4071
                  4084  4091  4095  4100  4105  4119  4128  4154* 4159* 4171* 4172* 4208* 4217*
                  4232* 4233* 4239  4245* 4275*
R4      =%000004  1278# 1631* 1635* 1729* 1735* 1741* 1742* 1743  1769* 1802* 1807* 1812* 1819*
                  1821* 1823* 1824* 1825  1827* 1854* 1874* 1878* 1881  1944* 2014* 2015* 2022*
                  2024* 2027* 2028* 2031* 2050* 2051* 2052  2083* 2084* 2090* 2092* 2096* 2097*
                  2101* 2126* 2128* 2135* 2137* 2141* 2147* 2148* 2149* 2150  2151* 2152  2153
                  2155* 2156* 2157* 2158* 2159* 2160* 2167* 2168* 2190* 2191* 2198* 2270* 2279*
                  2280* 2286* 2288* 2340* 2349* 2355* 2357* 2358* 2362* 2366* 2367* 2421* 2482*
                  2484* 2495* 2526* 2528* 2639* 2642* 2644* 2648* 2651* 2661* 2662* 2663  2666*
                  2682* 2708* 2713* 2715* 2717* 2729* 2750* 2760* 2772* 2782* 2791* 2800* 2809*
                  2818* 2905* 2910* 3027* 3032* 3042* 3048* 3068* 3072* 3074* 3076  3080* 3081*
                  3082  3086* 3089* 3090  3096* 3101* 3105  3109* 3114  3118* 3121* 3122* 3131*
                  3133  3135  3137* 3221* 3222* 3264* 3267* 3273* 3277* 3287* 3351* 3352  3353
                  3361* 3362  3385* 3386  3387* 3390* 3402* 3403  3404  3405* 3410* 3412* 3413
                  3414  3425* 3449* 3451* 3452  3454* 3456* 3457  3459* 3461* 3462  3464* 3466*
                  3467  3469* 3471* 3472  3474* 3476* 3477  3487* 3489* 3490  3495* 3507* 3508
                  3512* 3521* 3532* 3533* 3594* 3595* 3596  3627* 3631* 3641* 3645* 3650* 3660*
                  3695* 3698* 3731* 3732* 3733* 3741* 3744* 3747* 3760* 3767* 3773* 3780* 3783*
                  3799* 3844* 3850* 3860* 3867* 3880* 3884* 3897* 3912* 3918* 3927* 3937* 4013*
                  4034  4071* 4077  4079* 4082* 4084* 4085* 4086* 4087* 4088* 4089* 4091* 4092*
                  4093* 4095* 4096* 4097* 4098* 4100* 4101* 4102* 4103* 4105* 4110* 4116* 4117
                  4119* 4127* 4137* 4152* 4163* 4165* 4174* 4177* 4199* 4201* 4241* 4271* 4273*
                  4277* 4303*
R5      =%000005  1279# 2426* 2655* 2660* 2663* 2664  2670* 2685* 2754* 2765* 2777* 2786* 2795*
                  2804* 2813* 2822* 3076* 3077* 3078* 3079* 3081  3165* 3180* 3186* 3199* 3215*
                  3295  3297* 3312* 3317* 4007* 4156*
SEQCT    000776  1405# 4207* 4208
SERFL    000742  1391# 2012  2016* 2078  2119  2175* 2277  2297* 2345  3219  3261  3563* 3617*
SP      =%000006  1280# 1630* 1649* 1668* 1836  1870  1887* 2183  2193  2325  2680  3133* 3134*
                  3136  3823  4015* 4252* 4253* 4258  4261  4262  4289  4297
SPBK     010466  2178  2470  2513#
SPFLG    000630  1350# 1876  2793  2795
STAL     000730  1386# 1749* 1752* 1766* 2007* 2302* 2387* 2392* 2394* 2513* 2519* 2535* 2560*
                  2706*
STALL    010634  1750  1753  2008  2303  2388  2395  2514  2536  2560# 2561
START    002772  1315  1626#
STARTA   003124  1318  1648#
STARTB   003146  1647  1653#
STARTC   003174  1660# 1662
STARTD   003236  1668#
STARTE   003142  1322  1652#
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START0  003156          1655#   1657
START1  003356          1689#   1721    1774
START2  003512          1710    1712#
START3  003526          1713    1715#
START4  003542          1695    1716    1718#
START5  004016          1755    1760#
START6  004034          1764#   1767
START7  004072          1765    1772#   1937    3940
START8  004104          1763    1774#
STAR0A  003310          1675    1677    1679#   1684
STAR0B  003340          1680    1685#
STAR1A  003402          1694#
STAR1B  003414          1692    1696#
STAR1C  003456          1698    1700    1705#
STAR40  003562          1719    1722#
STAR44  003630          1731#   1732
STAR45  003644          1727    1734#
STAR46  003664          1725    1733    1738#
STAS    014240          3203*   3204    3214*   3226#
STAUT   003106          1334    1629    1645#   4244
STAUTO  003264          1651    1673#   1892    3751    4189    4191    4193    4198
STCDFL  001010          1410#   1738*   1745*   2315    2402    3170    3190    3568
STCS    014236          3204*   3214    3225#
STDLY   021226          1723    4143#   4144    4225
SUSWR   022040          1650    1669    4252#
SWR     000652          1359#   1627*   1638*   1674    1709    1712    1715    1754    1760    1903    1979    2004    2017
                        2029    2050    2075    2085    2099    2124    2133    2216    2218    2220    2228    2274    2281
                        2292    2299    2338    2347    2360    2407    2413    2433    2479    2523    3255    3285    3318
                        3323    3373    3381    3599    3618    3668    3673    3777    3785    3869    4255    4259*   4265
                        4275    4314*
SWREG   000176          1310#   1674    4259    4265
TAPG    017006          1995    2074    2262    2393    2406    2520    3730#
TAPG0   017024          3734#   3737
TAPG1   017070          3740    3744#
TAPG2   017104          3743    3747#
TAPG2A  017114          3749#
TAPG3   017126          3735    3752#
TAPG4   017230          3771#   3772    3774
TAPG5   017240          3775#   3801
TAPG6   017314          3778    3785#
TAPG7   017326          3786    3788#
TAPG8   017334          3770    3790#   3798    3800
TBELL   020654          4040    4057#
TCRLF   020572          4038    4043#   4294
TCRLFA  020610          4046#   4049
TEMPST  001002          1407#   4279*   4283*   4306*   4307*   4308*   4310*   4314
TEMP1   000706          1377#   2690    2724    2736    2902*   2915    2919*   3298*   3299*   3300*   3301*   3302    3304
                        3348*   3355*   3360    3405    3730*   3736*   3754*   3757*   3976*   3981    3990*   4170*   4171
                        4218*   4223*   4224    4228*   4231*   4232
TEMP2   000710          1378#   2684*   2685    2719*   2731*   2832*   2836    2920*   2927    3349*   3356*   3361    3406
                        4221*   4223    4236*   4237
TEMP3   000712          1379#   2425*   2431    2487*   2492    2494*   3350*   3368    3407*   3630*   3638    3640*   3814*
                        3816    4219*   4234*   4246    4247*   4248
TEMP4   000714          1380#   2463*   2469    2512    2904*   2908*
TEX     020704          4036    4056    4063#
TIB     000704          1376#   3979    3984    3987    3997*   3998    4022*   4026*   4029    4267*   4268*   4269    4286*
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		4287	4291	4299	4301	4309*	4310						
TINER	020440	3986	3989	4003	4006	4013*							
TINF	000700	1374*	1645*	1648*	1652*	2627							
TINP	010722	1671	2627*										
TINPA	010732	2628	2630*										
TINPB	010752	2634*	2636										
TINPB1	011000	2638	2642*										
TINPO	011020	2641	2646*										
TINPOA	011310	2693	2695*										
TINPOB	011326	2691	2698*										
TINPOC	011364	2704*	2707										
TINPOD	011416	2705	2711*										
TINPOE	011436	2712	2715*										
TINPOF	011442	2714	2716*										
TINPOO	011230	2679	2682*	2694	2710	2745							
TINP1	011446	2717*											
TINP2	011526	2725	2729*										
TINP2A	011606	2737	2741*										
TINP2B	011634	2697	2743	2746*									
TINP3	011654	2750*											
TINP4	012164	2800*	3815										
TKB	000660	1362*	2419	3809	3817*	4021*	4026	4267					
TKS	000656	1361*	1639*	2386*	2417	2435*	3808*	3818*	4020*	4023*	4024		
TMEX	000646	1357*	2042	2311	2464	2784	2786	4188*					
TMFLG	000756	1397*	2046*	2069*	2104*	2114	2254*	2294	2304	2318*	2322*	2399	3565	3590
		3609											
TOB	000702	1375*	1653	3654*	3664*	3871*	3893*	4034*	4035	4037	4039	4043*	4046*	4050*
		4057*	4062	4107*	4117*	4126*	4128*	4131	4136*					
TOG	020670	3655	3665	3872	3894	4041	4044	4047	4051	4058	4060*	4061	4108	4118
TPB	000664	1364*	4029*	4062*	4133*	4135*								
TPOS	012342	2701	2728	2740	2831*	2834								
TPS	000662	1363*	4027	4060	4129									
TSTAL	000636	1353*	1749	1752	2513	2535	2820	2822						
TTIN	020456	3978	4020*	4285										
TTINT	017404	1302	3807*											
TTINTO	017436	3810	3814*											
TTIN1	020476	4024*	4025											
TTIN2	020512	4027*	4028											
TTOUT	020530	1632	1636	1730	1736	1770	1803	1822	1828	1855	1875	1945	2023	2025
		2032	2091	2093	2102	2127	2129	2136	2138	2142	2199	2271	2287	2289
		2341	2350	2356	2363	2422	2483	2485	2496	2527	2529	2640	2643	2645
		2649	2652	2667	2683	2709	2716	2718	2730	2751	2761	2773	2783	2792
		2801	2810	2819	3265	3268	3274	3278	3288	3411	3426	3450	3455	3460
		3465	3470	3475	3488	3496	3509	3513	3522	3628	3632	3642	3646	3651
		3661	3696	3699	3742	3745	3748	3761	3781	3784	3845	3851	3861	3868
		3881	3885	3898	3913	3919	3928	3938	4014	4034*	4042	4054	4059	4153
		4164	4166	4178	4200	4202	4242	4272	4274	4278	4304			
TTR	020272	2430	2659	2674	2689	2723	2735	2758	2769	2781	2790	2799	2808	2817
		2826	3976*	4160										
TTRO	020300	3978*	4000											
TTR1	020326	3980	3984*											
TTR1A	020342	3985	3987*											
TTR1B	020356	3988	3990*											
TTR2	020414	3983	4001*											
TTR3	020424	4002	4004*											
TTR4	020434	4005	4007*											

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TTRS    020436          3982    4008#
UDES    000616          1345#   1694*   1708*   1722    1741    1795    1844*   1845    1847    1915*   1916    1928*   1929
                        1933    1950*   1951    2702*   2703    2726*   2738*   2867    2889    3107    3125    3128    3168
                        3594    3733    3846    3853    3856    3863    3914
UNP     000734          1388#   1690    1703*   1705*   1720*   1772*   1823    1834    1842*   1843    1860*   1861    1868*
                        1906*   1911    1920*   1923*   1924    1940*   1949*   2014    2027    2083    2096    2147    2149
                        2167    2190    2279    2357    2366    2630*   2692    2695    2698    2742    2744*   2746*   2835
                        3221    3351    3385    3402    3412    3451    3456    3461    3466    3471    3476    3489    3750*
                        3920
UNX     001032          1423#
UN1     001012          1415#   1679*   1681*   1682*   1685*   1691*   1693*   1694    1701*   1706*   1708    1718    1835*
                        1844    1859*   1862*   1864*   1866*   1912*   1914*   1915    1922*   1925*   1927*   1928    1947*
                        1950    2633    2696*   2699*   2702    2836*   3921*   3932    3935    4167    4232*   4245*
UN2     001014          1416#   1639
UN3     001016          1417#
UN4     001020          1418#
UN5     001022          1419#
UN6     001024          1420#
UN7     001026          1421#
UN8     001030          1422#
VECT    000614          1344#   2668    2670    2675
WDATA   026200          1987    2071    2875    2926    3043    3066    3094    3166    3187    3303    3576    4732#
WEOTF   017402          1996    1998*   3794*   3796*   3802#
WEX     005636          2038    2042#
WEX1    005650          2043    2045#
WEX2    005666          2049#   2053
WRITE   005254          1748    1979#
WRTSB   006504          2113    2175#
WRTSBO  006566          2181    2186#
WRTY    006142          2035    2103    2112#
WRTYR   006174          2117    2119#
WRTYTM  006170          2115    2118#
WRTYO   006150          2113#   2123    2170
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WRTY5   006500          2166    2171#
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WTER7   00111C          1452#
WTER8   001112          1453#
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WTMO    005760          2073    2075#
WTM1    006012          2081    2083#
WTM2    006070          2089    2095#
WTM3    006130          2100    2103#
WTM4    006134          2076    2079    2086    2104#
WO      005312          1986#   2040    2116
WOA     005350          1989    1993#
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W1      005424          1997    2004#
W1A     005370          1994    1996#
W3      005440          2005    2007#
W3A     005462          2010    2012#
W3AD    005460          1980    2011#
W3B     005552          2021    2027#
W3C     005602          2030    2033#
W3D     005616          2013    2018    2026    2036#
W4      005670          2048    2050#
XOR     013650          3070    3098    3102    3133#
XORS    013674          3067*   3082*   3086    3087*   3088*   3090*   3091    3095*   3103    3134    3135*   3136*   3137
                        3140#
YOZ     007600          2301    2343    2386#   2432    2434
YOZA    007626          2390#
YOZB    007634          2391#
YOZC    007654          2391    2394#
YOZC1   007736          2400    2403    2405#
YOZD    007750          2405    2407#
YOZE    007764          2408    2410#
YOZE1   007774          2411    2413#
YOZF    010010          2414    2416#
YOZG    010112          2418    2420    2433#
YOZO    007620          2389#
YSTAL   000640          1354#   2387    2394    2423    2426
$CNTG   026154          4271    4726#
$ENDAD  004650          1294    1881#
$MNEW   026170          4277    4729#
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                        4734#
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ENDCOM      1#
ESCAPE      1#
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GETSWR      1#
MULT        1#
NEWTST      1#
POP         1#
PUSH        1#
REPORT      1#
SETPRI      1#
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STARS       1#   1290
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TYPDEC      1#
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TYPNUM      1#
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TYPOCT      1#
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.$TYPD      1#
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.$4DCA      1#
.1170       1#
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ASL	4306	4307	4308												
BCC	3073														
BCS	3036	3313													
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	1989	1997	2010	2013	2021	2043	2079	2081	2089	2166	2181	2219	2221	2224	2264
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	3793	3810	3854	3857	3864	3870	3875	3933	3982	4036	4038	4040	4078	4132	4227
	4230	4256	4312												
BGE	4302														
BGT	2930	4300													
BHI	3293	3953	3955	3988											
BIC	1682	1742	1761	1859	2019	2051	2087	2284	2320	2460	2501	2505	2699	2726	2738
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	3615	3776	3824	3848	3916	3997	4110	4172	4231	4268	4286				
BICB	3205	3362	4309												
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	1848	1850	1857	1903	1918	1929	1934	1936	1938	1951	1979	2004	2017	2029	2075
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	2299	2338	2347	2360	2407	2413	2433	2471	2475	2479	2523	2704	2711	2906	3107
	3114	3123	3125	3128	3168	3174	3188	3255	3285	3318	3323	3373	3381	3571	3574
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BLO	3926														
BLOS	3296	3985	4002	4005											
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	2016	2033	2034	2036	2045	2046	2070	2095	2098	2104	2175	2182	2254	2256	2257
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ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

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RUN-TIME:  32 47 7 SECONDS
RUN-TIME RATIO: 341/87=3.8
CORE USED:  33K  (65 PAGES)
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L10

Spooler runtime 18 Seconds, 76 KCS, 480 disk reads, 4 disk writes, 127 pages

[redacted] Date 05-Nov-76 [redacted] Monitor IPC-0 5078 [103] [redacted]