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IDENTIFICATION

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TABLE OF CONTENTS

PARAGRAPH	SUBJECT	PAGE
1.	ABSTRACT	1
2.	REQUIREMENTS	1
3.	LOADING PROCEDURE	1
4.	STARTING PROCEDURE	2
5.	DATA PATTERNS	8
6.	RANDOMIZATION	9
7.	DYNAMIC PARAMETERS	10
8.	CONSOLE SWITCH	11
9.	ERROR PRINTOUTS	15
10.	STATISTICS PRINTOUT	23
11.	AUTO SEQUENCE	24
12.	TESTING PROCEDURES	26
13.	LISTING	

(PAGE 1)

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 MASSBUS THROUGH THE TMO2 MAG TAPE CONTROLLER. ANY TYPE OF TAPE DRIVE; NRZI, PE, 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 RH AND TMO2.

HOWEVER; THE RH AND TMO2 ARE 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 AS DETECTED BY THE RH OR TMO2.

2. REQUIREMENTS (HARDWARE)

- A. ANY PDP-11 PROCESSOR  
B. 8K OF CORE  
C. TELETYPE  
D. TMO2 TAPE CONTROLLER  
E. 1 TO 8 MAG TAPE DRIVES  
F. MASSBUS CONTROLLER

3. LOADING PROCEDURE

-----  
USE STANDARD PROCEDURE FOR LOADING BINARY TAPES

(PAGE 2)

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 RH STARTING ADDRESS, VECTOR ADDRESS, DRIVE NUMBER(TMO2 ADDRESS), SLAVE NUMBER, DENSITY, PARITY, FORMAT, RECORD COUNT, CHARACTER COUNT, PATTERN NUMBER, TAPE MARK AND STALL FOR READ, WRITE, AND TURNAROUND. ALL REPOSSES 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 REENTERED. SOME RESPONSES REQUIRE MORE THAN ONE (1) CHARACTER, BUT NONE REQUIRES MORE THAN SIX (6). RESPONSES OF MORE THAN ONE CHARACTER 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 THEREFORE IS HELD IN CORE FOR USE UNTIL CONSOLE SWITCH EIGHT(8) IS AGAIN SET AND THAT ALL STATISTICS WILL BE RETAINED.
- 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 ORIGINALLY CALLED FOR AT THE 200(8) START AND ALL STATISTICS ARE CLEARED TO ZERO.
- D. 240(8): THIS IS A SPECIAL ADDRESS WHICH WILL CAUSE THE PROGRAM TO EXECUTE A PREDETERMINED TEST PLAN ON ALL AVAILABLE DRIVES AND SLAVES. THE ONLY INPUT REQUIRED BY THE OPERATOR IS A RESPONSE TO REQUESTS FOR THE RH ADDRESS, VECTOR ADDRESS, CONTINUOUS OPERATION OF THE SEQUENCE, AND NRZ ONLY.
- SEE ITEM 11. (PAGE 24) FOR FULL DETAILS
- E. 300(8): THIS ADDRESS IS TO BE USED AS A RESTART ONLY AND WILL PERFORM JUST AS IN 200(8) EXCEPT THAT THE PARAMETER INPUT LIST IS SHORTENED. THE SHORT PARAMETER LIST CONSISTS OF DRIVE NUMBER, SLAVE

TMO2/TU45 DATA RELIABILITY PROGRAM  
CZTUIA.P11 07-JUN-78 14:49

MACY11 30(1046) 13-JUN-78 13:40 PAGE 5

F 1

SEQ 0005

NUMBER, DENSITY, PARITY, FORMAT, RECORD COUNT,  
CHARACTER COUNT, PATTERN, AND TAPE MARK.

(PAGE 3)

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 RH  
REGISTER (CS1) AS A SIX DIGIT UNIBUS ADDRESS.
- VECTOR ADDRESS: THE RESPONSE FOR THIS REQUEST  
IS TO ENTER THE INTERRUPT VECTOR ADDRESS  
USED BY THE RH AS A THREE (3) DIGIT ADDRESS.
- DRIVE NUMBER: THE DRIVE NUMBER (MASSBUS ADDRESS  
OF THE TMO2) IS ENTERED AS ONE (1)  
OCTAL CHARACTER AND MUST BE WITHIN THE LIMITS  
OF 0 THROUGH 7.
- SLAVE NUMBER: THE SLAVE NUMBER IS ENTERED AS ONE  
(1) OCTAL CHARACTER AND MUST BE  
WITHIN THE LIMITS OF 0 THROUGH 7.  
WHEN THE SLAVE NUMBER HAS BEEN  
ENTERED AND IS LEGAL, THE PROGRAM TESTS  
FOR THE PRESENCE OF A SLAVE OF THAT  
NUMBER. IF THE SLAVE IS AVAILABLE  
A PRINTOUT OF 7 CHANNEL, IF APPLICABLE,  
AND ITS SERIAL NUMBER (IN BCD)  
WILL BE MADE TO ASSIST THE OPERATOR  
IN SETTING OF DENSITY, PARITY, AND FORMAT.  
A CHECK IS MADE FOR THE PROPER SETTING  
OF THE DRIVE TYPE REGISTER; IF WRONG, A  
MESSAGE IS PRINTED FOR INFORMATION ONLY.  
IF THE SLAVE IS NOT AVAILABLE,  
A MESSAGE STATING SO WILL BE  
PRINTED AND A NEW SLAVE NUMBER  
REQUEST WILL BE ISSUED. WHEN A  
GOOD SLAVE NUMBER HAS BEEN ENTERED,  
REQUESTS FOR OPERATING DENSITY  
PARITY AND FORMAT ARE MADE FOR THAT  
SLAVE AND SHOULD BE RESPONDED TO  
ACCORDING TO THAT PARTICULAR SLAVE'S  
NEEDS. AS MANY AS EIGHT (8) SLAVE  
NUMBER REQUESTS MAY BE USED, HOW-  
EVER, AT LEAST ONE MUST BE USED.  
THE SLAVE NUMBERS AND THEIR RESPECTIVE  
DENSITY, PARITY AND FORMAT MAY BE ENTERED  
IN ANY ORDER. THE INFORMATION FOR  
EACH SLAVE ENTERED IS LOADED INTO A  
TABLE FOR REFERENCE IN TESTING.  
IF LESS THAN EIGHT(8) SLAVES ARE  
REQUIRED, THEN RESPONDING TO THE  
SLAVE NUMBER REQUEST WITH A CARRIAGE  
RETURN WILL TERMINATE THE SLAVE  
ENTRIES AND CONTINUE TO THE NEXT  
PARAMETER. IT SHOULD BE REMEMBERED  
THAT AT LEAST ONE SLAVE NUMBER REQUEST

MUST BE ENTERED. IF THE FIRST  
REQUEST IS RESPONDED TO BY A CARRIAGE  
RETURN, THEN THE REQUEST WILL BE REPEATED.

(PAGE 4)

DENSITY: THE DENSITY REQUEST IS RESPONDED TO BY ONE (1) OCTAL CHARACTER AND MUST BE WITHIN THE LIMITS OF 0 THRU 4. AS EACH SLAVE NUMBER IS ENTERED, A REQUEST FOR THE OPERATING DENSITY FOR THAT SLAVE IS TYPED. THE RESPONSE MEANINGS ARE AS FOLLOWING:

- A. 0 = 200BPI, NRZI
- B. 1 = 556BPI, NRZI
- C. 2 = 800BPI, NRZI
- D. 3 = 800BPI, NRZI
- E. 4 = 1600BPI, PE (9 CHANNEL ONLY)

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

FORMAT: THE FORMAT REQUEST IS RESPONDED TO BY TWO (2) CHARACTERS AND SHOULD BE AS FOLLOWS

- A. 14 = 9 CHANNEL NORMAL (TWO FRAMES PER WORD)
- B. 15 = CORE DUMP (FOUR FRAMES PER WORD)

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 CONJUNCTION 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 20 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.



(PAGE 5)

PATTERN NUMBER: THIS RESPONSE IS A TWO (2) CHARACTER OCTAL NUMBER WITHIN THE LIMITS OF 0 THRU 15(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. RESETTNG 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 200(8), 210(8), OR 300(8). WHEN OPERATING IN NRZ MODE (DENSITY 0-3) THE PROGRAM CONSTRUCTS AND SAVES BOTH AN EXPECTED CRC CHARACTER AND AN LRC CHARACTER FOR COMPARISONS WITH THE HARDWARE GENERATED CHECK CHARACTER IN BOTH READ AND WRITE. 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. (ZZ-CZTUNAO) 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 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.

TAPE MARK: THE TAPE MARK REQUEST IS USED TO DETERMINE IF THE OPERATOR WISHES TO HAVE EACH DATA BLOCK SEPERATED BY A TAPE MARK. IF RESPONDED TO BY A ONE (1) THE TAPE MARK WILL BE WRITTEN AND WHEN READING WILL BE EXPECTED AT THE END OF DATA BLOCK. A ZERO (0) RESPONSE WILL DISALLOW TAPE MARK. 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.

(PAGE 6)

- SINGLE PASS: THIS REQUEST IS RESPONDED TO BY EITHER A ONE (1) OR A ZERO (0). RESPONSE OF 1, WILL CAUSE THE TEST TO BE STOPPED AFTER THE LAST AVAILABLE DRIVE REACHES END OF TAPE. A RESPONSE OF 0, WILL ALLOW CONTINUOUS RUNNING THROUGH MULTIPLE PASSES. TO RESTART AT END OF PASS, PRESS CONTINUE, OR RESTART AT THE CONSOLE.
- 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 SLAVE DESCRIPTION VALUES (SLAVE NUMBER, DENSITY, PARITY, AND FORMAT) HAVE NOMINAL VALUES ALREADY STORED IN THE PROGRAM. AS EACH PARAMETER REQUEST (PATTERN NUMBER, RECORD COUNT, CHARACTER COUNT, TAPE MARK 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. TM=0
  - E. SINGLE PASS = 0
  - F. READ STALL = 1
  - G. WRITE STALL = 1
  - H. TURN AROUND STALL = 1

(PAGE 7)  
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:

TU45 TAPE DRIVE TEST  
ENTER CONDITIONS IN OCTAL

REGISTER START=172440(172440)  
VECTOR ADDRESS=224(CR)  
DRIVE NUMBER (4)  
SLAVE NUMBER=(5) SN: 5009  
DENSITY=(3)  
PARITY=(0)  
FORMAT=(14)  
SLAVE NUMBER=(2) 7 CHAN SN: 0022  
DENSITY=(2)  
PARITY=(1)  
FORMAT=(15)  
SLAVE NUMBER=(CR)  
RECORD COUNT=100 (500)(CR)  
CHARACTER COUNT=200 (38)?(7)(CR)  
PATTERN NUMBER=1 (22)  
?  
(6)(CR)  
TM=(0)  
SINGLE PASS=(0)

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 SLAVE 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.

NO TAPE MARKS WILL BE WRITTEN.

(PAGE 8)

5. DATA PATTERNS  
-----

THERE ARE FIFTEEN 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 (4000 CHARACTERS) WILL BE FILLED WITH THE PATTERN ENTERED SO THAT ANY SIZE RECORD CAN BE USED. (SEE DTC ZZ-CZTUNAO) THE PROGRAM GENERATES A CYLIC REDUNDENCY CHECK CHARACTER (CRC) AND A LONGITUDINAL REDUNDENCY CHECK CHARACTER (LRC) FOR COMPARISONS AGAINST THE CRC AND LRC GENERATED BY THE HARDWARE IN NRZI READS OR WRITES.

THE FOLLOWING IS A LIST OF THE DATA PATTERNS AVAILABLE:

DATA0: EXTERNAL INPUT THRU HIGH SPEED READER (SEE DTC)  
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: WALKING ONE/ALL ONE IN ALTERNATING CHARACTERS  
DATA11: INCREMENTING CHARACTERS (000-377)  
DATA12: DECREMENTING CHARACTERS (377-000)  
DATA13: ALTERNATING CHARACTERS OF ALL ZERO AND ALL ONE BITS  
DATA14: WALKING ZERO/ALL ZERO IN ALTERNATING CHARACTERS  
DATA15: AUTO SEQUENCE PATTERN 0,0,-1,-1,-1,0,0

(PAGE 9)

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.

(PAGE 10)

7. DYNAMIC PARAMETERS:  
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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.

THE YOZZLE STALL IS ALSO DYNAMIC AND CAN BE CHANGED BY TYPING A CNTRL C WHILE DOING A YOZZLE. A YOZZLE STALL REQUEST WILL BE PRINTED AND SHOULD BE RESPONDED TO WITH THE DESIRED VALUE.

(PAGE 11)

8. 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. IF A CONSOLE SWITCH REGISTER IS NOT PRESENT, THE SWITCHES ARE NOT DYNAMIC AND MUST BE SET BEFORE STARTING, USING THE FOLLOWING PROCEDURE:

- A) LOAD ADDRESS 606(8) LABELLED "SWR"
- B) DEPOSIT THE VALUE 176(8)
- C) LOAD ADDRESS 176(8)
- D) DEPOSIT THE DESIRED SWITCH VALUE.

- SW15: 1=STOP ON ERROR  
0=CONTINUE ON ERROR
- SW14: 1=PRINT READ/WRITE STATISTICS  
0=DO NOT PRINT STATS
- SW13: 1=DO NOT CHECK DATA ERRORS  
0=CHECK DATA ERRORS
- SW12: 1=DO NOT CHECK WRITE STATUS ERRORS (NOR CLEAR THEM IF THEY DO OCCUR)  
0=CHECK WRITE STATUS ERRORS
- SW11: 1=DO NOT CHECK READ STATUS ERRORS (NOR CLEAR THEM IF THEY DO OCCUR)  
0=CHECK READ STATUS ERRORS
- SW10: 1=DO NOT PRINT ANY ERRORS (EXCEPT CATASTROPHIC 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=DO WRITE/READ RETRIES

0=DO NOT RETRY

SW3: 1=DO NOT READ FORWARD  
0=READ FORWARD

SW2: 1=DO NOT READ REVERSE  
0=READ REVERSE

SW1: 1=READ FORWARD FIRST  
0=READ REVERSE FIRST

SW0: 1=DO NOT WRITE  
0=WRITE



(PAGE 12)

SWITCH EXPLANATION AND EXAMPLES:

SW0-3: THESE SWITCHES ARE USED TO CONTROL THE SEQUENCE OF MAG TAPE OPERATIONS PERFORMED 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 REACH EOT, AT WHICH TIME TESTING IS RESUMED ON ALL AVAILABLE UNITS.

EXAMPLES: 0-3

- A. SW0=0, SW1=0, SW2=1, SW3=1  
WRITE ONLY X RECORDS OF Y CHARACTERS
- B. SW0=0, SW1=0, SW2=1, SW3=0  
WRITE THEN BACKSPACE AND READ FORWARD X RECORDS
- C. SW0=0, SW1=0, SW2=0, SW3=1  
WRITE THEN READ REVERSE X RECORDS.
- D. SW0=0, SW1=0, SW2=0, SW3=0  
WRITE THEN READ REVERSE AND READ FORWARD X RECORDS
- E. SW0=0, SW1=1, SW2=0, SW3=0  
WRITE THEN BACKSPACE AND READ FORWARD THEN REVERSE
- F. SW0=1, SW1=0, SW2=1, SW3=0  
READ TAPE FORWARD X RECORDS
- G. SW0=1, SW1=0, SW2=0, SW3=1  
READ TAPE REVERSE X RECORDS
- H. SW0=1, SW1=0, SW2=0, SW3=0  
READ TAPE REVERSE THEN FORWARD
- I. SW0=1, SW1=1, SW2=0, SW3=0  
READ TAPE FORWARD THEN REVERSE

(PAGE 13)

- SW4: SWITCH FOUR (4), WHEN SET TO A ONE (1), WILL CAUSE ANY DATA RELATED ERROR TO BE RETRIED. THE WRITE RETRY SCHEME CONSISTS OF REWRITING THE RECORD IN THE SAME SPOT ON TAPE FOUR (4) TIMES. IF ALL FOUR (4) REPEATS ARE SUCCESSFUL, THE RECORD IS CONSIDERED AS RECOVERED, AND A TAPE WRITE ERROR IS LOGGED. IF ANY OF THE FOUR (4) REPEATS IS UNSUCCESSFUL, A SKIP ERASE IS DONE, A SUSPECTED BAD TAPE SPOT IS 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 SLAVE WILL BE REWOUND AND REMOVED FROM TESTING WITH AN APPROPRIATE MESSAGE PRINTED. THE READ RETRY SCHEME CONSISTS OF REREADING THE RECORD UP TO EIGHT TIMES. IF ALL EIGHT REREADS ARE BAD, IT IS A HARD ERROR. IF ANY REREAD IS SUCCESSFUL, THIS IS A SOFT ERROR. IF THE ORIGINAL ERROR IS OF THE NON-RETRYABLE TYPE (IE: ILF,RMR,ILR,NEF,CBUSPE), THE RETRY SCHEME IS NOT ENTERED AND A MESSAGE IS PRINTED.
- SW5: SWITCH FIVE (5) WHEN SET DURING A READ FORWARD OR REVERSE WILL CAUSE THE TAPE TO CONTINUOUSLY READ THE CURRENT RECORD BY SPACING EITHER FORWARD OR REVERSE 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 3000 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.

(PAGE 14)

- 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 (FORWARD OR REVERSE) 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.

\*\*NOTE THAT WHEN SW11 OR 12 ARE SET, NOT ONLY ARE ERRORS NOT CHECKED, BUT THEY ARE NOT CLEARED EITHER.  
\*\*\*THEREFOR USE CAUTION TO ASSURE THAT OPERATIONS ARE NOT UNEXECUTED DUE TO UNCLEARED ERRORS.  
\*\*\*\*DO NOT SET SW 11 OR 12 TO A ONE (1), DURING A RETRY SEQUENCE.

SW14: SWITCH FOURTEEN (14) WHEN SET TO A ONE (1) WILL PRINT THE ACCUMULATED READ/WRITE STATISTICS FOR THE SELECTED SLAVE UNDER TEST AT THE END OF THE CURRENT BLOCK CYCLE. THE STATISTICS PRINTED ARE THE NUMBER OF BITS DROPPED OR PICKED, THE NUMBER OF RETRIES, WRITE ERRORS, READ ERRORS, AND DATA ERRORS.

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.

(PAGE 15)

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 PROCEEDED BY A TWO LINE HEADER WHICH CONTAINS THE DRIVE NUMBER, SLAVE NUMBER, DENSITY, PARITY, AND FORMAT ON THE FIRST LINE, AND THE BLOCK NUMBER, RECORD NUMBER, RECORD SIZE, AND ERROR TYPE ON THE SECOND.

A. OPERATION ERRORS:

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

1. READ/WRITE STATUS ERRORS: THESE ARE DETECTED BY EITHER THE TM02 ITSELF OR BY THE MASSBUS CONTROLLER. ALL STATUS ERRORS WILL BE REPORTED.
2. TAPE POSITION ERRORS: THESE ARE INDICATED BY AN INCORRECT SPACE OR REWIND OPERATION IN WHICH TAPE POSITION BECOMES UNRELIABLE.

B. DATA ERRORS:

DATA ERRORS WILL OCCUR WHEN TAPE IS BEING READ AND THE DATA FROM TAPE DOES NOT MATCH THE EXPECTED DATA. WHEN READING IN THE REVERSE DIRECTION, THE RECORD NUMBERS WILL BE COUNTED DOWN FROM LAST TO FIRST. THE CHARACTER NUMBERS IN REVERSE READS WILL ALSO BE COUNTED DOWN IN ORDER TO REFLECT TAPE POSITION RATHER THAN THE ORDER TRANSFERRED.

BECAUSE DATA RECORDS CAN BE UP TO FOUR 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 FIVE (25) 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.

(PAGE 16)

C. CONDITION ERRORS: (CATASTROPHIC)

THESE PRINTOUTS REFLECT THE STATE OF THE TAPE SYSTEM  
EITHER BEFORE OR AFTER AN OPERATION

1. EOT: WHEN EOT (END OF TAPE) IS ENCOUNTERED DURING  
EITHER A READ OR WRITE, THE CYCLE IS COMPLETED  
ON THE SHORTENED BLOCK AFTER WHICH THE SLAVE  
WILL BE REWOUND AND FLAGGED AS UNAVAILABLE  
FOR TESTING UNTIL ALL SLAVES HAVE REACHED EOT AND  
ARE REWOUND. WHEN THE LAST AVAILABLE SLAVE  
HAS REACHED EOT AND BEEN REWOUND TO BOT,  
TESTING WILL BE RESUMED ON ALL SLAVES.
2. ILLEGAL BOT: WHEN A SLAVE ENCOUNTERS BOT DURING  
A READ, WRITE, OR SPACE OPERATION, AN ERROR  
IS PRINTED AND THE PROGRAM HALTED. THIS IS  
A CATASTROPHIC ERROR. TESTING MAY BE RESUMED  
BY PRESSING CONTINUE; BUT A RESTART IS  
SUGGESTED.
3. NO INTERRUPT RETURNED: EACH TAPE OPERATION SHOULD BE  
TERMINATED BY THE SETTING OF AN INTERRUPT IN  
THE CPU. IF NO INTERRUPT IS RETURNED WITHIN  
THE APPROPRIATE TIME, AN ERROR IS PRINTED.
4. NO MEDIUM ON-LINE: BEFORE AN OPERATION IS ATTEMPTED,  
THE TMO2 IS CHECKED FOR MOL. IF IT IS NOT  
SET, AN ERROR IS PRINTED, AND THE PROGRAM STOPPED.  
TESTING MAY BE RESUMED BY PRESSING CONTINUE.
5. NO BOT ON REWIND: AS EACH SLAVE IS REWOUND A CHECK  
IS MADE TO ASSURE THAT PROPER POSITION AT BOT  
IS ESTABLISHED. IF BOT IS NOT SET UPON COMPLETION OF  
A REWIND, AN ERROR IS PRINTED AND THE PROGRAM  
WILL HALT. PRESS CONTINUE TO RESUME TESTING.
6. POSITION ERROR: IF POSITION IS LOST DURING A RETRY,  
A MESSAGE IS PRINTED, THE TAPE REWOUND,  
AND REMOVED FROM TESTING UNTIL ALL ARE  
RESTARTED AT BLOCK ONE.
7. BAD TAPE OVERFLOW: IF 20(8) BAD TAPE SPOTS ARE FOUND,  
A MESSAGE IS PRINTED, THE TAPE REWOUND,  
AND REMOVED FROM TESTING UNTIL ALL ARE  
RESTARTED AT BLOCK ONE.
8. HARD READ ERROR: IF ANY HARD READ ERROR IS ENCOUNTERED  
DURING A RETRY, A MESSAGE IS PRINTED  
REGARDLESS OF THE SETTING OF SW10.
9. NON-RETRYABLE: IF ANY NON-RETRYABLE ERROR IS ENCOUNTERED, A  
MESSAGE IS PRINTED REGARDLESS OF THE SETTING OF SW10.

TM02/TU45 DATA RELIABILITY PROGRAM  
CZTUIA.P11 07-JUN-78 14:49

MACY11 30(1046) 13-JUN-78<sup>J 2</sup> 13:40 PAGE 22

SEQ 0022

(PAGE 17)

D. EXAMPLES:

GLOSSARY:

BN = CURRENT BLOCK NUMBER  
RN = CURRENT RECORD NUMBER  
RS = RECORD SIZE, IN FRAMES  
WE = WRITE STATUS ERROR  
RE = READ STATUS ERROR  
SE = SPACE ERROR  
TM = TAPE MARK  
F = FORWARD  
R = REVERSE  
CS1 = RH/TU45 CONTROL REGISTER  
WC = RH WORD COUNT  
BA = RH BUS ADDRESS  
FC = TU45 FRAME COUNT  
CS2 = RH CONTROLLER STATUS  
DS = TU45 DRIVE STATUS  
ER = TU45 ERROR REGISTER  
AS = ATTENTION SUMMARY  
CK = TU45 CHECK CHARACTER  
DB = RH DATA BUFFER  
MR = TU45 MAINTENENCE REGISTER  
DT = TU45 DRIVE TYPE  
SN = TU45 SERIAL NUMBER  
TC = TU45 TEST CONTROL  
\*F = DATA FORMAT  
\*P = PARITY  
\*D = DENSITY  
\*PATRN = DATA PATTERN NUMBER (R = RANDOM)

(PAGE 18)

EXAMPLE 1: IN THIS EXAMPLE SLAVE 1 ON TMO2 0 WAS OPERATING AT 1600 BPI IN ODD PARITY USING THE NINE CHANNEL NORMAL DATA FORMAT. A WRITE STATUS ERROR WAS DETECTED. THE BAD STATUS INDICATES THAT AN UNCORRECTABLE DATA ERROR (BIT 6 OF ER) AND A PE FORMAT ERROR (BIT 7 OF ER) OCCURED DURING THE WRITE OPERATION OF THE SIXTH (6) RECORD OF THE FIFTY (50) RECORDS IN BLOCK (2). THE SIZE OF THE RECORD WAS TWO HUNDRED (200) FRAMES. THE CHECK CHARACTER REFLECTS THE BAD TRACK.

DRIVE NO. 0 \*SLAVE NO. 1 \*D 4 \*P 0 \*F 14 \*PATRN 1  
\*BN 2 \*RN 6-50 \*RS = 200 \*WE  
CS1 144260  
CS2 100  
DS 150640  
ER 300  
WC 0  
CK 4

EXAMPLE 2: IN THIS EXAMPLE SLAVE 3 ON TMO2 1 WAS OPERATING AT 800 BPI IN EVEN PARITY USING THE NINE CHANNEL NORMAL DATA FORMAT. A READ STATUS ERROR WAS DETECTED DURING THE REVERSE READ OF THE TENTH (10) RECORD OF THE 25 RECORDS IN THIS BLOCK (12). THE SIZE OF THE RECORD IS TWENTY (20) FRAMES. THE PRINTOUT INDICATES THE DETECTION OF A VERTICAL PARITY ERROR (VPE: BIT 6 OF ER) AND A CYCLIC REDUNDENCY ERROR (CRC: BIT 15 OF ER). THE CRC CHARACTER, AS RECEIVED, IS NOT AS EXPECTED AND IS PRINTED SHOWING BOTH THE ACTUAL (FIRST) AND THE EXPECTED (LAST).

DRIVE NO. 2 \*SLAVE NO. 3 \*D 3 \*P 1 \*F 14 \*PATRN 3  
\*BN 12 \*RN 10-25 \*RS 20 \*RE R  
CS1 144276  
CS2 100  
DS 150600  
ER 100100  
WC 0  
CRC 767-777



(PAGE 19)

EXAMPLE 3: IN THIS EXAMPLE, THE HEADER IS THE SAME AS IN EXAMPLE TWO (2) EXCEPT THAT THE ERROR TYPE REFLECTS A READ ERROR IN THE FORWARD DIRECTION. IT IS NORMAL FOR THE SYSTEM TO DETECT AN ERROR IN THE FORWARD AND REVERSE DIRECTION AT THE SAME RECORD. REMEMBER THAT IN REVERSE OPERATIONS THE RECORD NUMBER IS COUNTED DOWN SO THAT RECORD NUMBER TEN (10) WILL SHOWN IN THE PROPER POSITION IN BOTH FORWARD AND REVERSE.

DRIVE NO. 2 \*SLAVE NO. 3 \*D 3 \*P 1 \*F 14 \*PATRN 2  
\*BN 12 \*RN 10-25 \*RS 20 \*RE F  
CS1 144270  
CS2 100  
DS 150600  
ER 100100  
WC 0  
CRC 767-777

EXAMPLE 4: IN EXAMPLES 2 AND 3 THE READ OPERATION RESULTED IN BAD STATUS, HOWEVER THE DATA ASSOCIATED WITH THE OPERATION WAS NOT BAD (OR WAS NOT CHECKED: SW 13=1). THIS EXAMPLE (4) SHOWS A PRINTOUT REFLECTING A READ STATUS ERROR ACCOMPANIED BY BAD DATA IN CHARACTERS FOUR (4) AND SIX (6).

DRIVE NO. 2 \*SLAVE NO. 3 \*D 3 \*P 1 \*F 14 \*PATRN 2  
\*BN 12 \*RN 10-25 \*RS 20 \*RE F  
CS1 144270  
CS2 100  
DS 150600  
ER 100100  
WC 0  
CRC 767-777  
CN 4  
G 11111111  
B 10111111  
CN 6  
G 11111111  
B 10111111

(PAGE 20)

EXAMPLE 5: THIS EXAMPLE SHOWS A READ DATA ERROR WHICH OCCURRED, WITHOUT AN ACCOMPANYING STATUS ERROR, WHICH RESULTED IN A BAD RECORD.

DRIVE NO. 3 \*SLAVE NO. 1 \*D 4 \*P 0 \*F 14 \*PATRN R  
\*BN 100 \*RN 66-200 \*RS 2000 \*DE F

CN 0  
G 11111111  
B 00000000  
CN 1  
G 11111111  
B 00000000  
CN 2  
G 11111111  
B 00000000  
CN 3  
G 11111111  
B 00000000  
CN 4  
G 11111111  
B 00000000  
CN 5  
G 11111111  
B 00000000  
CN 6  
G 11111111  
B 00000000  
CN 7  
G 11111111  
B 00000000

BAD RECORD

EXAMPLE 6: THE FOLLOWING EXAMPLE SHOWS THE RESULT OF A SPACE OPERATION THAT SHOULD HAVE SPACED REVERSE OVER AN ENTIRE 100 RECORD BLOCK BUT WHICH TERMINATED AT THE END OF 40 RECORDS. LEAVING A POSITION ERROR OF 40

DRIVE NO. 2 \*SLAVE NO. 6 \*D 2 \*P 0 \*F 14  
\*BN 3 \*RN 100-100 \*RS 1000 \*SE R  
ERR AMT 40

(PAGE 21)

EXAMPLE 7: THIS EXAMPLE REFLECTS AN ERROR DETECTED WHILE WRITING A TAPE MARK (TM) AT THE END OF THE CURRENT DATA BLOCK PER OPTION RESPONSE TM=1. NOTE THAT THE TM RECORD NUMBER IS ONE GREATER THAN THE TOTAL NUMBER OF DATA RECORDS IN THE CURRENT BLOCK.

DRIVE NO. 1 \*SLAVE NO. 1 \*D 2 \*P 0 \*F 14  
\*BN 67 \*RN 101-100 \*RS 36 \*WE TM  
CS1 144226  
CS2 300  
DS 150604  
ER 1000  
WC 0

EXAMPLE 8: THIS EXAMPLE SHOWS TWO (2) PRINTOUTS REFLECTING A WRITE RETRY WHICH WAS NOT SUCCESSFUL THE FIRST TIME, BUT WHICH DID RECOVER ON THE SECOND. THE UNSUCCESSFUL RETRY IS LOGGED AS A SUSPECTED BAD TAPE SPOT BY ITS BLOCK AND RECORD NUMBER.

DRIVE NO. 0 \*SLAVE NO. 2 \*D 4 \*P 0 \*F 14 \*PATRN 6  
\*BN 2 \*RN 12-20 \*RS 667 \*WE  
CS1 144260  
CS2 100  
DS 150640  
ER 100  
WC 0  
\*\*\*ORIGINAL ERROR\*\*\*

DRIVE NO. 0 SLAVE NO. 2 \*D 4 \*P 0 \*F 14 \*PATRN 6  
\*BN 2 \*RN 12-20 \*RS 667 \*WE  
CS1 144260  
CS2 100  
DS 150640  
ER 100  
WC 0  
SUSPECT BAD TAPE  
RETRY: 0  
REPT: 0  
RECOVERED  
RETRY: 1

(PAGE 22)

EXAMPLE 9: IF , DURING A WRITE RETRY THE BACKSPACE  
OR THE ERASE OPERATION RESULT IN AN ERROR,  
THE ERROR WILL BE PRINTED AND THE PROGRAM  
HALTED. THIS EXAMPLE SHOWS THE ERROR PRINT  
FOR A SPACE AND AN ERASE (2 EXAMPLES)

DRIVE NO. 1 \*SLAVE NO. 1 \*D 3 \*P 0 \*F 14  
BN 12 \*RN 8-64 \*RS 500 \*SE RTRY  
ERR AMT 1

DRIVE NO. 1 \*SLAVE NO. 1 \*D 3 \*P 0 \*F 14  
\*BN 12 \*RN 8-64 \*RS 500 \*ERASE  
CS1 144224  
CS2 100  
DS 150600  
ER 400  
WC 0

EXAMPLE 10: THIS EXAMPLE SHOWS THE PRINTOUT FROM  
A REWIND OPERATION WHICH DOES NOT HAVE  
BOT SET AT THE END.

DRIVE NO. 2 \*SLAVE NO. 3 \*D 3 \*P 0 \*F 14  
\*BN 66 \*RN 15-20 \*RS 1000  
NOT BOT ON REWIND: HALT

EXAMPLE 11: THIS EXAMPLE SHOWS THE PRINTOUT MADE WHEN  
THERE IS NO INTERRUPT RETURNED AT THE END  
OF AN OPERATION.

DRIVE NO. 7 \*SLAVE NO. 7 \*D 2 \*P 1 \*F 14  
\*BN 1 \*RN 25-26 \*RS 1200  
NO INTERRUPT

(PAGE 23)

10. STATISTICS PRINTOUT

THE PROGRAM, THROUGH ITS ERROR CHECKING, IS ABLE TO GATHER CERTAIN STATISTICS ABOUT THE PERFORMANCE OF EACH UNIT UNDER TEST. THIS INFORMATION IS PRINTED OUT WHENEVER A UNIT IS REWOUND FROM END OF TAPE, OR BECAUSE IT IS TO BE REMOVED FROM TESTING DUE TO SOME CATASTROPHIC ERROR. (POSITION LOST, BAD TAPE OVERFLOW) THE STATISTICS MAY BE PRINTED AT ANY TIME BY SETTING SWITCH 14 TO A ONE (1). THIS PRESENTS A PICTURE OF PERFORMANCE UP TO THIS TIME. THE STATISTICS WILL BE CLEARED UPON REWIND OF THE UNIT; BUT NOT BY SETTING SW 14.

STATISTICS PRINT EXAMPLE (A HEADER WILL PRECEED THE STATS)

DROPS: 0 3 0 0 0 6 45 0  
PICKS: 1 0 0 0 0 0 0 2  
RETRY: 1  
WTERR: 2  
REFWD: 3  
SOFT: 2  
HARD: 1  
DEFWD: 0  
REREV: 4  
SOFT: 1  
HARD: 3  
DEREV: 0  
2 BAD TAPE SPOTS  
0 \*BN 1 \*RN 2  
1 \*BN 15 \*RN 100

\*\* NOTE \*\* DROPS AND PICKS REFLECT CORE BIT POSITIONS.  
THE FOLLOWING IS A TABLE OF CORE BITS TO TRACK NUMBER.

TRACK NO.	7	6	5	3	9	1	8	2
CORE BIT	7	6	5	4	3	2	1	0

DROPS: NUMBER OF DATA BITS DROPPED: PER CORE BIT(SEE NOTE ABOVE)  
PICKS: NUMBER OF DATA BITS PICKED UP: PER CORE BIT(SEE NOTE ABOVE)  
RETRY: NUMBER OF WRITE RETRIES  
WTERR: NUMBER OF WRITE ERRORS NOT ASSOCIATED WITH BAD TAPE  
REFWD: NUMBER OF READ FORWARD STATUS ERRORS  
REREV: NUMBER OF READ REVERSE STATUS ERRORS  
SOFT: NUMBER OF RECOVERED READ ERRORS  
HARD: NUMBER OF UNRECOVERED READ ERRORS  
DEFWD: NUMBER OF FORWARD DATA ERRORS WITH NO ASSOCIATED STATUS ERROR  
DEREV: NUMBER OF REVERSE DATA ERRORS WITH NO ASSOCIATED STATUS ERROR

(PAGE 24)

11. AUTO SEQUENCE  
-----

THE AUTO SEQUENCE (START AT ADDRESS 240) WILL EXECUTE A  
PREDETERMINED TEST PLAN ON ALL AVAILABLE SLAVES ON EACH  
AVAILABLE TMO2. THE ONLY OPERATOR RESPONSE IS TO THE TYPED  
REQUESTS FOR THE RH ADDRESS, VECTOR, CONTINUOUS OR SINGLE  
CYCLE, AND NRZ ONLY. ALL SWITCHES REMAIN ACTIVE AND MAY BE  
USED NORMALLY; HOWEVER THE IDEA 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:

TU45 AUTO SEQUENCE TEST  
ENTER CONDITIONS IN OCTAL

REGISTER START = 172400(172440)  
VECTOR ADDRESS = 224(CR)  
NRZ ONLY: (0)  
AUTO CONT: (1)

THIS EXAMPLE SHOWS AN AUTO SEQUENCE START WITH THE RH  
AT BUS ADDRESS 172440 AND A VECTOR OF 224. ALL AVAILABLE  
HARDWARE WILL BE TESTED CONTINUOUSLY IN BOTH NRZ AND PE MODE.

AS EACH TMO2 AND ITS SLAVES ARE FOUND, A DIVIDER LINE OF  
ASTERICKS WILL BE PRINTED FOLLOWED BY A PRINTOUT OF THE  
TMO2 AND ITS SLAVES BEING TESTED. AS EACH TMO2 AND  
ITS SLAVES ARE FINISHED, ANOTHER DIVIDER IS PRINTED  
BEFORE TESTING IS RESUMED ON THE NEXT AVAILABLE DRIVE.

WHEN ALL AVAILABLE HARDWARE HAS BEEN TESTED,  
A PRINTOUT OF END OF SEQUENCE WILL BE DONE AND THE  
PROGRAM WILL EITHER HALT (AUTO CONT = 0) OR RESTART WITH  
THE FIRST AVAILABLE UNIT (AUTO CONT = 1).

(PAGE 25)

AUTO SEQUENCE TEST PLAN:

THE AUTO SEQUENCE WILL EXECUTE BOTH AN NRZ AND A PE CYCLE. EACH CYCLE WILL BE STARTED FROM BOT AND CONSIST OF VARIOUS DATA PATTERNS INTENDED TO BE WORST CASE FOR THAT PARTICULAR MODE.

1. NRZ CYCLE:

SIX (6) BLOCKS OF ONE HUNDRED (100) RECORDS OF FOUR THOUSAND (4000) CHARACTERS FOR EACH OF THE FOUR DATA PATTERNS.

PATTERN 1: ALL ONES DATA IN ALL BYTES  
PATTERN 10: WALKING ONE/ALL ONE  
PATTERN 14: WALKING ZERO/ALL ZERO  
RANDOM DATA: RANDOM

2. PE CYCLE: (IF NRZ ONLY = 0)

SIX BLOCKS OF ONE HUNDRED (100) RECORDS OF FOUR THOUSAND (4000) CHARACTERS EACH FOR EACH OF THREE DATA PATTERNS, THEN RANDOM DATA BLOCKS TO END OF TAPE.

PATTERN 10: WALKING ONE/ALL ONE  
PATTERN 14: WALKING ZERO/ALL ZERO  
PATTERN 15: THREE (3) 0 CHARACTERS, TWO (2) ALL CHARACTERS, THREE 0 CHARACTERS, THEN COMPLIMENT PATTERN. REPEATED FOR A FULL BUFFER  
RANDOM DATA: RANDOM

(PAGE 26)

12. TESTING PROCEDURES  
-----

AS PREVIOUSLY STATED THIS PROGRAM CONTAINS NO FIXED TESTS. THE ENTIRE TEST CYCLE TO BE EXECUTED IS DESCRIBED BY THE OPERATOR THROUGH 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 PERFORMED 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 WILL 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  
-----

-



```
1312 .LIST SEQ,LOC,BIN
1313 .TITLE TM02/TU45 DATA RELIABILITY PROGRAM
1314 :ZZ-CZTU1A0
1315 :15 MAY 1978
1316 :R. BARNES/R. J. COLLINS
1317
1318 .ENABLE ABS
1319
1320 :CONSOLE SWITCHES*****
1321
1322 :SW15: 1=STOP ON ERROR
1323 :      0=CONTINUE ON ERROR
1324
1325 :SW14: 1=PRINT READ/WRITE STATS
1326 :      0=DO NOT PRINT STATS
1327
1328 :SW13: 1=DO NOT CHECK DATA
1329 :      0=CHECK DATA
1330 :SW12: 1=DO NOT CHECK WRITE ERRORS
1331 :      0=CHECK WRITE ERRORS
1332 :SW11: 1=DO NOT CHECK READ ERRORS
1333 :      0=CHECK READ ERRORS
1334 :SW10: 1=DO NOT PRINT ERRORS
1335 :      0=PRINT ERRORS
1336
1337 :SW9: 1=REWIND TAPE
1338 :      0=DO NOT REWIND
1339
1340 :SW8: 1=USE RANDOM DATA
1341 :      0=USE FIXED DATA PATTERN
1342 :SW7: 1=USE RANDOM CHARACTER COUNT
1343 :      0=USE FIXED CHAR COUNT
1344 :SW6: 1=USE RANDOM RECORD COUNT
1345 :      0=USE FIXED RECORD COUNT
1346
1347 :SW5: 1=YOZZLE ON CURRENT RECORD
1348 :      0=DO NOT YOZZLE
1349
1350 :SW4: 1=DO BOTH READ AND WRITE RETRIES
1351 :      0=INHIBIT RETRIES
1352
1353 :SW3: 1=DO NOT READ FORWARD
1354 :      0=READ FORWARD
1355 :SW2: 1=DO NOT READ REVERSE
1356 :      0=READ REVERSE
1357 :SW1: 1=READ FORWARD FIRST
1358 :      0=READ REVERSE FIRST
1359 :SW0: 1=DO NOT WRITE
1360 :      0=WRITE
```



```

1407                ;REGISTER EQUIVS*****
1408
1409                R0=%0
1410                R1=%1
1411                R2=%2
1412                R3=%3
1413                R4=%4
1414                R5=%5
1415                SP=%6
1416                PC=%7
1417                NOP=240
1418                POPSP=5726
1419                POPPOP=22626
1420
1421                ;TRAP CATC.IERS*****
1422
1423                .=0
1424                .REPT 200
1425                .+2
1426                HALT
1427                .ENDR
1428
1429                ;TTY INTERRUPT VECTOR*****
1430
1431                .=60
1432 000060 022142    TTINT                ;TTY INTERRUPT HANDLER ADDRESS
1433 000062 000000
1434
1435                ;START ADDRESS*****
1436
1437                .=200
1438 000200 000167 002622    JMP      START                ;ENTER PARAMETERS VIA TTY
1439
1440                .=204
1441 000204 000167 002640    JMP      STARTC              ;USE FIXED PARAMETERS; HOLD DATA
1442
1443                .=210
1444 000210 005067 014774    CLR      RDFL
1445 000214 000167 002640    JMP      STARTA              ;USE FIXED PARAMETERS; NEW DATA
1446
1447                ;MAG TAPE INTERRUPT VECTOR*****
1448
1449                .=224
1450 000224 022216    MTINT                ;MAG TAPE INTERRUPT HANDLER ADDRESS
1451 000226 000340
1452
1453                ;AUTO SEQUENCE START*****
1454
1455                .=240
1456 000240 005267 000472    INC      ASEQF              ;SET AUTO SEQUENCE FLAG
1457 000244 000167 002562    JMP      STAUT              ;GO TO START OF AUTO SEQUENCE
  
```

```

1458                                     ;SHORT CONVERSATION RESTART*****
1459
1460                                     .=300
1461 000300 000300 013642                INC      SCVFL      ;SET SHORT CONVERSATION FLAG
1462 000304 000167 002516                JMP      START     ;ENTER SHORT PARAMETER LIST
1463
1464                                     .=510
1465                                     ;TU45 REGISTER EQUIVS*****
1466
1467 000510 172440                C1:      172440
1468 000512 172442                WC:      172442
1469 000514 172444                BA:      172444
1470 000516 172446                FC:      172446
1471 000520 172450                CS:      172450
1472 000522 172452                DS:      172452
1473 000524 172454                ER:      172454
1474 000526 172456                AS:      172456
1475 000530 172460                CC:      172460
1476 000532 172462                DB:      172462
1477 000534 172464                MR:      172464
1478 000536 172466                DT:      172466
1479 000540 172470                SN:      172470
1480 000542 172472                C2:      172472
1481
1482                                     ;CONSTANTS*****
1483
1484 000544 172440                REGS:    172440      ;STARTING REGISTER ADDRESS (CS1)
1485 000546 000224                VECT:    224        ;VECTOR ADDRESS (RH INTERRUPT)
1486 000550 000000                DVN:     0          ;DRIVE NUMBER
1487 000552 000000                UDES:    0          ;UNIT DESCRIPTION (PARITY,DENSITY,UNIT.FORMAT)
1488 000554 000100                RCNT:    100       ;RECORD COUNTER
1489 000556 177600                FMCNT:   177600    ;NUMBER OF CHAR (4 - 4000) OCTAL IN TWOS COMPLEMENT
1490 000560 000001                PATRN:   1          ;DATA PATTERN SELECTOR (0 - 15) OCTAL
1491 000562 000002                RDCMD:   2          ;READ COMMAND
1492 000564 000000                TMEX:    0          ;TAPE MARK FLAG: 1=TM 0=NO TM
1493 000566 000000                INTRF:   0          ;INTERCHANGE READ 0=NO
1494 000570 000000                SPFLG:   0          ;SINGLE PASS 1=YES 0=NO
1495 000572 000001                RSTAL:   1          ;READ STALL
1496 000574 000001                WSTAL:   1          ;WRITE STALL
1497 000576 000001                TSTAL:   1          ;TURN AROUND STAL
1498 000600 002000                YSTAL:   2000      ;YOZZLE STAL
1499 000602 000010                RETRY:   10        ;READ RETRY NUMBER
1500 000604 177776                PSW:     177776    ;PROCESSOR STATUS
1501 000606 177570                SWR:     177570    ;CONSOLE SWITCHES
1502 000610 177560                TKS:     177560    ;TTY READ STATUS REGISTER
1503 000612 177562                TKB:     177562    ;TTY READ BUFFER
1504 000614 177564                TPS:     177564    ;TTY PUNCH STATUS REGISTER
1505 000616 177566                TPB:     177566    ;TTY PUNCH OUTPUT REGISTER
1506 000620 177550                PRS:     177550    ;H/S READER STATUS REGISTER
1507 000622 177552                PRB:     177552    ;H/S READER BUFFER
1508 000624 153624                RANBAS:  153624    ;RANDOM NUMBER GENERATOR BASE
1509 000626 032561                RANSAV:  032561    ;RANDOM NUMBER BUFFER
1510 000630 000000                RCSAV:   0          ;RECORD COUNT SAVE
1511 000632 000000                FCSAV:   0          ;FRAME COUNT SAVE

```

```

1512
1513           ;FLAGS AND COUNTERS*****
1514
1515 000634 000000      MOLSW: 0           ;MOL ERROR PRINT SWITCH
1516 000636 000000      TINFL: 0          ;TTY ENTERY FLAG
1517 000640 000000      TOB: 0           ;TTY OUTPUT BUFFER
1518 000642 000000      TIB: 0           ;TTY INPUT BUFFER
1519 000644 000000      TEMP1: 0         ;TEMP STORAGE
1520 000646 000000      TEMP2: 0         ;TEMP STORAGE
1521 000650 000000      TEMP3: 0         ;TEMP STORAGE
1522 000652 000000      NRZOF: 0         ;NRZ ONLY FLAG
1523 000654 000000      EMADDR: 0        ;ERROR MSG ADDRESS STORAGE
1524 000656 000000      BLCNTR: 0        ;BLOCK COUNTER
1525 000660 000000      BBC: 0           ;BAD RECORD COUNTER
1526 000662 000000      EOTREC: 0        ;EOT FLAG
1527 000664 000000      RTRN: 0         ;INTERRUPT RETURN STORAGE
1528 000666 000000      HDRFL: 0         ;HEADER FLAG
1529 000670 000000      STAL: 0         ;DELAY STORAGE
1530 000672 000000      PFLG: 0         ;PRINT FLAG
1531 000674 000000      MTC1: 0         ;MAG TAPE CONT REGISTER BUFFER
1532 000676 000000      UNP: 0         ;UNIT TABLE POINTER
1533 000700 000000      TMFLG: 0         ;TAPE MARK FLAG
1534 000702 000000      RPCNT: 0        ;REPEAT COUNTER
1535 000704 000000      RTCNT: 0        ;RETRY COUNTER
1536 000706 000000      DERFL: 0         ;DATA ERROR FLAG
1537 000710 000000      SERFL: 0        ;STATUS ERROR FLAG
1538 000712 000000      BCNT: 0         ;BIT COUNTER
1539 000714 000000      RTYFL: 0        ;RETRY FLAG
1540 000716 000000      UPS: 0         ;UNIT POINTER SAVE
1541 000720 000000      BDPP: 0         ;BITS DROPPED POINTER
1542 000722 000000      BPKP: 0         ;BITS PICKED POINTER
1543 000724 000000      ERSV: 0         ;ERROR SAVE LOC
1544 000726 000000      BTFLG: 0        ;BAD TAPE FLAG
1545 000730 000000      BTSTF: 0        ;STATISTIC PRINT FLAG
1546 000732 000000      BTPT: 0         ;BAD TAPE POINTER
1547 000734 000000      ERTFL: 0        ;ERASE FLAG
1548 000736 000000      ASEQF: 0        ;AUTO SEQ FLAG
1549 000740 000000      ADRVN: 0        ;UTO SEQ DRIVE NUMBER
1550 000742 000000      ABLCNT: 0       ;AUTO BLOCK COUNTER
1551 000744 000000      ASEQCF: 0       ;AUTO SEQ CONTINUOUS FLAG
  
```

```
1552
1553                ;UNIT ORDER AND DESCRIPTION TABLE *****
1554
1555 000746 000000    UN1: 0                ;THIS TABLE IS LOADED
1556 000750 000000    UN2: 0                ;WITH UNIT NUMBERS AND
1557 000752 000000    UN3: 0                ;THEIR DESCRIPTIONS IN
1558 000754 000000    UN4: 0                ;THE ORDER THAT THEY
1559 000756 000000    UN5: 0                ;WILL BE TESTED
1560 000760 000000    UN6: 0
1561 000762 000000    UN7: 0
1562 000764 000000    UN8: 0
1563 000766 177777    UNX: -1
1564
1565                ;UNIT DROPS AND PICKS POINTERS*****
1566
1567 000770 001210    PIK1: BP00
1568 000772 001230    PIK2: BP10
1569 000774 001250    PIK3: BP20
1570 000776 001270    PIK4: BP30
1571 001000 001310    PIK5: BP40
1572 001002 001330    PIK6: BP50
1573 001004 001350    PIK7: BP60
1574 001006 001370    PIK8: BP70
1575 001010 001410    DRP1: BD00
1576 001012 001430    DRP2: BD10
1577 001014 001450    DRP3: BD20
1578 001016 001470    DRP4: BD30
1579 001020 001510    DRP5: BD40
1580 001022 001530    DRP6: BD50
1581 001024 001550    DRP7: BD60
1582 001026 001570    DRP8: BD70
1583
1584                ;UNIT BAD TAPE POINTERS*****
1585
1586 001030 001610    BTADDR: BT00
1587 001032 001714    BT01
1588 001034 002020    BT02
1589 001036 002124    BT03
1590 001040 002230    BT04
1591 001042 002334    BT05
1592 001044 002440    BT06
1593 001046 002544    BT07
1594
1595                ;UNIT WRITE RETRY COUNTER*****
1596
1597 001050 000000    RTY1: 0
1598 001052 000000    RTY2: 0
1599 001054 000000    RTY3: 0
1600 001056 000000    RTY4: 0
1601 001060 000000    RTY5: 0
1602 001062 000000    RTY6: 0
1603 001064 000000    RTY7: 0
1604 001066 000000    RTY8: 0
1605
1606                ;UNIT WRITE ERRORS*****
1607
```

1608 001070 000000  
1609 001072 000000  
1610 001074 000000  
1611 001076 000000  
1612 001100 000000  
1613 001102 000000  
1614 001104 000000  
1615 001106 000000

WTER1: 0  
WTER2: 0  
WTER3: 0  
WTER4: 0  
WTER5: 0  
WTER6: 0  
WTER7: 0  
WTER8: 0

:UNIT READ FORWARD ERRORS\*\*\*\*\*

1619 001110 000000  
1620 001112 000000  
1621 001114 000000  
1622 001116 000000  
1623 001120 000000  
1624 001122 000000  
1625 001124 000000  
1626 001126 000000

RDER1: 0  
RDER2: 0  
RDER3: 0  
RDER4: 0  
RDER5: 0  
RDER6: 0  
RDER7: 0  
RDER8: 0

:UNIT DATA ERRORS FORWARD\*\*\*\*\*

1630 001130 000000  
1631 001132 000000  
1632 001134 000000  
1633 001136 000000  
1634 001140 000000  
1635 001142 000000  
1636 001144 000000  
1637 001146 000000

DATER1: 0  
0  
0  
0  
0  
0  
0

:UNIT READ REVERSE ERRORS\*\*\*\*\*

1641 001150 000000  
1642 001152 000000  
1643 001154 000000  
1644 001156 000000  
1645 001160 000000  
1646 001162 000000  
1647 001164 000000  
1648 001166 000000

RDERR1: 0  
0  
0  
0  
0  
0  
0

:UNIT DATA ERRORS REVERSE\*\*\*\*\*

1652 001170 000000  
1653 001172 000000  
1654 001174 000000  
1655 001176 000000  
1656 001200 000000  
1657 001202 000000  
1658 001204 000000  
1659 001206 000000

DEREV1: 0  
0  
0  
0  
0  
0  
0

			;DROPS + PICKS PER CHANNEL PER UNIT*****	
1660				
1661				
1662	001210	000000	BP00:	0
1663		001230		.=.+16
1664	001230	000000	BP10:	0
1665		001250		.=.+16
1666	001250	000000	BP20:	0
1667		001270		.=.+16
1668	001270	000000	BP30:	0
1669		001310		.=.+16
1670	001310	000000	BP40:	0
1671		001330		.=.+16
1672	001330	000000	BP50:	0
1673		001350		.=.+16
1674	001350	000000	BP60:	0
1675		001370		.=.+16
1676	001370	000000	BP70:	0
1677		001410		.=.+16
1678	001410	000000	BD00:	0
1679		001430		.=.+16
1680	001430	000000	BD10:	0
1681		001450		.=.+16
1682	001450	000000	BD20:	0
1683		001470		.=.+16
1684	001470	000000	BD30:	0
1685		001510		.=.+16
1686	001510	000000	BD40:	0
1687		001530		.=.+16
1688	001530	000000	BD50:	0
1689		001550		.=.+16
1690	001550	000000	BD60:	0
1691		001570		.=.+16
1692	001570	000000	BD70:	0
1693		001610		.=.+16
1694				
1695				



```
1696
1697
1698
1699 001610 000000
1700      001714
1701 001714 000000
1702      002020
1703 002020 000000
1704      002124
1705 002124 000000
1706      002230
1707 002230 000000
1708      002334
1709 002334 000000
1710      002440
1711 002440 000000
1712      002544
1713 002544 000000
1714      002650
1715
1716
1717
1718 002650 000000
1719 002652 000000
1720 002654 000000
1721 002656 000000
1722 002660 000000
1723 002662 000000
1724 002664 000000
1725 002666 000000
1726
1727
1728
1729 002670 000000
1730 002672 000000
1731 002674 000000
1732 002676 000000
1733 002700 000000
1734 002702 000000
1735 002704 000000
1736 002706 000000
1737
1738
1739
1740 002710 000000
1741 002712 000000
1742 002714 000000
1743 002716 000000
1744 002720 000000
1745 002722 000000
1746 002724 000000
1747 002726 000000
1748
```

;UNIT BAD TAPE COUNTER:16 PER SLAVE\*\*\*\*\*

```
BT00: 0
      .=-.102
BT01: 0
      .=-.102
BT02: 0
      .=-.102
BT03: 0
      .=-.102
BT04: 0
      .=-.102
BT05: 0
      .=-.102
BT06: 0
      .=-.102
BT07: 0
      .=-.102
```

;UNIT END OF TAPE COUNTERS 1 PER SLAVE\*\*\*\*\*

```
EOTCO: 0
        0
        0
        0
        0
        0
        0
        0
```

;UNIT READ FORWARD SOFT ERROR\*\*\*\*\*

```
RFSOFT: 0
         0
         0
         0
         0
         0
         0
         0
```

;UNIT READ REVERSE SOFT ERROR\*\*\*\*\*

```
RRSOFT: 0
         0
         0
         0
         0
         0
         0
         0
```

```
1749
1750                ;UNIT READ FORWARD HARD ERROR*****
1751
1752 002730 000000    RFHARD: 0
1753 002732 000000    0
1754 002734 000000    0
1755 002736 000000    0
1756 002740 000000    0
1757 002742 000000    0
1758 002744 000000    0
1759 002746 000000    0
1760
1761                ;UNIT READ REVERSE HARD ERROR*****
1762
1763 002750 000000    RRHARD: 0
1764 002752 000000    0
1765 002754 000000    0
1766 002756 000000    0
1767 002760 000000    0
1768 002762 000000    0
1769 002764 000000    0
1770 002766 000000    0
1771
1772                ;DATA PATTERN GENERATORS*****
1773
1774 002770 002770    DATBL: .           ;ENTRY TABLE
1775 002772 014414    DATA0: DAT0       ;EXTERNAL INPUT FROM H/S READER(SEE ZZ-CZTUNAO)
1776 002774 014566    DATA1: DAT1       ;ALL ONES
1777 002776 014610    DATA2: DAT2       ;ALL ZEROS
1778 003000 014616    DATA3: DAT3       ;WALKING ONE
1779 003002 014644    DATA4: DAT4       ;WALKING ZERO
1780 003004 014656    DATA5: DAT5       ;ALTERNATING ONE/ZERO
1781 003006 014666    DATA6: DAT6       ;ALTERNATING ZERO/ONE
1782 003010 014676    DATA7: DAT7       ;ALTERNATING ONE/ZERO IN ALTERNATING CHARACTERS
1783 003012 014726    DATA10: DAT10      ;WALKING ONE/ALL ONE IN ALTERNATING CHARACTERS
1784 003014 014760    DATA11: DAT11     ;ALL BITS 0-377
1785 003016 015002    DATA12: DAT12     ;ALL BITS 377-0
1786 003020 015026    DATA13: DAT13     ;ALTERNATING CHARACTERS 0 AND 377
1787 003022 015036    DATA14: DAT14     ;WALKING ZERO/ALL ZERO IN ALTERNATING CHARACTERS
1788 003024 015070    DATA15: DAT15     ;AUTO SEQUENCE PATTERN 0,0,-1,-1,-1,0,0
1789
```

```

1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808 003026 005067 175704
1809 003032 012767 000001 175576
1810 003040 005067 012144
1811 003044 000167 000014
1812 003050 005067 175562
1813 003054 000167 000064
1814 003060 005067 175552
1815 003064 012700 000640
1816 003070 012701 000037
1817 003074 005020
1818 003076 005301
1819 003100 001375
1820 003102 012706 000500
1821 003106 004767 001116
1822 003112 012700 001050
1823 003116 012701 000750
1824 003122 005020
1825 003124 005301
1826 003126 001375
1827 003130 012767 177777 011252
1828 003136 012767 000001 175512
1829 003144 012706 000500
1830 003150 012777 000340 175426
1831 003156 004767 007152
1832 003162 012777 000040 175330
1833 003170 005000
1834 003172 005160 000746
1835 003176 001411
1836 003200 005160 000746
1837 003204 042760 100000 000746
1838 003212 062700 000002
1839 003216 000167 177750
1840 003222 005160 000746
1841 003226 016703 001550
1842 003232 000303
1843 003234 110367 001542
1844 003240 005067 175370
1845 003244 012777 000100 175336

```

```

.EVEN
:*****
:PROGRAM START AND SEQUENCE FORMATTER:
:
:THIS ROUTINE IS USED TO PERFORM ALL HOUSEKEEPING,
:DECIDE WHICH TRANSPORT TO TEST AND ITS AVAILABILITY,
:LOAD THE WRITE BUFFER WITH THE SELECTED DATA PATTERN,
:GENERATE ANY RANDOM NUMBER AND THEN EXECUTE
:THE TEST CYCLE REQUESTED BY THE SWITCH SETTING.
:AT THE END OF THE TEST CYCLE THE NEXT UNIT IS SELECTED
:AND CHECKED FOR AVAILABILITY AND THE TEST CYCLE IS
:EXECUTED ON IT.
:THE READ WRITE STATS MAY BE PRINTED AT THE END OF
:EACH TEST CYCLE VIA CONSOLE SWITCH FOURTEEN (14).
:*****

```

```

START: CLR ASEQF ;CLEAR AUTO SEQUENCE FLAG
STAUT: MOV #1,TINF ;SET TTY ENTRY FLAG
CLR RDFL ;CLEAR RANDOM DATA FLAG
JMP STARTB
STARTC: CLR TINF ;CLEAR TTY INPUT FLAG
JMP STARTD
STARTA: CLR TINF ;CLEAR TTY ENTRY FLAG
STARTB: MOV #TOB,R0
MOV #37,R1
STARTO: CLR (R0)+ ;CLEAR FLAGS AND COUNTERS
DEC R1
BNE STARTO
MOV #500,SP ;SET STACK POINTER
JSR PC,RANSET ;GO RESET RANDOM BASE
MOV #RTY1,R0
MOV #750,R1
STARTF: CLR (R0)+ ;CLEAR STATISTIC COUNTERS
DEC R1
BNE STARTF
MOV #-1,PATS ;PRESET PATTERN
STARTE: MOV #1,BLCNTR ;PRESET BLOCK COUNTER
STARTD: MOV #500,SP
MOV #340,@PSW
JSR PC,TINF ;GO GET PARAMETERS FROM TTY
MOV #40,@CS ;INITIALIZE
STARUTO: CLR R0 ;POINT TO FIRST ENTRY
STAROA: COM UN1(R0) ;SEE IF LAST ENTRY
BEQ STAROB ;IF SO: BR
COM UN1(R0)
BIC #100000,UN1(R0) ;CLEAR EOT FLAG
ADD #2,R0 ;POINT TO NEXT UNIT ENTRY
JMP STAROA ;CONTINUE CLEARING
STAROB: COM UN1(R0)
MOV REOTC,R3
SWAB R3
MOV R3,REOTC ;RESTORE EOT CNTR
CLR MOLSW ;RESET OFFLINE SW
START1: MOV #100,@TKS ;SET TTY INTERRUPT ENABLE

```

```

1846 003252 016700 175420      MOV      UNP,RO      ;RO = UNIT TABLE POINTER
1847 003256 005160 000746      STAR1A: COM      UN1(RO)
1848 003262 001407              BEQ      STAR1B      ;IF LAST UNIT IN STRING: BR
1849 003264 005160 000746      COM      UN1(RO)
1850 003270 016067 000746 175254  MOV      UN1(RO),UDES ;LOAD NEXT UNIT DESCRIPTION
1851 003276 000167 000124      JMP      START4
1852 003302 005267 175350      STAR1B: INC      BLCNTR      ;BUMP BLOCK COUNTER
1853 003306 005767 175424      TST      ASEQF      ;SEE IF AUTO SEQ
1854 003312 001413              BEQ      STAR1C      ;IF NOT: BR
1855 003314 026767 175336 175420  CMP      BLCNTR,ABL CNT ;SEE IF DONE SEQ
1856 003322 001007              BNE      STAR1C      ;IF NOT: BR
1857 003324 005160 000746      COM      UN1(RO)      ;RESET UNIT TABLE TERMINATOR
1858 003330 005067 175322      CLR      BLCNTR      ;RESET BLOCK CNTR
1859 003334 005067 175336      CLR      UNP          ;RESET UNIT POINTER
1860 003340 000207              RTS      PC           ;RETURN TO AUTO SEQ
1861 003342 005067 175330      STAR1C: CLR      UNP
1862 003346 005160 000746      COM      UN1(RO)
1863 003352 005000              CLR      RO
1864 003354 016067 000746 175170  MOV      UN1(RO),UDES ;LOAD FIRST UNIT DESCRIPTION
1865 003362 032777 000200 175216  BIT      #200,@SWR    ;SEE IF RANDOM RECORD SIZE
1866 003370 001402              BEQ      START2      ;IF NOT: BR
1867 003372 004767 006652      JSR      PC,CCNTR     ;GO GENERATE RANDOM RECORD SIZE
1868 003376 032777 000400 175202  START2: BIT      #400,@SWR ;SEE IF RANDOM DATA
1869 003404 001402              BEQ      START3      ;IF NOT: BR
1870 003406 004767 011530      JSR      PC,DATR      ;GO GENERATE RANDOM DATA
1871 003412 032777 000100 175166  START3: BIT      #100,@SWR ;SEE IF RANDOM RECORD COUNT
1872 003420 001402              BEQ      START4      ;IF NOT: BR
1873 003422 004767 006662      JSR      PC,RCNTR     ;GO GENERATE RANDOM RECORD COUNT
1874 003426 032760 100000 000746  START4: BIT      #100000,UN1(RO) ;SEE IF REACHED EOT
1875 003434 001402              BEQ      STAR40      ;IF NOT: BR
1876 003436 000167 000554      JMP      START7      ;ELSE GO TO NEXT UNIT
1877 003442 016777 175102 175050  STAR40: MOV      DVN,@CS ;SET DRIVE NUMBER
1878 003450 016777 175076 175064  MOV      UDES,@C2    ;SET UNIT NUMBER
1879 003456 032777 000200 175036  BIT      #200,@DS    ;SEE IF UNIT AVAIL
1880 003464 001014              BNE      STAR4A      ;IF SO: BR
1881 003466 005367 175176      DEC      STAL
1882 003472 001355              BNE      START4      ;AWAIT TUR
1883 003474 004767 017500      JSR      PC,PAPRT    ;PRINT HEADER
1884 003500 012704 026113      MOV      #MSG49,R4
1885 003504 004767 020412      JSR      PC,TTOUT    ;PRINT NOT AVAIL
1886 003510 000000              HALT
1887 003512 000167 177710      JMP      START4      ;RETRY
1888 003516 004767 010454      STAR4A: JSR      PC,DSUP ;GO SET UP WRITE DATA
1889 003522 004767 001256      JSR      PC,RWIND    ;REWIND
1890 003526 004767 001646      JSR      PC,WRITE    ;WRITE
1891 003532 016767 175040 175130  MOV      TSTAL,STAL ;SET TURN AROUND DELAY
1892 003540 004767 006474      JSR      PC,STALL    ;DELAY
1893 003544 004767 003572      JSR      PC,RSEQ     ;GO TO READ SEQUENCER
1894 003550 016767 175022 175112  MOV      TSTAL,STAL ;SET TURN AROUND DELAY
1895 003556 004767 006456      JSR      PC,STALL    ;DELAY
1896 003562 032777 040000 175016  BIT      #40000,@SWR ;SEE IF SHOULD PRINT STATISTICS
1897 003570 001565              BEQ      START5      ;IF NOT: BR
1898 003572 012700 000001      MOV      #1,RO      ;SET RECORD COUNTER TO 1
1899 003576 004767 017376      JSR      PC,PAPRT    ;PRINT CYCLE NUMBER
1900 003602 004767 000004      JSR      PC,STP      ;GO PRINT STATS
1901 003606 000167 000316      JMP      STPX
  
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1902	003612	004767	013530	STP:	JSR	PC,DPPRT	;PRINT DROPS AND PICKS
1903	003616	012704	026325		MOV	#MSG65,R4	
1904	003622	004767	020274		JSR	PC,TTOUT	;PRINT RETRY TOTAL
1905	003626	016704	175044		MOV	UNP,R4	
1906	003632	016403	001050		MOV	RTY1(R4),R3	
1907	003636	004767	020432		JSR	PC,OCTP	;PRINT RETRIES
1908	003642	012704	026476		MOV	#MSG73,R4	
1909	003646	004767	020250		JSR	PC,TTOUT	;PRINT WRITE ERROR TAG
1910	003652	016704	175020		MOV	UNP,R4	
1911	003656	016403	001070		MOV	WTER1(R4),R3	
1912	003662	004767	020406		JSR	PC,OCTP	;PRINT WRITE ERRORS
1913	003666	012704	026465		MOV	#MSG72,R4	
1914	003672	004767	020224		JSR	PC,TTOUT	;PRINT READ FORWARD ERROR TAG
1915	003676	016704	174774		MOV	UNP,R4	
1916	003702	016403	001110		MOV	RDER1(R4),R3	
1917	003706	004767	020362		JSR	PC,OCTP	;PRINT READ FORWARD ERRORS
1918	003712	012704	027305		MOV	#MSG113,R4	
1919	003716	004767	020200		JSR	PC,TTOUT	;PRINT SOFT TAG
1920	003722	016704	174750		MOV	UNP,R4	
1921	003726	016403	002670		MOV	RFSOFT(R4),R3	
1922	003732	004767	020336		JSR	PC,OCTP	;PRINT FORWARD SOFT ERRORS
1923	003736	012704	027316		MOV	#MSG114,R4	
1924	003742	004767	020154		JSR	PC,TTOUT	;PRINT HARD TAG
1925	003746	016704	174724		MOV	UNP,R4	
1926	003752	016403	002730		MOV	RFHARD(R4),R3	
1927	003756	004767	020312		JSR	PC,OCTP	;PRINT HARD FORWARE ERRORS
1928	003762	012704	026556		MOV	#MSG77,R4	
1929	003766	004767	020130		JSR	PC,TTOUT	;PRINT DATA ERROR FORWARD TAG
1930	003772	016704	174700		MOV	UNP,R4	
1931	003776	016403	001130		MOV	DATER1(R4),R3	
1932	004002	004767	020266		JSR	PC,OCTP	;PRINT DATA ERROR FORWARD NUMBER
1933	004006	012704	026361		MOV	#MSG68,R4	
1934	004012	004767	020104		JSR	PC,TTOUT	;PRINT READ ERROR REVERSE TAG
1935	004016	016704	174654		MOV	UNP,R4	
1936	004022	016403	001150		MOV	RDERR1(R4),R3	
1937	004026	004767	020242		JSR	PC,OCTP	;PRINT REVESE ERROR NUMBER
1938	004032	012704	027305		MOV	#MSG113,R4	
1939	004036	004767	020060		JSR	PC,TTOUT	;PRINT SOFT TAG
1940	004042	016704	174630		MOV	UNP,R4	
1941	004046	016403	002710		MOV	RRSOFT(R4),R3	
1942	004052	004767	020216		JSR	PC,OCTP	;PRINT REVERSE SOFT ERROR
1943	004056	012704	027316		MOV	#MSG114,R4	
1944	004062	004767	020034		JSR	PC,TTOUT	;PRINT HARD TAG
1945	004066	016704	174604		MOV	UNP,R4	
1946	004072	016403	002750		MOV	RRHARD(R4),R3	
1947	004076	004767	020172		JSR	PC,OCTP	
1948	004102	012704	026545		MOV	#MSG76,R4	
1949	004106	004767	020010		JSR	PC,TTOUT	;PRINT DATA ERROR REVERSE TAG
1950	004112	016704	174560		MOV	UNP,R4	
1951	004116	016403	001170		MOV	DEREV1(R4),R3	
1952	004122	004767	020146		JSR	PC,OCTP	;PRINT DATA REVERSE ERROR NUMBER
1953	004126	000207			RTS	PC	;RETURN
1954	004130	005267	174574	STPX:	INC	BTSTF	;SET STAT ONLY PRINT
1955	004134	004767	003102		JSR	PC,BTPRT	;PRINT BAD TAPE STATS
1956	004140	005067	174564		CLR	BTSTF	;CLEAR FLAG
1957	004144	017700	174436	START5:	MOV	@SWR,RO	;LOAD SWR

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1958 004150 042700 177762      BIC    #177762,RO      ;MASK READ/WRITE SWITCHES
1959 004154 022700 000015      CMP    #15,RO         ;SEE IF HAVE READ OR WRITE
1960 004160 001421                BEQ    START8         ;IF NOT: BR
1961 004162 032777 000200 174332 START6: BIT    #200,ADS      ;SEE IF HAVE UNIT READY
1962 004170 001012                BNE    START7         ;IF SO: BR
1963 004172 005367 174472      DEC    STAL
1964 004176 001371                BNE    START6         ;DELAY FOR TUR
1965 004200 004767 016774      JSR    PC,PAPRT       ;PRINT HEADER
1966 004204 012704 026113      MOV    #MSG49,R4
1967 004210 004767 017706      JSR    PC,TTOUT
1968 004214 000000                HALT
1969 004216 062767 000002 174452 START7: ADD    #2,UNP      ;PRINT NOT AVAIL
1970 004224 000167 177014      START8: JMP    START1 ;STOP
1971
1972                                ;RANDOM BASE RESET*****
1973
1974 004230 012767 153624 174366 RANSET: MOV    #153624,RANBAS ;RESET BASE
1975 004236 012767 032561 174362      MOV    #32561,RANSAV  ;RESET BUFFER
1976 004244 016767 174360 174302      MOV    RCSAV,RCNT     ;RESET RECORD COUNT
1977 004252 016767 174354 174276      MOV    FCSAV,FMCNT    ;RESET FRAME COUNT
1978 004260 000207                RTS    PC
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1992 004262 016777 174264 174252 REOT:  MOV    UDES,@C2      ;LOAD COMMAND REGISTER
1993 004270 012777 000011 174212      MOV    #11,@C1      ;DRIVE CLEAR
1994 004276 032777 000200 174216 REOT1:  BIT    #200,@DS
1995 004304 001774      BEQ    REOT1        ;AWAIT DRY
1996 004306 012777 000007 174174      MOV    #7,@C1      ;START REWIND
1997 004314 005767 174406      TST    BTFLG       ;SEE IF BAD TAPE OVERFLOW REWIND
1998 004320 001004      BNE    REOT1A      ;IF SO: BR
1999 004322 016700 174334      MOV    EOTREC,R0
2000 004326 042700 100000      BIC    #100000,R0  ;SET RECORD NUMBER OF EOT
2001 004332 004767 016642      REOT1A: JSR   PC,PAPRT ;PRINT HEADER
2002 004336 022767 000002 174362      CMP    #2,BTFLG   ;SEE IF POSITION ERROR
2003 004344 001003      BNE    REOT1B      ;IF NOT: BR
2004 004346 012704 027176      MOV    #MSG109,R4 ;SET POSITION ERROR MSG
2005 004352 000406      BR     REOT1F
2006 004354 022767 000001 174344 REOT1B: CMP    #1,BTFLG ;SEE IF BAD TAPE OVERFLOW
2007 004362 001005      BNE    REOT1C      ;IF NOT: BR
2008 004364 012704 027007      MOV    #MSG106,R4 ;SET BAD TAPE OVERFLOW MSG
2009 004370 004767 017526      REOT1F: JSR  PC,TTOUT ;PRINT REWIND REASON
2010 004374 000414      BR     REOT1E
2011 004376 012704 025116      REOT1C: MOV   #MSG20,R4 ;SET EOT MSG
2012 004402 004767 017514      REOT1D: JSR  PC,TTOUT ;PRINT MSG
2013 004406 016704 174264      MOV    UNP,R4
2014 004412 005264 002650      INC    EOTC0(R4)  ;BUMP CNTR
2015 004416 016403 002650      MOV    EOTC0(R4),R3
2016 004422 004767 017646      JSR    PC,OCTP    ;PRINT EOT CNTR
2017 004426 012704 027034      REOT1E: MOV   #MSG16A,R4
2018 004432 004767 017464      JSR    PC,TTOUT  ;PRINT RESTART MSG
2019 004436 005067 174264      CLR    BTFLG     ;CLEAR BAD TAPE FLAG
2020 004442 004767 177144      JSR    PC,STP    ;PRINT STATS
2021 004446 004767 002570      JSR    PC,BTPRT  ;PRINT BAD TAPE STATS
2022 004452 032777 000200 174042 REOT2:  BIT    #200,@DS
2023 004460 001015      BNE    REOT2A     ;IF DRY: BR
2024 004462 005367 174202      DEC    STAL
2025 004466 001371      BNE    REOT2     ;WAIT DRY
2026 004470 012767 024755 174156      MOV    #MSG6,EMADDR
2027 004476 004767 016476      JSR    PC,PAPRT  ;PRINT HEADER
2028 004502 012704 026267      MOV    #MSG60,R4
2029 004506 004767 017410      JSR    PC,TTOUT  ;PRINT NO DRIVE READY
2030 004512 000000      HALT
2031 004514 105367 000262      REOT2A: DECB  REOTC   ;SEE IF LAST UNIT TO REACH EOT
2032 004520 001410      BEQ    REOT3     ;IF SO: BR
2033 004522 016700 174150      MOV    UNP,R0
2034 004526 052760 100000 000746      BIS    #100000,UN1(R0) ;SET EOT FLAG
2035 004534 005726      TST    (SP)+     ;RESET STACK POINTER

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2036 004536 000167 177454      JMP      START7      ;GO TO NEXT UNIT
2037 004542 000367 000234      REOT3: SWAB      REOTC
2038 004546 016700 000230      MOV      REOTC,R0
2039 004552 000367 000224      SWAB      REOTC
2040 004556 110067 000220      MOVVB    R0,REOTC      ;RESTORE EOT UNIT COUNTER
2041 004562 005067 174110      CLR      UNP
2042 004566 016700 174104      MOV      UNP,R0      ;POINT TO FIRST UNIT
2043 004572 016067 000746 173752 REOT4: MOV      UN1(R0),UDES ;LOAD UNIT DESCRIPTION
2044 004600 016777 173746 173734 MOV      UDES,@C2      ;LOAD COMMAND REGISTER
2045 004606 032777 020000 173706 REOT5: BIT      #20000,@DS
2046 004614 001374      BNE      REOT5      ;AWAIT PIP RESET
2047 004616 032777 000002 173676 BIT      #2,@DS      ;SEE IF HAVE BOT
2048 004624 001013      BNE      REOT6      ;IF SO: BR
2049 004626 012700 000001      MOV      #1,R0
2050 004632 004767 016342      JSR      PC,PAPRT      ;PRINT HEADER
2051 004636 012704 026060      MOV      #MSG48,R4
2052 004642 004767 017254      JSR      PC,TTOUT      ;PRINT BOT ERROR
2053 004646 000000      HALT
2054 004650 016700 174022      MOV      UNP,R0
2055 004654 042760 100000 000746 REOT6: BIC      #10000,UN1(R0) ;CLEAR EOT FLAG
2056 004662 062767 000002 174006 ADD      #2,UNP
2057 004670 016700 174002      MOV      UNP,R0      ;POINT TO NEXT UNIT
2058 004674 005160 000746      COM      UN1(R0)      ;SEE IF LAST UNIT
2059 004700 001404      BEQ      REOT7      ;IF SO: BR
2060 004702 005160 000746      COM      UN1(R0)
2061 004706 000167 177660      JMP      REOT4      ;DO NEXT UNIT
2062 004712 005160 000746      REOT7: COM      UN1(R0)
2063 004716 005067 173754      CLR      UNP      ;CLEAR UNIT POINTER
2064 004722 005067 173710      CLR      TINF      ;CLEAR TTY INPUT FLAG
2065 004726 005767 174004      TST      ASEQF      ;SEE IF AUTO SEQ
2066 004732 001402      BEQ      REOTX      ;IF NOT: BR
2067 004734 005726      TST      (SP)+      ;RESET STACK POINTER
2068 004736 000207      RTS      PC      ;RETURN TO AUTO SEQ
2069 004740 004767 177264      REOTX: JSR      PC,RANSET ;GO RESET RANDOM BASE
2070 004744 012767 177777 007436 MOV      #-1,PATS      ;PRESET PATTERN
2071 004752 005067 010232      CLR      RDFL      ;CLEAR RANDOM FLAG
2072 004756 005767 173606      TST      SPFLG      ;SEE IF SINGLE PASS
2073 004762 001405      BEQ      REOTXX      ;IF NOT: BR
2074 004764 012704 026670      MOV      #MSG100,R4
2075 004770 004767 017126      JSR      PC,TTOUT      ;PRINT END OF PASS
2076 004774 000000      HALT
2077 004776 000167 176134      REOTXX: JMP      STARTE      ;RESTART AT BLOCK NUMBER ONE
2078 005002 000000      REOTC: 0      ;EOT UNIT COUNTER

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2088 005004 032777 001000 173574 RWND: BIT #1000,@SWR ;SEE IF SHOULD REWIND
2089 005012 001001 BNE RWNDA ;IF SO: BR
2090 005014 000207 RTS PC ;ELSE EXIT
2091 005016 016767 173654 173672 RWNDA: MOV UNP,UPS ;SAVE UNIT POINTER
2092 005024 005067 173646 CLR UNP ;CLEAR POINTER
2093 005030 005067 173626 CLR EOTREC ;CLEAR EDT FLAG
2094 005034 000367 177742 SWAB REOTC
2095 005040 016700 177736 MOV REOTC,RO
2096 005044 000367 177732 SWAB REOTC
2097 005050 110067 177726 MOVB RO,REOTC ;RESTORE EOT UNIT COUNTER
2098 005054 016700 173616 RWND0: MOV UNP,RO ;POINT TO UNIT ENTRY
2099 005060 005160 000746 COM UN1(RO) ;SEE IF LAST ENTRY
2100 005064 001453 BEQ RWND2 ;IF SO: BR
2101 005066 005160 000746 COM UN1(RO)
2102 005072 032760 100000 000746 BIT #100000,UN1(RO) ;SEE IF ALREADY REWINDING
2103 005100 001035 BNE RWND1A ;IF SO: BR
2104 005102 016067 000746 173442 MOV UN1(RO),UDES ;SET UNIT DESCRIPTION
2105 005110 016777 173436 173424 MOV UDES,@C2 ;LOAD COMMAND REGISTER
2106 005116 012777 000011 173364 MOV #11,@C1 ;DRIVE CLEAR
2107 005124 012777 000007 173356 MOV #7,@C1 ;START REWIND
2108 005132 032777 000200 173362 RWND1: BIT #200,@DS
2109 005140 001015 BNE RWND1A ;IF DRY: BR
2110 005142 005367 173522 DEC STAL
2111 005146 001371 BNE RWND1 ;AWAIT DRY
2112 005150 012767 024755 173476 MOV #MSG6,EMADDR
2113 005156 004767 016016 JSR PC,PAPRT ;PRINT HEADER
2114 005162 012704 026410 MOV #MSG70,R4
2115 005166 004767 016730 JSR PC,TTOUT ;PRINT NO DRIVE READY
2116 005172 000000 HALT
2117 005174 042760 100000 000746 RWND1A: BIC #100000,UN1(RO) ;CLEAR EOT FLAG
2118 005202 062767 000002 173466 ADD #2,UNP ;BUMP POINTER
2119 005210 000167 177640 JMP RWND0 ;DO NEXT UNIT
2120 005214 005160 000746 RWND2: COM UN1(RO)
2121 005220 005067 173452 CLR UNP ;CLEAR POINTER
2122 005224 016700 173446 RWND3: MOV UNP,RO ;POINT TO UNIT ENTRY
2123 005230 005160 000746 COM UN1(RO) ;SEE IF LAST ENTRY:
2124 005234 001443 BEQ RWNDX ;IF SO: BR
2125 005236 005160 000746 COM UN1(RO)
2126 005242 016067 000746 173302 MOV UN1(RO),UDES ;SET UNIT DESCRIPTION
2127 005250 016777 173276 173264 MOV UDES,@C2 ;LOAD COMMAND REGISTER
2128 005256 032777 020000 173236 RWND4: BIT #20000,@DS
2129 005264 001374 BNE RWND4 ;AWAIT PIP RESET
2130 005266 032777 000002 173226 BIT #2,@DS ;SEE IF HAVE BOT
2131 005274 001410 BEQ RWND6 ;IF NOT: BR
2132 005276 062767 000002 173372 RWND5: ADD #2,UNP ;BUMP POINTER
2133 005304 012777 000011 173176 MOV #11,@C1 ;DRIVE CLEAR
2134 005312 000167 177706 JMP RWND3 ;DO NEXT UNIT

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2135 005316 012700 000001
2136 005322 004767 015652
2137 005326 012704 026060
2138 005332 004767 016564
2139 005336 000000
2140 005340 000167 177732
2141 005344 005160 000746
2142 005350 016767 173342 173320
2143 005356 016700 173314
2144 005362 016067 000746 173162
2145 005370 016777 173156 173144
2146 005376 000207
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RWND6:  MOV  #1,R0
        JSR  PC,PAPRT      ;PRINT HEADER
        MOV  #MSG48,R4
        JSR  PC,TTOUT      ;PRINT NO BOT
        HALT
        ...
RWNDS   RWND5      ;DO NEXT UNIT
RWNDX:  COM  UN1(RO)
        MOV  UPS,UNP      ;RESTORE UNIT POINTER
        MOV  UNP,R0
        MOV  UN1(RO),UDES ;RESET UNIT DESCRIPTION
        MOV  UDES,@C2
        RTS  PC          ;RETURN TO TEST
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2181 005400 005067 173256
2182 005404 032777 000001 173174
2183 005412 001402
2184 005414 000167 000562
2185 005420 016700 173130
2186 005424 012767 024750 173222
2187 005432 016777 173120 173056
2188 005440 012777 027426 173046
2189 005446 112767 000060 173220
2190 005454 012767 005466 173202
2191 005462 000167 013734
2192 005466 032777 002000 173026
2193 005474 001405
2194 005476 010067 173160
2195 005502 052767 100000 173152
2196 005510 032777 010000 173070
2197 005516 001002
2198 005520 004767 011770
2199 005524 016767 173044 173136
2200 005532 004767 004502
2201 005536 005767 173152
2202 005542 001401
2203 005544 000207

;*****
;WRITE ROUTINE:
;
;THIS ROUTINE IS USED TO WRITE ONTO TAPE THE BLOCK
;OF DATA DESCRIBED BY THE OPERATOR AND SET UP
;IN THE SEQUENCE FORMATTER. THE TAPE UNIT TO BE USED
;HAS BEEN ASSIGNED BY THE SEQUENCE FORMATTER AND
;ITS PARAMETERS SET IN A UNIT DESCRIPTION WORD.
;AS EACH RECORD OF THE BLOCK IS WRITTEN, IT IS CHECKED
;FOR STATUS ERRORS, WORD COUNT ZERO, AND CORRECT CURRENT
;MEMORY ADDRESS. IF THE WRITE OPERATION RESULTS IN
;ANY ERROR CONDITION, A WRITE RETRY OF THAT OPERATION
;MAY BE DONE BY SETTING SWITCH FOUR (4) TO A ONE (1).
;THE RETRY CONSISTS OF A BACKSPACE, ERASE FORWARD, AND
;REWRITE OF THE RECORD. (SEE WRITE RETRY SUBROUTINE)
;AFTER ALL DATA RECORDS IN THE BLOCK HAVE BEEN
;WRITTEN, THE WRITE ROUTINE WILL EXECUTE A WRITE
;TAPE MARK COMMAND IF THE TTY RESPONSE TM=1 WAS
;MADE AT INITIAL START. THE TM IS COUNTED AS TOTAL
;DATA RECORDS PLUS ONE (IE: IF 100 DATA RECORDS; TM=RECORD 101)
;IF THE WRITE OPERATION (DATA OR TM) CAUSES THE SELECTED SLAVE
;TO REACH END OF TAPE (EOT) AND THERE IS TO BE NO READING DONE,
;(SW2 AND SW3 SET TO A 1) THEN THE SLAVE IS REWOUND AND
;FLAGGED AS UNAVAILABLE FOR TESTING UNTIL ALL SLAVES HAVE
;REACHED EOT AND BEEN REWOUND AT WHICH TIME TESTING IS
;RESUMED ON ALL AVAILABLE SLAVES.
;WRITE RETRY MAY BE ALLOWED VIA CONSOLE SWITCH FOUR (4).
;ERROR CHECKING MAY BE DISALLOWED VIA CONSOLE SWITCH
;TWELVE (12).
;WRITING TO TAPE MAY BE DISALLOWED VIA CONSOLE SWITCH
;ZERO (0).
;*****

WRITE: CLR EOTREC ;CLEAR EOT FLAG
        BIT #1,ASWR ;SEE IF SHOULD WRITE
        BEQ WRTE
        JMP WEX ;IF NOT: BR
        MOV RCNT,RO ;RO=RECORD COUNT
        MOV #MSG5,EMADDR ;SET ERROR MSG ADDRESS
        MOV #MFCNT,afc ;LOAD CHAR COUNT
        MOV #WDATA,@BA ;SET DATA ADDR
        MCVB #60,MTC1 ;SET WRITE OP COMMAND
        MOV #W1,RTRN ;SET RETURN ADDRESS
        JMP TAPG ;GO EXECUTE COMMAND
        BIT #2000,@DS ;SEE IF EOT
        BEQ W2 ;IF NOT AT EOT: BR
        MOV RO,EOTREC ;SAVE EOT RECORD NUMBER
        BIS #100000,EOTREC ;SET EOT FLAG
        BIT #10000,@SWR ;SEE IF SHOULD CHECK ERRORS
        BNE W3 ;IF NOT: BR
        JSR PC,ERCHK ;GO CHECK ERRORS
        MOV WSTAL,STAL ;SET DELAY
        JSR PC,STALL ;DELAY
        TST RTYFL ;SEE IF RETRY TIME
        BEQ W3A ;IF NOT: BR
        RTS PC ;ELSE RETURN
    
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2204	005546	005767	173136	W3A:	TST	SERFL	:SEE IF WRITE ERROR
2205	005552	001452			BEQ	W5	:IF NOT: BR
2206	005554	016704	173116		MOV	UNP,R4	
2207	005560	005264	001070		INC	WTER1(R4)	:BUMP WRITE ERROR
2208	005564	005067	173120		CLR	SERFL	:CLEAR STATUS ERROR FLAG
2209	005570	032777	000020	173010	BIT	#20,@SWR	:SEE IF RETRY
2210	005576	001440			BEQ	W5	:IF NOT: BR
2211	005600	016703	173120		MOV	ERSAV,R3	
2212	005604	042703	102700		BIC	#102700,R3	:MASK UNRECOVERABLE ERROR
2213	005610	001411			BEQ	W4	:IF SO: BR
2214	005612	004767	015362		JSR	PC,PAPRT	:PRINT HEADER
2215	005616	012704	026567		MOV	#MSG78,R4	
2216	005622	004767	016274		JSR	PC,TTOUT	:PRINT NON-RETRYABLE ERROR TAG
2217	005626	004767	003404		JSR	PC,NRTP	:PRINT ER FOR NON-RETRYABLE
2218	005632	000422			BR	W5	
2219	005634	016704	173036	W4:	MOV	UNP,R4	
2220	005640	005264	001050		INC	RTY1(R4)	:BUMP RETRY CNTR
2221	005644	032777	002000	172734	BIT	#2000,@SWR	:SEE IF PRINT ERRORS
2222	005652	001004			BNE	W4A	:IF NOT: BR
2223	005654	012704	026303		MOV	#MSG64,R4	
2224	005660	004767	016236		JSR	PC,TTOUT	:PRINT ORIGINAL ERROR TAG
2225	005664	005067	173014	W4A:	CLR	RTCNT	:CLEAR RETRY NUMBER
2226	005670	005067	173006		CLR	RPCNT	:CLEAR REPEAT COUNTER
2227	005674	004767	000346		JSR	PC,WRTY	:GO RETRY WRITE ERROR
2228	005700	005067	173010	W5:	CLR	RTYFL	:CLEAR RETRY COUNTER
2229	005704	005767	172752		TST	EOTREC	:SEE IF EOT FOUND
2230	005710	100402			BMI	W6	:IF SO: BR
2231	005712	005300			DEC	RO	:SEE IF DONE ALL
2232	005714	001243			BNE	W0	:IF NOT: BR
2233	005716	005767	172642	W6:	TST	TMEX	:SEE IF TM
2234	005722	001527			BEQ	WEX	:IF NOT: BR
2235	005724	005267	172750		INC	TMFLG	:SET TM FLAG
2236	005730	012767	026210	172716	W7M:	#MSG54,EMADDR	:POINT TO TM ERROR MSG
2237	005736	012767	000026	172730	MOV	#26,MTCl	:SET TM OP CODE
2238	005744	012777	000000	172544	MOV	#0,@FC	:LOAD FRAME COUNTER
2239	005752	012777	027426	172534	MOV	#WDATA,@BA	:LOAD BUS ADDRESS
2240	005760	012767	005772	172676	MOV	#WTMO,RTRN	:SAVE RETURN ADDRESS
2241	005766	000167	013430		JMP	TAPG	:WRITE TM
2242	005772	032777	010000	172606	WTMO:	#10000,@SWR	:SEE IF SHOULD CHECK ERRORS
2243	006000	001100			BNE	WEX	
2244	006002	032777	000004	172512	BIT	#4,@DS	:SEE IF TM STATUS
2245	006010	001011			BNE	WTM1	:IF SO: BR
2246	006012	012767	027426	013312	MOV	#WDATA,CADER	:SET EXPT BUS ADDRESS
2247	006020	012767	000001	013312	MOV	#1,DRVER	:INDICATE ERROR
2248	006026	004767	012320		JSR	PC,ERPT	:PRINT TM ERROR
2249	006032	000404			BR	WTM2	
2250	006034	012703	027426	WTM1:	MOV	#WDATA,R3	:SET EXPT ADDRESS
2251	006040	004767	011546		JSR	PC,ER2	:GO CHECK FOR OTHER ERRORS
2252	006044	005767	172644	WTM2:	TST	RTYFL	:SEE IF RETRY
2253	006050	001401			BEQ	WTM3	:IF NOT: BR
2254	006052	000207			RTS	PC	:ELSE RETURN TO RETRY ROUTINE
2255	006054	005767	172630	WTM3:	TST	SERFL	:SEE IF WRITE ERROR
2256	006060	001450			BEQ	WEX	:IF NOT: BR
2257	006062	016704	172610		MOV	UNP,R4	
2258	006066	005264	001070		INC	WTER1(R4)	:BUMP WRITE ERROR
2259	006072	032777	000020	172506	BIT	#20,@SWR	:SEE IF SHOULD RETRY

2260	006100	001440			BEQ	WEX		:IF NOT: BR
2261	006102	016703	172616		MOV	ERSAV,R3		
2262	006106	042703	102700		BIC	#102700,R3		:MASK UNRECOVERABLE ERROR
2263	006112	001411			BEQ	WTM4		:IF SO: BR
2264	006114	004767	015060		JSR	PC,PAPRT		:PRINT HEADER
2265	006120	012704	026567		MOV	#MSG78,R4		
2266	006124	004767	015772		JSR	PC,TTOUT		:PRINT UNRETRYABLE TAG
2267	006130	004767	003102		JSR	PC,NRTP		:PRINT ER FOR NON-RETRYABLE
2268	006134	000422			BR	WEX		
2269	006136	005067	172540		WTM4: CLR	RPCNT		:CLEAR REPEAT CNTR
2270	006142	016704	172530		MOV	UNP,R4		
2271	006146	005264	001050		INC	RTY1(R4)		:BUMP RETRY CNTR
2272	006152	005067	172526		CLR	RTCNT		:CLEAR RETRY CNTR
2273	006156	032777	002000	172422	BIT	#2000,@SWR		:SEE IF PRINT ERRORS
2274	006164	001004			BNE	WTM4A		:IF NOT: BR
2275	006166	012704	026303		MOV	#MSG64,R4		
2276	006172	004767	015724		JSR	PC,TTOUT		:PRINT ORIGINAL ERROR TAG
2277	006176	004767	000044		WTM4A: JSR	PC,WRTY		:GO DO RETRY
2278	006202	005067	172506		WEX: CLR	RTYFL		:CLEAR RETRY FLAG
2279	006206	005067	172466		CLR	TMFLG		:CLEAR TAPE MARK FLAG
2280	006212	005767	172444		TST	EOTREC		:SEE IF EOT
2281	006216	100401			BMI	WRW		:IF SO: BR
2282	006220	000207			RTS	PC		:ELSE EXIT
2283	006222	017703	172360		WRW: MOV	@SWR,R3		
2284	006226	042703	177763		BIC	#177763,R3		
2285	006232	022703	000014		CMP	#14,R3		:SEE IF WRITE ONLY
2286	006236	001002			BNE	WRWX		:IF NOT: BR
2287	006240	000167	176016		JMP	REOT		:ELSE REWIND
2288	006244	000207			WRWX: RTS	PC		:EXIT

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2289                                     :*****
2290                                     :WRITE ERROR RETRY
2291                                     :
2292                                     :*****
2293
2294 006246 012767 000001 172440 WRTY:  MOV    #1,RTYFL      ;SET RETRY FLAG
2295 006254 004767 000406 WRTY0: JSR    PC,WRTSB    ;GO SPACE REVERSE FOR REPEAT
2296 006260 005767 172414      TST    TMFLG        ;SEE IF TAPE MARK TIME
2297 006264 001003      BNE    WRTYTM        ;IF SO: BR
2298 006266 004767 177132      JSR    PC,W0         ;REWRITE RECORD
2299 006272 000402      BR     WRTYR         ;GO ON
2300 006274 004767 177430 WRTYTM: JSR    PC,WTM        ;GO WRITE TAPE MARK AGAIN
2301 006300 005767 172404 WRTYR:  TST    SERFL        ;REWRITE GOOD
2302 006304 001027      BNE    WRTY2        ;IF NOT: BR
2303 006306 005267 172370      INC    RPCNT        ;BUMP REPEAT COUNTER
2304 006312 022767 000003 172362 CMP    #3,RPCNT      ;SEE IF THREE GOOD REPEATS
2305 006320 001355      BNE    WRTY0        ;IF NOT, REPEAT
2306 006322 032777 002000 172256 BIT    #2000,@SWR    ;SEE IF PRINT
2307 006330 001014      BNE    WRTY1        ;IF NOT: BR
2308 006332 012704 026774      MOV    #MSG105,R4
2309 006336 004767 015560      JSR    PC,TTOUT      ;PRINT RECOVERED MESSAGE
2310 006342 012704 026325      MOV    #MSG65,R4
2311 006346 004767 015550      JSR    PC,TTOUT      ;PRINT RETRY TAG
2312 006352 016703 172326      MOV    RTCNT,R3
2313 006356 004767 015712      JSR    PC,OCTP       ;PRINT RETRY NUMBER
2314 006362 000207 WRTY1:  RTS    PC         ;RESUME TESTING
2315 006364 016703 172334 WRTY2:  MOV    ERSV,R3    ;GET ER
2316 006370 042703 102700      BIC    #102700,R3    ;MASK RECOVERABLE BITS
2317 006374 001414      BEQ    WRTY2A        ;IF RECOVERABLE: BR
2318 006376 004767 014576      JSR    PC,PAPRT      ;PRINT HEADER
2319 006402 012704 026567      MOV    #MSG78,R4
2320 006406 004767 015510      JSR    PC,TTOUT      ;PRINT NON-RECOVERABLE MSG
2321 006412 004767 002620      JSR    PC,NRTP       ;PRINT ER
2322 006416 012767 000001 172224 MOV    #1,TEMP3      ;SET FLAG
2323 006424 000410      BR     WRTY2B
2324 006426 032777 002000 172152 WRTY2A: BIT    #2000,@SWR    ;SEE IF PRINT
2325 006434 001032      BNE    WRTY3        ;IF NOT: BR
2326 006436 012704 027230      MOV    #MSG110,R4
2327 006442 004767 015454      JSR    PC,TTOUT      ;PRINT BAD TAPE SUSPECT
2328 006446 012704 026325 WRTY2B: MOV    #MSG65,R4
2329 006452 004767 015444      JSR    PC,TTOUT      ;PRINT RETRY TAG
2330 006456 016703 172222      MOV    RTCNT,R3
2331 006462 004767 015606      JSR    PC,OCTP       ;PRINT RETRY NUMBER
2332 006466 012704 027252      MOV    #MSG111,R4
2333 006472 004767 015424      JSR    PC,TTOUT      ;PRINT REPEAT TAG
2334 006476 016703 172200      MOV    RPCNT,R3
2335 006502 004767 015566      JSR    PC,OCTP       ;PRINT REPEAT NUMBER
2336 006506 005767 172136      TST    TEMP3        ;SEE IF DID NON-RECOVERABLE
2337 006512 001403      BEQ    WRTY3        ;IF NOT: BR
2338 006514 005067 172130      CLR    TEMP3        ;CLEAR FLAG
2339 006520 000207      RTS    PC         ;EXIT
2340 006522 005767 172156 WRTY3:  TST    RTCNT        ;SEE IF FIRST RETRY
2341 006526 001004      BNE    WRTY3A        ;IF NOT: BR
2342 006530 016704 172142      MOV    UNP,R4
2343 006534 005364 001070      DEC    WTER1(R4)    ;DECREMENT WRITE ERROR CNTR
2344 006540 016704 172132 WRTY3A: MOV    UNP,R4    ;GET UNIT NUMBER

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2345 006544 016467 001030 172160      MOV      BTADDR(R4),BTPT ;GET ADDRESS OF UNIT BAD TAPE CNTR
2346 006552 017704 172154              MOV      @BTPT,R4        ;GET COUNTER
2347 006556 005724                      TST      (R4)+          ;SET POINTER OFFSET
2348 006560 010477 172146              MOV      R4,@BTPT
2349 006564 016703 172142              MOV      BTPT,R3
2350 006570 060304                      ADD      R3,R4          ;SET ABSOLUTE POINTER
2351 006572 016714 172060              MOV      BLCNTR,(R4)   ;SET BLOCK NUMBER
2352 006576 062704 000040              ADD      #40,R4        ;ADD RCNT OFFSET
2353 006602 016714 171746              MOV      RCNT,(R4)
2354 006606 160014                      SUB      R0,(R4)       ;SET RECORD NUMBER
2355 006610 005214                      INC      (R4)          ;CORRECT RECORD NUMBER
2356 006612 022777 000040 172112      CMP      #40,@BTPT    ;SEE IF TOO MANY BAD SPOTS
2357 006620 001002                      BNE      WRTY4         ;IF NOT: BR
2358 006622 000167 000234              JMP      BTOV          ;ELSE GO TO BAD TAPE OVERFLOW
2359 006626 005267 172052              WRTY4:  INC      RTCNT  ;BUMP RETRY COUNTER
2360 006632 022767 000004 172044      CMP      #4,RTCNT     ;SEE IF DONE 4 RETRIES
2361 006640 001410                      BEQ      WRTY5         ;IF SO: BR
2362 006642 016704 172030              MOV      UNP,R4
2363 006646 005264 001050              INC      RTY1(R4)     ;BUMP RETRY COUNTER
2364 006652 005267 172056              INC      ERTFL        ;SET ERASE FLAG
2365 006656 000167 177372              JMP      WRTY0         ;DO NEXT RETRY
2366 006662 000167 000436              WRTY5:  JMP      BTUR         ;ELSE GO TO BAD TAPE UNRECOVERABLE
2367
2368 ;WRITE RETRY BACKSPACE-ERASE SUBROUTINE*****
2369
2370 006666 005067 172016              WRTSB:  CLR      SERFL   ;CLEAR FLAG
2371 006672 016767 171700 171770      MOV      TSTAL,STAL
2372 006700 004767 003334              JSR      PC,STALL     ;DO TURN AROUND DELAY
2373 006704 012767 026336 171742      MOV      #MSG66,EMADDR ;SET ERROR CODE
2374 006712 012777 177777 171576      MOV      #-1,@FC      ;SET TO BACKSPACE 1 RECORD
2375 006720 012777 033434 171566      MOV      #RDATA,@BA   ;SET BA
2376 006726 004767 003236              JSR      PC,BKRT      ;GO BACKSPACE
2377 006732 005767 171752              TST      SERFL        ;SEE IF ERROR
2378 006736 001406                      BEQ      WRTSB1       ;IF NOT: BR
2379 006740 012767 000002 171760      WRTSB0: MOV      #2,BTFLG  ;SET FLAG
2380 006746 022626                      CMP      (SP)+,(SP)+  ;RESET STACK
2381 006750 000167 175306              JMP      REOT         ;GO REWIND AND REMOVE FROM TESTING
2382 006754 005767 171754              WRTSB1: TST      ERTFL   ;SEE IF SHOULD ERASE
2383 006760 001001                      BNE      WRTSB2       ;IF SO: BR
2384 006762 000207                      RTS                    ;RETURN
2385 006764 005067 171744              WRTSB2: CLR      ERTFL   ;CLEAR ERASE FLAG
2386 006770 005067 171706              CLR      RPCNT        ;CLEAR REPEAT CNTR
2387 006774 005067 171710              CLR      SERFL        ;CLEAR FLAG
2388 007000 012767 026351 171646      MOV      #MSG67,EMADDR ;SET ERROR CODE
2389 007006 005077 171504              CLR      @FC          ;CLEAR FRAME COUNT
2390 007012 012767 000024 171654      MOV      #24,MTCT1    ;SET ERASE OP-CODE
2391 007020 012777 027426 171466      MOV      #WDATA,@BA   ;SET BA
2392 007026 012767 007040 171630      MOV      #WRTSB3,RTRN ;SET RETURN ADDRESS
2393 007034 000167 012362              JMP      TAPG         ;GO ERASE
2394 007040 012703 027426              WRTSB3: MOV      #WDATA,R3 ;SET EXPT BA
2395 007044 004767 010542              JSR      PC,ER2       ;GO CHECK ERRORS
2396 007050 005767 171634              TST      SERFL        ;SEE IF ERROR
2397 007054 001737                      BEQ      WRTSB1       ;IF NOT: BR
2398 007056 000167 177656              JMP      WRTSB0
2399
2400 ;BAD TAPE OVERFLOW SUBROUTINE*****
  
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2401
2402 007062 005067 171626      BTOV:  CLR      RTYFL      ;CLEAR RETRY FLAG
2403 007066 012767 000001 171632  MOV      #1,BTFLG      ;SET BAD TAPE OVERFLOW FLAG
2404 007074 005726      POPSP
2405 007076 000167 175160      JMP      REOT          ;GO REWIND AND REMOVE FROM TESTING
2406 007102 016701 171624      BTOV0:  MOV      BTPT,R1  ;SET TABLE POINTER
2407 007106 005721      TST      (R1)+
2408 007110 005000      CLR      R0
2409 007112 010003      BTOV1:  MOV      R0,R3
2410 007114 000241      CLC
2411 007116 006003      ROR      R3          ;R3=R3/2 FOR CORRECT NUMBER
2412 007120 004767 015150      JSR      PC,OCTP      ;PRINT ENTRY NUMBER
2413 007124 012704 025044      MOV      #MSG13,R4
2414 007130 105724      TSTB     (R4)+      ;SKIP CR/LF
2415 007132 004767 014764      JSR      PC,TTOUT     ;PRINT BLOCK NUMBER TAG
2416 007136 011103      MOV      (R1),R3
2417 007140 004767 015130      JSR      PC,OCTP      ;PRINT BLOCK NUMBER
2418 007144 012704 025052      MOV      #MSG14,R4
2419 007150 004767 014746      JSR      PC,TTOUT     ;PRINT RECORD NUMBER TAG
2420 007154 062701 000040      ADD      #40,R1      ;SET POINTER OFFSET FOR RECOED NUMBER
2421 007160 012103      MOV      (R1)+,R3
2422 007162 004767 015106      JSR      PC,OCTP      ;PRINT RECORD NUMBER
2423 007166 162701 000040      SUB      #40,R1      ;RESET POINTER FOR BLOCK NUMBER
2424 007172 005720      TST      (R0)+
2425 007174 020077 171532      CMP      R0,@BTPT     ;SEE IF DONE
2426 007200 001405      BEQ      BTOV2        ;IF SO: BR
2427 007202 012704 025352      MOV      #MSG28,R4
2428 007206 004767 014710      JSR      PC,TTOUT     ;DO CR/LF
2429 007212 000737      BR       BTOV1        ;CONTINUE
2430 007214 005767 171510      BTOV2:  TST      BTSTF     ;SEE IF STAT ONLY PRINT
2431 007220 001007      BNE      BTOVX        ;IF SO: BR
2432 007222 012703 000041      MOV      #41,R3      ;SET SIZE OF TABLE
2433 007226 016704 171500      MOV      BTPT,R4     ;SET POINTER
2434 007232 005024      BTOV3:  CLR      (R4)+   ;CLEAR TABLE
2435 007234 005303      DEC      R3          ;SEE IF DONE
2436 007236 001375      BNE      BTOV3        ;IF NOT: BR
2437 007240 000207      BTOVX:  RTS      PC      ;RETURN
2438

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2440
2441 ;BAD TAPE STATISTIC PRINT*****
2442 007242 012704 025352 BTPRT: MOV #MSG28,R4
2443 007246 004767 014650 JSR PC,TTOUT ;DO CR/LF
2444 007252 016704 171420 MOV UNP,R4
2445 007256 016467 001030 17144b MOV BTADDR(R4),BTPT ;SET TABLE POINTER
2446 007264 017703 171442 MOV @BTPT,R3
2447 007270 000241 CLC
2448 007272 006003 ROR R3 ;CORRECT NUMBER
2449 007274 004767 014774 JSR PC,OC1P ;PRINT NUMBER OF BAD SPOTS
2450 007300 012704 027264 MOV #MSG112,R4
2451 007304 004767 014612 JSR PC,TTOUT ;PRINT BAD TAPE TAG
2452 007310 005777 171416 TST @BTPT ;SEE IF ANY BAD SPOTS
2453 007314 001001 BNE BTPRT1 ;IF SO: BR
2454 007316 000207 RTS PC ;ELSE RETURN
2455 007320 000167 177556 BTPRT1: JMP BTOVO ;PRINT STATS
2456
2457 ;BAD TAPE UNRECOVERABLE SUBROUTINE*****
2458
2459 007324 004767 013650 BTUR: JSR PC,PAPRT ;PRINT HEADER
2460 007330 012704 027077 MOV #MSG107,R4
2461 007334 004767 014562 JSR PC,TTOUT ;PRINT UNRECOVERABLE BAD SPOT MSG
2462 007340 000207 RTS PC ;RESUME TESTING
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2480 007342 012767 000002 171212 RSEQ: MOV #2,RDCMD
2481 007350 017704 171232 MOV @SWR,R4 ;READ SWITCHES
2482 007354 042704 177763 BIC #177763,R4 ;MASK READ BITS
2483 007360 005704 TST R4 ;SEE IF BOTH READS
2484 007362 001004 BNE RSR ;IF NOT: BR
2485 007364 032777 000002 171214 BIT #2,@SWR ;SEE IF READ REVERSE FIRST
2486 007372 001053 BNE RSFR ;IF NOT: BR
2487 007374 032777 000004 171204 RSR: BIT #4,@SWR ;SEE IF SHOULD READ REVERSE
2488 007402 001005 BNE RSF ;IF NOT: BR
2489 007404 012767 010000 171150 MOV #10000,RDCMD ;LOAD READ REVERSE COMMAND
2490 007412 004767 000252 JSR PC,READ ;GO READ REVERSE
2491 007416 032777 000010 171162 RSF: BIT #10,@SWR ;SEE IF SHOULD READ FORWARD
2492 007424 001033 BNE RSEX ;IF NOT: BR
2493 007426 032767 010000 171126 BIT #10000,RDCMD ;SEE IF HAVE READ REVERSE
2494 007434 001407 BEQ RSFO ;IF NOT: BR
2495 007436 016767 171134 171224 MOV TSTAL,STAL
2496 007444 004767 002570 JSR PC,STALL ;DO READ STALL
2497 007450 000167 000014 JMP RSF1
2498 007454 032777 000001 171124 RSFO: BIT #1,@SWR ;SEE IF WRITE
2499 007462 001002 BNE RSF1 ;IF NOT: BR
2500 007464 004767 002322 JSR PC,BKSP ;GO BACKSPACE
2501 007470 012767 000002 171064 PSF1: MOV #2,RDCMD ;LOAD READ FORWARD COMMAND
2502 007476 004767 000166 JSR PC,READ ;GO READ
2503 007502 005767 171154 TST EOTREC ;SEE IF AT END OF TAPE
2504 007506 100002 BPL RSEX ;IF NOT: BR
2505 007510 000167 174546 JMP REOT ;ELSE GO TO REWIND
2506 007514 005067 171142 RSEX: CLR EOTREC ;CLEAR EOT FLAG
2507 007520 000207 RTS PC ;EXIT
2508 007522 012767 010000 171032 RSFR: MOV #10000,RDCMD
2509 007530 032777 000010 171050 BIT #10,@SWR ;SEE IF SHOULD READ FORWARD
2510 007536 001013 BNE RSFR1 ;IF NOT: BR
2511 007540 032777 000001 171040 BIT #1,@SWR ;SEE IF WRITE
2512 007546 001002 BNE RSFR0 ;IF NOT: BR
2513 007550 004767 002236 JSR PC,BKSP ;GO BACKSPACE TO START
2514 007554 012767 000002 171000 RSFR0: MOV #2,RDCMD ;LOAD READ FORWARD COMMAND
2515 007562 004767 000102 JSR PC,READ ;GO READ FORWARD
2516 007566 032777 000004 171012 RSFR1: BIT #4,@SWR ;SEE IF SHOULD READ REVERSE
2517 007574 001347 BNE RSEX ;IF NOT: BR
2518 007576 032767 010000 170756 BIT #10000,RDCMD
2519 007604 001005 BNE RSFR2 ;IF READ REVERSE: BR

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2533 ;*****
2534 ;READ ROUTINE:
2535 ;
2536 ;THIS ROUTINE PERFORMS THE READ OPERATION DETERMINED
2537 ;BY THE READ SEQUENCE ROUTINE ONE RECORD AT A TIME.
2538 ;AT THE END OF EACH READ OPERATION THE STATUS REGISTER
2539 ;IS SCANNED FOR EITHER END OF TAPE OR BEGINNING OF TAPE.
2540 ;IF EOT WAS REACHED, CONTROL WILL BE PASSED TO
2541 ;THE EOT SUBROUTINE TO REWIND THE UNIT AND FLAG IT
2542 ;UNAVAILABLE UNTIL ALL UNITS HAVE REACHED EOT.
2543 ;IF BOT WAS REACHED AN ERROR IS PRINTED AND THE
2544 ;PROGRAM WILL HALT. TESTING MAY BE RESUMED BY PRESSING
2545 ;THE CONTINUE SWITCH.
2546 ;IF A TAPE MARK IS EXPECTED (TM=1) THEN THE
2547 ;READ ROUTINE EXPECTS THE FIRST RECORD OF A
2548 ;READ REVERSE TO BE A TM, AND THE LAST RECORD
2549 ;OF A READ FORWARD TO BE A TM. REMEMBER
2550 ;THAT THE TM ADDS ONE (1) TO THE TOTAL NUMBER
2551 ;OF RECORDS IN A BLOCK.
2552 ;CONSOLE SWITCHES ELEVEN (11) AND THIRTEEN (13) DETERMINE WHETHER
2553 ;OR NOT TO CHECK FOR STATUS ERRORS (11) OR DATA ERRORS (13),
2554 ;CONSOLE SWITCH FIVE (5) IS USED TO CAUSE A CONTINUOUS
2555 ;READ AND SPACE (FORWARD OR REVERSE) OF THE CURRENT
2556 ;RECORD ON TAPE (YOZZLE).
2557 ;*****
2558
2559 007670 016700 170660 READ: MOV RCNT,R0 ;LOAD REC CNTR
2560 007674 005767 170762 TST EOTREC ;SEE IF EOT
2561 007700 100013 BPL RDA ;IF NOT: BR
2562 007702 032767 010000 170652 BIT #10000,RDCMD ;SEE IF READ FORWARD
2563 007710 001407 BEQ RDA ;IF SO: BR
2564 007712 042767 100000 170742 BIC #100000,EOTREC ;CLEAR FLAG
2565 007720 016703 170736 MOV EOTREC,R3 ;GET MODIFIED RECORD COUNT
2566 007724 160300 SUB R3,R0 ;SET RECORD AT
2567 007726 005200 INC R0 ;SET TO PROPER NUMBER OF RECORDS
2568 007730 012767 024755 170716 RDA: MOV #MSG6,EMADDR ;SET ERROR MSG ADDRESS
2569 007736 005067 170736 CLR TMFLG
2570 007742 032767 010000 170612 BIT #10000,RDCMD
2571 007750 001406 BEQ RDO ;IF READ FORWARD: BR
2572 007752 005767 170606 TST TMEX ;SEE IF TM
2573 007756 001403 BEQ RDO ;IF NOT: BR
2574 007760 005267 170714 INC TMFLG ;SET TM FLAG
2575 007764 005200 INC R0
2576 007766 016777 170564 170522 RDO: MOV FMCNT,@FC ;LOAD CHAR CNTR
2577 007774 012777 033434 170512 MOV #RDATA,@BA ;LOAD DATA ADDR
2578 010002 032767 010000 170552 BIT #10000,RDCMD ;SEE IF READ REVERSE
2579 010010 001417 BEQ RD1A ;IF NOT: BR
2580 010012 016703 170540 MOV FMCNT,R3
2581 010016 005103 COM R3
2582 010020 032767 000020 170524 BIT #20,UDES ;SEE IF CORE DUMP
2583 010026 001402 BEQ RD1 ;IF NOT: BR
2584 010030 000241 CLC
2585 010032 006003 ROR R3 ;R3 = FC/2
2586 010034 060377 170454 RD1: ADD R3,@BA ;SET REVERSE BUS ADDRESS
2587 010040 012767 000076 170626 MOV #76,MTC1 ;SET READ REVERSE
2588 010046 000403 BR RD1B

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2589 010050 012767 000070 170616 RD1A: MOV #70,MTC1 ;SET READ FORWARD
2590 010056 012767 010070 170600 RD1B: MOV #RD2,RTRN ;SET INTERRUPT RETURN ADDRESS
2591 010064 000167 011332 RD1D: JMP TAPG ;GO EXECUTE TAPE COMMAND
2592 010070 032767 010000 170464 RD2: BIT #10000,RDCMD ;SEE IF READ REVERSE
2593 010076 001024 BNE RD3 ;IF SO: BR
2594 010100 032777 000020 170414 BIT #20,ADS
2595 010106 001404 BEQ RD2B ;AWAIT SWDN
2596 010110 032777 000020 170404 RD2A: BIT #20,ADS
2597 010116 001374 BNE RD2A ;AWAIT TUR
2598 010120 032777 002000 170374 RD2B: BIT #2000,ADS ;SEE IF EOT
2599 010126 001410 BEQ RD3 ;IF NOT: BR
2600 010130 005767 170544 TST TMFLG ;SEE IF TM
2601 010134 001005 BNE RD3 ;IF SO: BR
2602 010136 010067 170520 MOV R0,EOTREC
2603 010142 052767 100000 170512 BIS #100000,EOTREC ;SET EOT FLAG
2604 010150 032777 000002 170344 RD3: BIT #2,ADS ;SEE IF AT LOAD POINT
2605 010156 001411 BEQ RD4 ;IF NOT: BR
2606 010160 004767 013014 JSR PC,PAPRT ;PRINT CYCLE NUMBER
2607 010164 012704 025131 MOV #MSG22,R4
2608 010170 004767 013726 JSR PC,TTOUT ;PRINT BOT ERROR
2609 010174 000000 HALT
2610 010176 000167 172656 JMP STARTA ;RESTART
2611 010202 032777 004000 170376 RD4: BIT #4000,ASWR ;SEE IF SHOULD CHECK ERRORS
2612 010210 001121 BNE RD5 ;IF NOT: BR
2613 010212 005767 170462 TST TMFLG
2614 010216 001472 BEQ RD4B ;IF NO TM EXPT: BR
2615 010220 032777 000004 170274 BIT #4,ADS
2616 010226 001024 BNE RD4A ;IF TM RECVD: BR
2617 010230 012767 033434 011074 MOV #RDATA,CADER ;SAVE EXPT BUS ADDRESS
2618 010236 012767 000002 011074 MOV #2,DRVER ;SET TM STATUS ERROR FLAG
2619 010244 004767 010102 JSR PC,ERPT ;GO PRINT TM ERROR
2620 010250 016704 170422 MOV UMP,R4
2621 010254 032767 010000 170300 BIT #10000,RDCMD ;SEE IF READ REVERSE
2622 010262 001403 BEQ 1$ ;IF NOT: BR
2623 010264 005264 001150 INC RDERR1(R4) ;BUMP READ REVERSE ERROR
2624 010270 000502 BR RD6
2625 010272 005264 001110 1$: INC RDER1(R4) ;BUMP READ FORWARD ERROR
2626 010276 000477 BR RD6
2627 010300 012703 033434 RD4A: MOV #RDATA,R3
2628 010304 032767 010000 170250 BIT #10000,RDCMD ;SEE IF READ REVERSE
2629 010312 001007 BNE RD4A0 ;IF SO: BR
2630 010314 032767 002000 170230 BIT #2000,UDES ;SEE IF IN PE
2631 010322 001025 BNE RD4A2 ;IF SO: BR
2632 010324 062703 000002 ADD #2,R3
2633 010330 000422 BR RD4A2
2634 010332 016704 170220 RD4A0: MOV FMCNT,R4
2635 010336 005104 COM R4
2636 010340 032767 000020 170204 BIT #20,UDES ;SEE IF CORE DUMP
2637 010346 001402 BEQ RD4A1 ;IF NOT: BR
2638 010350 000241 CLC
2639 010352 006004 ROR R4 ;SET TO FC/2
2640 010354 060403 RD4A1: ADD R4,R3 ;SET EXPT BUS ADDRESS
2641 010356 042703 000001 BIC #1,R3 ;MAKE EXPT ADDRESS EVEN
2642 010362 032767 002000 170162 BIT #2000,UDES ;SEE IF IN PE
2643 010370 001002 BNE RD4A2 ;IF SO: BR
2644 010372 162703 000002 SUB #2,R3

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2645 010376 004767 007210      RD4A2: JSR   PC,ER2
2646 010402 000402                BR     RD4C
2647 010404 004767 007104      RD4B: JSR   PC,ERCHK      ;GO CHECK ERRORS
2648 010410 005767 170274      RD4C: TST   SERFL
2649 010414 001417                BEQ    RD5      ;IF NO ERROR: BR
2650 010416 016704 170254                MOV   UNP,R4
2651 010422 032767 010000 170132      BIT   #10000,RDCMD      ;SEE IF READ REVERSE
2652 010430 001003                BNE   RD4D      ;IF SO: BR
2653 010432 005264 001110                INC   RDER1(R4)      ;BUMP READ FORWARD ERROR
2654 010436 000402                BR     RD4E
2655 010440 005264 001150      RD4D: INC   RDERR1(R4)      ;BUMP READ REVERSE ERROR
2656 010444 004767 000176      RD4E: JSR   PC,RDRTY      ;GO RETRY
2657 010450 005067 170240                CLR   RTYFL      ;CLEAR RETRY FLAG
2658 010454 032777 020000 170124      RD5:  BIT   #20000,@SWR      ;SEE IF SHOULD DO DATA CHECK
2659 010462 001005                BNE   RD6      ;IF NOT; BR
2660 010464 005767 170210                TST   TMFLG
2661 010470 001002                BNE   RD6
2662 010472 004767 005110                JSR   PC,DCHK      ;GO CHECK DATA
2663 010476 005067 170206      RD6:  CLR   SERFL      ;CLEAR STATUS ERROR FLAG
2664 010502 004767 003646                JSR   PC,DS3      ;CLEAR BUFFER
2665 010506 032777 000040 170072      BIT   #40,@SWR      ;SEE IF SHOULD YOZZLE
2666 010514 001402                BEQ    RD7      ;IF NOT: BR
2667 010516 004767 000532                JSR   PC,YOZ      ;ELSE GO YOZZLE
2668 010522 016767 170044 170140      RD7:  MOV   RSTAL,STAL      ;SET DELAY
2669 010530 004767 001504                JSR   PC,STALL      ;STALL
2670 010534 032767 010000 170020      BIT   #10000,RDCMD      ;SEE IF READ REVERSE
2671 010542 001403                BEQ    RD7A      ;IF NOT: BR
2672 010544 005067 170130                CLR   TMFLG      ;CLEAR TAPE MARK FLAG
2673 010550 000405                BR     RD10
2674 010552 005767 170104      RD7A: TST   EOTREC      ;SEE IF EOT FOUND
2675 010556 100002                BPL   RD10      ;IF NOT: BR
2676 010560 012700 000001                MOV   #1,R0      ;SET TO EOT
2677 010564 005300      RD10: DEC   R0
2678 010566 001402                BEQ    RD11      ;IF DONE ALL: BR
2679 010570 000167 177172                JMP   RDO
2680 010574 032767 010000 167760      RD11: BIT   #10000,RDCMD      ;SEE IF READ REVERSE
2681 010602 001016                BNE   RDEX      ;IF SO: BR
2682 010604 005767 170052                TST   EOTREC      ;SEE IF FOUND EOT
2683 010610 100413                BMI   RDEX      ;IF SO: BR
2684 010612 005767 167746                TST   TMEX      ;SEE IF TM EXPECTED
2685 010616 001410                BEQ    RDEX      ;IF NOT: BR
2686 010620 005767 170054                TST   TMFLG      ;SEE IF TM FOUND
2687 010624 001005                BNE   RDEX      ;IF SO: BR
2688 010626 005267 170046                INC   TMFLG      ;ELSE SET FLAG
2689 010632 005200                INC   R0      ;SET RECORD COUNT TO ONE
2690 010634 000167 177126                JMP   RDO      ;GO READ TM
2691 010640 005067 170034      RDEX: CLR   TMFLG
2692 010644 000207      RDX:  RTS   PC      ;EXIT

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2704 010646 032777 000020 167732 RDRTY: BIT #20,@SWR ;SEE IF RETRY INHIBITED
2705 010654 001001 BNE RDRT0 ;IF NOT: BR
2706 010656 000207 RTS PC ;ELSE RETURN
2707 010660 016703 170040 RDRT0: MOV ERSAV,R3
2708 010664 042703 102700 BIC #102700,R3 ;MARK NON-RECOVERABLE ERROR BITS
2709 010670 001411 BEQ RDRT1 ;IF NOT: BR
2710 010672 004767 012302 JSR PC,PAPRT ;PRINT HEADER
2711 010676 012704 026630 MOV #MSG79,R4
2712 010702 004767 013214 JSR PC,TTOUT ;PRINT NON-RECOVERABLE MESSAGE
2713 010706 004767 000324 JSR PC,NRTP ;PRINT ER FOR NON-RETRYABLE ERROR
2714 010712 000207 RDRT1A: RTS PC ;RETURN
2715 010714 032777 002000 167664 RDRT1: BIT #2000,@SWR ;SEE IF PRINT INHIBITED
2716 010722 001004 BNE RDRT1B ;IF SO: BR
2717 010724 012704 026303 MOV #MSG64,R4
2718 010730 004767 013166 JSR PC,TTOUT ;PRINT ORIGINAL ERROR TAG
2719 010734 005067 167744 RDRT1B: CLR RTCNT ;CLEAR RETRY COUNTER
2720 010740 005067 167744 RDRTG: CLR SERFL ;CLEAR STATUS ERROR FLAG
2721 010744 012767 000002 167742 MOV #2,RTYFL ;SET READ RETRY FLAG
2722 010752 004767 000276 JSR PC,YOZ ;GO TO YOZZLE TO RETRY READ
2723 010756 005767 167726 TST SERFL ;SEE IF RETRY ERROR
2724 010762 001034 BNE RDRT5 ;IF SO: BR
2725 010764 032777 002000 167614 BIT #2000,@SWR
2726 010772 001014 BNE RDRT2
2727 010774 012704 026774 MOV #MSG105,R4
2728 011000 004767 013116 JSR PC,TTOUT ;PRINT RECOVERED MESSAGE
2729 011004 012704 026325 MOV #MSG65,R4
2730 011010 004767 013106 JSR PC,TTOUT ;PRINT RETRY TAG
2731 011014 016703 167664 MOV RTCNT,R3
2732 011020 004767 013250 JSR PC,OCTP ;PRINT RETRY NUMBER
2733 011024 016704 167646 RDRT2: MOV UNP,R4
2734 011030 032767 010000 167524 BIT #10000,RDCMD ;SEE IF READ REVERSE
2735 011036 001003 BNE RDRT3 ;IF SO: BR
2736 011040 005264 002670 INC RFSOFT(R4) ;ELSO BUMP FORWARD SOFT ERROR COUNTER
2737 011044 000402 BR RDRT4
2738 011046 005264 002710 RDRT3: INC RRSOFT(R4) ;BUMP ERRORS SOFT CNTR
2739 011052 000207 RDRT4: RTS PC ;RETURN
2740 011054 016703 167644 RDRT5: MOV ERSAV,R3 ;GET ER
2741 011060 042703 102700 BIC #102700,R3 ;MASK RECOVERABLE BITS
2742 011064 001414 BEQ RDRT5A ;IF RECOVERABLE: BR
2743 011066 004767 012106 JSR PC,PAPRT ;PRINT HEADER
2744 011072 012704 026630 MOV #MSG79,R4
2745 011076 004767 013020 JSR PC,TTOUT ;PRINT NON-RECOVERABLE MSG
2746 011102 004767 000130 JSR PC,NRTP ;PRINT ER
2747 011106 012767 000001 167534 MOV #1,TEMP3 ;SET FLAG
2748 011114 000404 BR RDRT5B

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2749	011116	032777	002000	167462	RDRT5A:	BIT	#2000,@SWR	;SEE IF PRINT INHIBITED
2750	011124	001016				BNE	RDRT6	;IF SO: BR
2751	011126	012704	026325		RDRT5B:	MOV	#MSG65,R4	
2752	011132	004767	012764			JSR	PC,TTOUT	;PRINT RETRY TAG
2753	011136	016703	167542			MOV	RTCNT,R3	
2754	011142	004767	013126			JSR	PC,OCTP	;PRINT RETRY NUMBER
2755	011146	005767	167476			TST	TEMP3	;SEE IF DID NON-RECOVERABLE
2756	011152	001403				BEQ	RDRT6	;IF NOT: BR
2757	011154	C05067	167470			CLR	TEMP3	;CLEAR FLAG
2758	011160	000207				RTS	PC	;EXIT
2759	011162	005267	167516		RDRT6:	INC	RTCNT	
2760	011166	026767	167512	167406		CMP	RTCNT,RETRY	;SEE IF DONE 8 RETRIES
2761	011174	001261				BNE	RDRTG	;IF NOT: BR
2762	011176	012704	027327			MOV	#MSG115,R4	
2763	011202	004767	012714			JSR	PC,TTOUT	;PRINT HARD ERROR MESSAGE
2764	011206	016704	167464			MOV	UNP,R4	
2765	011212	032767	010000	167342		BIT	#10000,RDCMD	;SEE IF READ REVERSE
2766	011220	001003				BNE	RDRT7	;IF SO: BR
2767	011222	005264	002730			INC	RFHARD(R4)	;BUMP FORWARD HARD ERROR CNTR
2768	011226	000402				BR	RDRTX	
2769	011230	005264	002750		RDRT7:	INC	RRHARD(R4)	;BUMP REVERSE HARD ERROR CNTR
2770	011234	000207			RDRTX:	RTS	PC	;RETURN
2771								
2772	011236	016703	167462		NRTP:	MOV	ERSAV,R3	;GET ER REGISTER
2773	011242	004767	013026			JSR	PC,OCTP	;PRINT ER
2774	011246	004767	010104			JSR	PC,FRPRT	;PRINT F OR R
2775	011252	000207				RTS	PC	;RETURN



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2789 011254 012777 000001 167326 YOZ: MOV #1,@TKS ;SET TTY ENABLE
2790 011262 016767 167312 167400 MOV YSTAL,STAL
2791 011270 004767 000744 JSR PC,STALL ;DO YOZZLE STALL
2792 011274 012777 177777 167214 YOZO: MOV #-1,@FC ;SET TO 1 RECORD SPACING
2793 011302 032767 010000 167252 BIT #10000,RDCMD ;SEE IF READ REVERSE
2794 011310 001404 BEQ YOZA ;IF NOT: BR
2795 011312 112767 000030 167354 MOVB #30,MTC1 ;SET TO SPACE FORWARD
2796 011320 000403 BR YOZB
2797 011322 112767 000032 167344 YOZA: MOVB #32,MTC1 ;SET TO SPACE REVERSE
2798 011330 012767 011350 167326 YOZB: MOV #YOZC,RTRN ;SET RETURN ADDRESS
2799 011336 012767 177775 167324 MOV #177775,STAL ;SET TIME MULTIPLIER
2800 011344 000167 010052 JMP TAPG ;GO YOZZLE
2801 011350 005767 167324 YOZC: TST TMFLG ;SEE IF TM
2802 011354 001404 BEQ 1$ ;IF NOT: BR
2803 011356 012767 040000 167304 MOV #40000,STAL ;SET TM STALL
2804 011364 000403 BR 2$
2805 011366 016767 167206 167274 1$: MOV YSTAL,STAL
2806 011374 004767 000640 2$: JSR PC,STALL ;DO YOZZLE STALL
2807 011400 012777 033434 167106 MOV #RDATA,@BA ;SET BUS ADDRESS
2808 011406 032767 010000 167146 BIT #10000,RDCMD ;SEE IF READ REVERSE
2809 011414 001417 BEQ YOZC1 ;IF NOT: BR
2810 011416 016703 167134 MOV FMCNT,R3
2811 011422 005103 COM R3
2812 011424 032767 000020 167120 BIT #20,UDES ;SEE IF CORE DUMP
2813 011432 001402 BEQ YOZCO ;IF NOT: BR
2814 011434 000241 CLC
2815 011436 006003 ROR R3 ;R3 = FC/2
2816 011440 060377 157050 YOZCO: ADD R3,@BA ;SET REVERSE BUS ADDRESS
2817 011444 012767 000076 167222 MOV #76,MTC1 ;SET READ REVERSE
2818 011452 000403 BR YOZC2
2819 011454 012767 000070 167212 YOZC1: MOV #70,MTC1 ;SET READ FORWARD
2820 011462 016777 167070 167026 YOZC2: MOV FMCNT,@FC ;SET CHARACTER COUNT
2821 011470 012767 011502 167166 MOV #YOZD,RTRN ;SET RETURN ADDRESS
2822 011476 000167 007720 JMP TAPG ;GO READ
2823 011502 032777 004000 167076 YOZD: BIT #4000,@SWR ;SEE IF SHOULD CHECK ERRORS
2824 011510 001051 BNE YOZE ;IF NOT: BR
2825 011512 005767 167162 TST TMFLG ;SEE IF TAPE MARK TIME
2826 011516 001444 BEQ YOZD1 ;IF NOT: BR
2827 011520 032767 010000 167034 BIT #10000,RDCMD ;SEE IF READ REVERSE
2828 011526 001426 BEQ YOZD0 ;IF NOT: BR
2829 011530 012703 033434 MOV #RDATA,R3
2830 011534 016704 167016 MOV FMCNT,R4
2831 011540 005104 COM R4

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2832 011542 032767 000020 167002 BIT #20,UDES ;SEE IF CORE DUMP
2833 011550 001402 BEQ YOZD4 ;IF NOT: BR
2834 011552 000241 CLC
2835 011554 006004 ROR R4 ;SET TO FC/2
2836 011556 060403 YOZD4: ADD R4,R3 ;SET EXPT BUS ADDRESS
2837 011560 042703 000001 BIC #1,R3 ;MAKE EXPT ADDRESS EVEN
2838 011564 032767 002000 166760 BIT #2000,UDES ;SEE IF PE
2839 011572 001001 BNE YOZD2 ;IF SO: BR
2840 011574 005743 TST -(R3) ;SET EXPT BA
2841 011576 004767 006001 YOZD2: JSR PC,ER2 ;GO CHECK ERRORS
2842 011602 000430 BR YOZF
2843 011604 012703 000434 YOZD0: MOV #RDATA,R3
2844 011610 032767 002000 166734 BIT #2000,UDES ;SEE IF PE
2845 011616 001001 BNE YOZD3 ;IF SO: BR
2846 011620 005723 TST (R3)+ ;SET EXPT BA
2847 011622 004767 005764 YOZD3: JSR PC,ER2 ;GO CHECK ERRORS
2848 011626 000416 BR YOZF
2849 011630 004767 005660 YOZD1: JSR PC,ERCHK ;ELSE GO CHECK ERRORS
2850 011634 032777 020000 166744 YOZE: BIT #20000,@SWR ;SEE IF SHOULD CHECK DATA
2851 011642 001010 BNE YOZF ;IF NOT: BR
2852 011644 005767 167030 TST TMFLG ;SEE IF TAPE MARK
2853 011650 001005 BNE YOZF ;IF SO: BR
2854 011652 005767 167036 TST RTYFL ;SEE IF RETRY
2855 011656 001004 BNE YOZFO ;IF SO: BR
2856 011660 004767 003722 JSR PC,DCHK ;ELSE GO CHECK DATA
2857 011664 004767 002464 YOZF: JSR PC,DS3 ;GO CLEAR DATA AREA
2858 011670 105777 166714 YOZFO: TSTB @TKS ;SEE IF HAVE NEW STALL VALUE
2859 011674 100034 BPL YOZG ;IF NOT: BR
2860 011676 122777 000203 166706 CMPB #203,@TKB ;SEE IF CONT C
2861 011704 001030 BNE YOZG ;IF NOT: BR
2862 011706 012704 026005 MOV #MSG44,R4
2863 011712 004767 012204 JSR PC,TTOUT ;PRINT YSTALL REQUEST
2864 011716 016703 166656 MOV YSTAL,R3
2865 011722 004767 012346 JSR PC,OCTP ;PRINT PRESENT STALL
2866 011726 010067 166716 MOV R0,TEMP3 ;SAVE R0(REC CNT)
2867 011732 012705 000600 MOV #YSTAL,R5 ;SET ADDRESS OF YSTL
2868 011736 012701 000006 MOV #6,R1 ;SET NUMBER OF CHAR TO INPUT
2869 011742 012702 177777 MOV #-1,R2 ;SET MAXIMUM LIMIT
2870 011746 012703 002000 MOV #2000,R3 ;SET MINIMUM LIMIT
2871 011752 004767 011706 JSR PC,TTR ;GO GET VALUE
2872 011756 016700 166666 MOV TEMP3,R0 ;RESTORE R0(REC CNTR)
2873 011762 000167 177266 JMP YOZ ;RESTART YOZZLE
2874 011766 032777 000040 166612 YOZG: BIT #40,@SWR ;SEE IF SHOULD CONTINUE YOZZLE
2875 011774 001402 BEQ YOZH ;IF NOT: BR
2876 011776 000167 177272 JMP YOZO
2877 012002 012777 000100 166600 YOZH: MOV #100,@TKS ;SET TTY INTERRUPT ENABLE
2878 012010 000207 RTS PC ;EXIT
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2897 012012 016767 166560 166650 BKSP: MOV TSTAL,STAL
2898 012020 004767 000214 JSR PC,STALL ;DO TURN AROUND STALL
2899 012024 012767 025005 166622 MOV #MSG10,EMADDR
2900 012032 012777 033434 166454 MOV #RDATA,@BA
2901 012040 005767 166520 TST TMEX ;SEE IF TM
2902 012044 001440 BEQ BO ;IF NOT: BR
2903 012046 012777 177777 166442 MOV #-1,@FC
2904 012054 012767 000032 166612 MOV #32,MTC1
2905 012062 012767 012074 166574 MOV #BKTM,RTRN
2906 012070 000167 007326 JMP TAPG ;SPACE TO TM
2907 012074 032777 010000 166504 BKTM: BIT #10000,@SWR ;SEE IF SHOULD CHECK ERROR
2908 012102 001021 BNE BO ;IF NOT: BR
2909 012104 012767 026217 166542 MOV #MSG55,EMADDR
2910 012112 032777 000004 166402 BIT #4,@DS ;SEE IF TM
2911 012120 001006 BNE BKTMO ;IF SO: BR
2912 012122 012767 033434 007202 MOV #RDATA,CADER
2913 012130 004767 006216 JSR PC,ERPT ;PRINT ERROR
2914 012134 000404 BR BO
2915 012136 012703 033434 BKTMO: MOV #RDATA,R3
2916 012142 004767 005444 JSR PC,ER2
2917 012146 016700 166402 BO: MOV RCNT,RO
2918 012152 005100 COM RO ;BUILD SPACE AMOUNT
2919 012154 005200 INC RO
2920 012156 012767 025005 166470 MOV #MSG10,EMADDR ;SET ERROR MESSG ADDRESS
2921 012164 010077 166326 MOV RO,@FC
2922 012170 012767 000032 166476 BKRT: MOV #32,MTC1 ;SET SPACE REVERSE
2923 012176 012767 012214 166460 MOV #B1,RTRN ;SET RETURN ADDRESS
2924 012204 010067 166460 MOV RO,STAL ;SET INTERRUPT TIME MULTIPLIER
2925 012210 000167 007206 JMP TAPG ;GO DO SPACE
2926 012214 012703 033434 B1: MOV #RDATA,R3
2927 012220 004767 005366 JSR PC,ER2
2928 012224 016767 166346 166436 B2: MOV TSTAL,STAL ;DO STALL
2929 012232 004767 000002 JSR PC,STALL ;STALL
2930 012236 000207 RTS PC ;EXIT
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2951 012240 005367 166424  
2952 012244 001375  
2953 012246 000207

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*****  
: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.  
: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.  
*****  
STALL: DEC      STAL  
        BNE     STALL      :DELAY  
        RTS     PC         :EXIT
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```
*****  
: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 TWENTY (20) TO FOUR THOUSAND  
:(4000) OCTAL CHARACTERS PER RECORD.  
:*****
```

```
CCNTR:  MOV    #-20,R1      ;SET HIGH LIMIT  
        MOV    #-4000,R2  ;SET LOW LIMIT  
        JSR    PC,RANG     ;GO GENERATE NUMBER  
        BIC    #1,RANSAV  
        MOV    RANSAV,FMCNT ;SET CHAR COUNT  
        MOV    #-1,PATS    ;PRESET DATA PATTERN  
        RTS    PC         ;EXIT
```

```
*****  
:RANDOM RECORD COUNT GENERATOR:  
:  
:THIS ROUTINE ENTERED VIA CONSOLE SWITCH SIX (6)  
:IS USED TO GENERATE A RANDOM NUMBER OF RECORDS  
:FOR EACH BLOCK OF DATA.  
:THE LIMITS ARE ONE (1) TO FIVE HUNDRED (500) OCTAL  
:RECORDS PER BLOCK.  
:*****
```

```
RCNTR:  MOV    #1,R2       ;SET LOW LIMIT  
        MOV    #500,R1    ;SET HIGH LIMIT  
        JSR    PC,RANG     ;GO GENERATE NUMBER  
        MOV    RANSAV,RCNT ;SET RECORD COUNT  
        RTS    PC         ;EXIT
```

```
012250 012701 177760  
012254 012702 174000  
012260 004767 011346  
012264 042767 000001 166334  
012272 016767 166330 166256  
012300 012767 177777 002102  
012306 000207  
  
012310 012702 000001  
012314 012701 000500  
012320 004767 011306  
012324 016767 166276 166222  
012332 000207
```

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3038 012334 005767 166276
3039 012340 001001
3040 012342 000207
3041 012344 005067 166326
3042 012350 005067 172426
3043 012354 012700 000010
3044 012360 012701 000746
3045 012364 005021
3046 012366 005300
3047 012370 001375

```

```

:*****
:TEST CONDITION ENTRY ROUTINE:
:
:THIS ROUTINE IS USED TO ALLOW THE OPERATOR
:TO ENTER, AT THE TTY, THE NECESSARY PARAMETERS
:TO RUN THE PROGRAM AS HE WISHES. THE
:ROUTINE IS ONLY ENTERED UPON INITIAL STARTING
:FROM LOCATION 200(8).
:THE MAIN PURPOSE OF THIS ROUTINE IS TO ESTABLISH
:A TABLE OF DEVICES TO BE TESTED. THIS TABLE
:CONSISTS OF AN ENTRY FOR EACH OF ONE (1) TO
:EIGHT (8) DEVICES. EACH ENTRY CONTAINS THE
:SLAVE NUMBER, DENSITY, PARITY, AND
:FORMAT. THE INFORMATION IS ENTERED
:IN RESPONSE TO PRINTED REQUESTS AT THE TTY.
:SLAVES MAY BE ENTERED IN ANY ORDER. EACH
:PARAMETER IS CHECKED FOR LEGALITY BEFORE BEING
:SET INTO THE TABLE.
:THE DRIVE NUMBER REQUEST WILL ALSO CHECK THE MASSBUS
:FOR THE PRESENCE OF THE REQUESTED DRIVE. IF IT IS NOT FOUND,
:A NON-EXIST DRIVE MESSAGE WILL BE PRINTED AND ANOTHER DRIVE
:REQUEST MADE. WHEN THE DRIVE IS FOUND, THE RESPONSE IS STORED
:AND CONTROL PASSED TO THE SLAVE SELECT ROUTINE.
:THE SLAVE SELECT ROUTINE ALSO CHECKS FOR THE PRESENCE OF THE
:SLAVE. IF IT IS NOT PRESENT, A MESSAGE IS PRINTED AND ANOTHER
:REQUEST IS ISSUED. WHEN THE SELECTED SLAVE IS FOUND TO BE
:PRESENT, A MESSAGE IS PRINTED IF IT IS A 7 CHANNEL DRIVE
:TO ASSIST IN SELECTING DENSITY, PARITY, AND FORMAT.
:UPON COMPLETION OF THE DEVICE TABLE, REQUESTS
:ARE PRINTED FOR ENTRY OF THE NUMBER OF CHARACTERS
:PER RECORD AND THE NUMBER OF RECORDS PER BLOCK. THE
:NEXT REQUEST IS FOR A PATTERN NUMBER TO BE USED
:FOR WRITING AND CHECKING OF READ DATA.
:FOLLOWING THE PATTERN REQUEST IS THE TAPE MARK OPTION.
:RESPONDING TO THE REQUEST (TM=) WITH A ONE (1)
:WILL CAUSE THE PROGRAM TO WRITE A TM AT THE
:END OF EACH DATA BLOCK AND TO EXPECT THE
:TM TO BE DETECTED IN EITHER READ FORWARD AND REVERSE
:OR DURING SPACE OPERATION. A RESPONSE OF ZERO (TM=0)
:DISALLOWS WRITTING OF THE TM AND CAUSES THE READ
:AND SPACE ROUTINES TO EXPECT NO TM TO BE PRESENT.
:THE LAST REQUESTS ARE FOR ENTRY OF THE DESIRED
:WRITE, READ, AND TURN AROUND STALLS.
:*****

```

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TINP:  TST      TINF      ;SEE IF SHOULD INPUT FROM TTY
       BNE     TINPA    ;IF SO: BR
       RTS     PC       ;EXIT
TINPA: CLR     UNP      ;CLEAR TABLE POINTER
       CLR     REOTC    ;CLEAR EOT UNIT COUNTER
       MOV     #10,RO   ;SET SIZE OF TABLE
       MOV     #UN1,R1  ;SET START OF TABLE
TINPB: CLR     (R1)+    ;CLEAR TABLE
       DEC     RO       ;SEE IF DONE
       BNE     TINPB    ;IF NOT: BR

```

```

3048 012372 012704 025442      MOV      #MSG31,R4
3049 012376 005767 166334      TST      ASEQF          ;SEE IF AUTO SEQ
3050 012402 001402                BEQ      TINPB1         ;IF NOT: BR
3051 012404 012704 025354      MOV      #MSG30,R4     ;SET AUTO SEQ HDR
3052 012410 004767 011506      TINPB1: JSR     PC,TTOUT ;PRINT PROGRAM NAME
3053 012414 005767 001526      TST      SCVFL         ;SEE IF SHORT CONVERSATION
3054 012420 001073                BNE     TINPC          ;IF SO: BR
3055 012422 012704 026507      MOV      #MSG74,R4
3056 012426 004767 011470      JSR     PC,TTOUT      ;REQUEST STARTING REGISTER ADDRESS
3057 012432 016703 166106      MOV      REGS,R3
3058 012436 004767 011632      JSR     PC,OCTP       ;PRINT CURRENT REG START
3059 012442 012705 000544      MOV      #REGS,R5     ;SAVE ADDRESS LOCATION
3060 012446 012701 000006      MOV      #6,R1        ;SET SIZE OF ENTRY
3061 012452 012702 177400      MOV      #177400,R2   ;SET UPPER LIMIT
3062 012456 012703 160000      MOV      #160000,R3   ;SET LOWER LIMIT
3063 012462 004767 011176      JSR     PC,TTR        ;GO GET RESPONSE
3064 012466 012704 026532      MOV      #MSG75,R4
3065 012472 004767 011424      JSR     PC,TTOUT      ;GO REQUEST VECTOR ADDRESS
3066 012476 016703 166044      MOV      VECT,R3
3067 012502 004767 011566      JSR     PC,OCTP       ;PRINT CURRENT VECTOR
3068 012506 012705 000546      MOV      #VECT,R5     ;SET SAVE LOCATION
3069 012512 012701 000093      MOV      #3,R1        ;SET SIZE OF ENTRY
3070 012516 012702 000474      MOV      #474,R2      ;SET UPPER LIMIT
3071 012522 012703 000100      MOV      #100,R3     ;SET LOWER LIMIT
3072 012526 004767 011132      JSR     PC,TTR        ;GO GET RESPONSE
3073 012532 016700 166010      MOV      VECT,R0      ;GET VECTOR ADDRESS
3074 012536 012720 022216      MOV      #MTINT,(R0)+ ;LOAD VECTOR WITH HANDLER ADDRESS
3075 012542 012710 000340      MOV      #340,(R0)    ;LOAD PRIORITY LEVEL
3076 012546 016700 165772      MOV      REGS,R0      ;GET STARTING REGISTER ADDRESS
3077 012552 012701 000016      MOV      #16,R1       ;SET NUMBER OF REGISTERS
3078 012556 012702 000510      MOV      #C1,R2       ;GET FIRST ADDRESS LOCATION
3079 012562 010022                TINPB0: MOV     R0,(R2)+  ;BUILD TABLE OF ADDRESSES
3080 012564 062700 000002      ADD      #2,R0        ;BUMP ADDRESS
3081 012570 005301                DEC      R1           ;SEE IF DONE
3082 012572 001373                BNE     TINPB0        ;IF NOT: BR
3083 012574 005767 166136      TST      ASEQF         ;SEE IF AUTO SEQ
3084 012600 001403                BEQ     TINPC         ;IF NOT: BR
3085 012602 005726                TST     (SP)+         ;RESET STACK POINTER
3086 012604 000167 007424      JMP     ASEQ          ;GO TO AUTO SEQUENCE
3087 012610 012777 000040 165702 TINPC: MOV     #40,@CS   ;INITIALIZE
3088 012616 012704 026154      MOV      #MSG52,R4
3089 012622 004767 011274      JSR     PC,TTOUT      ;REQUEST DRIVE NUMBER
3090 012626 012705 000550      MOV      #DVN,R5     ;GET ADDRESS
3091 012632 012701 000001      MOV      #1,R1       ;SET SIZE OF RESPONSE
3092 012636 012702 000007      MOV      #7,R2       ;SET UPPER LIMIT
3093 012642 012703 000000      MOV      #0,R3       ;SET LOWER LIMIT
3094 012646 004767 011012      JSR     PC,TTR        ;GO GET DRIVE NUMBER
3095 012652 016777 165672 165640 MOV      DVN,@CS
3096 012660 005777 165624      TST     @C1          ;ACCESS DRIVE
3097 012664 032777 010000 165626 BIT      #10000,@CS   ;SEE IF NED
3098 012672 001413                BEQ     TINPO         ;IF NOT: BR
3099 012674 012704 026444      MOV      #MSG71,R4
3100 012700 004767 011216      JSR     PC,TTOUT      ;PRINT NED
3101 012704 016704 165600      MOV      C1,R4
3102 012710 005204                INC     R4
3103 012712 152714 000100      BISB    #100,(R4)    ;CLEAR TRE

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```
3104 012716 000167 177666          JMP      TINPC          ;RETRY DVN
3105 012722 012704 025540          TINP0:  MOV      #MSG32,R4
3106 012726 004767 011170          JSR      PC,TTOUT      ;PRINT UNIT NUMBER REQUEST
3107 012732 005067 165710          CLR      TEMP2        ;CLEAR BUFFER
3108 012736 012705 000646          MOV      #TEMP2,R5    ;SET UNIT DESCRIPTION BUFFER ADDRESS
3109 012742 012701 000001          MOV      #1,R1        ;SET NUMBER OF CHARACTERS TO INPUT
3110 012746 012702 000007          MOV      #7,R2        ;SET MAXIMUM LIMIT
3111 012752 012703 000000          MOV      #0,R3        ;SET MINIMUM LIMIT
3112 012756 004767 010702          JSR      PC,TTR        ;GO GET UNIT NUMBER
3113 012762 005767 165656          TST      TEMP1        ;SEE IF HAVE NEW PARAMETER
3114 012766 001014          BNE      TINPOB       ;IF SO: BR
3115 012770 005767 165702          TST      UNP          ;SEE IF FIRST ENTRY
3116 012774 001002          BNE      TINPOA       ;IF NOT: BR
3117 012776 000167 177720          JMP      TINPO        ;ELSE RETRY
3118 013002 016700 165670          TINPOA: MOV      UNP,RO
3119 013006 012760 177777 000746  MOV      #-1,UN1(RO)  ;SET END UNIT TABLE
3120 013014 000167 000402          JMP      TINP2C       ;GO GET RECORD COUNT
3121 013020 016700 165652          TINPOB: MOV      UNP,RO
3122 013024 042760 000007 000746  BIC      #7,UN1(RO)  ;CLEAR UNIT NUMBER
3123 013032 004767 001124          JSR      PC,TPOST     ;GO LOAD UNIT NUMBER TO PROPER POSITION
3124 013036 012777 000040 165454  MOV      #40,@CS
3125 013044 016777 165500 165446  MOV      DVN,@CS
3126 013052 016077 000746 165462  MOV      UN1(RO),@C2 ;LOAD UNIT NUMBER
3127 013060 032777 002000 165450  TINPOC: BIT      #2000,@DT ;SEE IF SLAVE PRESENT
3128 013066 001006          BNE      TINPOD       ;IF SO: BR
3129 013070 012704 026232          MOV      #MSG57,R4
3130 013074 004767 011022          JSR      PC,TTOUT     ;PRINT NON-EXIST SLAVE
3131 013100 000167 177616          JMP      TINPO        ;REDO
3132 013104 022777 142012 165424  TINPOD: CMP      #142012,@DT ;SEE IF 9TRK TM02,TU45
3133 013112 001410          BEQ      TINPOE       ;IF SO: BR
3134 013114 012704 026127          MOV      #MSG50,R4   ;ILLEGAL DRIVE TYPE
3135 013120 004767 010776          JSR      PC,TTOUT     ;GO PRINT
3136 013124 017703 165406          MOV      @DT,R3
3137 013130 004767 011140          JSR      PC,OCTP      ;PRINT DRIVE TYPE REGISTER
3138 013134 012704 024777          TINPOE: MOV      #MSG9,R4
3139 013140 004767 010756          JSR      PC,TTOUT     ;PRINT SERIAL NUMBER TAG
3140 013144 017703 165370          MOV      @SN,R3
3141 013150 004767 011446          JSR      PC,SNPT      ;PRINT SERIAL NUMBER
3142 013154 012704 025561          TINP1: MOV      #MSG33,R4
3143 013160 004767 010736          JSR      PC,TTOUT     ;PRINT DENSITY REQUEST
3144 013164 005067 165456          CLR      TEMP2        ;CLEAR BUFFER
3145 013170 012701 000001          MOV      #1,R1        ;SET NUMBER OF CHARACTERS TO INPUT
3146 013174 012702 000007          MOV      #7,R2        ;SET MAXIMUM LIMIT
3147 013200 012703 000000          MOV      #0,R3        ;SET MINIMUM LIMIT
3148 013204 004767 010454          JSR      PC,TTR        ;GO GET DENSITY
3149 013210 005767 165430          TST      TEMP1        ;SEE IF HAVE NEW PARAMETER
3150 013214 001407          BEQ      TINP2        ;IF NOT: BR
3151 013216 042767 003400 165326  BIC      #3400,UDES   ;ELSE CLEAR OLD PARAMETER
3152 013224 012703 000010          MOV      #10,R3       ;SET POSITION FACTOR
3153 013230 004767 000714          JSR      PC,TPOS      ;GO LOAD DENSITY INTO PROPER POSITION
3154 013234 012704 025575          TINP2: MOV      #MSG34,R4
3155 013240 004767 010656          JSR      PC,TTOUT     ;PRINT PARITY REQUEST
3156 013244 005067 165376          CLR      TEMP2        ;CLR BUFFER
3157 013250 012701 000001          MOV      #1,R1        ;SET NUMBER OF CHARACTERS TO INPUT
3158 013254 012702 000001          MOV      #1,R2        ;SET MAXIMUM LIMIT
3159 013260 012703 000000          MOV      #0,R3        ;SET MINIMUM LIMIT
```



3160	013264	004767	010374		JSR	PC,TTR	:GO INPUT PARITY
3161	013270	005767	165350		TST	TEMP1	:SEE IF HAVE NEW PARAMETER
3162	013274	001407			BEQ	TINP2A	:IF NOT: BR
3163	013276	042767	000010	165246	BIC	#10,UDES	:ELSE CLEAR OLD PARAMETER
3164	013304	012703	000003		MOV	#3,R3	:SET POSITION FACTOR
3165	013310	004767	000634		JSR	PC,TPOS	:GO LOAD PARITY TO PROPER POSITION
3166	013314	012704	026175		TINP2A: MOV	#MSG53,R4	
3167	013320	004767	010576		JSR	PC,TTOUT	:REQUEST FORMAT
3168	013324	005067	165316		CLR	TEMP2	
3169	013330	012701	000002		MOV	#2,R1	
3170	013334	012702	000016		MOV	#16,R2	
3171	013340	012703	000014		MOV	#14,R3	
3172	013344	004767	010314		JSR	PC,ITR	:GO GET FORMAT
3173	013350	005767	165270		TST	TEMP1	:SEE IF NEW PARAMETER
3174	013354	001407			BEQ	TINP2B	:IF NOT: BR
3175	013356	042767	000170	165166	BIC	#170,UDES	
3176	013364	012703	000004		MOV	#4,R3	
3177	013370	004767	000554		JSR	PC,TPOS	
3178	013374	005267	171402		TINP2B: INC	REOTC	:BUMP EOT UNIT COUNTER
3179	013400	022767	000016	165270	CMP	#16,UNP	:SEE IF DONE UNITS
3180	013406	001405			BEQ	TINP2C	:IF SO: BR
3181	013410	062767	000002	165260	ADD	#2,UNP	:POINT TO NEXT UNIT
3182	013416	000167	177300		JMP	TINP0	:ELSE LOOK FOR NEXT UNIT
3183	013422	005067	165250		TINP2C: CLR	UNP	:CLEAR UNIT POINTER
3184	013426	016700	171350		MOV	REOTC,R0	
3185	013432	000367	171344		SWAB	REOTC	
3186	013436	110067	171340		MOV	R0,REOTC	:SET UNIT EOT COUNTER
3187	013442	012704	025610		TINP3: MOV	#MSG35,R4	
3188	013446	004767	010450		JSR	PC,TTOUT	:PRINT RECORD COUNT REQUEST
3189	013452	016703	165076		MOV	RCNT,R3	
3190	013456	004767	010612		JSR	PC,OCTP	:PRINT RECORD COUNT
3191	013462	012705	000554		MOV	#RCNT,R5	:SET RECORD COUNT ADDRESS
3192	013466	012701	000006		MOV	#6,R1	:SET NUMBER OF CHARACTERS TO INPUT
3193	013472	012702	177777		MOV	#-1,R2	:SET MAXIMUM LIMIT
3194	013476	012703	000001		MOV	#1,R3	:SET MINIMUM LIMIT
3195	013502	004767	010156		JSR	PC,TTR	:GO GET RECORD COUNT
3196	013506	016767	165042	165114	MOV	RCNT,RCSAV	:SAVE RECORD COUNT
3197	013514	012704	025631		MOV	#MSG36,R4	
3198	013520	004767	010376		JSR	PC,TTOUT	:PRINT CHARACTER COUNT REQUEST
3199	013524	005467	165026		NEG	FMCNT	
3200	013530	016703	165022		MOV	FMCNT,R3	
3201	013534	004767	010534		JSR	PC,OCTP	:PRINT CHAR COUNT
3202	013540	012705	000556		MOV	#FMCNT,R5	:SET CHARACTER COUNT ADDRESS
3203	013544	012701	000006		MOV	#6,R1	:SET NUMBER OF CHARACTERS TO INPUT
3204	013550	012702	004000		MOV	#4000,R2	:SET MAXIMUM LIMIT
3205	013554	012703	000004		MOV	#4,R3	:SET MINIMUM LIMIT
3206	013560	004767	010100		JSR	PC,TTR	:GO GET CHARACTER COUNT
3207	013564	005467	164766		NEG	FMCNT	:SET TO TWO'S COMPLIMENT
3208	013570	016767	164762	165034	MOV	FMCNT,FCSAV	:SAVE FRAME COUNT
3209	013576	012704	025655		MOV	#MSG37,R4	:PRINT PATTERN NUMBER REQUEST
3210	013602	004767	010314		JSR	PC,TTOUT	
3211	013606	016703	164746		MOV	PATRN,R3	
3212	013612	004767	010456		JSR	PC,OCTP	:PRINT PATTERN
3213	013616	005067	000742		CLR	DOFL	:CLEAR EXTERNAL DATA FLAG
3214	013622	012705	000560		MOV	#PATRN,R5	:SET PATTERN NUMBER ADDRESS
3215	013626	012701	000002		MOV	#2,R1	:SET NUMBER OF CHARACTERS TO INPUT

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3216 013632 012702 000015      MOV      #15,R2      ;SET MAXIMUM LIMIT
3217 013636 012703 000000      MOV      #0,R3      ;SET MINIMUM LIMIT
3218 013642 004767 010016      JSR      PC,TTR      ;GO GET PATTERN NUMBER
3219 013646 012704 026372      MOV      #MSG69,R4
3220 013652 004767 010244      JSR      PC,TTOUT    ;REQUEST TM
3221 013656 016703 164702      MOV      TMEX,R3
3222 013662 004767 010406      JSR      PC,OCTP    ;PRINT CURRENT TM FLAG SETTING
3223 013666 012705 000564      MOV      #TMEX,R5   ;GET TM FLAG ADDRESS
3224 013672 012701 000001      MOV      #1,R1      ;SET SIZE OF RESPONSE
3225 013676 012702 000001      MOV      #1,R2      ;SET UPPER LIMIT
3226 013702 012703 000000      MOV      #0,R3      ;SET LOWER LIMIT
3227 013706 004767 007752      JSR      PC,TTR      ;TM 1=YES
3228 013712 012704 025700      MOV      #MSG38,R4
3229 013716 004767 010200      JSR      PC,TTOUT    ;REQUEST SINGLE PASS
3230 013722 016703 164642      MOV      SPFLG,R3
3231 013726 004767 010342      JSR      PC,OCTP    ;PRINT CURRENT SETTING
3232 013732 012705 000570      MOV      #SPFLG,R5  ;SET ADDRESS OF FLAG
3233 013736 012701 000001      MOV      #1,R1      ;SET SIZE OF RESPONSE
3234 013742 012702 000001      MOV      #1,R2      ;SET UPPER LIMIT
3235 013746 012703 000000      MOV      #0,R3      ;SET LOWER LIMIT
3236 013752 004767 007706      JSR      PC,TTR      ;GO GET RESPONSE
3237 013756 005767 000164      TST      SCVFL      ;SEE IF SHORT CONVERSATION
3238 013762 001066                BNE      TINPX      ;IF SO: BR
3239 013764 012704 025720      MOV      #MSG40,R4
3240 013770 004767 010126      JSR      PC,TTOUT    ;PRINT READ STALL REQUEST
3241 013774 016703 164572      MOV      RSTAL,R3
3242 014000 004767 010270      JSR      PC,OCTP    ;PRINT READ STALL
3243 014004 012705 000572      MOV      #RSTAL,R5  ;SET READ STALL ADDRESS
3244 014010 012701 000006      MOV      #6,R1      ;SET NUMBER OF CHARACTERS TO INPUT
3245 014014 012702 177777      MOV      #-1,R2     ;SET MAXIMUM LIMIT
3246 014020 012703 000001      MOV      #1,R3      ;SET MINIMUM LIMIT
3247 014024 004767 007634      JSR      PC,TTR      ;GO GET READ STALL
3248 014030 012704 025747      MOV      #MSG41,R4
3249 014034 004767 010062      JSR      PC,TTOUT    ;PRINT WRITE STALL REQUEST
3250 014040 016703 164530      MOV      WSTAL,R3
3251 014044 004767 010224      JSR      PC,OCTP    ;PRINT READ STALL
3252 014050 012705 000574      MOV      #WSTAL,R5  ;SET WRITE STALL ADDRESS
3253 014054 012701 000006      MOV      #6,R1      ;SET NUMBER OF CHARACTERS TO INPUT
3254 014060 012702 177777      MOV      #-1,R2     ;SET MAXIMUM LIMIT
3255 014064 012703 000001      MOV      #1,R3      ;SET MINIMUM LIMIT
3256 014070 004767 007570      JSR      PC,TTR      ;GO GET WRITE STALL
3257 014074 012704 025761      MOV      #MSG42,R4
3258 014100 004767 010016      JSR      PC,TTOUT    ;PRINT TURN AROUND STALL REQUEST
3259 014104 016703 164466      MOV      TSTAL,R3
3260 014110 004767 010160      JSR      PC,OCTP    ;PRINT TA STALL
3261 014114 012705 000576      MOV      #TSTAL,R5  ;SET TURN AROUND STALL ADDRESS
3262 014120 012701 000006      MOV      #6,R1      ;SET NUMBER OF CHARACTERS TO INPUT
3263 014124 012702 177777      MOV      #-1,R2     ;SET MAXIMUM LIMIT
3264 014130 012703 000001      MOV      #1,R3      ;SET MINIMUM LIMIT
3265 014134 004767 007524      JSR      PC,TTR      ;GO GET TURN AROUND STALL
3266 014140 005067 000002      TINPX:  CLR      SCVFL ;CLEAR SHORT CONVERSATION FLAG
3267 014144 000207                RTS      PC          ;EXIT
3268 014146 000000      SCVFL:  0           ;SHORT CONVERSATION FLAG
3269
3270
3271
;UNIT DESCRIPTION POSITIONING SUBROUTINE*****

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3272 014150 000241  
3273 014152 006167 164470  
3274 014156 005303  
3275 014160 001373  
3276 014162 016700 164510  
3277 014166 056760 164454 000746  
3278 014174 000207  
3279

TPOS: CLC  
ROL TEMP2 ;POSITION CHARACTER  
DEC R3 ;SEE IF DONE  
BNE TPOS ;IF NOT: BR  
TPOS1: MOV UNP,R0 ;LOAD UNIT POINTER  
BIS TEMP2,UN1(R0) ;LOAD CHARACTER INTO UN1(R0)  
RTS PC ;EXIT

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3298 014176 005767 001006 DSUP: TST RDFL ;SEE IF DID RANDOM DATA
3299 014202 001401 DSO BEQ DS0 ;IF NOT: BR
3300 014204 000445 BR DS1 ;ELSE EXIT
3301 014206 005767 164524 DSO: TST ASEQF ;SEE IF AUTO SEQ
3302 014212 001406 BEQ DSOC ;IF NOT: BR
3303 014214 005767 164340 TST PATRN ;SEE IF AUTO RANDOM
3304 014220 100003 BPL DSOC ;IF NOT: BR
3305 014222 004767 000714 JSR PC,DATR ;ELSE GO GENERATE RANDOM DATA
3306 014226 000207 RTS PC ;RETURN
3307 014230 026767 164324 000152 DSOC: CMP PATRN,PATS ;SEE IF NEW PATTERN
3308 014236 001014 BNE DSOA ;IF SO: BR
3309 014240 016703 164306 MOV UDES,R3 ;GET UNIT DESCRIPTION
3310 014244 042703 177767 BIC #177767,R3 ;MASK EVEN PARITY
3311 014250 026703 000136 CMP PARS,R3 ;SEE IF SAME AS LAST TIME
3312 014254 001404 BEQ DSOB ;IF SO: BR
3313 014256 010367 000130 MOV R3,PARS ;SAVE PARITY
3314 014262 004767 000724 JSR PC,CRCLRC ;GO GENERATE EXPT CRC/LRC
3315 014266 000207 DSOB: RTS PC
3316 014270 012703 027426 DSOA: MOV #WDATA,R3 ;R3 = ADDRS OF WRITE BUFFER
3317 014274 016701 164260 MOV PATRN,R1 ;R1 = PATTERN SELECTOR
3318 014300 010167 000104 MOV R1,PATS
3319 014304 062701 000001 ADD #1,R1 ;BUMP POINTER
3320 014310 000241 CLC
3321 014312 006101 ROL R1 ;MAKE PATTERN SELECTOR EVEN
3322 014314 000171 002770 JMP @DATBL(R1) ;GO GENERATE PATTERN
3323 014320 032777 010000 164210 DS1: BIT #10000,@DT ;SEE IF 7 CH
3324 014326 001410 BEQ DS2A ;IF NOT: BR
3325 014330 012702 002002 MOV #2002,R2 ;SET BUFFER SIZE
3326 014334 012701 027426 MOV #WDATA,R1 ;SET START OF BUFFER
3327 014340 042721 140300 DS2: BIC #140300,(R1)+ ;MASK FOR 7 CH
3328 014344 005302 DEC R2 ;SEE IF DONE
3329 J14346 001374 BNE -DS2 ;IF NOT: BR
3330 014350 004767 000636 DS2A: JSR PC,CRCLRC ;GO GENERATE EXPT CRC/LRC
3331 014354 012702 002000 DS3: MOV #2000,R2 ;R2=BUFFER SIZE
3332 014360 012701 033434 MOV #RDATA,R1 ;R1=READ DATA START
3333 014364 005021 DS4: CLR (R1)+ ;CLEAR BUFFER
3334 014366 005302 DEC R2 ;SEE IF DONE ALL
3335 014370 001375 BNE DS4 ;IF NOT: BR

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3336 014372 016767 164154 000012      MOV      UDES,PARS      ;GET UNIT DESCRIPTION
3337 014400 042767 177767 000004      BIC      #177767,PARS  ;MASK PARITY
3338 014406 000207                RTS      PC              ;EXIT
3339 014410 177777                PATS:    -1              ;PATTERN NUMBER SAVE
3340 014412 000000                PARS:    0
3341
3342
3343                ;EXTERNAL DATA INPUT FROM H/S READER (256 CHARACTER MAXIMUM)
3344 014414 005767 000144      DATO:    TST      DOFL      ;SEE IF SHOULD DO EXTERNAL INPUT
3345 014420 001337                BNE      DS1            ;IF NOT: BR
3346 014422 012767 000001 000134      MOV      #1,DOFL       ;SET EXTERNAL FLAG
3347 014430 005077 164166                CLR      @PRB          ;CLEAR READER BUFFER
3348 014434 005077 164160                CLR      @PRS          ;CLEAR READER STATUS
3349 014440 005067 164200                CLR      TEMP1         ;CLEAR FOR USE AS CHARACTER FLAG
3350 014444 052777 000001 164146  DATOA:    BIS      #1,@PRS      ;START READER
3351 014452 032777 000200 164140  DATOB:    BIT      #200,@PRS  ;SEE IF DONE
3352 014460 001774                BEQ      DATOB         ;IF NOT : BR
3353 014462 005001                CLR      R1            ;CLEAR SAVE LOCATION
3354 014464 117701 164132      MOVB     @PRB,R1       ;SAVE CHARACTER
3355 014470 005767 164150                TST      TEMP1         ;SEE IF HAVE FOUND START CHARACTER
3356 014474 001012                BNE      DATOC         ;IF SO : BR
3357 014476 105701                TSTB    R1             ;SEE IF CHARACTER IS 0
3358 014500 001761                BEQ      DATOA         ;IF SO : BR
3359 014502 012767 000001 164134      MOV      #1,TEMP1     ;ELSE SET CHARACTER FOUND FLAG
3360 014510 010167 164132      MOV      R1,TEMP2     ;SAVE DATA SIZE
3361 014514 010102                MOV      R1,R2         ;SAVE DATA SIZE
3362 014516 000167 177722                JMP      DATOA         ;GO GET FIRST DATA CHAR
3363 014522 110123                DATOC:   MOVB     R1,(R3)+ ;LOAD BUFFER
3364 014524 005302                DEC      R2            ;SEE IF READ ALL
3365 014526 001346                BNE      DATOA         ;IF NOT : BR
3366 014530 012701 027426      DATOD:   MOV      #WDATA,R1 ;R1 = START OF WRITE BUFFER
3367 014534 016702 164106      MOV      TEMP2,R2     ;R2 = SIZE OF DATA FIELD
3368 014540 112123                DATOE:   MOVB     (R1)+,(R3)+ ;REPEAT LOAD OF DATA FIELD
3369 014542 022703 033434      CMP      #RDATA,R3    ;SEE IF DONE
3370 014546 003002                BGT      DATOF        ;IF NOT: BR
3371 014550 000167 177544                JMP      DS1          ;EXIT
3372 014554 005302                DATOF:   DEC      R2            ;SEE IF AT END OF DATA FIELD
3373 014556 001370                BNE      DATOE        ;IF NOT : BR
3374 014560 000167 177744                JMP      DATOD       ;ELSE RESTART FILL
3375 014564 000000                DOFL:    0              ;EXTERNAL DATA FLAG=1 IF ALREADY DONE
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3377 ;ALL ONES*****
3378
3379 014566 012701 177777 DAT1: MOV #-1,R1 ;R1=DATA
3380 014572 012702 002002 DAT1A: MOV #2002,R2 ;R2=WORD COUNT +2
3381 014576 010123 DAT1B: MOV R1,(R3)+ ;LOAD BUFFER
3382 014600 005302 DEC R2 ;SEE IF DONE
3383 014602 001375 BNE v-1B ;IF NOT: BR
3384 014604 000167 177510 JMP DS1 ;RETURN
3385
3386 ;ALL ZEROS*****
3387
3388 014610 005001 DAT2: CLR R1 ;R1=DATA
3389 014612 000167 177754 JMP DAT1A ;LOAD BUFFER
3390
3391 ;WALKING ONE*****
3392
3393 014616 012701 000001 DAT3: MOV #1,R1 ;R1=DATA
3394 014622 000241 CLC
3395 014624 012702 004004 DAT3A: MOV #4004,R2 ;R2=CHARACTER COUNT+4
3396 014630 110123 DAT3B: MOV R1,(R3)+ ;LOAD BUFFER
3397 014632 106101 ROLB R1 ;SET NEXT CHARACTER
3398 014634 005302 DEC R2 ;SEE IF DONE
3399 014636 001374 BNE DAT3B ;IF NOT: BR
3400 014640 000167 177454 JMP DS1 ;RETURN
3401
3402 ;WALKING ZERO*****
3403
3404 014644 012701 000376 DAT4: MOV #376,R1 ;R1=START OF DATA
3405 014650 000261 SEC
3406 014652 000167 177746 JMP DAT3A ;LOAD BUFFER
3407
3408 .ALTERNATING ONE/ZERO*****
3409
3410
3411 014656 012701 052525 DAT5: MOV #52525,R1 ;R1=DATA
3412 014662 000167 177704 JMP DAT1A ;LOAD BUFFER
3413
3414 ;ALTERNATING ZERO/ONE*****
3415
3416 014666 012701 125252 DAT6: MOV #125252,R1 ;R1=DATA
3417 014672 000167 177674 JMP DAT1A ;LOAD BUFFER
3418
3419 ;ONE/ZERO IN ALTERNATING WORDS*****
3420
3421 014676 012701 125252 DAT7: MOV #125252,R1 ;SET WORD 1
3422 014702 012702 052525 MOV #52525,R2 ;SET WORD 2
3423 014706 012704 001002 MOV #1002,R4 ;SET NUMBER OF ENTRIES
3424 014712 010123 DAT7A: MOV R1,(R3)+ ;LOAD WORD 1
3425 014714 010223 MOV R2,(R3)+ ;LOAD WORD 2
3426 014716 005304 DEC R4 ;SEE IF DONE
3427 014720 001374 BNE DAT7A ;IF NOT: BR
3428 014722 000167 177372 JMP DS1 ;RETURN
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3430                                     ;WALKING ONE/ALL ONE IN ALTERNATING CHARS****
3431
3432 014726 012702 004002  DAT10: MOV    #4002,R2      ;SET BUFFER SIZE
3433 014732 012701 000001      MOV    #1,R1        ;SET WALK BASE
3434 014736 000241              CLC
3435 014740 012713 177400  DAT10A: MOV   #177400,(R3) ;LOAD ALL ONE BYTE
3436 014744 050123              BIS    R1,(R3)+     ;LOAD WALK BYTE
3437 014746 106101              ROLB   R1           ;WALK ONE
3438 014750 005302              DEC    R2
3439 014752 001372              BNE    DAT10A      ;DO FULL BUFFER
3440 014754 000167 177340      JMP    DS1         ;RETURN
3441
3442                                     ;ALL BITS 0-377*****
3443
3444 014760 005001              DAT11: CLR    R1     ;R1=STARTING DATA
3445 014762 012702 004004      MOV    #4004,R2    ;R2=CHARACTER COUNT+4
3446 014766 110123              DAT11A: MOVB   R1,(R3)+ ;LOAD BUFFER
3447 014770 105201              INCB   R1          ;BUMP DATA
3448 014772 005302              DEC    R2          ;SEE IF DONE
3449 014774 001374              BNE    DAT11A     ;IF NOT: BR
3450 014776 000167 177316      JMP    DS1         ;RETURN
3451
3452                                     ;ALL BITS 377-0*****
3453
3454 015002 012701 000377      DAT12: MOV    #377,R1 ;R1=STARTING DATA
3455 015006 012702 004004      MOV    #4004,R2    ;R2=CHARACTER COUNT+4
3456 015012 110123              DAT12A: MOVB   R1,(R3)+ ;LOAD BUFFER
3457 015014 105301              DECB   R1          ;BUMP DATA
3458 015016 005302              DEC    R2          ;SEE IF DONE
3459 015020 001374              BNE    DAT12A     ;IF NOT: BR
3460 015022 000167 177272      JMP    DS1         ;RETURN
3461
3462                                     ;ALTERNATING CHARACTERS 0 AND 377*****
3463
3464 015026 012701 000377      DAT13: MOV    #377,R1 ;R1 = DATA
3465 015032 000167 177534      JMP    DAT1A      ;LOAD BUFFER
3466
3467                                     ;WALKING ZERO/ALL ZERO IN ALTERNATING CHARS*****
3468
3469 015036 012702 004002  DAT14: MOV    #4002,R2 ;SET BUFFER SIZE
3470 015042 012701 000376      MOV    #376,R1    ;SET WALK BASE
3471 015046 000261              SEC
3472 015050 010113              DAT14A: MOV   R1,(R3) ;LOAD WALK BYTE
3473 015052 042723 177400      BIC    #177400,(R3)+ ;CLEAR HIGH BYTE
3474 015056 106101              ROLB   R1         ;WALK ZERO BIT
3475 015060 005302              DEC    R2
3476 015062 001372              BNE    DAT14A     ;FILL BUFFER
3477 015064 000167 177230      JMP    DS1         ;RETURN
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3479                                     ;AUTO SEQUENCE PATTERN*****
3480
3481 015070 012702 000400  DAT15:  MOV    #400,R2      ;SET NUMBER OF ENTRIES
3482 015074 012701 015122  DAT15A: MOV    #APATS,R1    ;SET START OF PATTERN
3483 015100 012704 000010      MOV    #10,R4      ;SET SIZE OF PATTERN
3484 015104 012123      DAT15B: MOV    (R1)+,(R3)+  ;FILL BUFFER
3485 015106 005304      DEC    R4          ;SEE IF DONE PATTERN
3486 015110 001375      BNE   DAT15B      ;IF NOT: BR
3487 015112 005302      DEC    R2          ;SEE IF DONE BUFER
3488 015114 001367      BNE   DAT15A      ;IF NOT: BR
3489 015116 000167 177176      JMP   DS1         ;RETURN
3490 015122 000000      APATS:  0
3491 015124 177400      177400
3492 015126 000377      377
3493 015130 000000      0
3494 015132 177777      -1
3495 015134 000377      377
3496 015136 177400      177400
3497 015140 177777      -1
3498
3499                                     ;RANDOM DATA GENERATOR SUBROUTINE*****
3500
3501 015142 016704 163410  DATR:  MOV    FMCNT,R4      ;SET NUMBER OF FRAMES
3502 015146 012703 027426      MOV    #WDATA,R3    ;SET ADDRESS OF START OF BUFFER
3503 015152 012701 177777      MOV    #-1,R1       ;SET HIGH LIMIT
3504 015156 005002      CLR    R2           ;SET LOW LIMIT
3505 015160 004767 006446  DATRO:  JSR    PC,RANG     ;GO GENERATE NUMBER
3506 015164 016723 163436      MOV    RANSV,(R3)+  ;LOAD BUFFER
3507 015170 005204      INC    R4           ;SEE IF DONE WHOLE BUFFER
3508 015172 001372      BNE   DATRO        ;IF NOT: BR
3509 015174 004767 177120      JSR    PC,DS1       ;GO CHECK FOR 7 CH
3510 015200 012767 000001 000002  MOV    #1,RDFL      ;SET RANDOM DATA FLAG
3511 015206 000207      RTS    PC           ;EXIT
3512 015210 000000      RDFL:  0           ;RANDOM DATA SELECT FLAG
  
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3514 ;*****
3515 ;CRC/LRC CHARACTER BUILD;
3516 ;
3517 ;THIS ROUTINE WILL CONSTRUCT AND SAVE THE EXPECTED
3518 ;CRC AND LRC CHARACTERS ACCORDING TO DATA AND
3519 ;RECORD SIZE IF OPERATING IN NRZ MODE
3520 ;*****
3521
3522 015212 016700 163340 CRCLRC: MOV FMCNT,R0 ;SET RECORD SIZE
3523 015216 005400 NEG R0
3524 015220 012701 027426 MOV #WDATA,R1 ;SET START OF BUFFER
3525 015224 005067 000346 CLR XORS
3526 015230 111104 CLO: MOV (R1),R4 ;GET CHARACTER
3527 015232 004767 000166 JSR PC,CLP ;GO GET PARITY OF CHARACTER
3528 015236 004767 000310 JSR PC,XOR ;XOR CHARACTER
3529 015242 000241 CLC
3530 015244 006004 ROR R4 ;ROTATE 1 RIGHT
3531 015246 103014 BCC CL2 ;IF NO CARRY: BR
3532 015250 052704 000400 BIS #400,R4 ;SET BIT NINE
3533 015254 000241 CLC
3534 015256 010405 CL1: MOV R4,R5 ;SAVE CHARACTER
3535 015260 042705 177703 BIC #177703,R5
3536 015264 005105 COM R5
3537 015266 042705 177703 BIC #177703,R5
3538 015272 042704 000074 BIC #74,R4
3539 015276 050504 BIS R5,R4 ;COMPLIMENT BITS 2,3,4,5
3540 015300 010467 000272 CL2: MOV R4,XORS
3541 015304 005300 DEC R0
3542 015306 001402 BEQ CLLAST ;IF LAST CHARACTER: BR
3543 015310 000167 177714 JMP CLO ;GET NEXT
3544 015314 016704 000256 CLLAST: MOV XORS,R4
3545 015320 005167 000252 COM XORS
3546 015324 042767 177050 000244 BIC #177050,XORS
3547 015332 042704 177727 BIC #177727,R4 ;COMPLIMENT ALL BUT BITS 3&5
3548 015336 050467 000234 BIS R4,XORS
3549 015342 016767 000230 000230 MOV XORS,EXCRC ;SAVE EXPECTED CRC
3550 015350 016700 163202 MOV FMCNT,R0
3551 015354 005400 NEG R0
3552 015356 012701 027426 MOV #WDATA,R1 ;DO EXPT LRC
3553 015362 005067 000210 CLR XORS
3554 015366 111104 CL3: MOV (R1),R4
3555 015370 004767 000030 JSR PC,CLP ;GET PARITY
3556 015374 004767 000152 JSR PC,XOR ;XOR CHARACTER
3557 015400 005300 DEC R0
3558 015402 001371 BNE CL3 ;DO ALL FOR LRC
3559 015404 016704 000170 MOV EXCRC,R4
3560 015410 004767 000136 JSR PC,XOR ;XOR CRC TO DATA
3561 015414 016767 000156 000160 MOV XORS,EXLRC ;SAVE EXPT LRC
3562 015422 000207 PC ;RETURN
3563 015424 005704 CLP: TST R4 ;SEE IF 0 CHAR
3564 015426 001010 BNE CLPE ;IF NOT: BR
3565 015430 032767 000010 163114 BIT #10,UDES ;SEE IF EVEN PARITY
3566 015436 001404 BEQ CLPE ;IF NOT: BR
3567 015440 012704 000420 MOV #420,R4 ;SET 0 CHAR EVEN PARITY
3568 015444 005201 INC R1 ;BUMP POINTER

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3618 015606 005067 163046      DCHK: CLR      BBC      ;CLEAR BAD RECORD CNTR
3619 015612 005067 163070      CLR      DERFL     ;CLEAR DATA ERROR FLAG
3620 015616 016705 162734      MOV      FMCNT,R5   ;LOAD CHAR COUNT
3621 015622 032767 000020 162722 BIT      #20,UDES   ;SEE IF CORE DUMP
3622 015630 001402          BEQ      DCHKO      ;IF NOT: BR
3623 015632 000261          SEC
3624 015634 006005          ROR      R5         ;R5 = FC/2
3625 015636 012701 027426      DCHKO: MOV      #WDATA,R1 ;SET WRITE DATA ADDR
3626 015642 012702 033434      MOV      #RDATA,R2  ;SET READ DATA ADDR
3627 015646 032767 000010 162676 BIT      #10,UDES   ;SEE IF EVEN PARITY
3628 015654 001430          BEQ      DFOCO      ;IF NOT: BR
3629 015656 032767 000020 162666 BIT      #20,UDES   ;SEE IF CORE DUMP PARITY
3630 015664 001024          BNE      DFOCO      ;IF SO: BR
3631 015666 032767 002000 162656 BIT      #2000,UDES ;SEE IF PE MODE
3632 015674 001020          BNE      DFOCO      ;IF SO: BR
3633 015676 105711          DFOF: TSTB     (R1)  ;SEE IF 0 CHAR
3634 015700 001404          BEQ      DFOD       ;IF SO: BR
3635 015702 005201          INC      R1         ;BUMP POINTER
3636 015704 005205          DFOE: INC      R5         ;SEE IF DONE
3637 015706 001373          BNE      DFOF       ;IF NOT: BR
3638 015710 000406          BR       DFOC       ;ELSE CONTINUE
3639 015712 112721 000020          DFOD: MOVB     #20,(R1)+ ;SET 20 IN PLACE OF 0
3640 015716 012767 177777 176464 MOV      #-1,PATS   ;SET PATTERN GENERATE FLAG
3641 015724 000767          BR       DFOE
3642 015726 016705 162624          DFOC: MOV      FMCNT,R5 ;RESET CHAR CNT
3643 015732 012701 027426          MOV      #WDATA,R1 ;RESET DATA ADDRESS
3644 015736 032767 010000 162616 DFOCO: BIT      #10000,RDCMD ;SEE IF READ REVERSE
3645 015744 001462          BEQ      DFO        ;IF NOT: BR
3646 015746 016704 162604          DFOB: MOV      FMCNT,R4 ;GET FRAME COUNT
3647 015752 005404          NEG      R4         ;SET TO WHOLE NUMBER
3648 015754 032767 000020 162570 BIT      #20,UDES   ;SEE IF CORE DUMP
3649 015762 001402          BEQ      DFOBO      ;IF NOT: BR
3650 015764 000241          CLC
3651 015766 006004          ROR      R4         ;SET TO FC/2
3652 015770 060401          DFOBO: ADD      R4,R1      ;POINT TO START OF WRITE DATA
3653 015772 060402          ADD      R4,R2      ;POINT TO START OF READ DATA
3654 015774 032767 000001 162554 BIT      #1,FMCNT   ;SEE IF ODD FRAME COUNT
3655 016002 001401          BEQ      DFOA       ;IF NOT: BR
3656 016004 105722          TSTB     (R2)+     ;BUMP POINTER
3657 016006 032767 000020 162536 DFOA: BIT      #20,UDES ;SEE IF CORE DUMP
3658 016014 001431          BEQ      DFOA4      ;IF NOT: BR

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3659 016016 000241          CLC
3660 016020 132742 000001  BITB  #1,-(R2)      ;SEE IF BIT 0 = 1
3661 016024 001401          BEQ   DFOA0        ;IF NOT: BR
3662 016026 000261          SEC
3663 016030 106012          DFOA0: RORB      (R2)
3664 016032 000241          CLC
3665 016J34 132712 000001  BITB  #1,(R2)
3666 016040 001401          BEQ   DFOA1
3667 016042 000261          SEC
3668 016044 106012          DFOA1: RORB      (R2)      ;POSITION BITS FOR REVERSE CORE DUMP
3669 016046 000241          CLC
3670 016050 132712 000001  BITB  #1,(R2)
3671 016054 001401          BEQ   DFOA2
3672 016056 000261          SEC
3673 016060 106012          DFOA2: RORB      (R2)
3674 016062 000241          CLC
3675 016064 132712 000001  BITB  #1,(R2)
3676 016070 001401          BEQ   DFOA3
3677 016072 000261          SEC
3678 016074 106012          DFOA3: RORB      (R2)
3679 016076 005202          INC   R2          ;RESET POINTER
3680 016100 124142          DFOA4: CMPB     -(R1),-(R2) ;TEST DATA CHARACTER
3681 016102 001010          BNE   DF1        ;IF NOT GOOD: BR
3682 016104 105067 162550  CLRB  BBC        ;CLEAR BAD RECORD COUNTER
3683 016110 000411          BR    DF2
3684 016112 122122          DFO:  CMPB     (R1)+,(R2)+ ;CHECK DATA
3685 016114 001003          BNE   DF1        ;IF BAD: BR
3686 016116 105067 162536  CLRB  BBC        ;CLEAR BAD RECORD CNTR
3687 016122 000404          BR    DF2
3688 016124 004767 000632  DF1:  JSR     PC,DRPKF ;GO GET DROPS AND PICKS
3689 016130 004767 000066  JSR     PC,DERR   ;GO DO PRINT
3690 016134 005205          DF2:  INC     R5   ;BUMP CHAR CNTR
3691 016136 001405          BEQ   DF3        ;IF DONE ALL: BR
3692 016140 032767 010000 162414 BIT    #10000,RDCMD ;SEE IF READ REVERSE
3693 016146 001761          BEQ   DFO        ;IF NOT: BR
3694 016150 000716          BR    DFOA      ;ELSE CONTINUE READ REV
3695 016152 005067 162510  DF3:  CLR     HDRFL ;CLEAR HEADER FLAG
3696 016156 005767 162524  TST   DERFL     ;SEE IF HAD DATA ERROR
3697 016162 001416          BEQ   DFX       ;IF NOT: BR
3698 016164 005767 162520  TST   SERFL
3699 016170 001013          BNE   DFX       ;IF NOT DATA ERROR ONLY: BR
3700 016172 016704 162500  MOV   UNP,R4
3701 016176 032767 010000 162356 BIT    #10000,RDCMD ;SEE IF READ REVERSE
3702 016204 001003          BNE   DF4        ;IF SO: BR
3703 016206 005264 001130  INC   DATER1(R4) ;BUMP DATA ERROR FORWARD COUNTER
3704 016212 000402          BR    DFX
3705 016214 005264 001170  DF4:  INC   DEREV1(R4) ;BUMP REVERSE DATA ERROR
3706 016220 000207          DFX:  RTS     PC   ;EXIT
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3736 016222 032777 002000 162356 DERR: BIT #2000,@SWR ;SEE IF SHOULD PRINT ERRORS
3737 016230 001402 BEQ DERR0 ;IF SO: BR
3738 016232 000167 000172 JMP DERR4 ;ELSE SKIP PRINT
3739 016236 005267 162430 DERR0: INC PFLG ;SET PRINT FLAG
3740 016242 005767 162420 TST HDRFL ;SEE IF HAVE PRINTED HEADER
3741 016246 001010 BNE DERR0A ;IF SO: BR
3742 016250 004767 004724 JSR PC,PAPRT ;PRINT CYCLE NUMBER
3743 016254 012704 024724 MOV #MSG1,R4 ;LOAD ERROR MSG ADDR
3744 016260 004767 005636 JSR PC,TTOUT ;PRINT ERROR
3745 016264 004767 003066 JSR PC,FRPRT ;PRINT F OR R
3746 016270 012704 024743 DERR0A: MOV #MSG4,R4
3747 016274 004767 005622 JSR PC,TTOUT ;PRINT CHAR NO. HEADER
3748 016300 010203 MOV R2,R3
3749 016302 162703 033434 SUB #RDATA,R3 ;POINT TO CHAR
3750 016306 005303 DEC R3
3751 016310 032767 010000 162244 BIT #10000,RDCMD ;SEE IF READ REVERSE
3752 016316 001402 BEQ DERROB ;IF NOT: BR
3753 016320 010503 MOV R5,R3 ;GET CHAR NUMBER
3754 016322 005103 COM R3
3755 016324 004767 005744 DERR0B: JSR PC,OCTP ;PRINT CHAR NUMBER
3756 016330 012704 024731 MOV #MSG2,R4
3757 016334 004767 005562 JSR PC,TTOUT ;PRINT EXPECTED DATA
3758 016340 032767 010000 162214 BIT #10000,RDCMD ;SEE IF READ REVERSE
3759 016346 001402 BEQ DERROC ;IF NOT: BR
3760 016350 111103 MOVB (R1),R3 ;GET CHAR
3761 016352 000401 BR DERR0D
3762 016354 114103 DERR0C: MOVB -(R1),R3 ;LOAD EXPECTED DATA
3763 016356 004767 006132 DERR0D: JSR PC,DOUT ;GO PRINT CHAR

```

3764	016362	012704	024736		MOV	#MSG3,R4	
3765	016366	004767	005530		JSR	PC,TTOUT	;PRINT RECIEVED DATA
3766	016372	032767	010000	162162	BIT	#10000,RDCMD	;SEE IF READ REVERSE
3767	016400	001402			BEQ	DERR1	;IF NOT: BR
3768	016402	111203			MOVB	(R2),R3	;GET CHAR
3769	016404	000401			BR	DERR2	
3770	016406	114203			DERR1: MOVB	-(R2),R3	
3771	016410	004767	006100		DERR2: JSR	PC,DOUT	;PRINT BAD CHAR
3772	016414	032767	010000	162140	BIT	#10000,RDCMD	;SEE IF READ REVERSE
3773	016422	001401			BEQ	DERR3	;IF SO: BR
3774	016424	000401			BR	DERR4	
3775	016426	122122			DERR3: CMPB	(R1)+,(R2)+	;RESET POINTERS
3776	016430	105267	162224		DERR4: INCB	BBC	;BUMP BAD RECORD CNTR
3777	016434	122767	000010	162216	CMPB	#10,BBC	;SEE IF BLD BTH
3778	016442	001124			BNE	DEREX	;IF NOT: BR
3779	016444	032777	002000	162134	BIT	#2000,@SWR	;SEE IF PRINT INHIBIT
3780	016452	001004			BNE	1\$	;IF SO: BR
3781	016454	012704	025057		MOV	#MSG15,R4	
3782	016460	004767	005436		JSR	PC,TTOUT	;PRINT BLD BTH
3783	016464	105067	162170		1\$: CLRB	BBC	;RESET BAD RECORD CNTR
3784	016470	000367	162164		SWAB	BBC	;POSITION BLD BTH AMOUNT
3785	016474	105267	162160		INCB	BBC	;BUMP AMOUNT
3786	016500	122767	000003	162152	CMPB	#3,BBC	;SEE IF HAD 3 BLD BTHS
3787	016506	101054			BHI	DERR4B	;IF NOT: BR
3788	016510	000367	162144		SWAB	BBC	;REPOSITION BBC
3789	016514	022705	177767		CMP	#177767,R5	;SEE IF ON LAST EIGHT CHARS
3790	016520	101473			BLOS	DERR6	;IF SO: BR
3791	016522	012705	177767		MOV	#177767,R5	;SET CHAR CNTR TO 8
3792	016526	032767	010000	162026	BIT	#10000,RDCMD	;SEE IF READ REVERSE
3793	016534	001416			BEQ	DERR4A	;IF NOT: BR
3794	016536	012701	027426		MOV	#WDATA,R1	;GET START OF BUFFER
3795	016542	012702	033434		MOV	#RDATA,R2	;GET START OF BUFFER
3796	016546	062701	000010		ADD	#10,R1	
3797	016552	062702	000010		ADD	#10,R2	;POINT TO START +10
3798	016556	032767	000001	161772	BIT	#1,FMCNT	;SEE IF ODD FRAME COUNT
3799	016564	001453			BEQ	DEREX	;IF NOT: BR
3800	016566	105722			TSTB	(R2)+	;BUMP POINTER
3801	016570	000451			BR	DEREX	
3802	016572	016767	161760	162044	DERR4A: MOV	FMCNT,TEMP1	;LOAD CHAR COUNT
3803	016600	005167	162040		COM	TEMP1	
3804	016604	005267	162034		INC	TEMP1	
3805	016610	162767	000010	162026	SUB	#10,TEMP1	;POINT TO BUFFER -8
3806	016616	016701	162022		MOV	TEMP1,R1	;POINT TO NEXT CHAR
3807	016622	062701	027426		ADD	#WDATA,R1	;POINT TO NEXT WRITE CHAR
3808	016626	016702	162012		MOV	TEMP1,R2	;POINT TO END OF READ DATA -8 FORWARD
3809	016632	062702	033434		ADD	#RDATA,R2	;POINT TO NEXT CHAR
3810	016636	000426			BR	DEREX	;EXIT
3811	016640	000367	162014		DERR4B: SWAB	BBC	;REPOSITION BBC
3812	016644	000241			CLC		
3813	016646	062705	000024		ADD	#24,R5	;SKIP 20 CHARS
3814	016652	103416			BCS	DERR6	;IF EXCEED RECORD SIZE: BR
3815	016654	032767	010000	161700	BIT	#10000,RDCMD	;SEE IF READ REVERSE
3816	016662	001405			BEQ	DERR5	;IF NOT: BR
3817	016664	162701	000024		SUB	#24,R1	
3818	016670	162702	000024		SUB	#24,R2	;RESET POINTERS
3819	016674	000407			BR	DEREX	

3820	016676	062701	000024		DERR5:	ADD	#24,R1	:SKIP 20 CHARS
3821	016702	062702	000024			ADD	#24,R2	:SKIP FORWARD 20 CHARS
3822	016706	000402				BR	DEREX	
3823	016710	012705	177777		DERR6:	MOV	#-1,R5	:SET TO EOR
3824	016714	032777	100000	161664	DEREX:	BIT	#100000,@SWR	:SEE IF SHOULD HALT ON ERROR
3825	016722	001412				BEQ	DEREX1	:IF NOT: BR
3826	016724	000000				HALT		
3827	016726	005767	161740			TST	PFLG	:SEE IF PRINTED
3828	016732	001006				BNE	DEREX1	:IF SO: BR
3829	016734	032777	002000	161644		BIT	#2000,@SWR	:SEE IF SHOULD PRINT
3830	016742	001002				BNE	DEREX1	:IF NOT: BR
3931	016744	000167	177266			JMP	DERRO	:ELSE PRINT
3832	016750	005067	161716		DEREX1:	CLR	PFLG	:CLEAR FLAG
3833	016754	005267	161726			INC	DERFL	:BUMP DATA ERROR FLAG
3834	016760	000207				RTS	PC	:RETURN
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016762 005067 161656  
016766 005067 161654  
016772 005067 161652  
016776 111167 161642  
017002 111267 161640  
017006 016704 161664  
017012 016467 000770 161702  
017020 016467 001010 161672  
017026 032767 010000 161526  
017034 001005  
017036 124142  
017040 112167 161600  
017044 112267 161576  
017050 004767 000006  
017054 004767 000222  
017060 000207  
017062 116703 161556  
017066 116704 161554  
017072 140403  
017074 001001  
017076 000207  
017100 012767 000010 161604  
017106 132703 000001  
017112 001455  
017114 105767 161530  
017120 001016  
017122 005277 161572  
017126 005777 161566  
017132 100045  
017134 032777 002000 161444  
017142 001402  
017144 004767 004030  
017150 004767 000172  
017154 000415  
017156 005277 161540  
017162 005777 161534  
017166 100027  
017170 032777 002000 161410

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:*****
:DROPS AND PICKS SUBROUTINE:
:
:THIS SUBROUTINE IS USED TO ACCUMULATE FROM
:EACH BAD DATA CHARACTER FOUND THE NUMBER
:OF BITS WHICH WERE EITHER DROPPED OR PICKED UP.
:TWO COUNTERS PER SLAVE ARE USED TO ACCUMULATE THIS
:INFORMATION AND CAN STORE UP TO 32K DROPS
:OR PICKS BEFORE OVERFLOWING. IF OVERFLOW IS
:ABOUT TO OCCUR, THESE ACCUMULATORS ARE
:PRINTED IN OCTAL AND RESET TO ZERO.
:THE CONTENTS OF THE ACCUMULATORS MAY BE
:DISPLAYED AT ANY TIME BY SETTING CONSOLE
:SWITCH FOURTEEN TO A ONE (1). THE PRINTOUT WILL OCCUR
:AT THE END OF THE CURRENT BLOCK CYCLE.
:*****
DRPKF: CLR     TEMP1
        CLR     TEMP2
        CLR     TEMP3
        MOV     (R1),TEMP1      ;LOAD GOOD CHAR
        MOV     (R2),TEMP2      ;LOAD BAD CHAR
        MOV     UNP,R4
        MOV     PIK1(R4),BPKP
        MOV     DRP1(R4),BDPP
        BIT     #10000,RDCMD     ;SEE IF READ REVERSE
        BNE     DRPK            ;IF SO: BR
        CMP     -(R1),-(R2)     ;POINT TO CHAR
        MOV     (R1)+,TEMP1     ;LOAD GOOD CHAR
        MOV     (R2)+,TEMP2     ;LOAD BAD CHAR
DRPK:  JSR     PC,DROP          ;GET DROPS
        JSR     PC,PICK         ;GET PICKS
        RTS
DROP:  MOV     TEMP1,R3        ;R3 = GOOD CHAR
        MOV     TEMP2,R4        ;R4 = BAD CHAR
DPC:  BIC     R4,R3            ;GET DROPS/PICKS
        BNE     DPCG            ;IF SOME: BR
        RTS                    ;RETURN
DPCG:  MOV     #10,BCNT        ;SET NUMBER TO CHECK
DPC0:  BIT     #1,R3            ;SEE IF DROPPED OR PICKED THIS BIT
        BEQ     DPC2            ;IF NOT: BR
        TST     TEMP3           ;SEE IF ON PICKS
        BNE     DPC1            ;IF SO: BR
        INC     @BDPP           ;BUMP DROP CNTR
        BPL     DPC2            ;IF NO OVERFLOW: BR
        BIT     #2000,@SWR      ;SEE IF HAVE PRINTED DATA
        BEQ     DPC0A           ;IF SO: BR
        JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
DPC0A: JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
        BR     DPC2A
DPC1:  INC     @BPKP           ;BUMP PICK CNTR
        TST     @BPKP           ;SEE IF OVERFLOW
        BPL     DPC2            ;IF NOT: BR
        BIT     #2000,@SWR      ;SEE IF HAVE PRINTED DATA

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3892 017176 001402
3893 017200 004767 003774
3894 017204 004767 000136
3895 017210 016704 161462
3896 017214 016403 001010
3897 017220 016404 000770
3898 017224 012767 000010 161460
3899 017232 005023
3900 017234 005024
3901 017236 005367 161450
3902 017242 001373
3903 017244 000207
3904 017246 000241
3905 017250 106003
3906 017252 005367 161434
3907 017256 001410
3908 017260 062767 000002 161434
3909 017266 062767 000002 161424
3910 017274 000167 177606
3911 017300 000207
3912 017302 016704 161370
3913 017306 016467 000770 161406
3914 017314 016467 001010 161376
3915 017322 116704 161316
3916 017326 116703 161314
3917 017332 112767 000001 161310
3918 017340 004767 177526
3919 017344 000207
3920 017346 012704 025330
3921 017352 004767 004544
3922 017356 016704 161314
3923 017362 016467 001010 161330
3924 017370 016467 000770 161324
3925 017376 062767 000016 161314
3926 017404 062767 000016 161310
3927 017412 012767 000010 161272
3928 017420 017703 161274
3929 017424 004767 004644
3930 017430 005367 161256
3931 017434 001404
3932 017436 162767 000002 161254
3933 017444 000765
3934 017446 012767 000010 161236
3935 017454 012704 025341
3936 017460 004767 004436
3937 017464 017703 161232
3938 017470 004767 004600
3939 017474 005367 161212
3940 017500 001404
3941 017502 162767 000002 161212
3942 017510 000765
3943 017512 000207

      BEQ      DPC1A      ;IF SO: BR
      JSR      PC,PAPRT   ;PRINT CYCLE NUMBER
DPC1A: JSR      PC,DPPRT   ;PRINT DROPS AND PICKS
DPC2A: MOV      UNP,R4
      MOV      DRP1(R4),R3 ;SET DROP POINTER
      MOV      PIK1(R4),R4 ;SET PICK POINTER
      MOV      #10,BCNT    ;SET NUMBER OF BITS
DPC2B: CLR      (R3)+      ;CLEAR DROPS
      CLR      (R4)+      ;CLEAR PICK
      DEC      BCNT        ;SEE IF DONE
      BNE      DPC2B      ;IF NOT: BR
      RTS      PC          ;EXIT

DPC2:  CLC
      RORB     R3          ;GET NEXT BIT
      DEC      BCNT        ;SEE IF DONE
      BEQ      DPC3
      ADD      #2,BPKP
      ADD      #2,BDPP
      JMP      DPC0        ;CONTINUE
DPC3:  RTS      PC          ;RETURN
PICK:  MOV      UNP,R4     ;GET UNIT POINTER
      MOV      PIK1(R4),BPKP ;SET PICK POINTER
      MOV      DRP1(R4),BDPP ;SET DROP POINTER
      MOV      TEMP1,R4     ;R4 = GOOD CHAR
      MOV      TEMP2,R3     ;R3 = BAD CHAR
      MOV      #1,TEMP3     ;SET PICK FLAG
      JSR      PC,DPC      ;GO CHECK PICKS
      RTS      PC          ;EXIT

DPPRT: MOV      #MSG26,R4
      JSR      PC,TTOUT    ;PRINT DROP HEADER
      MOV      UNP,R4
      MOV      DRP1(R4),BDPP ;SET DROP POINTER
      MOV      PIK1(R4),BPKP ;SET PICK POINTER
      ADD      #16,BDPP
      ADD      #16,BPKP
      MOV      #10,BCNT    ;SET NUMBER TO PRINT
DPPRT0: MOV      @BDPP,R3
      JSR      PC,OCTP     ;PRINT DROPS
      DEC      BCNT        ;SEE IF DONE
      BEQ      DPPRT1     ;IF NOT: BR
      SUB      #2,BDPP     ;BUMP POINTER
      BR       DPPRT0     ;CONTINUE FOR ALL 8 BITS
DPPRT1: MOV      #10,BCNT ;SET NUMBER TO PRINT
      MOV      #MSG27,R4
      JSR      PC,TTOUT    ;PRINT PICK HEADER
DPPRT2: MOV      @BPKP,R3
      JSR      PC,OCTP     ;PRINT PICKS
      DEC      BCNT        ;SEE IF DONE
      BEQ      DPPRTX     ;IF SO: BR
      SUB      #2,BPKP     ;BUMP POINTER
      BR       DPPRT2     ;CONTINUE FOR ALL 8 BITS
DPPRTX: RTS      PC          ;RETURN

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017514 016703 161036  
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 017524 001401  
 017526 005303  
 017530 005403  
 017532 032767 000020 161012  
 017540 001402  
 017542 000241  
 017544 006003  
 017546 032767 000010 161120  
 017554 001414  
 017556 032767 010000 160776  
 017564 001405  
 017566 012703 033434  
 017572 162703 000002  
 017576 000405  
 017600 062703 033434  
 017604 000402  
 017606 062703 027426  
 017612 010367 001514  
 017616 012704 000007  
 017622 012701 021334  
 017626 005021  
 017630 005304  
 017632 001375  
 017634 020377 160654  
 017640 001402  
 017642 005267 001466  
 017646 032767 000010 161020  
 017654 001007  
 017656 005777 160634

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:*****
:STATUS CHECK SUBROUTINE:
:
:THIS SUBROUTINE IS USED TO PERFORM A CHECK OF
: BOTH THE MASSBUS CONTROLLER (RH11) AND THE TAPE
: CONTROLLER (TM02). THE RH11 IS CHECKED FOR ERRORS
: AS REFLECTED IN REGISTERS CS1 AND CS2 AND ALSO THAT
: THE BUS ADDRESS (BA) AND WORD COUNT (WC) ARE
: CORRECT. THE TM02 IS CHECKED FOR DRIVE STATIS (DS),
: DRIVE ERRORS (ER), AND PROPER FRAME COUNT. THE SPECIAL
: CHECK CHARACTERS (CRC+LRC) ARE ALSO CHECKED WHEN
: APPROPRIATE (IE: NRZ READ OR WRITE). CERTAIN TYPES
: OF DRIVE ERRORS IN PE OPERATION WILL BE ACCOMPANIED
: BY THE DISPLAY OF THE DEAD TRACK REGISTER (CC). THESE
: TYPES ARE ER BITS 15,10,7,6. THE PRINTOUTS OF BAD
: CRC,LRC,FC, AND BA WILL SHOW BOTH THE EXPECTED AND
: RECEIVED VALUES (IE: EXPT-RCVD). ONLY THOSE REGISTERS
: WHICH ARE IN ERROR WILL BE PRINTED AND ALL PRINTOUTS
: ARE IN OCTAL FORMAT WITH NO LEADING ZEROS. AS IN
: DATA ERRORS, STATUS ERRORS ARE PRECEDED BY HEADER
: DESCRIBING THE HARDWARE UNDER TEST, THE BLOCKING
: INFORMATION, AND THE ERROR TYPE.
:*****
  
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ERCHK: MOV FMCNT,R3 ;GET FRAME COUNT
        BIT #1,R3 ;SEE IF ODD
        BEQ ERO ;IF NOT: BR
        DEC R3 ;BUMP COUNT
ERO: NEG R3
        BIT #20,UDES ;SEE IF CORE DUMP
        BEQ EROB ;IF NOT: BR
        CLC
        ROR R3 ;SET TO FC/2
EROB: BIT #10,MTC1 ;SEE IF WRITE OP
        BEQ ER1 ;IF SO: BR
        BIT #10000,RDCMD
        BEQ EROA
        MOV #RDATA,R3
        SUB #2,R3 ;SET POINTER
        BR ER2
EROA: ADD #RDATA,R3 ;BUILD EXPT READ ADDRESS
        BR ER2
ER1: ADD #WDATA,R3 ;BUILD EXPT WRITE ADDRESS
ER2: MOV R3,CADER ;SAVE ADDRESS
        MOV #7,R4
        MOV #BAER,R1
ER2A0: CLR (R1)+ ;CLEAR FLAGS
        DEC R4
        BNE ER2A0
        CMP R3,@BA ;SEE IF ADDRESS OK
        BEQ ER2A1 ;IF SO: BR
        INC BAER ;SET BUS ADDRESS ERROR
ER2A1: BIT #10,MTC1 ;SEE IF WRITE OPER
        BNE ER2B ;IF NOT: BR
ER2A: TST @FC ;SEE IF FC=0
  
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40CJ	017662	001443			BEQ	ER_		:IF SO: BR
4001	017664	005267	001452		INC	FCER		:SET FC ERROR
4002	017670	000167	000076		JMP	ER3		
4003	017674	032767	000040	160772	ER2B:	BIT	#40,MTC1	:SEE IF SPACE OPER
4004	017702	001765			BEQ	ER2A		:IF SO: BR
4005	017704	005767	160770		TST	TMFLG		:SEE IF TM TIME
4006	017710	001012			BNE	ER2D		:IF SO: BR
4007	017712	016703	160640		MOV	FMCNT,R3		
4008	017716	005403			NEG	R3		:R3 = EXPT RECORD SIZE
4009	017720	020377	160572		ER2C:	CMP	R3,@FC	:SEE IF FC = EXPT
4010	017724	001422			BEQ	ER3		:IF SO: BR
4011	017726	005267	001410		INC	FCER		:SET FC ERROR FLAG
4012	017732	000167	000034		JMP	ER3		
4013	017736	032767	002000	160606	ER2D:	BIT	#2000,UDES	:SEE IF PE
4014	017744	001344			BNE	ER2A		:IF SO: BR
4015	017746	032767	010000	160606	BIT	#10000,RDCMD		:SEE IF READ REVERSE
4016	017754	001003			BNE	ER2E		:IF SO: BR
4017	017756	012703	000002		MOV	#2,R3		
4018	017762	000756			BR	ER2C		:LOOK FOR EXPT = 2
4019	017764	012703	000001		ER2E:	MOV	#1,R3	
4020	017770	000753			BR	ER2C		:GO CHECK FC FOR TM
4021	017772	032777	160000	160510	ER3:	BIT	#16000,@c1	:SEE IF COUNT ERROR
4022	020000	001442			BEQ	ER4		
4023	020002	017703	160512		MOV	@CS,R3		:GET CONT STATUS REG
4024	020006	042703	000307		BIC	#307,R3		:MASK OUT IR,OR,UNIT NO.
4025	020012	005703			TST	R3		:SEE IF ANY OTHER ERRORS
4026	020014	001407			BEQ	ER3A		:IF NOT: BR
4027	020016	005767	160656		TST	TMFLG		:SEE IF TAPE MARK TIME
4028	020022	001427			BEQ	ER3B		:IF NOT: BR
4029	020024	042703	001000		BIC	#1000,R3		:MASK MISSED TRANS
4030	020030	005703			TST	R3		:SEE IF ANY OTHER ERRORS
4031	020032	001023			BNE	ER3B		:IF SO: BR
4032	020034	032777	060000	160446	ER3A:	BIT	#60000,@c1	:SEE IF EITHER TRE OR MCPE
4033	020042	001421			BEQ	ER4		:IF NOT: BR
4034	020044	005767	160630		TST	TMFLG		:SEE IF TM TIME
4035	020050	001414			BEQ	ER3B		:IF NOT: BR
4036	020052	017703	160446		MOV	@ER,R3		:GET ERROR REGISTER
4037	020056	032767	000010	160466	BIT	#10,UDES		:SEE IF EVEN PARITY
4038	020064	001402			BEQ	ER3A1		:IF NOT: BR
4039	020066	042703	000100		BIC	#100,R3		:MASK PAR
4040	020072	042703	001000		ER3A1:	BIC	#1000,R3	:MASK FCE
4041	020076	005703			TST	R3		
4042	020100	001402			BEQ	ER4		:IF NO ERRORS EXCEPT FCE: BR
4043	020102	005267	001230		ER3B:	INC	CONER	:SET CONT ERROR FLAG
4044	020106	032777	040000	160406	ER4:	BIT	#40000,@DS	:SEE IF DRIVE ERROR
4045	020114	001421			BEQ	ER6		:IF NOT: BR
4046	020116	005767	160556		TST	TMFLG		:SEE IF TAPE MARK TIME
4047	020122	001414			BEQ	ER4A		:IF NOT: BR
4048	020124	017703	160374		MOV	@ER,R3		:GET ER
4049	020130	032767	000010	160414	BIT	#10,UDES		:SEE IF EVEN PARITY
4050	020136	001402			BEQ	ER4A1		:IF NOT: BR
4051	020140	042703	000100		BIC	#100,R3		:MASK PAR
4052	020144	042703	001000		ER4A1:	BIC	#1000,R3	:MASK OUT FCE
4053	020150	005703			TST	R3		:SEE IF ANY OTHER ERRORS
4054	020152	001402			BEQ	ER6		:IF NOT: BR
4055	020154	005267	001160		ER4A:	INC	DRVER	:SET DRIVER ERROR FLAG

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4056 020160 032767 002000 160364 ER6: BIT #2000,UDES
4057 020166 001071 BNE ERPT ;IF IN PE MODE: BR
4058 020170 032777 020000 160410 BIT #20000,@SWR ;SEE IF NO DATA CHECK
4059 020176 001065 BNE ERPT ;IF NOT: BR (ALLOW READ OF UNKNOWN TAPES)
4060 020200 032767 000040 160466 BIT #40,MTC1 ;SEE IF WRITE OR READ OP
4061 020206 001461 BEQ ERPT ;IF NOT: BR
4062 020210 05767 160464 TST TMFLG ;SEE IF TAPE MARK TIME
4063 020214 001413 BEQ ER6A ;IF NOT: BR
4064 020216 016767 175356 001130 MOV EXCRC,CRCSV ;SAVE CRC
4065 020224 016767 175352 001120 MOV EXLRC,LRCV ;SAVE LRC
4066 020232 005067 175342 CLR EXCRC
4067 020236 012767 000023 175336 MOV #23,EXLRC ;SET CRC/LRC FOR TM
4068 020244 032767 000060 160300 ER6A: BIT #60,UDES
4069 020252 001037 BNE ERPT
4070 020254 017703 160250 MOV @CC,R3 ;GET CRC CHARACTER
4071 020260 042703 177000 BIC #177000,R3
4072 020264 026703 175310 CMP EXCRC,R3
4073 020270 001402 BEQ ER7 ;IF CRC GOOD: BR
4074 020272 005267 001050 INC CRCER ;SET ERROR FLAG
4075 020276 017703 160232 ER7: MOV @MR,R3 ;GET LRC
4076 020302 000303 SWAB R3
4077 020304 005703 TST R3
4078 020306 100002 BPL ER10
4079 020310 052703 000400 BIS #400,R3
4080 020314 042703 177000 ER10: BIC #177000,R3
4081 020320 026703 175256 CMP EXLRC,R3
4082 020324 001412 BEQ ERPT ;IF LRC GOOD: BR
4083 020326 010367 001016 MOV R3,ACTLRC ;SAVE ACTUAL LRC
4084 020332 005267 001006 INC LRCER ;SET LRC ERROR FLAG
4085 020336 032767 010000 160216 BIT #10000,RDCMD ;SEE IF READ REVERSE
4086 020344 001402 BEQ ERPT ;IF NOT: BR
4087 020346 005067 000772 CLR LRCER ;ELSE CLEAR LRC ERROR
4088 020352 012703 000006 ERPT: MOV #6,R3
4089 020356 005067 160326 CLR SERFL ;CLEAR ERROR FLAG
4090 020362 005067 160336 CLR ERSAV
4091 020366 012704 021334 MOV #BAER,R4
4092 020372 005724 ERPTT: TST (R4)+ ;SEE IF ANY ERROR
4093 020374 001004 BNE ERPTG ;IF SO: BR
4094 020376 005303 DEC R3
4095 020400 001374 BNE ERPTT
4096 020402 000167 000670 JMP ERPX1
4097 020406 005267 160276 ERPTG: INC SERFL ;SET ERROR FLAG
4098 020412 017767 160106 160304 MOV @ER,ERSAV ;SAVE ERROR REGISTER
4099 020420 032777 002000 160160 BIT #2000,@SWR ;SEE IF PRINT
4100 020426 001420 BEQ ERPTO ;IF SO: BR
4101 020430 022767 000002 160256 CMP #2,RTYFL ;SEE IF READ RETRY
4102 020436 001006 BNE ERPTG1 ;IF NOT: BR
4103 020440 016703 160240 MOV RTCNT,R3
4104 020444 005203 INC R3 ;BUMP RETRY COUNT
4105 020446 020367 160130 CMP R3,RETRY ;SEE IF LAST RETRY
4106 020452 001406 BEQ ERPTO ;IF SO: BR
4107 020454 022767 000002 000656 ERPTG1: CMP #2,DRVER ;SEE IF TM STATUS ERROR
4108 020462 001402 BEQ ERPTO ;IF SO: BR
4109 020464 000167 000510 JMP ERPX0
4110 020470 005267 160176 ERPTO: INC PFLG
4111 020474 004767 002500 JSR PC,PAPRT ;PRINT HEADER

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4112	020500	016704	160150		MOV	EMADDR,R4	
4113	020504	004767	003412		JSR	PC,TTOUT	:PRINT ERROR TYPE
4114	020510	004767	000642		JSR	PC,FRPRT	:PRINT F OR R
4115	020514	005767	160160		TST	TMFLG	
4116	020520	001410			BEQ	ERPT1	
4117	020522	022767	026210	160124	CMP	#MSG54,EMADDR	
4118	020530	001404			BEQ	ERPT1	
4119	020532	012704	026226		MOV	#MSG56,R4	:PRINT TM
4120	020536	004767	003360		JSR	PC,TTOUT	
4121	020542	005767	000570		ERPT1: TST	CONER	
4122	020546	001420			BEQ	ERPT2	:IF NO CONT ERROR: BR
4123	020550	012704	025160		MOV	#MSG23,R4	
4124	020554	004767	003342		JSR	PC,TTOUT	:PRINT C1 TAG
4125	020560	017703	157724		MOV	@C1,R3	
4126	020564	004767	003504		JSR	PC,OCTP	:PRINT CONTROL 1
4127	020570	012704	025205		MOV	#MSG23D,R4	:PRINT CS TAG
4128	020574	004767	003322		JSR	PC,TTOUT	
4129	020600	017703	157714		MOV	@CS,R3	
4130	020604	004767	003464		JSR	PC,OCTP	:PRINT CONT STATUS
4131	020610	005767	000524		ERPT2: TST	DRVER	
4132	020614	001420			BEQ	ERPT3	:IF SO DRIVE ERROR: BR
4133	020616	012704	025213		MOV	#MSG23E,R4	
4134	020622	004767	003274		JSR	PC,TTOUT	:PRINT DS TAG
4135	020626	017703	157670		MOV	@DS,R3	
4136	020632	004767	003436		JSR	PC,OCTP	:PRINT DRIVE STATUS
4137	020636	012704	025220		MOV	#MSG23F,R4	
4138	020642	004767	003254		JSR	PC,TTOUT	:PRINT ER TAG
4139	020646	017703	157652		MOV	@ER,R3	
4140	020652	004767	003416		JSR	PC,OCTP	:PRINT DRIVE ERROR
4141	020656	005767	000452		ERPT3: TST	BAER	
4142	020662	001421			BEQ	ERPT4	:IF NO BA ERROR: BR
4143	020664	012704	025173		MOV	#MSG23B,R4	
4144	020670	004767	003226		JSR	PC,TTOUT	:PRINT BA TAG
4145	020674	017703	157614		MOV	@BA,R3	
4146	020700	004767	003370		JSR	PC,OCTP	:PRINT BUS ADDRESS
4147	020704	012767	000255	157726	MOV	#255,TOB	
4148	020712	004767	003314		JSR	PC,TOG	:PRINT /
4149	020716	016703	000410		MOV	CADER,R3	
4150	020722	004767	003346		JSR	PC,OCTP	:PRINT EXPT BUS ADDRESS
4151	020726	005767	000410		ERPT4: TST	FCER	
4152	020732	001410			BEQ	ERPT5	:IF NO FC ERROR: BR
4153	020734	012704	025200		MOV	#MSG23C,R4	
4154	020740	004767	003156		JSR	PC,TTOUT	:PRINT FC TAG
4155	020744	017703	157546		MOV	@FC,R3	
4156	020750	004767	003320		JSR	PC,OCTP	:PRINT FRAME COUNT
4157	020754	012704	025166		ERPT5: MOV	#MSG23A,R4	
4158	020760	004767	003136		JSR	PC,TTOUT	:PRINT WC TAG
4159	020764	017703	157522		MOV	@WC,R3	
4160	020770	004767	003300		JSR	PC,OCTP	:PRINT WORD COUNT
4161	020774	005767	000346		TST	CRCER	
4162	021000	001423			BEQ	ERPT5A	:IF NO CRC ERROR: BR
4163	021002	012704	026253		MOV	#MSG58,R4	
4164	021006	004767	003110		JSR	PC,TTOUT	:PRINT CRC TAG
4165	021012	017703	157512		MOV	@CC,R3	
4166	021016	042703	177000		BIC	#177000,R3	
4167	021022	004767	003246		JSR	PC,OCTP	:PRINT ACTUAL CRC

4168	021026	012767	000255	157604	MOV	#255,TOB	
4169	021034	004767	003172		JSR	PC,TOG	
4170	021040	016703	174534		MOV	EXCRC,R3	
4171	021044	004767	003224		JSR	PC,OCTP	;PRINT EXPECTED CRC
4172	021050	005767	000270		ERPT5A: TST	LRCER	
4173	021054	001421			BEQ	ERPT6	;IF NO LRC ERROR: BR
4174	021056	012704	026261		MOV	#MSG59,R4	
4175	021062	004767	003034		JSR	PC,TTOUT	;PRINT LRC TAG
4176	021066	016703	000256		MOV	ACTLRC,R3	
4177	021072	004767	003176		JSR	PC,OCTP	;PRINT ACTUAL LRC
4178	021076	012767	000255	157534	MOV	#255,TOB	
4179	021104	004767	003122		JSR	PC,TOG	
4180	021110	016703	174466		MOV	EXLRC,R3	
4181	021114	004767	003154		JSR	PC,OCTP	;PRINT EXPECTED LRC
4182	021120	005767	000214		ERPT6: TST	DRVER	
4183	021124	001424			BEQ	ERPT7	;IF NO DRIVE ERROR: BR
4184	021126	032767	002000	157416	BIT	#2000,UDES	
4185	021134	001420			BEQ	ERPT7	;IF NO PE: BR
4186	021136	017704	157362		MOV	@ER,R4	
4187	021142	042704	075477		BIC	#75477,R4	;MASK OUT ALL BUT BITS 15,10,7,6
4188	021146	005704			TST	R4	
4189	021150	001412			BEQ	ERPT7	;IF NO CONDITIONALS SET: BR
4190	021152	012704	025232		MOV	#MSG23H,R4	
4191	021156	004767	002740		JSR	PC,TTOUT	;PRINT CC TAG
4192	021162	017703	157342		MOV	@CC,R3	
4193	021166	042703	177000		BIC	#177000,R3	;MASK CC
4194	021172	004767	003076		JSR	PC,OCTP	;PRINT CHECK CHARACTERS
4195	021176	000240			ERPT7: NOP		
4196	021200	032777	100000	157400	ERPX0: BIT	#100000,@SWR	;SEE IF STOP ON ERROR
4197	021206	001412			BEQ	ERPX	;IF NOT: BR
4198	021210	000000			HALT		
4199	021212	005767	157454		TST	PFLG	;SEE IF HAVE PRINTED
4200	021216	001006			BNE	ERPX	;IF SO: BR
4201	021220	032777	002000	157360	BIT	#2000,@SWR	;SEE IF SHOULD PRINT
4202	021226	001002			BNE	ERPX	;IF NOT: BR
4203	021230	000167	177234		JMP	ERPT0	;PRINT ERROR
4204	021234	005067	157432		ERPX: CLR	PFLG	
4205	021240	012777	000011	157242	MOV	#11,@C1	;DRIVE CLEAR
4206	021246	017704	157254		MOV	@AS,R4	
4207	021252	010477	157250		MOV	R4,@AS	;CLEAR AS
4208	021256	016704	157226		MOV	C1,R4	
4209	021262	005204			INC	R4	
4210	021264	152714	000100		BISB	#100,(R4)	;RESET TRE
4211	021270	016777	157256	157244	MOV	UDES,@C2	;RESET TC
4212	021276	032767	000040	157370	ERPX1: BIT	#40,MTCT	
4213	021304	001411			BEQ	ERPX2	;IF NOT READ/WRITE OP: BR
4214	021306	005767	157366		TST	TMFLG	
4215	021312	001406			BEQ	ERPX2	;IF NOT TM TIME: BR
4216	021314	016767	000034	174256	MOV	CRCSV,EXCRC	;RESTORE CRC
4217	021322	016767	000024	174252	MOV	LRCSV,EXLRC	;RESTORE LRC
4218	021330	000207			ERPX2: RTS	PC	;EXIT
4219	021332	000000			CADER: 0		;EXPT ADDRESS SAVE
4220	021334	000000			BAER: 0		
4221	021336	000000			CONER: 0		
4222	021340	000000			DRVER: 0		
4223	021342	000000			FCER: 0		

4224 021344 000000  
4225 021346 000000  
4226 021350 000000  
4227 021352 000000  
4228 021354 000000  
4229  
4230  
4231  
4232  
4233  
4234  
4235  
4236  
4237  
4238

LRCER: 0  
CRCER: 0  
ACTLRC: 0  
LRCSV: 0  
CRCSV: 0

\*\*\*\*\*  
: F FOR FORWARD/R FOR REVERSE PRINT SUBROUTINE:  
:  
: THIS SUBROUTINE IS USED TO PRINT OUT THE  
: TAPE DIRECTION USED WHEN ANY ERROR IS  
: DETECTED IN STATUS OF READ OR WRITE, DATA, OR  
: SPACING OPERATIONS.  
:\*\*\*\*\*

4239 021356 032767 000010 157310  
4240 021364 001415  
4241 021366 032767 000002 157300  
4242 021374 001405  
4243 021376 012704 025115  
4244 021402 004767 002514  
4245 021406 000404  
4246 021410 012704 025110  
4247 021414 004767 002502  
4248 021420 000207  
4249

FRPRT: BIT #10,MTC1 ;SEE IF WRITE COMMAND  
BEQ FREX ;IF SO: BR  
BIT #2,MTC1 ;SEE IF REVERSE  
BEQ FRO ;IF NOT: BR  
MOV #MSG17,R4  
JSR PC,TTOUT ;PRINT R  
BR FREX  
FRO: MOV #MSG16,R4  
JSR PC,TTOUT ;PRINT F  
FREX: RTS PC ;EXIT

4250  
4251  
4252 :\*\*\*\*\*  
4253 :TAPE COMMAND EXECUTE SUBROUTINE:  
4254 :  
4255 :THIS SUBROUTINE IS USED TO EXECUTE THE  
4256 :MAG TAPE COMMAND DESCRIBED BY THE READ  
4257 :OR WRITE ROUTINE. THE FINAL COMMAND IS  
4258 :SENT TO THE DEVICE REGISTER ALONG WITH THE  
4259 :INTERRUPT ENABLE AND GO BITS.  
4260 :ONCE THE COMMAND IS ISSUED, AN INTERRUPT  
4261 :TIMER IS STARTED AND IF NO INTERRUPT IS RETURNED  
4262 :BEFORE TIME OUT OCCURS, AN ERROR WILL BE  
4263 :PRINTED AND THE PROGRAM STOPPED. TESTING MAY  
4264 :BE RESUMED BY PRESSING THE CONTINUE SWITCH.  
4265 :TWO INTERRUPT HANDLERS ARE USED, ONE FOR MAG TAPE  
4266 :AND ANOTHER FOR TELETYPE (TTY).  
4267 :UPON RECEIPT OF A MAG TAPE INTERRUPT, HOUSEKEEPING  
4268 :IS PERFORMED AND CONTROL RETURNED TO THE CALLING  
4269 :ROUTINE (READ,WRITE,ETC).  
4270 :RECEIPT OF A TTY INTERRUPT WILL CAUSE THE  
4271 :PROGRAM TO CHECK FOR ENTRY OF A CNTRL C CHARACTER.  
4272 :IF NOT CNTRL C, THEN CONTINUATION OF WAIT FOR MAG  
4273 :TAPE INTERRUPT IS RETURNED. IF, HOWEVER, THE TTY  
4274 :INTERRUPT WAS CAUSED BY ENTRY OF A CNTRL C,  
4275 :THEN AT THIS TIME REQUESTS FOR NEW STALL VALUES  
4276 :ARE PRINTED AND THE RESPONSES ENTERED. RESUMPTION  
4277 :OF TAPE INTERRUPT WAIT IS THEN RESUMED.  
4278 :\*\*\*\*\*

4279	021422	005067	157216		TAPG:	CLR	TEMP1	
4280	021426	016777	157116	157064		MOV	DVN,ACS	;SET DRIVE NO.
4281	021434	016704	157236		TAPG0:	MOV	UNP,R4	;GET UNIT POINTER
4282	021440	032777	010000	157054		BIT	#10000,ADS	;SEE IF HAVE MOL
4283	021446	001046				BNE	TAPG3	;IF SO: BR
4284	021450	005267	157170			INC	TEMP1	;SEE IF TIMED OUT
4285	021454	001367				BNE	TAPG0	;WAIT FOR READY
4286	021456	032777	002000	157122		BIT	#2000,ASWR	;SKIP PRINT?
4287	021464	001034				BNE	MOLEX	
4288	021466	036467	022122	157140		BIT	MOLTAB(4),MOLSW	;FIRST TIME?
4289	021474	001030				BNE	MOLEX	;NO
4290	021476	056467	022122	157130		BIS	MOLTAB(4),MOLSW	;SET FLAG
4291	021504	004767	001470			JSR	PC,PAPRT	;PRINT CYCLE NUMBER
4292	021510	032767	000010	157156		BIT	#10,MTC1	;SEE IF WRITE OP
4293	021516	001005				BNE	TAPG1	;IF NOT: BR
4294	021520	012704	024750			MOV	#MSG5,R4	
4295	021524	004767	002372			JSR	PC,TTOUT	;PRINT WRITE ERR
4296	021530	000406				BR	TAPG2	
4297	021532	012704	024755		TAPG1:	MOV	#MSG6,R4	
4298	021536	004767	002360			JSR	PC,TTOUT	;PRINT READ ERR
4299	021542	004767	177610			JSR	PC,FRPRT	;PRINT F OR R
4300	021546	012704	025310		TAPG2:	MOV	#MSG25,R4	
4301	021552	004767	002344			JSR	PC,TTOUT	;PRINT NO MOL ERR
4302	021556	005726			MOLEX:	POPSP		
4303	021560	000167	162432			JMP	START7	
4304	021564	016704	157106		TAPG3:	MOV	UNP,R4	
4305	021570	046467	022122	157036		BIC	MOLTAB(4),MOLSW	;CLEAR FLAG



4306	021576	032777	020000	156716		BIT	#20000,@DS		;SEE IF PIP RESET
4307	021604	001412				BEQ	TAPG3F		;IF SO: BR
4308	021606	004767	001366			JSR	PC,PAPRT		;PRINT HEADER
4309	021612	012704	027352			MOV	#MSG116,R4		
4310	021616	004767	002300			JSR	PC,TTOUT		;PRINT REWINDING MESSAGE
4311	021622	032777	020000	156672	1\$:	BIT	#20000,@DS		
4312	021630	001374				BNE	1\$		;AWAIT PIP RESET
4313	021632	022767	000026	157034	TAPG3F:	CMP	#26,MTC1		;SEE IF WRITE TM
4314	021640	001003				BNE	TAPG3A		;IF NOT: BR
4315	021642	012704	177777			MOV	#-1,R4		;ELSE SET FC FOR -1
4316	021646	000406				BR	TAPG3B		
4317	021650	016704	156702		TAPG3A:	MOV	FMCNT,R4		
4318	021654	032704	000001			BIT	#1,R4		
4319	021660	001401				BEQ	TAPG3B		
4320	021662	005304				DEC	R4		
4321	021664	000261			TAPG3B:	SEC			
4322	021666	006004				ROR	R4		;SET WC = FC/2 FOR NORMAL FORMAT
4323	021670	032767	000020	156654		BIT	#20,UDES		;SEE IF CORE DUMP FORMAT
4324	021676	001402				BEQ	TAPG3C		;IF NOT: BR
4325	021700	000261				SEC			
4326	021702	006004				ROR	R4		;SET WC = FC/4 FOR CORE DUMP
4327	021704	010477	156602		TAPG3C:	MOV	R4,@WC		;SET WORD COUNT
4328	021710	012777	000011	156572		MOV	#11,@C1		;DRIVE CLEAR
4329	021716	017777	156574	156572		MOV	@FC,@FC		;RESET FC LOADED
4330	021724	005767	156636			TST	INTRF		;SEE IF INTERCHANGE READ
4331	021730	001407				BEQ	TAPG3D		;IF NOT: BR
4332	021732	032767	000040	156734		BIT	#40,MTC1		;SEE IF READ OP
4333	021740	001403				BEQ	TAPG3D		;IF NOT: BR
4334	021742	012777	000003	156564		MOV	#3,@MR		;SET INTERCHANGE READ MAINT. MODE
4335	021750	016704	156720		TAPG3D:	MOV	MTC1,R4		;GET COMMAND
4336	021754	042704	177707			BIC	#177707,R4		;MASK OP CODE
4337	021760	022704	000030			CMP	#30,R4		;SEE IF SPACE OP CODE
4338	021764	001403				BEQ	TAPG3E		;IF SO: BR
4339	021766	012767	177740	156674		MOV	#-40,STAL		;SET INTERRUPT DELAY MULT TO 40
4340	021774	052767	000101	156672	TAPG3E:	BIS	#101,MTC1		;SET INTERRUPT ENABLE AND GO
4341	022002	000240				NOP			
4342	022004	016777	156664	156476		MOV	MTC1,@C1		;EXECUTE COMMAND
4343	022012	005077	156566			CLR	@PSW		;CLEAR PRIORITY
4344	022016	005067	156622			CLR	TEMP1		
4345	022022	005267	156616		TAPG4:	INC	TEMP1		;SEE IF HAVE TIMED OUT
4346	022026	001375				BNE	TAPG4		;IF NOT: BR
4347	022030	005267	156634			INC	STAL		
4348	022034	001372				BNE	TAPG4		;DO TIME DELAY MULTIPLIER
4349	022036	012777	000340	156540	TAPG5:	MOV	#340,@PSW		;RESET PRIORITY
4350	022044	032777	002000	156534		BIT	#2000,@SWR		;SEE IF SHOULD PRINT ERRORS
4351	022052	001014				BNE	TAPG6		;IF NOT: BR
4352	022054	004767	001120			JSR	PC,PAPRT		;PRINT CYCLE NUMBER
4353	022060	016704	156570			MOV	EMADDR,R4		
4354	022064	004767	002032			JSR	PC,TTOUT		;PRINT ERROR OP
4355	022070	004767	177262			JSR	PC,FRPRT		;PRINT F OR R
4356	022074	012704	025270			MOV	#MSG24,R4		
4357	022100	004767	002016			JSR	PC,TTOUT		;PRINT NO INTERRUPT
4358	022104	032777	100000	156474	TAPG6:	BIT	#100000,@SWR		;SEE IF SHOULD HALT ON ERROR
4359	022112	001401				BEQ	TAPG7		;IF NOT: BR
4360	022114	000000				HALT			
4361	022116	000167	000100		TAPG7:	JMP	MTINTA		;RETURN TO CALLING ROUTINE

4362

4363	022122	000001
4364	022124	000002
4365	022126	000004
4366	022130	000010
4367	022132	000020
4368	022134	000040
4369	022136	000100
4370	022140	000200

MOLTAB: 1  
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200

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4371
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4374 022142 012777 000340 156434 TTINT: MOV #340,@PSW ;RESET PSW
4375 022150 005077 156434 CLR @TKS ;CLEAR TTY STATUS
4376 022154 122777 000203 156430 CMPB #203,@TKB ;SEE IF CONT C
4377 022162 001401 BEQ TTINT0 ;IF SO: BR
4378 022164 000002 RTI ;ELSE RETURN
4379 022166 010067 156456 TTINT0: MOV R0,TEMP3 ;SAVE R0(REC CNTR)
4380 022172 004767 171560 JSR PC,TIMP4 ;GO GET STALL VALUES
4381 022176 016700 156446 MOV TEMP3,R0 ;RESTORE R0(REC CNTR)
4382 022202 005077 156404 CLR @TKB ;CLEAR TTY BUFFER
4383 022206 012777 000100 156374 MOV #100,@TKS ;RESET INTERRUPT ENABLE
4384 022214 000002 RTI ;RETURN
4385
4386 ;MAG TAPE INTERRUPT HANDLER*****
4387
4388 022216 000240 MTINT: NOP
4389 022220 022626 CMP (SP)+,(SP)+ ;RESET STACK POINTER
4390 022222 042777 000037 156304 MTINTA: BIC #37,@MR ;CLEAR MAINT MODE
4391 022230 000177 156430 JMP @RTN ;RETURN
  
```

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4392                                     ;*****
4393                                     ;AUTO SEQUENCE
4394                                     ;
4395                                     ;THIS ROUTINE ,ENTERED VIA STARTING ADDRESS 240
4396                                     ;WILL EXERCISE ALL AVAILABLE SLAVES ON ALL AVAILABLE
4397                                     ;DRIVES IN BOTH PE AND NRZ ACCORDING TO THE PRESELECTED
4398                                     ;TEST PLAN. IF NRZ ONLY, PE TESTING WILL NOT BE ATTEMPTED.
4399                                     ;*****
4400
4401 022234 012704 027162   ASEQ:  MOV    #MSG108,R4
4402 022240 004767 001656   JSR    PC,TTOUT           ;PRINT NRZ ONLY REQUEST
4403 022244 012705 000652   MOV    #NRZOF,R5        ;SET ADDRESS OF FLAG
4404 022250 012701 000001   MOV    #1,R1             ;SET SIZE OF ENTRY
4405 022254 012702 000001   MOV    #1,R2             ;SET UPPER LIMIT
4406 022260 012703 000000   MOV    #0,R3             ;SET LOWER LIMIT
4407 022264 004767 001374   JSR    PC,TTR            ;GO GET RESPONSE
4408 022270 012704 026757   MOV    #MSG104,R4
4409 022274 004767 001622   JSR    PC,TTOUT           ;REQUEST CONT OR NOT
4410 022300 012705 000744   MOV    #ASEQCF,R5        ;SET ADDRESS OF ENTRY
4411 022304 012701 000001   MOV    #1,R1             ;SET SIZE OF ENTRY
4412 022310 012702 000001   MOV    #1,R2             ;SET UPPER LIMIT
4413 022314 012703 000000   MOV    #0,R3             ;SET LOWER LIMIT
4414 022320 004767 001340   JSR    PC,TTR            ;GO GET INPUT
4415 022324 005067 156410   ASEQ0: CLR   ADRVN        ;CLEAR DRV NUM
4416 022330 004767 000130   ASEQ1: JSR    PC,HRDS      ;GO SELECT HARDWARE CONFIGURATION
4417 022334 012704 026711   MOV    #MSG101,R4
4418 022340 004767 001556   JSR    PC,TTOUT           ;PRINT DIVIDER
4419 022344 012704 026737   MOV    #MSG102,R4
4420 022350 004767 001546   JSR    PC,TTOUT           ;PRINT TM02 NUMBER
4421 022354 016703 156360   MOV    ADRVN,R3
4422 022360 004767 001710   JSR    PC,OCTP            ;PRINT TM02
4423 022364 012704 026746   MOV    #MSG103,R4
4424 022370 004767 001526   JSR    PC,TTOUT           ;PRINT SLAVE HDR
4425 022374 012700 000746   MOV    #UN1,R0           ;POINT TO START OF SLAVE TABLE
4426 022400 005710           ASEQ2: TST   (R0)         ;SEE IF END
4427 022402 100404           BMI   ASEQ3              ;IF SO: BR
4428 022404 012003           MOV   (R0)+,R3
4429 022406 004767 001662   JSR    PC,OCTP            ;PRINT SLAVE TABLE
4430 022412 000772           BR   ASEQ2              ;DO ALL
4431 022414 004767 000216   ASEQ3: JSR   PC,AMOD1      ;GO DO MODE 1(NRZ)
4432 022420 004767 000406   JSR   PC,AMOD2          ;GO DO MODE 2(PE)
4433 022424 022767 000007 156306 ASEQ4: CMP   #7,ADRVN     ;SEE IF DONE ALL DRIVES
4434 022432 001403           BEQ   ASEQX              ;IF SO: BR
4435 022434 005267 156300   INC   ADRVN             ;BUMP DRIVE NUMBER
4436 022440 000733           BR   ASEQ1              ;CONTINUE
4437 022442 005767 156276   ASEQX: TST   ASEQCF       ;SEE IF CONTINUOUS AUTO SEQ
4438 022446 001005           BNE   ASEQXX            ;IF SO: BR
4439 022450 012704 026670   MOV   #MSG100,R4
4440 022454 004767 001442   JSR   PC,TTOUT           ;PRINT END OF PASS
4441 022460 000000           HALT
4442 022462 000720           ASEQXX: BR    ASEQ0

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4443
4444
4445 ;SUBROUTINE TO SELECT AUTO SEQUENCE HARDWARE*****
4446 022464 005067 162312 HRDS: CLR REOTC ;CLEAR EOT UNIT CNTR
4447 022470 005067 156150 CLR TEMP1
4448 022474 012777 000040 156016 MOV #40,@CS ;INIT
4449 022502 016777 156232 156010 MOV ADRVN,@CS ;SET DRIVE
4450 022510 017701 156022 MOV @DT,R1 ;READ DRIVE TYPE
4451 022514 032777 010000 155776 BIT #10000,@CS ;TEST FOR NON-EXISTANT DRIVE
4452 022522 001403 BEQ HRDS1 ;IF DRIVE AVAIL: BR
4453 022524 005726 HRDS0: TST (SP)+ ;RESET STACK POINTER
4454 022526 000167 177672 JMP ASEQ4 ;IF NOT: BR
4455 022532 032701 040000 HRDS1: BIT #40000,R1 ;SEE IF DRIVE IS TAPE
4456 022536 001772 BEQ HRDS0 ;IF NOT: BR
4457 022540 005000 CLR RO
4458 022542 012701 000746 MOV #UN1,R1 ;SET START OF SLAVE TABLE
4459 022546 010077 155770 HRDS2: MOV RO,@C2 ;SELECT SLAVE
4460 022552 032777 010000 155742 BIT #10000,@DS ;SEE IF SLAVE AVAIL FOR TEST(MOL)
4461 022560 001403 BEQ HRDS3 ;IF NOT: BR
4462 022562 005267 156056 INC TEMP1 ;SET SLAVE FOUND FLAG
4463 022566 010021 MOV RO,(R1)+ ;LOAD SLAVE TABLE
4464 022570 022700 000007 HRDS3: CMP #7,RO ;SEE IF DONE ALL SLAVES
4465 022574 001402 BEQ HRDS4 ;IF SO: BR
4466 022576 005200 INC RO ;ELSE BUMP SLAVE NUMBER
4467 022600 000762 BR HRDS2 ;CONTINUE SELECTION
4468 022602 005767 156036 HRDS4: TST TEMP1 ;SEE IF FOUND ANY SLAVES
4469 022606 001746 BEQ HRDS0 ;IF NOT: BR
4470 022610 016767 156030 162164 MOV TEMP1,REOTC ;SET NUMBER OF UNITS
4471 022616 000367 156022 SWAB TEMP1
4472 022622 056737 156016 162152 BIS TEMP1,REOTC ;SET EOT CNTR
4473 022630 012711 177777 MOV #-1,(R1) ;TERMINATE SLAVE TABLE
4474 022634 000207 RTS PC ;RETURN TO SEQ
  
```

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4475
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4478 022636 005067 156014
4479 022642 012701 000746
4480 022646 052721 001700
4481 022652 005111
4482 022654 001402
4483 022656 005111
4484 022660 000772
4485 022662 005111
4486 022664 004767 162126
4487 022670 012767 000062 156044
4488 022676 012767 174000 155652
4489 022704 012767 000100 155642
4490 022712 016767 156022 155630
4491 022720 012767 000001 155632
4492 022726 005067 155632
4493 022732 005067 155630
4494 022736 004767 160226
4495 022742 012767 000010 155610
4496 022750 004767 160214
4497 022754 012767 000014 155576
4498 022762 004767 160202
4499 022766 005767 155660
4500 022772 001411
4501 022774 012767 177777 155740
4502 023002 012767 153624 155614
4503 023010 012767 032561 155610
4504 023016 012767 177777 155534
4505 023024 004767 160140
4506 023030 000207

;SUBROUTINE TO SELECT NRZ AUTO TEST MODE*****
AMOD1: CLR BLCNTR ;ASSURE BLOCK COUNTER IS 0
MOV #UN1,R1 ;GET START OF SLAVE TABLE
AMOD1A: BIS #1700,(R1)+ ;SET ALL SLAVE TO NRZ,NORM,ODD
COM (R1)
BEQ AMOD1B ;IF FILLED ALL SLAVES: BR
COM (R1)
BR AMOD1A ;ELSE DO ALL
AMOD1B: COM (R1)
JSR PC,RWVDA ;GO REWIND ALL AVAIL SLAVES
MOV #50,ABL CNT ;SET NUMBER OF BLOCKS FOR MODE 1
MOV #-4000,FMCNT ;SET FC = 4000
MOV #100,RCNT ;SET REC CNTR = 100
MOV ADRVN,DVN ;SELECT DRIVE
MOV #1,PATRN ;SELECT PATTERN 1
CLR TMEX ;ASSURE NO TMK
CLR INTRF ;ASSURE NORMAL READ
JSR PC,STAUTO ;GO DO AUTO MODE 1
MOV #10,PATRN ;SELECT PATTERN 10
JSR PC,STAUTO ;GO DO PATTERN 10
MOV #14,PATRN ;SELECT PATTERN 14
JSR PC,STAUTO
TST NRZOF ;SEE IF NRZ ONLY
BEQ AMOD1C ;IF NOT: BR
MOV #-1,ABL CNT ;FORCE TO EOT
MOV #153624,RANBAS
MOV #32561,RANSAV ;RESET RANDOM DATA BASE
AMOD1C: MOV #-1,PATRN ;SELECT AUTO RANDOM DATA
JSR PC,STAUTO
RTS PC ;RETURN TO SEQ

```

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 4510 023032 005767 155614  
 4511 023036 001057  
 4512 023040 005067 155612  
 4513 023044 012701 000746  
 4514 023050 042711 001700  
 4515 023054 052721 002300  
 4516 023060 005111  
 4517 023062 001402  
 4518 023064 005111  
 4519 023066 000770  
 4520 023070 005111  
 4521 023072 004767 161720  
 4522 023076 012767 000006 155636  
 4523 023104 012767 174000 155444  
 4524 023112 012767 000100 155434  
 4525 023120 012767 000010 155432  
 4526 023126 004767 160036  
 4527 023132 012767 000014 155420  
 4528 023140 004767 160024  
 4529 023144 012767 000015 155406  
 4530 023152 004767 160012  
 4531 023156 012767 177777 155556  
 4532 023164 012767 177777 155366  
 4533 023172 004767 157772  
 4534 023176 000207  
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 4536

:SUBROUTINE TO SELECT PE AUTO TEST MODE\*\*\*\*\*

```

AMOD2: TST NRZOF ;SEE IF NRZ ONLY
        BNE AMOD2X ;IF SO: BR
        CLR BLCNTR ;CLEAR BLOCK CNTR
        MOV #UN1,R1 ;SET START OF SLAVE TABLE
AMOD2A: BIC #1700,(R1) ;CLEAR NRZ
        BIS #2300,(R1)+ ;SET TO PE NORM, ODD
        LJM (R1) ;SEE IF EN. OF TABLE
        BEQ AMOD2B ;IF SO: BR
        COM (R1)
        BR AMOD2A ;CONTINUE
AMOD2B: COM (R1)
        JSR PC,RWDA ;REWIND ALL SLAVES
        MOV #6,ABLCNT ;SET AUTO BLOCK COUNT
        MOV #-4000,FMCNT ;SET FC = 4000
        MOV #100,RCNT ;SET REC CNTR TO 100
        MOV #10,PATRN ;SELECT PATTERN 10
        JSR PC,STAUTO ;GO DO AUTO SEQ
        MOV #14,PATRN ;SELECT PATTERN 14
        JSR PC,STAUTO
        MOV #15,PATRN ;SELECT PATTERN 15
        JSR PC,STAUTO
        MOV #-1,ABLCNT ;FORCE TO END OF TAPE
        MOV #-1,PATRN ;SELECT AUTO RANDOM DATA
        JSR PC,STAUTO
AMOD2X: RTS PC ;RETURN TO SEQ
  
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023200 012704 025026  
023204 004767 000712  
023210 016703 155334  
023214 004767 001054  
023220 012704 025012  
023224 004767 000672  
023230 016703 155316  
023234 042703 177770  
023240 004767 001030  
023244 012704 026267  
023250 004767 000646  
023254 016703 155272  
023260 000303  
023262 042703 177770  
023266 004767 001002  
023272 012704 026273  
023276 004767 000620  
023302 005003  
023304 032767 000010 155240  
023312 001402  
023314 012703 000001  
023320 004767 000750  
023324 012704 026277  
023330 004767 000566  
023334 016703 155212  
023340 000241  
023342 006003  
023344 006003  
023346 006003  
023350 006003  
023352 042703 177760  
023356 004767 000712  
023362 012704 024767  
023366 004767 000530  
023372 032777 000400 155206  
023400 001406  
023402 012767 000122 155230  
023410 004767 000616  
023414 000412  
023416 005767 155314

```
*****  
: 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: DRIVE NO. SLAVE NO. DENSITY PARITY FORMAT  
: 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.  
:*****  
PAPRT: MOV #MSG12,R4  
JSR PC,TTOUT ;PRINT DRIVE HEADER  
MOV DVN,R3  
JSR PC,OCTP ;PRINT DRIVE NUMBER  
MOV #MSG11,R4  
JSR PC,TTOUT ;PRINT UNIT HEADER  
MOV UDES,R3  
BIC #177770,R3  
JSR PC,OCTP ;PRINT UNIT NUMBER  
MOV #MSG60,R4  
JSR PC,TTOUT ;PRINT DENSITY TAG  
MOV UDES,R3  
SWAB R3  
BIC #177770,R3  
JSR PC,OCTP ;PRINT DENSITY  
MOV #MSG61,R4  
JSR PC,TTOUT ;PRINT PARITY TAG  
CLR R3  
BIT #10,UDES  
BEQ PAPRT0  
MOV #1,R3  
PAPRT0: JSR PC,OCTP ;PRINT PARITY  
MOV #MSG62,R4  
JSR PC,TTOUT ;PRINT FORMAT TAG  
MOV UDES,R3  
CLC  
ROR R3  
ROR R3  
ROR R3 ;PONTION FORMAT  
ROR R3  
BIC #177760,R3  
JSR PC,OCTP ;PRINT FORMAT  
MOV #MSG8,R4  
JSR PC,TTOUT ;PRINT PATRN TAG  
BIT #400,@SWR ;SEE IF RANDOM DATA  
BEQ PAPRTB ;IF NOT: BR  
PAPRTA: MOV #122,TOB  
JSR PC,TOG ;PRINT R  
BR PAPRTD  
PAPRTB: TST ASEQF ;SEE IF AUTO SEQ
```

4593	023422	001403			BEQ	PAPRTC		:IF NOT: BR
4594	023424	005767	155130		TST	PATRN		:SEE IF AUTO RANDOM
4595	023430	100764			BMI	PAPRTA		:IF SO: BR
4596	023432	016703	155122		PAPRTC: MOV	PATRN,R3		
4597	023436	004767	000632		JSR	PC,OCTP		:PRINT PATRN NUMBER
4598	023442	012704	025044		PAPRTD: MOV	#MSG13,R4		
4599	023446	004767	000450		JSR	PC,TTOUT		:PRINT BLOCK NO. HEADER
4600	023452	016703	155200		MOV	BLCNTR,R3		
4601	023456	004767	000612		JSR	PC,OCTP		:PRINT NUMBER
4602	023462	012704	025052		MOV	#MSG14,R4		
4603	023466	004767	000430		JSR	PC,TTOUT		:PRINT REC NO. HEADER
4604	023472	010003			MOV	R0,R3		
4605	023474	032767	000010	155172	BIT	#10,MTC1		:SEE IF WRITE OPERATION
4606	023502	001404			BEQ	PAPRT1		:IF SO: BR
4607	023504	032767	010000	155050	BIT	#10000,RDCMD		:SEE IF READ REVERSE
4608	023512	001016			BNE	PAPRT3		:IF SO: BR
4609	023514	016703	155034		PAPRT1: MOV	RCNT,R3		
4610	023520	005767	155154		TST	TMFLG		:SEE IF TAPE MARK TIME
4611	023524	001010			BNE	PAPRT2		:IF SO: BR
4612	023526	022767	012214	155130	CMP	#B1,RTRN		
4613	023534	001003			BNE	PAPRTY		:IF NOT BACK SPACE: BR
4614	023536	005767	155152		TST	RTYFL		
4615	023542	001402			BEQ	PAPRT3		:IF NOT RETRY: BR
4616	023544	160003			PAPRTY: SUB	R0,R3		:GET RECORD NUMBER
4617	023546	005203			PAPRT2: INC	R3		
4618	023550	004767	000520		PAPRT3: JSR	PC,OCTP		:PRINT RECORD NUMBER
4619	023554	012767	000055	155056	MOV	#55,TOB		:LOAD DASH (-)
4620	023562	004767	000444		JSR	PC,TOG		:PRINT DASH (-)
4621	023566	016703	154762		MOV	RCNT,R3		
4622	023572	004767	000476		JSR	PC,OCTP		:PRINT RECORD COUNT
4623	023576	012704	024762		MOV	#MSG7,R4		
4624	023602	004767	000314		JSR	PC,TTOUT		:PRINT RECORD SIZE HEADER
4625	023606	016703	154744		MOV	FMCNT,R3		:GET CHARACTER COUNT
4626	023612	005303			DEC	R3		
4627	023614	005103			COM	R3		:REMOVE TWOS COMPLEMENT
4628	023616	004767	000452		JSR	PC,OCTP		:PRINT RECORD SIZE
4629	023622	012767	000001	155036	MOV	#1,HDRFL		:SET HEADER FLAG
4630	023630	000207			RTS	PC		:RETURN
4631								

4632  
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4641 023632 066767 154770 154764 RANG:  
4642 023640 066767 154760 154760  
4643 023646 026701 154754  
4644 023652 101367  
4645 023654 020267 154746  
4646 023660 101364  
4647 023662 000207  
4648

```
*****  
:RANDOM NUMBER GENERATOR SUBROUTINE:  
:  
:THIS SUBROUTINE IS USED TO GENERATE THE RANDOM  
:NUMBERS REQUIRED FOR USE AS RANDOM DATA,  
:RECORD COUNT, AND CHARACTER COUNT.  
:*****  
ADD RANSV,RANBAS  
ADD RANBAS,RANSV ;GET NEW NUMBER  
CMP RANSV,R1 ;SEE IF NUMBER TOO BIG  
BHI RANG ;IF SO: BR  
CMP R2,RANSV ;SEE IF NUMBER TOO SMALL  
BHI RANG ;IF SO: BR  
RTS PC ;EXIT
```

```

4649      ;*****
4650      ;TTY ENTRY SUBROUTINE:
4651      ;
4652      ;THIS SUBROUTINE IS USED BY THE TEST CONDITION
4653      ;ENTRY ROUTINE TO READ THE RESPONSE ENTERED
4654      ;AT THE TTY AND CHECK THEM FOR LEGALITY AND
4655      ;LIMITS. ALL RESPONSE MUST BE TYPED IN OCTAL
4656      ;(0-7) AND MUST FALL WITHIN THE LIMITS SET BY
4657      ;THE CALLING ROUTINE.
4658      ;IF AN ENTRY IS ILLEGAL OR OUTSIDE THE LIMITS,
4659      ;A QUESTION MARK IS TYPED (?) AND THE RESPONSE
4660      ;MAY BE REENTERED.
4661      ;ENTRIES MAY NOT EXCEED SIX (6) CHARACTERS AND
4662      ;MAY BE TERMINATED AT LESS THAN SIX BY TYPING A
4663      ;CARRIAGE RETURN
4664      ;*****
4665
4666 023664 005067 154754      TTR:  CLR      TEMP1      ;CLEAR FIRST CHARACTER FLAG
4667 023670 005000              CLR      RO
4668 023672 004767 000152      TTR0:  JSR      PC,TTIN      ;GO READ CHARACTER
4669 023676 122767 000215 154736  CMPB     #215,TIB      ;SEE IF CR
4670 023704 001005              BNE      TTR1          ;IF NOT: BR
4671 023706 005767 154732      TST      TEMP1        ;SEE IF FIRST CHARACTER
4672 023712 001446              BEQ      TTR5          ;IF SO: BR
4673 023714 000167 000066      JMP      TTR2          ;ELSE GO LOAD VALUE
4674 023720 122767 000260 154714  TTR1:  CMPB     #260,TIB      ;SEE IF CHAR IS LESS THAN 0
4675 023726 101402              BLOS     TTR1A         ;IF NOT: BR
4676 023730 000167 000076      JMP      TNER          ;ELSE GO TO ERROR
4677 023734 122767 000270 154700  TTR1A: CMPB     #270,TIB      ;SEE IF CHAR IS GREATER THAN 7
4678 023742 101002              BHI      TTR1B         ;IF NOT: BR
4679 023744 000167 000062      JMP      TNER          ;ELSE GO TO ERROR
4680 023750 005267 154670      TTR1B: INC      TEMP1      ;SET FIRST CHARACTER FLAG
4681 023754 000241              CLC
4682 023756 006100              ROL      RO
4683 023760 000241              CLC
4684 023762 006100              ROL      RO      ;SHIFT 3 LEFT
4685 023764 000241              CLC
4686 023766 006100              ROL      RO
4687 023770 042767 177770 154644  BIC      #177770,TIB    ;STRIP ASCII
4688 023776 056700 154640      BIS      TIB,RO        ;LOAD CHARACTER
4689 024002 005301              DEC      R1            ;SEE IF DONE
4690 024004 001332              BNE      TTR0          ;IF NOT: BR
4691 024006 020002      TTR2:  CMP      RO,R2        ;SEE IF EXCEEDED MAXIMUM LIMIT
4692 024010 101402              BLOS     TTR3          ;IF NOT: BR
4693 024012 000167 000014      JMP      TNER          ;ELSE GO TO ERROR
4694 024016 020300      TTR3:  CMP      R3,RO        ;SEE IF BELOW MINIMUM LIMIT
4695 024020 101402              BLOS     TTR4          ;IF NOT: BR
4696 024022 000167 000004      JMP      TNER          ;ELSE GO TO ERROR
4697 024026 010015      TTR4:  MOV      RO,(R5)    ;LOAD VALUE
4698 024030 000207      TTR5:  RTS              ;EXIT
4699 024032 012704 026001      TNER:  MOV      #MSG43,R4
4700 024036 004767 000060      JSR      PC,TTOUT      ;PRINT?
4701 024042 162716 000020      SUB      #20,(SP)      ;RESET SP TO START OF VALUE ROUTINE
4702 024046 000207      RTS      PC            ;REDO VALUE ENTRY

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4703
4704
4705 ;TTY READ SUBROUTINE*****
4706 024050 005077 154534 TTIN: CLR @TKS
4707 024054 005077 154532 CLR @TKB
4708 024060 005067 154556 CLR TIB
4709 024064 005277 154520 INC @TKS
4710 024070 105777 154514 TTIN1: TSTB @TKS
4711 024074 100375 BPL TTIN1
4712 024076 017767 154510 154536 MOV @TKB,TIB
4713 024104 105777 154504 TTIN2: TSTB @TPS
4714 024110 100375 BPL TTIN2
4715 024112 116777 154524 154476 MOVB TIB,@TPB
4716 024120 000207 RTS PC
4717
4718 ;TTY OUTPUT SUBROUTINE*****
4719
4720 024122 112467 154512 TTOUT: MOVB (R4)+,TOB
4721 024126 122767 000043 154504 CMPB #43,TOB
4722 024134 001444 BEQ TEX
4723 024136 122767 000045 154474 CMPB #45,TOB
4724 024144 001407 BEQ TCRLF
4725 024146 122767 000041 154464 CMPB #41,TOB
4726 024154 001435 BEQ TBELL ;DO BELL
4727 024156 004767 000050 JSR PC,TOG
4728 024162 000757 BR TTOUT
4729 024164 112767 000015 154446 TCRLF: MOVB #15,TOB
4730 024172 004767 000034 JSR PC,TOG
4731 024176 012703 000006 MOV #6,R3
4732 024202 005067 154432 TCRLFA: CLR TOB
4733 024206 004767 000020 JSR PC,TOG
4734 024212 005303 DEC R3
4735 024214 001372 BNE TCRLFA ;DO FILLERS
4736 024216 112767 000012 154414 MOVB #12,TOB
4737 024224 004767 000002 JSR PC,TOG
4738 024230 000734 BR TTOUT
4739 024232 105777 154356 TOG: TSTB @TPS
4740 024236 100375 BPL TOG
4741 024240 116777 154374 154350 MOVB TOB,@IPB
4742 024246 000207 TEX: RTS PC
4743 024250 012703 000002 TBELL: MOV #2,R3
4744 024254 012767 000007 154356 TBELA: MOV #7,TOB
4745 024262 004767 177744 JSR PC,TOG
4746 024266 005303 DEC R3
4747 024270 001371 BNE TBELA
4748 024272 000713 BR TTOUT
4749
4750

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4751                                     ;OCTAL OUTPUT SUBROUTINE*****
4752
4753 024274 005067 000212      OCTP:  CLR      OFL          ;CLEAR FLAG FOR LEADING ZERO
4754 024300 010304              MOV      R3,R4          ;SEE IF NUMBER IS ZERO
4755 024302 001004              BNE      OCTP0         ;IF NOT ZERO: BR
4756 024304 004767 000162      JSR      PC,OCTPG1     ;ELSE PRINT ZERO
4757 024310 000167 000120      JMP      OCTP3         ;SPACE AND EXIT
4758 024314 032704 100000      OCTP0: BIT      #100000,R4 ;SEE IF MSD = 1
4759 024320 001406              BEQ      OCTP1         ;IF NOT: BR
4760 024322 012704 0000G1      MOV      #1,R4
4761 024326 004767 000116      JSR      PC,OCTPG     ;PRINT 1
4762 024332 000167 000006      JMP      OCTP2
4763 024336 005004              OCTP1: CLR      R4
4764 024340 004767 000104      JSR      PC,OCTPG     ;PRINT 0
4765 024344 010304              OCTP2: MOV      R3,R4
4766 024346 006004              ROR      R4
4767 024350 006004              ROR      R4
4768 024352 006004              ROR      R4          ;POSITION DIGIT
4769 024354 006004              ROR      R4
4770 024356 000304              SWAB     R4
4771 024360 004767 000064      JSR      PC,OCTPG     ;PRINT DIGIT 2
4772 024364 010304              MOV      R3,R4
4773 024366 006004              ROR      R4
4774 024370 000304              SWAB     R4
4775 024372 004767 000052      JSR      PC,OCTPG     ;PRINT DIGIT 3
4776 024376 010304              MOV      R3,R4
4777 024400 006104              ROL      R4
4778 024402 006104              ROL      R4
4779 024404 000304              SWAB     R4
4780 024406 004767 000036      JSR      PC,OCTPG     ;PRINT DIGIT 4
4781 024412 010304              MOV      R3,R4
4782 024414 006004              ROR      R4
4783 024416 006004              ROR      R4
4784 024420 006004              ROR      R4
4785 024422 004767 000022      JSR      PC,OCTPG
4786 024426 010304              MOV      R3,R4
4787 024430 004767 000014      JSR      PC,OCTPG     ;PRINT DIGIT 5
4788 024434 012767 000240 154176 OCTP3: MOV      #240,TOB
4789 024442 004767 177564      JSR      PC,TOG       ;PRINT SPACE
4790 024446 000207              RTS      PC           ;EXIT
4791 024450 042704 177770      OCTPG: BIC      #177770,R4
4792 024454 001004              BNE      OCTPG0
4793 024456 005767 000030      TST      OFL
4794 024462 001001              BNE      OCTPG0
4795 024464 000207              RTS      PC
4796 024466 005267 000020      OCTPG0: INC     OFL
4797 024472 052704 000260      OCTPG1: BIS      #260,R4
4798 024476 010467 154136      MOV      R4,TOB
4799 024502 004767 177524      JSR      PC,TOG
4800 024506 010304              MOV      R3,R4
4801 024510 000207              RTS      PC
4802 024512 000000      OFL:    0             ;FIRST CHAR FLAG
4803

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4804
4805
4806
4807 024514 005067 154120
4808 024520 012704 000010
4809 024524 110367 154110
4810 024530 105777 154060
4811 024534 100375
4812 024536 132767 000200 154074
4813 024544 001404
4814 024546 012777 000061 154042
4815 024554 000403
4816 024556 012777 000060 154032
4817 024564 006167 154050
4818 024570 005304
4819 024572 001356
4820 024574 000207
4821 024576 016703 154046
4822 024602 000303
4823 024604 004767 177704
4824 024610 016703 154034
4825 024614 004767 177674
4826 024620 000207
4827
4828
4829
4830 024622 010304
4831 024624 000304
4832 024626 006004
4833 024630 006004
4834 024632 006004
4835 024634 006004
4836 024636 004767 000036
4837 024642 010304
4838 024644 000304
4839 024646 004767 000026
4840 024652 010304
4841 024654 006004
4842 024656 006004
4843 024660 006004
4844 024662 006004
4845 024664 004767 000010
4846 024670 010304
4847 024672 004767 000002
4848 024676 000207
4849 024700 012767 000260 153732
4850 024706 042704 177760
4851 024712 050467 153722
4852 024716 004767 177310
4853 024722 000207
4854

;DATA CHARACTER OUTPUT SUBROUTINE*****
DOUT: CLR TOB
      MOV #10,R4 ;SET NUMBER TO PRINT
      MOV R3,TOB
DOUT1: TSTB @TPS
      BPL DOUT1
      BITB #200,TOB
      BEQ DOUT2
      MOV #061,@TPB
      BR DOUT3
DOUT2: MOV #060,@TPB
DOUT3: ROL TOB
      DEC R4
      BNE DOUT1
      RTS PC
DOUTD: MOV TEMP3,R3
      SWAB R3
      JSR PC,DOUT
      MOV TEMP3,R3
      JSR PC,DOUT
      RTS PC

;TU45 SERIAL NUMBER PRINT SUBROUTINE*****
SNPT: MOV R3,R4
      SWAB R4
      ROR R4
      ROR R4
      ROR R4
      ROR R4
      JSR PC,SNPG ;PRINT FIRST DIGIT
      MOV R3,R4
      SWAB R4
      JSR PC,SNPG ;PRINT SECOND DIGIT
      MOV R3,R4
      ROR R4
      ROR R4
      ROR R4
      JSR PC,SNPG ;PRINT THIRD DIGIT
      MOV R3,R4
      JSR PC,SNPG ;PRINT FOURTH DIGIT
      RTS PC
      ;EXIT
      MOV #260,TOB ;SET NUMBER BASE
      BIC #177760,R4 ;MASK NUMBER
      BIS R4,TOB ;BUILD DIGIT
      JSR PC,TOG ;GO TYPE
      RTS PC ;RETURN

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4855
4856                               :ERROR MESSAGES*****
4857
4858 024724 042052 020105 043 MSG1: .ASCII /*DE #/
4859
4860 024731 045 035507 021440 MSG2: .ASCII /%G; #/
4861
4862 024736 041045 020073 043 MSG3: .ASCII /%B; #/
4863
4864 024743 045 047103 021440 MSG4: .ASCII /%CN #/
4865
4866 024750 053452 020105 043 MSG5: .ASCII /*WE #/
4867
4868 024755 052 042522 021440 MSG6: .ASCII /*RE #/
4869
4870 024762 051052 020123 043 MSG7: .ASCII /*RS #/
4871
4872 024767 052 040520 051124 MSG8: .ASCII /*PATRN #/
4873 024774 020116 043
4874 024777 040 047123 020072 MSG9: .ASCII / SN: #/
4875 025004 043
4876 025005 052 042523 021440 MSG10: .ASCII /*SE #/
4877
4878 025012 051452 040514 042526 MSG11: .ASCII /*SLAVE NO. #/
4879 025020 047040 027117 021440
4880
4881 025026 022445 042045 044522 MSG12: .ASCII /%XXDRIVE NO. #/
4882 025034 042526 047040 027117
4883 025042 021440
4884
4885 025044 025045 047102 021440 MSG13: .ASCII /%*BN #/
4886
4887 025052 051052 020116 043 MSG14: .ASCII /*RN #/
4888
4889 025057 045 020041 020040 MSG15: .ASCII /%! BAD RECORD%#%/
4890 025064 020040 020040 020040
4891 025072 041040 042101 051040
4892 025100 041505 051117 022504
4893 025106 021445
4894
4895 025110 043040 043 MSG16: .ASCII / F#/
4896
4897 025113 040 021522 MSG17: .ASCII / R#/
4898
4899 025116 020041 047505 020124 MSG20: .ASCII /! EOT NO: #/
4900 025124 047516 020072 043
4901
4902
4903 025131 045 044441 046114 MSG22: .ASCII /%!ILLEGAL BOT: HALT%#%/
4904 025136 043505 046101 041040
4905 025144 052117 020072 040510
4906 025152 052114 022445 021445
4907
4908 025160 041445 030523 021440 MSG23: .ASCII /%CS1 #/
4909
4910 025166 053445 020103 043 MSG23A: .ASCII /%WC #/
  
```



4911						
4912	025173	045	040502	021440	MSG23B:	.ASCII /%BA #/
4913						
4914	025200	043045	020103	043	MSG23C:	.ASCII /%FC #/
4915						
4916	025205	045	051503	020062	MSG23D:	.ASCII /%CS2 #/
4917	025212	043				
4918						
4919	025213	045	051504	021440	MSG23E:	.ASCII /%DS #/
4920						
4921	025220	042445	020122	043	MSG23F:	.ASCII /%ER #/
4922						
4923	025225	045	051501	021440	MSG23G:	.ASCII /%AS #/
4924						
4925	025232	041445	020113	043	MSG23H:	.ASCII /%CK #/
4926						
4927	025237	045	041104	021440	MSG23I:	.ASCII /%DB #/
4928						
4929	025244	046445	020122	043	MSG23J:	.ASCII /%MR #/
4930						
4931	025251	045	052104	021440	MSG23K:	.ASCII /%DT #/
4932						
4933	025256	052045	020103	043	MSG23L:	.ASCII /%TC #/
4934						
4935	025263	045	047123	021440	MSG23M:	.ASCII /%SN #/
4936						
4937	025270	020445	047516	044440	MSG24:	.ASCII /%!NO INTERRUPT%#/
4938	025276	052116	051105	052522		
4939	025304	052120	021445			
4940						
4941	025310	020445	047516	046440	MSG25:	.ASCII /%!NO MOL: HALT%#/
4942	025316	046117	020072	040510		
4943	025324	052114	021445			
4944						
4945	025330	042045	047522	051520	MSG26:	.ASCII /%DROPS: #/
4946	025336	020072	043			
4947						
4948	025341	045	044520	045503	MSG27:	.ASCII /%PICKS: #/
4949	025346	035123	021440			
4950						
4951	025352	021445			MSG28:	.ASCII /%#/
4952	025354	022445	052524	032464	MSG30:	.ASCII /%TU45 AUTO SEQUENCE (CZTUIA0)%/
4953	025362	040440	052125	020117		
4954	025370	042523	052521	047105		
4955	025376	042503	024040	055103		
4956	025404	052524	040511	024460		
4957	025412	045				
4958	025413	115	045501	020105		.ASCII /%MAKE ENTRIES IN OCTAL%#/
4959	025420	047105	051124	042511		
4960	025426	020123	047111	047440		
4961	025434	052103	046101	021445		
4962	025442	022445	052524	032464	MSG31:	.ASCII /%TU45 DATA RELIABILITY TEST (CZTUIA0)%MAKE ENTRIES IN OCTAL%#/
4963	025450	042040	052101	020101		
4964	025456	042522	044514	041101		
4965	025464	046111	052111	020131		
4966	025472	042524	052123	024040		

4967	025500	055103	052524	040511	
4968	025506	024460	046445	045501	
4969	025514	020105	047105	051124	
4970	025522	042511	020123	047111	
4971	025530	047440	052103	046101	
4972	025536	021445			
4973					
4974	025540	051445	040514	042526	MSG32: .ASCII /%SLAVE NUMBER = #/
4975	025546	047040	046525	042502	
4976	025554	020122	020075	043	
4977					
4978	025561	045	042504	051516	MSG33: .ASCII /%DENSITY = #/
4979	025566	052111	020131	020075	
4980	025574	043			
4981					
4982	025575	045	040520	044522	MSG34: .ASCII /%PARITY = #/
4983	025602	054524	036440	021440	
4984					
4985	025610	051045	041505	051117	MSG35: .ASCII /%RECORD COUNT = #/
4986	025616	020104	047503	047125	
4987	025624	020124	020075	043	
4988					
4989	025631	045	044103	051101	MSG36: .ASCII /%CHARACTER COUNT = #/
4990	025636	041501	042524	020122	
4991	025644	07503	047125	020124	
4992	025652	020075	043		
4993					
4994	025655	045	040520	052124	MSG37: .ASCII /%PATTERN NUMBER = #/
4995	025662	051105	020116	052516	
4996	025670	041115	051105	036440	
4997	025676	021440			
4998	025700	051445	047111	046107	MSG38: .ASCII /%SINGLE PASS = #/
4999	025706	020105	040520	051523	
5000	025714	036440	021440		
5001	025720	022445	047105	042524	MSG40: .ASCII /%ENTER STALLS%READ = #/
5002	025726	020122	052123	046101	
5003	025734	051514	051045	040505	
5004	025742	020104	020075	043	
5005					
5006	025747	045	051127	052111	MSG41: .ASCII /%WRITE = #/
5007	025754	020105	020075	043	
5008					
5009	025761	045	052524	047122	MSG42: .ASCII /%TURN AROUND = #/
5010	025766	040440	047522	047125	
5011	025774	020104	020075	043	
5012					
5013	026001	045	022477	043	MSG43: .ASCII /%?%#/
5014					
5015	026005	045	047105	042524	MSG44: .ASCII /%ENTER YOZZLE STALL = #/
5016	026012	020122	047531	055132	
5017	026020	042514	051440	040524	
5018	026026	046114	036440	021440	
5019					
5020	026034	042445	051122	040440	MSG45: .ASCII /%ERR AMT #/
5021	026042	052115	021440		
5022					

5023	026046	043045	020103	043	MSG46:	.ASCII	/%FC #/
5024							
5025	026053	045	040503	021440	MSG47:	.ASCII	/%CA #/
5026							
5027	026060	020445	047516	041040	MSG48:	.ASCII	/%!NO BOT ON REWIND: HALTXX#/
5028	026066	052117	047440	020116			
5029	026074	042522	044527	042116			
5030	026102	020072	040510	052114			
5031	026110	022445	043				
5032							
5033	026113	040	047516	020124	MSG49:	.ASCII	/ NOT AVAIL #/
5034	026120	053101	044501	020114			
5035	026126	043					
5036	026127	040	046111	042514	MSG50:	.ASCII	/ ILLEGAL DRIVE TYPE #/
5037	026134	040507	020114	051104			
5038	026142	053111	020105	054524			
5039	026150	042520	021440				
5040	026154	042045	044522	042526	MSG52:	.ASCII	/%DRIVE NUMBER = #/
5041	026162	047040	046525	042502			
5042	026170	020122	020075	043			
5043							
5044	026175	045	047506	046522	MSG53:	.ASCII	/%FORMAT = #/
5045	026202	052101	036440	021440			
5046							
5047	026210	053452	020105	046524	MSG54:	.ASCII	/*WE TM#/
5048	026216	043					
5049							
5050	026217	052	042523	052040	MSG55:	.ASCII	/*SE TM#/
5051	026224	021515					
5052							
5053	026226	052040	021515		MSG56:	.ASCII	/ TM#/
5054							
5055	026232	047040	047117	042455	MSG57:	.ASCII	/ NON-EXIST SLAVE#/
5056	026240	044530	052123	051440			
5057	026246	040514	042526	043			
5058	026253	045	051103	020103	MSG58:	.ASCII	/%CRC #/
5059	026260	043					
5060	026261	045	051114	020103	MSG59:	.ASCII	/%LRC #/
5061	026266	043					
5062	026267	052	020104	043	MSG60:	.ASCII	/*D #/
5063	026273	052	020120	043	MSG61:	.ASCII	/*P #/
5064	026277	052	020106	043	MSG62:	.ASCII	/*F #/
5065							
5066	026303	045	047452	044522	MSG64:	.ASCII	/%*ORIGINAL ERROR*#/
5067	026310	044507	040516	020114			
5068	026316	051105	047522	025122			
5069	026324	043					
5070							
5071	026325	045	042522	051124	MSG65:	.ASCII	/%RETRY: #/
5072	026332	035131	021440				
5073							
5074	026336	020452	042523	051040	MSG66:	.ASCII	/%!SE RTRY #/
5075	026344	051124	020131	043			
5076							
5077	026351	052	042441	040522	MSG67:	.ASCII	/%!ERASE#/
5078	026356	042523	043				

5079  
5080 026361 045 042522 042522 MSG68: .ASCII /%RREV: #/  
5081 026366 035126 021440  
5082 026372 052045 050101 020105 MSG69: .ASCII /%TAPE MARK = #/  
5083 026400 040515 045522 036440  
5084 026406 021440  
5085  
5086 026410 020445 047516 042040 MSG70: .ASCII /%!NO DRY FROM REWIND: HALTX#/  
5087 026416 054522 043040 047522  
5088 026424 020115 042522 044527  
5089 026432 042116 020072 040510  
5090 026440 052114 021445  
5091 026444 047040 047117 042455 MSG71: .ASCII /NON-EXIST DRIVE#/  
5092 026452 044530 052123 042040  
5093 026460 044522 042526 043  
5094 026465 045 042522 053506 MSG72: .ASCII /%REFWD: #/  
5095 026472 035104 021440  
5096 026476 053445 042524 051122 MSG73: .ASCII /%WTERR: #/  
5097 026504 020072 043  
5098 026507 045 042522 044507 MSG74: .ASCII /%REGISTER START = #/  
5099 026514 052123 051105 051440  
5100 026522 040524 052122 036440  
5101 026530 021440  
5102 026532 053045 041505 047524 MSG75: .ASCII /%VECTOR = #/  
5103 026540 020122 020075 043  
5104 026545 045 042504 042522 MSG76: .ASCII /%DEREV: #/  
5105 026552 035126 021440  
5106 026556 042045 043105 042127 MSG77: .ASCII /%DEFWD: #/  
5107 026564 020072 043  
5108 026567 045 047041 047117 MSG78: .ASCII /%!NON-RETRYABLE WRITE ERROR: ER #/  
5109 026574 051055 052105 054522  
5110 026602 041101 042514 053440  
5111 026610 044522 042524 042440  
5112 026616 051122 051117 020072  
5113 026624 051105 021440  
5114 026630 020445 047516 026516 MSG79: .ASCII /%!NON-RETRYABLE READ ERROR: ER #/  
5115 026636 042522 051124 040531  
5116 026644 046102 020105 042522  
5117 026652 042101 042440 051122  
5118 026660 051117 020072 051105  
5119 026666 021440  
5120 026670 020445 042441 042116 MSG100: .ASCII /%!!END OF PASS %#/  
5121 026676 047440 020106 040520  
5122 026704 051523 022440 043  
5123 026711 045 025045 025052 MSG101: .ASCII /%\*\*\*\*\*/  
5124 026716 025052 025052 025052  
5125 026724 025052 025052 025052  
5126 026732 025052 025052 052  
5127 026737 052 046524 031060 MSG102: .ASCII /\*TM02 #/  
5128 026744 021440  
5129 026746 051452 040514 042526 MSG103: .ASCII /\*SLAVES #/  
5130 026754 020123 043  
5131 026757 045 052501 047524 MSG104: .ASCII /%AUTO CONT: #/  
5132 026764 041440 047117 035124  
5133 026772 021440  
5134 026774 051045 041505 053117 MSG105: .ASCII /%RECOVERED#/  
1

5135	027002	051105	042105	043	
5136	027007	052	020441	040502	MSG106: .ASCII /*!!BAD TAPE OVERFLOW#
5137	027014	020104	040524	042520	
5138	027022	047440	042526	043122	
5139	027030	047514	021527		
5140	027034	051045	053505	047111	MSG16A: .ASCII /%REWIND TAPE; RESTART AT BLOCK ONE#
5141	027042	020104	040524	042520	
5142	027050	020073	042522	052123	
5143	027056	051101	020124	052101	
5144	027064	041040	047514	045503	
5145	027072	047440	042516	043	
5146	027077	045	020441	047125	MSG107: .ASCII /%!!UNRECOVERABLE BAD SPOT/
5147	027104	042522	047503	042526	
5148	027112	040522	046102	020105	
5149	027120	040502	020104	050123	
5150	027126	052117			
5151	027130	041045	042101	051040	.ASCII /%BAD RECORD LEFT ON TAPE%#
5152	027136	041505	051117	020104	
5153	027144	042514	052106	047440	
5154	027152	020116	040524	042520	
5155	027160	021445			
5156	027162	047045	055122	047440	MSG108: .ASCII /%NRZ ONLY: #/
5157	027170	046116	035131	021440	
5158	027176	020452	050041	051517	MSG109: .ASCII /*!!POSITION LOST IN RETRY#
5159	027204	052111	047511	020116	
5160	027212	047514	052123	044440	
5161	027220	020116	042522	051124	
5162	027226	021531			
5163	027230	051445	051525	042520	MSG110: .ASCII /%SUSPECT BAD TAPE#
5164	027236	052103	041040	042101	
5165	027244	052040	050101	021505	
5166	027252	051045	050105	040505	MSG111: .ASCII /%REPEAT: #/
5167	027260	035124	021440		
5168	027264	041040	042101	052040	MSG112: .ASCII / BAD TAPE SPOTS%#
5169	027272	050101	020105	050123	
5170	027300	052117	022523	043	
5171					
5172	027305	045	051440	043117	MSG113: .ASCII /% SOFT: #/
5173	027312	035124	021440		
5174					
5175	027316	020045	040510	042122	MSG114: .ASCII /% HARD: #/
5176	027324	020072	043		
5177					
5178	027327	045	020441	040510	MSG115: .ASCII /%!!HARD READ ERROR#
5179	027334	042122	051040	040505	
5180	027342	020104	051105	047522	
5181	027350	021522			
5182	027352	020445	047125	052111	MSG116: .ASCII /%!UNIT IS REWINDING: TEST WILL START AT BOT#
5183	027360	044440	020123	042522	
5184	027366	044527	042116	047111	
5185	027374	035107	052040	051505	
5186	027402	020124	044527	046114	
5187	027410	051440	040524	052122	
5188	027416	040440	020124	047502	
5189	027424	021524			
5190					

TMO2/TU45 DATA RELIABILITY PROGRAM  
CZTUIA.P11 07-JUN-78 14:49

MACY11 30(1046) 13-JUN-78 13:40 PAGE 118

B 10

SEQ 0118

5191  
5192 027426 000000  
5193  
5194 033434 033434  
5195 033434 000000  
5196  
5197 000001

WDATA: .EVEN  
0 ;WRITE BUFFER  
RDATA: .=.+4004  
0 ;READ BUFFER  
.END

ABL CNT	000742	BTOVX	007240	DATA5	003004	DERR3	016426	DRP6	001022
ACTLRC	021350	BTOV0	007102	DATA6	003006	DERR4	016430	DRP7	001024
ADRVN	000740	BTOV1	007112	DATA7	003010	DERR4A	016572	DRP8	001026
AMOD1	022636	BTOV2	007214	DATBL	002770	DERR4B	016640	DRVER	021340
AMOD1A	022646	BTOV3	007232	DATER1	001130	DERR5	016676	DS	000522
AMOD1B	022662	BTPRT	007242	DATR	015142	DERR6	016710	DSUP	014176
AMOD1C	023016	BTPRT1	007320	DATRO	015160	DFX	016220	DSO	014206
AMOD2	023032	BTPT	000732	DATO	014414	DFO	016112	DSOA	014270
AMOD2A	023050	BTSTF	000730	DATOA	014444	DFOA	016006	DSOB	014266
AMOD2B	023070	BTLR	007324	DATOB	014452	DFOA0	016030	DSOC	014230
AMOD2X	023176	BT00	001610	DATOC	014522	DFOA1	016044	DS1	014320
APATS	015122	BT01	001714	DATOD	014530	DFOA2	016060	DS2	014340
AS	000526	BT02	002020	DATOE	014540	DFOA3	016074	DS2A	014350
ASEQ	022234	BT03	002124	DATOF	014554	DFOA4	016100	DS3	014354
ASEQCF	000744	BT04	002230	DAT1	014566	DFOB	015746	DS4	014364
ASEQF	000736	BT05	002334	DAT1A	014572	DFOB0	015770	DT	000536
ASEQX	022442	BT06	002440	DAT1B	014576	DFOC	015726	DVN	000550
ASEQXX	022462	BT07	002544	DAT10	014726	DFOCO	015736	DOFL	014564
ASEQ0	022324	B0	012146	DAT10A	014740	DFOD	015712	EMADDR	000654
ASEQ1	022330	B1	012214	DAT11	014760	DFOE	015704	EOTCO	002650
ASEQ2	022400	B2	012224	DAT11A	014766	DFOF	015676	EOTREC	000662
ASEQ3	022414	CADER	021332	DAT12	015002	DF1	016124	ER	000524
ASEQ4	022424	CC	000530	DAT12A	015012	DF2	016134	ERCHK	017514
BA	000514	CCNTR	012250	DAT13	015026	DF3	016152	ERPT	020352
BAER	021334	CLLAST	015314	DAT14	015036	DF4	016214	ERPTG	020406
BBC	000660	CLP	015424	DAT14A	015050	DOUT	024514	ERPTG1	020454
BCNT	000712	CLPE	015450	DAT15	015070	DOUTD	024576	ERPTT	020372
BDPP	000720	CLP0	015460	DAT15A	015074	DOUT1	024530	ERPT0	020470
BD00	001410	CLP1	015472	DAT15B	015104	DOUT2	024556	ERPT1	020542
BD10	001430	CLP2	015532	DAT2	014610	DOUT3	024564	ERPT2	020610
BD20	001450	CLP3	015544	DAT3	014616	DPC	017072	ERPT3	020656
BD30	001470	CLO	015230	DAT3A	014624	DPCG	017100	ERPT4	020726
BD40	001510	CL1	015256	DAT3B	014630	DPC0	017106	ERPT5	020754
BD50	001530	CL2	015300	DAT4	014644	DPC0A	017150	ERPT5A	021050
BD60	001550	CL3	015366	DAT5	014656	DPC1	017156	ERPT6	021120
BD70	001570	CONER	021336	DAT6	014666	DPC1A	017204	ERPT7	021176
BKRT	012170	CR CER	021346	DAT7	014676	DPC2	017246	ERPX	021234
BKSP	012012	CRCLRC	015212	DAT7A	014712	DPC2A	017210	ERPX0	021200
BKTM	012074	CRCSV	021354	DB	000532	DPC2B	017232	ERPX1	021276
BKTM0	012136	CS	000520	DCHK	015606	DPC3	017300	ERPX2	021330
BLCNTR	000656	C1	000510	DCHKO	015636	DPPRT	017346	ERSAV	000724
BPKP	000722	C2	000542	DEREV1	001170	DPPRTX	017512	ERTFL	000734
BP00	001210	DATA0	002772	DEREX	016714	DPPRT0	017420	ERO	017530
BP10	001230	DATA1	002774	DEREX1	016750	DPPRT1	017446	EROA	017600
BP20	001250	DATA10	003012	DERFL	000706	DPPRT2	017464	EROB	017546
BP30	001270	DATA11	003014	DERR	016222	DROP	017062	ER1	017606
BP40	001310	DATA12	003016	DERRO	016236	DRPK	017050	ER10	020314
BP50	001330	DATA13	003020	DERROA	016270	DRPKF	016762	ER2	017612
BP60	001350	DATA14	003022	DERROB	016324	DRP1	001010	ER2A	017656
BP70	001370	DATA15	003024	DERROC	016354	DRP2	001012	ER2A0	017626
BTADDR	001030	DATA2	002776	DERROD	016356	DRP3	001014	ER2A1	017646
BTFLG	000726	DATA3	003000	DERR1	016406	DRP4	001016	ER2B	017674
BTOV	007062	DATA4	003002	DERR2	016410	DRP5	001020	ER2C	017720

ER2D	017736	MSG115	027327	MSG50	026127	PAPRT0	023320	RDRT4	011052
ER2E	017764	MSG116	027352	MSG52	026154	PAPRT1	023514	RDRT5	011054
ER3	017772	MSG12	025026	MSG53	026175	PAPRT2	023546	RDRT5A	011116
ER3A	020034	MSG13	025044	MSG54	026210	PAPRT3	023550	RDRT5B	011126
ER3A1	020072	MSG14	025052	MSG55	026217	PARCNT	015604	RDRT6	011162
ER3B	020102	MSG15	025057	MSG56	026226	PARS	014412	RDRT7	011230
ER4	020106	MSG16	025110	MSG57	026232	PATRM	000560	RDY	010644
ER4A	020154	MSG16A	027034	MSG58	026253	PATS	014410	RD0	007766
ER4A1	020144	MSG17	025113	MSG59	026261	PFLG	000672	RD1	010034
ER6	020160	MSG2	024731	MSG6	024755	PICK	017302	RD1A	010050
ER6A	020244	MSG20	025116	MSG60	026267	PIK1	000770	RD1B	010056
ER7	020276	MSG22	025131	MSG61	026273	PIK2	000772	RD1D	010064
EXCRC	015600	MSG23	025160	MSG62	026277	PIK3	000774	RD10	010564
EXLRC	015602	MSG23A	025166	MSG64	026303	PIK4	000776	RD11	010574
FC	000516	MSG23B	025173	MSG65	026325	PIK5	001000	RD2	010070
F CER	021342	MSG23C	025200	MSG66	026336	PIK6	001002	RD2A	010110
FCSAV	000632	MSG23D	025205	MSG67	026351	PIK7	001004	RD2B	010120
FMCNT	000556	MSG23E	025213	MSG68	026361	PIK8	001006	RD3	010150
FREX	021420	MSG23F	025220	MSG69	026372	POPPOP=	022626	RD4	010202
FRPRT	021356	MSG23G	025225	MSG7	024762	POPSP =	005726	RD4A	010300
FRO	021410	MSG23H	025232	MSG70	026410	PRB	000622	RD4A0	010332
HDRFL	000666	MSG23I	025237	MSG71	026444	PRS	000620	RD4A1	010354
HRDS	022464	MSG23J	025244	MSG72	026465	PSW	000604	RD4A2	010376
HRDS0	022524	MSG23K	025251	MSG73	026476	RANBAS	000624	RD4B	010404
HRDS1	022532	MSG23L	025256	MSG74	026507	RANG	023632	RD4C	010410
HRDS2	022546	MSG23M	025263	MSG75	026532	RANSAV	000626	RD4D	010440
HRDS3	022570	MSG24	025270	MSG76	026545	RANSET	004230	RD4E	010444
HRDS4	022602	MSG25	025310	MSG77	026556	RCNT	000554	RD5	010454
INTRF	000566	MSG26	025330	MSG78	026567	RCNTR	012310	RD6	010476
LRCER	021344	MSG27	025341	MSG79	026630	RCSAV	000630	RD7	010522
LRCV	021352	MSG28	025352	MSG8	024767	RDA	007730	RD7A	010552
MOLEX	021556	MSG3	024736	MSG9	024777	RDATA	033434	READ	007670
MOLSW	000634	MSG30	025354	MTC1	000674	RDCMD	000562	REGS	000544
MOLTAB	022122	MSG31	025442	MTINT	022216	RDERR1	001150	REOT	004262
MR	000534	MSG32	025540	MTINTA	022222	RDER1	001110	REOTC	005002
MSG1	024724	MSG33	025561	NOP =	000240	RDER2	001112	REOTX	004740
MSG10	025005	MSG34	025575	NRTP	011236	RDER3	001114	REOTXX	004776
MSG100	026670	MSG35	025610	NRZOF	000652	RDER4	001116	REOT1	004276
MSG101	026711	MSG36	025631	OCTP	024274	RDER5	001120	REOT1A	004332
MSG102	026737	MSG37	025655	OCTPG	024450	RDER6	001122	REOT1B	004354
MSG103	026746	MSG38	025700	OCTPG0	024466	RDER7	001124	REOT1C	004376
MSG104	026757	MSG4	024743	OCTPG1	024472	RDER8	001126	REOT1D	004402
MSG105	026774	MSG40	025720	OCTP0	024314	RDEX	010640	REOT1E	004426
MSG106	027007	MSG41	025747	OCTP1	024336	RDFL	015210	REOT1F	004370
MSG107	027077	MSG42	025761	OCTP2	024344	RDRTG	010740	REOT2	004452
MSG108	027162	MSG43	026001	OCTP3	024434	RDRTX	011234	REOT2A	004514
MSG109	027176	MSG44	026005	OFL	024512	RDRTY	010646	REOT3	004542
MSG11	025012	MSG45	026034	PAPRT	023200	RDRT0	010660	REOT4	004572
MSG110	027230	MSG46	026046	PAPRTA	023402	RDRT1	010714	REOT5	004606
MSG111	027252	MSG47	026053	PAPRTB	023416	RDRT1A	010712	REOT6	004654
MSG112	027264	MSG48	026060	PAPRTC	023432	RDRT1B	010734	REOT7	004712
MSG113	027305	MSG49	026113	PAPRTD	023442	RDRT2	011024	RETRY	000602
MSG114	027316	MSG5	024750	PAPRTY	023544	RDRT3	011046	RFHARD	002730



RFSOFT	002670	STARTA	003060	TEMP2	000646	TTR1B	023750	WTER5	001100
RPCNT	000702	STARTB	003064	TEMP3	000650	TTR2	024006	WTER6	001102
RRHARD	002750	STARTC	003050	TEX	024246	TTR3	024016	WTER7	001104
RRSOFT	002710	STARTD	003144	TIB	000642	TTR4	024026	WTER8	001106
RSEQ	007342	STARTE	003136	TINER	024032	TTR5	024030	WTM	005730
RSEX	007514	STARTF	003122	TINF	000636	UDES	000552	WTM0	005772
RSF	007416	STARTO	003074	TINP	012334	UNP	000676	WTM1	006034
RSFR	007522	START1	003244	TINPA	012344	UNX	000766	WTM2	006044
RSFRX	007662	START2	003376	TINPB	012364	UN1	000746	WTM3	006054
RSFR0	007554	START3	003412	TINPBO	012562	UN2	000750	WTM4	006136
RSFR1	007566	START4	003426	TINPB1	012410	UN3	000752	WTM4A	006176
RSFR2	007620	START5	004144	TINPC	012610	UN4	000754	W0	005424
RSF0	007454	START6	004162	TINPX	014140	UN5	000756	W1	005466
RSF1	007470	START7	004216	TINPO	012722	UN6	000760	W2	005510
RSR	007374	START8	004224	TINPOA	013002	UN7	000762	W3	005524
RSTAL	000572	STAROA	003172	TINPOB	013020	UN8	000764	W3A	005546
RTCNT	000704	STAROB	003222	TINPOC	013060	UPS	000716	W4	005634
RTRN	000664	STAR1A	003256	TINPOD	013104	VECT	000546	W4A	005664
RTYFL	000714	STAR1B	003302	TINPOE	013134	WC	000512	W5	005700
RTY1	001050	STAR1C	003342	TINP1	013154	WDATA	027426	W6	005716
RTY2	001052	STAR4A	003516	TINP2	013234	WEX	006202	XOR	015552
RTY3	001054	STAR40	003442	TINP2A	013314	WRITE	005400	XORS	015576
RTY4	001056	STAUT	003032	TINP2B	013374	WRTE	005420	YOZ	011254
RTY5	001060	STAUTO	003170	TINP2C	013422	WRTSB	006666	YOZA	011322
RTY6	001062	STP	003612	TINP3	013442	WRTSBO	006740	YOZB	011330
RTY7	001064	STPX	004130	TINP4	013756	WRTSB1	006754	YOZC	011350
RTY8	001066	SWR	000606	TKB	000612	WRTSB2	006764	YOZCO	011440
RWND	005004	TAPG	021422	TKS	000610	WRTSB3	007040	YOZC1	011454
RWDA	005016	TAPGO	021434	TMEX	000564	WRTY	006246	YOZC2	011462
RWDX	005344	TAPG1	021532	TMFLG	000700	WRTYR	006300	YOZD	011502
RWDO	005054	TAPG2	021546	TOB	000640	WRTYTM	006274	YOZDO	011604
RWND1	005132	TAPG3	021564	TOG	024232	WRTY0	006254	YOZD1	011630
RWND1A	005174	TAPG3A	021650	TPB	000616	WRTY1	006362	YOZD2	011576
RWND2	005214	TAPG3B	021664	TPOS	014150	WRTY2	006364	YOZD3	011622
RWND3	005224	TAPG3C	021704	TPOS1	014162	WRTY2A	006426	YOZD4	011556
RWND4	005256	TAPG3D	021750	TPS	000614	WRTY2B	006446	YOZE	011634
RWND5	005276	TAPG3E	021774	TSTAL	000576	WRTY3	006522	YOZF	011664
RWND6	005316	TAPG3F	021632	TTIN	024050	WRTY3A	006540	YOZFO	011670
CVFL	014146	TAPG4	022022	TTINT	022142	WRTY4	006626	YOZG	011766
ERFL	000710	TAPG5	022036	TTINTO	022166	WRTY5	006662	YOZH	012002
SN	000540	TAPG6	022104	TTIN1	024070	WRW	006222	YOZO	011274
SNPG	024700	TAPG7	022116	TTIN2	024104	WRWX	006244	YSTAL	000600
SNPT	024622	TBELA	024254	TTOUT	024122	WSTAL	000574	=	033436
SPFLG	000570	TBELL	024250	TTR	023664	WTER1	001070		
STAL	000670	TCRLF	024164	TTR0	023672	WTER2	001072		
STALL	012240	TCRLFA	024202	TTR1	023720	WTER3	001074		
START	003026	TEMP1	000644	TTR1A	023734	WTER4	001076		

. ABS. 033436 000

ERRORS DETECTED: 0

.CZTUIA.SEQ/SOL\_CZTUIA.P11  
RUN-TIME: 31 65 5 SECONDS  
RUN-TIME RATIO: 526/102=5.1

TMO2/TU45 DATA RELIABILITY PROGRAM  
CZTUIA.P11 07-JUN-78 14:49

MACY11 30(1046) 13-JUN-78 13:40 PAGE 123  
SYMBOL TABLE

F 10

SEQ 0122

CORE USED: 5K (10 PAGES)