

TM02/TU45

DATA RELIABILITY PROGRAM
CZTU1A0

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IDENTIFICATION

PRODUCT CODE: AC-E469A-MC
PRODUCT TITLE: CZTUIA0 TM02/TU45 DATA RELIABILITY PROGRAM
DATE CREATED: 25 MAY 1978
MAINTAINER: COMPUTER SPECIAL SYSTEMS
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1. ABSTRACT

THIS PROGRAM IS DESIGNED TO BE USED BY AN EXPERIENCED ENGINEER /TECHNICIAN FOR EVALUATION AND DEBUGGING OF MAG TAPE DRIVES. THE PROGRAM IS CAPABLE OF EXERCISING ANY TAPE DRIVE THAT CAN BE OPERATED ON A MASSBUS THROUGH THE TM02 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 TM02.

HOWEVER; THE RH AND TM02 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 TM02.

2. REQUIREMENTS (HARDWARE)

- A. ANY PDP-11 PROCESSOR
B. 8K OF CORE
C. TELETYPE
D. TM02 TAPE CONTROLLER
E. 1 TO 8 MAG TAPE DRIVES
F. MASSBUS CONTROLLER

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR LOADING BINARY TAPES

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4. STARTING PROCEDURE

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

- A. 200(8): THIS ADDRESS MUST BE USED ON INITIAL START FROM LOAD AS ALL PARAMETERS ARE ENTERED FROM HERE. REQUESTS ARE PRINTED ON THE TELETYPE FOR ENTRY OF RH STARTING ADDRESS, VECTOR ADDRESS, DRIVE NUMBER(TM02 ADDRESS), SLAVE NUMBER, DENSITY, PARITY, FORMAT, RECORD COUNT, CHARACTER COUNT, PATTERN NUMBER, TAPE MARK AND STALL FOR READ, WRITE, AND TURNAROUND. ALL RESPONSES 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

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

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

REGISTER START: THE RESPONSE REQUIRED FOR THIS REQUEST
IS TO ENTER THE ADDRESS OF THE FIRST 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 TM02) 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

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

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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.

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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. RESETING 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.

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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

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SAMPLE START AT 200(8):

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

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

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.

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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

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6. RANDOMIZATION

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

- A. RANDOM DATA: (CONSOLE SWITCH 8)
GENERATES AN ENTIRE BUFFER, CHARACTER BY CHARACTER, OF RANDOM DATA WHEN SWITCH 8 IS SET TO A ONE. ONCE SET, THE RESETTING OF SWITCH 8 CAUSES THE LAST GENERATED PATTERN TO BE RETAINED IN CORE. A RESTART AT LOCATION 200(8) OR 210(8) WILL CAUSE REVERSION OF THE DATA TO THE FIXED PATTERN REQUESTED INITIALLY. A RESTART AT LOCATION 204(8) WILL HOLD THE LAST GENERATED PATTERN IN CORE UNTIL SWITCH 8 IS AGAIN SET.
ALTHOUGH THE DATA IS GENERATED AS RANDOM, THE PROGRESSION OF RANDOM CHARACTERS IS ALWAYS THE SAME FROM THE OUTSET OF RANDOMIZATION. THEREFORE IT IS POSSIBLE TO GENERATE ONE TAPE REEL OF RANDOM DATA ON ONE UNIT, RESTART THE PROGRAM TO RE-ESTABLISH THE OUTSET POINT, AND READ THE RANDOM TAPE REEL ON ANOTHER UNIT FOR COMPATABILITY TESTING. IN MULTIDRIVE SYSTEMS THE SAME BLOCK OF DATA, WHETHER RANDOM OR FIXED, IS WRITTEN OR READ ON EACH AVAILABLE UNIT IN THE ORDER THAT THEY WERE ENTERED, BEFORE BEING CHANGED.
- B. RANDOM CHARACTER COUNT: (CONSOLE SWITCH 7)
GENERATES A DIFFERENT NUMBER OF CHARACTERS PER RECORD TO BE WRITTEN ON EACH BLOCK CYCLE. THE SAME NUMBER OF CHARACTERS PER RECORD IS WRITTEN OR READ ON EACH AVAILABLE UNIT BEFORE BEING CHANGED. RESETTING SWITCH 7 HOLDS THE LAST VALUE GENERATED.
- C. RANDOM RECORD COUNT: (CONSOLE SWITCH 6)
GENERATES A DIFFERENT NUMBER OF RECORDS FOR EACH BLOCK OF DATA WRITTEN OR READ ON EACH BLOCK CYCLE. THE SAME NUMBER OF RECORDS IS WRITTEN OR READ ON EACH AVAILABLE UNIT BEFORE BEING CHANGED. RESETTING SWITCH 6 HOLDS LAST VALUE GENERATED.

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7. DYNAMIC PARAMETERS:

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

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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

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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

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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.

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- 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.

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9. ERROR PRINTOUTS

THERE ARE THREE TYPES OF ERROR PRINTOUTS MADE BY THE PROGRAM; OPERATION ERRORS, DATA ERRORS, AND CONDITION ERRORS. EACH ERROR MESSAGE PRINTED IS 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.

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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 TM02 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^{J 2} 13:40 PAGE 22

SEQ 0022

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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 MAINTENANCE 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)

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EXAMPLE 1: IN THIS EXAMPLE SLAVE 1 ON TM02 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 TM02 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

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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

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EXAMPLE 5: THIS EXAMPLE SHOWS A READ DATA ERROR
WHICH OCCURRED, WITHOUT AN ACCOMPANING
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

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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

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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

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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

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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).

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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

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12. TESTING PROCEDURES

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

```

[illegible]

```

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                    0
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                    340
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          RANSAB:   032561        ;RANDOM NUMBER BUFFER
1510 000630 000000          RCSAV:     0           ;RECORD COUNT SAVE
1511 000632 000000          FCSAV:     0           ;FRAME COUNT SAVE

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1514

1515 000634 000000

1516 000636 000000

1517 000640 000000

1518 000642 000000

1519 000644 000000

1520 000646 000000

1521 000650 000000

1522 000652 000000

1523 000654 000000

1524 000656 000000

1525 000660 000000

1526 000662 000000

1527 000664 000000

1528 000666 000000

1529 000670 000000

1530 000672 000000

1531 000674 000000

1532 000676 000000

1533 000700 000000

1534 000702 000000

1535 000704 000000

1536 000706 000000

1537 000710 000000

1538 000712 000000

1539 000714 000000

1540 000716 000000

1541 000720 000000

1542 000722 000000

1543 000724 000000

1544 000726 000000

1545 000730 000000

1546 000732 000000

1547 000734 000000

1548 000736 000000

1549 000740 000000

1550 000742 000000

1551 000744 000000

;FLAGS AND COUNTERS*****

MOLSW: 0	;MOL ERROR PRINT SWITCH
TINF: 0	;TTY ENTERY FLAG
TOB: 0	;TTY OUTPUT BUFFER
TIB: 0	;TTY INPUT BUFFER
TEMP1: 0	;TEMP STORAGE
TEMP2: 0	;TEMP STORAGE
TEMP3: 0	;TEMP STORAGE
NRZOF: 0	;NRZ ONLY FLAG
EMADDR: 0	;ERROR MSG ADDRESS STORAGE
BLCNTR: 0	;BLOCK COUNTER
BBC: 0	;BAD RECORD COUNTER
EOTREC: 0	;EOT FLAG
RTRN: 0	;INTERRUPT RETURN STORAGE
HDRFL: 0	;HEADER FLAG
STAL: 0	;DELAY STORAGE
PFLG: 0	;PRINT FLAG
MTC1: 0	;MAG TAPE CONT REGISTER BUFFER
UNP: 0	;UNIT TABLE POINTER
TMFLG: 0	;TAPE MARK FLAG
RPCNT: 0	;REPEAT COUNTER
RTCNT: 0	;RETRY COUNTER
DERFL: 0	;DATA ERROR FLAG
SERFL: 0	;STATUS ERROR FLAG
BCNT: 0	;BIT COUNTER
RTYFL: 0	;RETRY FLAG
UPS: 0	;UNIT POINTER SAVE
BDPP: 0	;BITS DROPPED POINTER
BPKP: 0	;BITS PICKED POINTER
ERSAV: 0	;ERROR SAVE LOC
BTFLG: 0	;BAD TAPE FLAG
BTSTF: 0	;STATISTIC PRINT FLAG
BTPT: 0	;BAD TAPE POINTER
ERTFL: 0	;ERASE FLAG
ASEQF: 0	;AUTO SEQ FLAG
ADRVN: 0	;UTO SEQ DRIVE NUMBER
ABLCNT: 0	;AUTO BLOCK COUNTER
ASEQCF: 0	;AUTO SEQ CONTINUOUS FLAG

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UNIT ORDER AND DESCRIPTION TABLE *****

```
UN1:      0      ;THIS TABLE IS LOADED
UN2:      0      ;WITH UNIT NUMBERS AND
UN3:      0      ;THEIR DESCRIPTIONS IN
UN4:      0      ;THE ORDER THAT THEY
UN5:      0      ;WILL BE TESTED
UN6:      0
UN7:      0
UN8:      0
UNX:     -1
```

:UNIT DROPS AND PICKS POINTERS*****

PIK1:	BP00
PIK2:	BP10
PIK3:	BP20
PIK4:	BP30
PIK5:	BP40
PIK6:	BP50
PIK7:	BP60
PIK8:	BP70
DRP1:	BD00
DRP2:	BD10
DRP3:	BD20
DRP4:	BD30
DRP5:	BD40
DRP6:	BD50
DRP7:	BD60
DRP8:	BD70

```

UNIT BAD TAPE POINTERS*****

```

BTADDR: BT00
BT01
BT02
BT03
BT04
BT05
BT06
BT07

```

:UNIT WRITE RETRY COUNTER*****

```

```

RTY1:      0
RTY2:      0
RTY3:      0
RTY4:      0
RTY5:      0
RTY6:      0
RTY7:      0
RTY8:      0

```

;UNIT WRITE ERRORS*****

1608	001070	000000	WTER1:	0
1609	001072	000000	WTER2:	0
1610	001074	000000	WTER3:	0
1611	001076	000000	WTER4:	0
1612	001100	000000	WTER5:	0
1613	001102	000000	WTER6:	0
1614	001104	000000	WTER7:	0
1615	001106	000000	WTER8:	0
1616				
1617			;UNIT READ FORWARD ERRORS*****	
1618				
1619	001110	000000	RDER1:	0
1620	001112	000000	RDER2:	0
1621	001114	000000	RDER3:	0
1622	001116	000000	RDER4:	0
1623	001120	000000	RDER5:	0
1624	001122	000000	RDER6:	0
1625	001124	000000	RDER7:	0
1626	001126	000000	RDER8:	0
1627				
1628			;UNIT DATA ERRORS FORWARD*****	
1629				
1630	001130	000000	DATER1:	0
1631	001132	000000		0
1632	001134	000000		0
1633	001136	000000		0
1634	001140	000000		0
1635	001142	000000		0
1636	001144	000000		0
1637	001146	000000		0
1638				
1639			;UNIT READ REVERSE ERRORS*****	
1640				
1641	001150	000000	RDERR1:	0
1642	001152	000000		0
1643	001154	000000		0
1644	001156	000000		0
1645	001160	000000		0
1646	001162	000000		0
1647	001164	000000		0
1648	001166	000000		0
1649				
1650			;UNIT DATA ERRORS REVERSE*****	
1651				
1652	001170	000000	DEREV1:	0
1653	001172	000000		0
1654	001174	000000		0
1655	001176	000000		0
1656	001200	000000		0
1657	001202	000000		0
1658	001204	000000		0
1659	001206	000000		0

```

1660                                     ;DROPS + PICKS PER CHANNEL PER UNIT*****
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

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1696
1697                ;UNIT BAD TAPE COUNTER:16 PER SLAVE*****
1698
1699 001610 000000    BT00: 0
1700                .=. +102
1701 001714 000000    BT01: 0
1702                .=. +102
1703 002020 000000    BT02: 0
1704                .=. +102
1705 002124 000000    BT03: 0
1706                .=. +102
1707 002230 000000    BT04: 0
1708                .=. +102
1709 002334 000000    BT05: 0
1710                .=. +102
1711 002440 000000    BT06: 0
1712                .=. +102
1713 002544 000000    BT07: 0
1714                .=. +102
1715
1716                ;UNIT END OF TAPE COUNTERS 1 PER SLAVE*****
1717
1718 002650 000000    EOTC0: 0
1719 002652 000000        0
1720 002654 000000        0
1721 002656 000000        0
1722 002660 000000        0
1723 002662 000000        0
1724 002664 000000        0
1725 002666 000000        0
1726
1727                ;UNIT READ FORWARD SOFT ERROR*****
1728
1729 002670 000000    RFSOFT: 0
1730 002672 000000        0
1731 002674 000000        0
1732 002676 000000        0
1733 002700 000000        0
1734 002702 000000        0
1735 002704 000000        0
1736 002706 000000        0
1737
1738                ;UNIT READ REVERSE SOFT ERROR*****
1739
1740 002710 000000    RRSOFT: 0
1741 002712 000000        0
1742 002714 000000        0
1743 002716 000000        0
1744 002720 000000        0
1745 002722 000000        0
1746 002724 000000        0
1747 002726 000000        0
1748

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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

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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,TINP ;GO GET PARAMETERS FROM TTY
              MOV #40,@CS ;INITIALIZE
      STAUTO: 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
              MOVB 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,ABLCNT	;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	STAR2: 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	STAR3: 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	STAR4: 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		;STOP
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,RWND	;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	

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 FORWARD 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	RDER1(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	STARTS:	MOV	@SWR,R0	;LOAD SWR

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1958 004150 042700 177762      BIC      #177762,R0      ;MASK READ/WRITE SWITCHES
1959 004154 022700 000015      CMP      #15,R0      ;SEE IF HAVE READ OR WRITE
1960 004160 001421              BEQ      START8      ;IF NOT: BR
1961 004162 032777 000200 174332 START6: BIT      #200,R0S      ;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      ;PRINT NOT AVAIL
1968 004214 000000              HALT
1969 004216 062767 000002 174452 START7: ADD      #2,UNP      ;POINT TO NEXT UNIT
1970 004224 000167 177014      START8: JMP      START1      ;CONTINUE
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
1979

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1992 004262 016777 174264 174252 REOT: MOV UDES,AC2 ;LOAD COMMAND REGISTER
1993 004270 012777 000011 174212 MOV #11,AC1 ;DRIVE CLEAR
1994 004276 032777 000200 174216 REOT1: BIT #200,ADS
1995 004304 001774 BEQ REOT1 ;AWAIT DRY
1996 004306 012777 000007 174174 MOV #7,AC1 ;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,ADS
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      MOV      RO,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,AC2      ;LOAD COMMAND REGISTER
2045 004606 032777 020000 173706 REOT5: BIT      #20000,ADS
2046 004614 001374      BNE      REOT5      ;AWAIT PIP RESET
2047 004616 032777 000002 173676 BIT      #2,ADS      ;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      #100000,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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2079      ;*****
2080      ;REWIND ALL AVAIL TAPES:
2081      ;
2082      ;THIS ROUTINE; ENTERED VIA CONSOLE SWITCH NINE (9),
2083      ;WILL REWIND ALL AVAILABLE TAPES TO BOT NO MATTER
2084      ;WHERE THEY ARE CURRENTLY POSITIONED AND RESUME TESTING
2085      ;ON THE CURRENTLY SELECTED UNIT.
2086      ;*****
2087
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,R0
2096 005044 000367 177732 SWAB REOTC
2097 005050 110067 177726 MOV R0,REOTC ;RESTORE EOT UNIT COUNTER
2098 005054 016700 173616 RWND0: MOV UNP,R0 ;POINT TO UNIT ENTRY
2099 005060 005160 000746 COM UN1(R0) ;SEE IF LAST ENTRY
2100 005064 001453 BEQ RWND2 ;IF SO: BR
2101 005066 005160 000746 COM UN1(R0)
2102 005072 032760 100000 000746 BIT #100000,UN1(R0) ;SEE IF ALREADY REWINDING
2103 005100 001035 BNE RWND1A ;IF SO: BR
2104 005102 016067 000746 173442 MOV UN1(R0),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(R0) ;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(R0)
2121 005220 005067 173452 CLR UNP ;CLEAR POINTER
2122 005224 016700 173446 RWND3: MOV UNP,R0 ;POINT TO UNIT ENTRY
2123 005230 005160 000746 COM UN1(R0) ;SEE IF LAST ENTRY:
2124 005234 001443 BEQ RWNDX ;IF SO: BR
2125 005236 005160 000746 COM UN1(R0)
2126 005242 016067 000746 173302 MOV UN1(R0),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		
2147				

RWND6:	MOV	#1,R0	
	JSR	PC,PAPRT	;PRINT HEADER
	MOV	#MSG48,R4	
	JSR	PC,TTOUT	;PRINT NO BOT
	HALT		
RWNDX:	COM	RWND5	;DO NEXT UNIT
	MOV	UN1(R0)	
	MOV	UPS,UNP	;RESTORE UNIT POINTER
	MOV	UNP,R0	
	MOV	UN1(R0),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 FMCNT,afc ;LOAD CHAR COUNT
        MOV #WDATA,aba ;SET DATA ADDR
        MCVB #60,MTCT ;SET WRITE OP COMMAND
        MOV #W1,RTRN ;SET RETURN ADDRESS
        JMP TAPG ;GO EXECUTE COMMAND
        BIT #2000,ads ;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,ASWR ;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	R0	;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	WTM:	MOV	#MSG54,EMADDR	;POINT TO TM ERROR MSG
2237	005736	012767	000026	172730		MOV	#26,MTCT	;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:	BIT	#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	015063	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,ASWR ;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 ERSAR,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,WRTP ;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,ASWR ;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      PC      ;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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2439
2440                ;BAD TAPE STATISTIC PRINT*****
2441
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 171440 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,OCTP        ;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
2463

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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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2520	007606	016767	170764	171054	MOV	TSTAL,STAL	;DO READ STALL
2521	007614	004767	002420		JSR	PC,STALL	
2522	007620	012767	010000	170734	RSFR2: MOV	#10000,RDCMD	;LOAD READ REVERSE
2523	007626	004767	000036		JSR	PC,READ	;GO READ REVERSE
2524	007632	005767	171024		TST	EOTREC	;SEE IF AT END OF TAPE
2525	007636	001411			BEQ	RSFRX	;IF NOT: BR
2526	007640	166767	170710	171014	SUB	RCNT,EOTREC	
2527	007646	005467	171010		NEG	EOTREC	;SET TO PROPER RECORD NUMBER
2528	007652	005267	171004		INC	EOTREC	
2529	007656	000167	174400		JMP	REOT	;ELSE GO TO REWIND
2530	007662	005067	170774		RSFRX: CLR	EOTREC	;CLEAR EOT FLAG
2531	007666	000207			RTS	PC	;EXIT
2532							

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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 *****

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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,MTCL	: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 UNP,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,UES ;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,UES ;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,UES ;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	R0	
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	R0	;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,OCIP ;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 ERSV, 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,ATKS ;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,ATC ;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,MTCL ;SET TO SPACE FORWARD
2796 011320 000403 BR YOZB
2797 011322 112767 000032 167344 YOZA: MOVB #32,MTCL ;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,ABA ;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 YOZC0 ;IF NOT: BR
2814 011434 000241 CLC
2815 011436 006003 ROR R3 ;R3 = FC/2
2816 011440 060377 157050 YOZC0: ADD R3,ABA ;SET REVERSE BUS ADDRESS
2817 011444 012767 000076 167222 MOV #76,MTCL ;SET READ REVERSE
2818 011452 000403 BR YOZC2
2819 011454 012767 000070 167212 YOZC1: MOV #70,MTCL ;SET READ FORWARD
2820 011462 016777 167070 167026 YOZC2: MOV FMCNT,ATC ;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,ASWR ;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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Address	Hex	Dec	Label	Op	Op2	Op3	Op4	Op5	Op6	Op7	Op8	Op9	Op10	Op11	Op12	Op13	Op14	Op15	Op16	Op17	Op18	Op19	Op20	Op21	Op22	Op23	Op24	Op25	Op26	Op27	Op28	Op29	Op30	Op31	Op32	Op33	Op34	Op35	Op36	Op37	Op38	Op39	Op40	Op41	Op42	Op43	Op44	Op45	Op46	Op47	Op48	Op49	Op50	Op51	Op52	Op53	Op54	Op55	Op56	Op57	Op58	Op59	Op60	Op61	Op62	Op63	Op64	Op65	Op66	Op67	Op68	Op69	Op70	Op71	Op72	Op73	Op74	Op75	Op76	Op77	Op78	Op79	Op80	Op81	Op82	Op83	Op84	Op85	Op86	Op87	Op88	Op89	Op90	Op91	Op92	Op93	Op94	Op95	Op96	Op97	Op98	Op99	Op100	Op101	Op102	Op103	Op104	Op105	Op106	Op107	Op108	Op109	Op110	Op111	Op112	Op113	Op114	Op115	Op116	Op117	Op118	Op119	Op120	Op121	Op122	Op123	Op124	Op125	Op126	Op127	Op128	Op129	Op130	Op131	Op132	Op133	Op134	Op135	Op136	Op137	Op138	Op139	Op140	Op141	Op142	Op143	Op144	Op145	Op146	Op147	Op148	Op149	Op150	Op151	Op152	Op153	Op154	Op155	Op156	Op157	Op158	Op159	Op160	Op161	Op162	Op163	Op164	Op165	Op166	Op167	Op168	Op169	Op170	Op171	Op172	Op173	Op174	Op175	Op176	Op177	Op178	Op179	Op180	Op181	Op182	Op183	Op184	Op185	Op186	Op187	Op188	Op189	Op190	Op191	Op192	Op193	Op194	Op195	Op196	Op197	Op198	Op199	Op200	Op201	Op202	Op203	Op204	Op205	Op206	Op207	Op208	Op209	Op210	Op211	Op212	Op213	Op214	Op215	Op216	Op217	Op218	Op219	Op220	Op221	Op222	Op223	Op224	Op225	Op226	Op227	Op228	Op229	Op230	Op231	Op232	Op233	Op234	Op235	Op236	Op237	Op238	Op239	Op240	Op241	Op242	Op243	Op244	Op245	Op246	Op247	Op248	Op249	Op250	Op251	Op252	Op253	Op254	Op255	Op256	Op257	Op258	Op259	Op260	Op261	Op262	Op263	Op264	Op265	Op266	Op267	Op268	Op269	Op270	Op271	Op272	Op273	Op274	Op275	Op276	Op277	Op278	Op279	Op280	Op281	Op282	Op283	Op284	Op285	Op286	Op287	Op288	Op289	Op290	Op291	Op292	Op293	Op294	Op295	Op296	Op297	Op298	Op299	Op300	Op301	Op302	Op303	Op304	Op305	Op306	Op307	Op308	Op309	Op310	Op311	Op312	Op313	Op314	Op315	Op316	Op317	Op318	Op319	Op320	Op321	Op322	Op323	Op324	Op325	Op326	Op327	Op328	Op329	Op330	Op331	Op332	Op333	Op334	Op335	Op336	Op337	Op338	Op339	Op340	Op341	Op342	Op343	Op344	Op345	Op346	Op347	Op348	Op349	Op350	Op351	Op352	Op353	Op354	Op355	Op356	Op357	Op358	Op359	Op360	Op361	Op362	Op363	Op364	Op365	Op366	Op367	Op368	Op369	Op370	Op371	Op372	Op373	Op374	Op375	Op376	Op377	Op378	Op379	Op380	Op381	Op382	Op383	Op384	Op385	Op386	Op387	Op388	Op389	Op390	Op391	Op392	Op393	Op394	Op395	Op396	Op397	Op398	Op399	Op400	Op401	Op402	Op403	Op404	Op405	Op406	Op407	Op408	Op409	Op410	Op411	Op412	Op413	Op414	Op415	Op416	Op41
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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 B0 ;IF NOT: BR
2903 012046 012777 177777 166442 MOV #-1,@FC
2904 012054 012767 000032 166612 MOV #32,MTCT
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 B0 ;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 BKTM0 ;IF SO: BR
2912 012122 012767 033434 007202 MOV #RDATA,CADER
2913 012130 004767 006216 JSR PC,ERPT ;PRINT ERROR
2914 012134 000404 BR B0
2915 012136 012703 033434 BKTM0: MOV #RDATA,R3
2916 012142 004767 005444 JSR PC,ER2
2917 012146 016700 166402 B0: MOV RCNT,R0
2918 012152 005100 COM R0 ;BUILD SPACE AMOUNT
2919 012154 005200 INC R0
2920 012156 012767 025005 166470 MOV #MSG10,EMADDR ;SET ERROR MESSG ADDRESS
2921 012164 010077 166326 MOV R0,@FC
2922 012170 012767 000032 166476 BKRT: MOV #32,MTCT ;SET SPACE REVERSE
2923 012176 012767 012214 166460 MOV #B1,RTRN ;SET RETURN ADDRESS
2924 012204 010067 166460 MOV R0,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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2967 012250 012701 177760
2968 012254 012702 174000
2969 012260 004767 011346
2970 012264 042767 000001 166334
2971 012272 016767 166330 166256
2972 012300 012767 177777 002102
2973 012306 000207
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2985 012310 012702 000001
2986 012314 012701 000500
2987 012320 004767 011306
2988 012324 016767 166276 166222
2989 012332 000207
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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,RANSV   ;
        MOV    RANSV,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    RANSV,RCNT ;SET RECORD COUNT
        RTS    PC         ;EXIT

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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 WRITING 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.
;*****

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,R0 ;SET SIZE OF TABLE
      MOV #UN1,R1 ;SET START OF TABLE
TINPB: CLR (R1)+ ;CLEAR TABLE
      DEC R0 ;SEE IF DONE
      BNE TINPB ;IF NOT: BR

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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	000003		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,ACS
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,ACS	
3096	012660	005777	165624		TST	AC1	;ACCESS DRIVE
3097	012664	032777	010000	165626	BIT	#10000,ACS	;SEE IF NED
3098	012672	001413			BEQ	TINP0	;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

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,R0	
3119	013006	012760	177777	000746	MOV	#-1,UN1(R0)	:SET END UNIT TABLE
3120	013014	000167	000402		JMP	TINP2C	:GO GET RECORD COUNT
3121	013020	016700	165652		TINPOB: MOV	UNP,R0	
3122	013024	042760	000007	000746	BIC	#7,UN1(R0)	:CLEAR UNIT NUMBER
3123	013032	004767	001124		JSR	PC,TPOS1	:GO LOAD UNIT NUMBER TO PROPER POSITION
3124	013036	012777	000040	165454	MOV	#40,ACS	
3125	013044	016777	165500	165446	MOV	DVN,ACS	
3126	013052	016077	000746	165462	MOV	UN1(R0),AC2	:LOAD UNIT NUMBER
3127	013060	032777	002000	165450	TINPOC: BIT	#2000,ADT	: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,ADT	: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	ADT,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	ASN,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,TTR	;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		MOVB	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

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	TINP4: 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*****

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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3297
3298 014176 005767 001006      DSUP:  TST      RDFL      ;SEE IF DID RANDOM DATA
3299 014202 001401              BEQ      DSO      ;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              RTS      PC
3316 014270 012703 027426      DSOB:  MOV      #WDATA,R3 ;R3 = ADDRS OF WRITE BUFFER
3317 014274 016701 164260      DSOA:  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 014346 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                      ;EXTERNAL DATA INPUT FROM H/S READER (256 CHARACTER MAXIMUM)
3343
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
3376

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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     J 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: MOVB   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
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    RANSAB,(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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3522 015212 016700 163340
3523 015216 005400
3524 015220 012701 027426
3525 015224 005067 000346
3526 015230 111104
3527 015232 004767 000166
3528 015236 004767 000310
3529 015242 000241
3530 015244 006004
3531 015246 103014
3532 015250 052704 000400
3533 015254 000241
3534 015256 010405
3535 015260 042705 177703
3536 015264 005105
3537 015266 042705 177703
3538 015272 042704 000074
3539 015276 050504
3540 015300 010467 000272
3541 015304 005300
3542 015306 001402
3543 015310 000167 177714
3544 015314 016704 000256
3545 015320 005167 000252
3546 015324 042767 177050 000244
3547 015332 042704 177727
3548 015336 050467 000234
3549 015342 016767 000230 000230
3550 015350 016700 163202
3551 015354 005400
3552 015356 012701 027426
3553 015362 005067 000210
3554 015366 111104
3555 015370 004767 000030
3556 015374 004767 000152
3557 015400 005300
3558 015402 001371
3559 015404 016704 000170
3560 015410 004767 000136
3561 015414 016767 000156 000160
3562 015422 000207
3563 015424 005704
3564 015426 001010
3565 015430 032767 000010 163114
3566 015436 001404
3567 015440 012704 000420
3568 015444 005201

;*****
;CRC/LRC CHARACTER BUILD;
;
;THIS ROUTINE WILL CONSTRUCT AND SAVE THE EXPECTED
;CRC AND LRC CHARACTERS ACCORDING TO DATA AND
;RECORD SIZE IF OPERATING IN NRZ MODE
;*****

CRCLRC: MOV FMCNT,R0 ;SET RECORD SIZE
        NEG R0
        MOV #WDATA,R1 ;SET START OF BUFFER
        CLR XORS
CLO:     MOV (R1),R4 ;GET CHARACTER
        JSR PC,CLP ;GO GET PARITY OF CHARACTER
        JSR PC,XOR ;XOR CHARACTER
        CLC
        ROR R4 ;ROTATE 1 RIGHT
        BCC CL2 ;IF NO CARRY: BR
        BIS #400,R4 ;SET BIT NINE
        CLC
CL1:     MOV R4,R5 ;SAVE CHARACTER
        BIC #177703,R5
        COM R5
        BIC #177703,R5
        BIC #74,R4
        BIS R5,R4 ;COMPLIMENT BITS 2,3,4,5
CL2:     MOV R4,XORS
        DEC R0
        BEQ CLLAST ;IF LAST CHARACTER: BR
        JMP CLO ;GET NEXT
CLLAST: MOV XORS,R4
        COM XORS
        BIC #177050,XORS
        BIC #177727,R4 ;COMPLIMENT ALL BUT BITS 3&5
        BIS R4,XORS
        MOV XORS,EXCRC ;SAVE EXPECTED CRC
        MOV FMCNT,R0
        NEG R0
        MOV #WDATA,R1 ;DO EXPT LRC
        CLR XORS
CL3:     MOV (R1),R4
        JSR PC,CLP ;GET PARITY
        JSR PC,XOR ;XOR CHARACTER
        DEC R0
        BNE CL3 ;DO ALL FOR LRC
        MOV EXCRC,R4
        JSR PC,XOR ;XOR CRC TO DATA
        MOV XORS,EXLRC ;SAVE EXPT LRC
        RTS PC ;RETURN
CLP:     TST R4 ;SEE IF 0 CHAR
        BNE CLPE ;IF NOT: BR
        BIT #10,UDES ;SEE IF EVEN PARITY
        BEQ CLPE ;IF NOT: BR
        MOV #420,R4 ;SET 0 CHAR EVEN PARITY
        INC R1 ;BUMP POINTER

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3569	015446	000207			RTS	PC	;RETURN
3570	015450	005067	000130		CLPE: CLR	PARCNT	;CLEAR BIT COUNTER
3571	015454	012703	000010		MOV	#10,R3	;SET NUMBER OF BITS
3572	015460	032704	000001		CLP0: BIT	#1,R4	;SEE IF ONE BIT
3573	015464	001402			BEQ	CLP1	;IF NOT: BR
3574	015466	005267	000112		INC	PARCNT	;BUMP COUNTER
3575	015472	000241			CLP1: CLC		
3576	015474	006004			ROR	R4	;ROTATE TO NEXT BIT
3577	015476	005303			DEC	R3	
3578	015500	001367			BNE	CLP0	;CONTINUE FOR ALL BITS
3579	015502	112104			MOVB	(R1)+,R4	
3580	015504	042704	177400		BIC	#177400,R4	
3581	015510	032767	000001	000066	BIT	#1,PARCNT	;SEE IF ODD NUMBER OF ONE BITS
3582	015516	001005			BNE	CLP2	;IF SO: BR
3583	015520	032767	000010	163024	BIT	#10,UDES	;SEE IF SHOULD BE EVEN PARITY
3584	015526	001406			BEQ	CLP3	;IF NOT: BR
3585	015530	000207			RTS	PC	;ELSE EXIT
3586	015532	032767	000010	163012	CLP2: BIT	#10,UDES	;SEE IF SHOULD BE ODD PARITY
3587	015540	001001			BNE	CLP3	;IF NOT: BR
3588	015542	000207			RTS	PC	;ELSE EXIT
3589	015544	052704	000400		CLP3: BIS	#400,R4	;SET PARITY BIT
3590	015550	000207			RTS	PC	
3591	015552	010446			XOR: MOV	R4,-(SP)	
3592	015554	046716	000016		BIC	XORS,(SP)	
3593	015560	040467	000012		BIC	R4,XORS	;XOR SUBROUTINE: R4 WITH XORS
3594	015564	052667	000006		BIS	(SP)+,XORS	
3595	015570	016704	000002		MOV	XORS,R4	
3596	015574	000207			RTS	PC	
3597							
3598	015576	000000			XORS: 0		;XOR SAVE
3599	015600	000000			EXCRC: 0		;EXPECTED CRC
3600	015602	000000			EXLRC: 0		;EXPECTED LRC
3601	015604	000000			PARCNT: 0		;PARITY COUNTER
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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      DCHK0      ;IF NOT: BR
3623 015632 000261          SEC
3624 015634 006005          ROR      R5          ;R5 = FC/2
3625 015636 012701 027426      DCHK0: 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      DFOC0      ;IF NOT: BR
3629 015656 032767 000020 162666 BIT      #20,UDES   ;SEE IF CORE DUMP PARITY
3630 015664 001024          BNE      DFOC0      ;IF SO: BR
3631 015666 032767 002000 162656 BIT      #2000,UDES  ;SEE IF PE MODE
3632 015674 001020          BNE      DFOC0      ;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 DF0C0: BIT      #10000,RDCMD ;SEE IF READ REVERSE
3645 015744 001462          BEQ      DF0      ;IF NOT: BR
3646 015746 016704 162604      DF0B:  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      DF0B0      ;IF NOT: BR
3650 015764 000241          CLC
3651 015766 006004          ROR      R4          ;SET TO FC/2
3652 015770 060401          DF0B0: 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      DF0A      ;IF NOT: BR
3656 016004 105722          TSTB     (R2)+      ;BUMP POINTER
3657 016006 032767 000020 162536 DF0A:  BIT      #20,UDES   ;SEE IF CORE DUMP
3658 016014 001431          BEQ      DF0A4      ;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	DF0A0	;IF NOT: BR
3662	016026	000261		SEC		
3663	016030	106012		DF0A0:	RORB	(R2)
3664	016032	000241		CLC		
3665	016034	132712	000001	BITB	#1,(R2)	
3666	016040	001401		BEQ	DF0A1	
3667	016042	000261		SEC		
3668	016044	106012		DF0A1:	RORB	(R2)
3669	016046	000241		CLC		;POSITION BITS FOR REVERSE CORE DUMP
3670	016050	132712	000001	BITB	#1,(R2)	
3671	016054	001401		BEQ	DF0A2	
3672	016056	000261		SEC		
3673	016060	106012		DF0A2:	RORB	(R2)
3674	016062	000241		CLC		
3675	016064	132712	000001	BITB	#1,(R2)	
3676	016070	001401		BEQ	DF0A3	
3677	016072	000261		SEC		
3678	016074	106012		DF0A3:	RORB	(R2)
3679	016076	005202		INC	R2	;RESET POINTER
3680	016100	124142		DF0A4:	CMPB	-(R1),-(R2)
3681	016102	001010		BNE	DF1	;TEST DATA CHARACTER
3682	016104	105067	162550	CLRB	BBC	;IF NOT GOOD: BR
3683	016110	000411		BR	DF2	;CLEAR BAD RECORD COUNTER
3684	016112	122122		DF0:	CMPB	(R1)+,(R2)+
3685	016114	001003		BNE	DF1	;CHECK DATA
3686	016116	105067	162536	CLRB	BBC	;IF BAD: BR
3687	016122	000404		BR	DF2	;CLEAR BAD RECORD CNTR
3688	016124	004767	000632	DF1:	JSR	PC,DRPKF
3689	016130	004767	000066		JSR	PC,DERR
3690	016134	005205		DF2:	INC	R5
3691	016136	001405		BEQ	DF3	;GO GET DROPS AND PICKS
3692	016140	032767	010000 162414	BIT	#10000,RDCMD	;GO DO PRINT
3693	016146	001761		BEQ	DF0	;BUMP CHAR CNTR
3694	016150	000716		BR	DF0A	;IF DONE ALL: BR
3695	016152	005067	162510	DF3:	CLR	HDRFL
3696	016156	005767	162524		TST	DERFL
3697	016162	001416		BEQ	DFX	;SEE IF HAD DATA ERROR
3698	016164	005767	162520	TST	SERFL	;IF NOT: BR
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)
3706	016220	000207		DFX:	RTS	PC
3707						;EXIT

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3736 016222 032777 002000 162356 DERR: BIT #2000,BSWR ;SEE IF SHOULD PRINT ERRORS
3737 016230 001402 BEQ DERRO ;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 DERROA ;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 DERROA: 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 DERROB: 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 DERROD
3762 016354 114103 DERROC: MOVB -(R1),R3 ;LOAD EXPECTED DATA
3763 016356 004767 006132 DERROD: JSR PC,DOUT ;GO PRINT CHAR

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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	

Address	Hex	Hex	Hex	Label	Operation	Comment
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
3831	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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3854 016762 005067 161656      DRPKF: CLR      TEMP1
3855 016766 005067 161654      CLR      TEMP2
3856 016772 005067 161652      CLR      TEMP3
3857 016776 111167 161642      MOV      (R1),TEMP1      ;LOAD GOOD CHAR
3858 017002 111267 161640      MOV      (R2),TEMP2      ;LOAD BAD CHAR
3859 017006 016704 161664      MOV      UNP,R4
3860 017012 016467 000770 161702  MOV      PIK1(R4),BPKP
3861 017020 016467 001010 161672  MOV      DRP1(R4),BDPP
3862 017026 032767 010000 161526  BIT      #10000,RDCMD      ;SEE IF READ REVERSE
3863 017034 001005      BNE      DRPK      ;IF SO: BR
3864 017036 124142      CMP      -(R1),-(R2)      ;POINT TO CHAR
3865 017040 112167 161600      MOV      (R1)+,TEMP1      ;LOAD GOOD CHAR
3866 017044 112267 161576      MOV      (R2)+,TEMP2      ;LOAD BAD CHAR
3867 017050 004767 000006      DRPK:  JSR      PC,DROP      ;GET DROPS
3868 017054 004767 000222      JSR      PC,PICK      ;GET PICKS
3869 017060 000207      RTS      PC      ;EXIT
3870 017062 116703 161556      DROP:  MOV      TEMP1,R3      ;R3 = GOOD CHAR
3871 017066 116704 161554      MOV      TEMP2,R4      ;R4 = BAD CHAR
3872 017072 140403      DPC:   BIC      R4,R3      ;GET DROPS/PICKS
3873 017074 001001      BNE      DPCG      ;IF SOME: BR
3874 017076 000207      RTS      PC      ;RETURN
3875 017100 012767 000010 161604  DPCG:  MOV      #10,BCNT      ;SET NUMBER TO CHECK
3876 017106 132703 000001      DPC0:  BIT      #1,R3      ;SEE IF DROPPED OR PICKED THIS BIT
3877 017112 001455      BEQ      DPC2      ;IF NOT: BR
3878 017114 105767 161530      TST      TEMP3      ;SEE IF ON PICKS
3879 017120 001016      BNE      DPC1      ;IF SO: BR
3880 017122 005277 161572      INC      @BDPP      ;BUMP DROP CNTR
3881 017126 005777 161566      TST      @BDPP
3882 017132 100045      BPL      DPC2      ;IF NO OVERFLOW: BR
3883 017134 032777 002000 161444  BIT      #2000,@SWR      ;SEE IF HAVE PRINTED DATA
3884 017142 001402      BEQ      DPC0A      ;IF SO: BR
3885 017144 004767 004030      JSR      PC,PAPRT      ;PRINT CYCLE NUMBER
3886 017150 004767 000172      DPC0A: JSR      PC,DPPRT      ;PRINT DROPS AND PICKS
3887 017154 000415      BR      DPC2A
3888 017156 005277 161540      DPC1:  INC      @BPKP      ;BUMP PICK CNTR
3889 017162 005777 161534      TST      @BPKP      ;SEE IF OVERFLOW
3890 017166 100027      BPL      DPC2      ;IF NOT: BR
3891 017170 032777 002000 161410  BIT      #2000,@SWR      ;SEE IF HAVE PRINTED DATA

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3892 017176 001402      BEQ      DPC1A      ;IF SO: BR
3893 017200 004767 003774      JSR      PC,PAPRT  ;PRINT CYCLE NUMBER
3894 017204 004767 000136      JSR      PC,DPPRT  ;PRINT DROPS AND PICKS
3895 017210 016704 161462      DPC2A: MOV      UNP,R4
3896 017214 016403 001010      MOV      DRP1(R4),R3 ;SET DROP POINTER
3897 017220 016404 000770      MOV      PIK1(R4),R4 ;SET PICK POINTER
3898 017224 012767 000010 161460      MOV      #10,BCNT ;SET NUMBER OF BITS
3899 017232 005023      DPC2B: CLR      (R3)+ ;CLEAR DROPS
3900 017234 005024      CLR      (R4)+ ;CLEAR PICK
3901 017236 005367 161450      DEC      BCNT ;SEE IF DONE
3902 017242 001373      BNE      DPC2B ;IF NOT: BR
3903 017244 000207      RTS      PC ;EXIT
3904 017246 000241      DPC2:  CLC
3905 017250 106003      RORB      R3 ;GET NEXT BIT
3906 017252 005367 161434      DEC      BCNT ;SEE IF DONE
3907 017256 001410      BEQ      DPC3
3908 017260 062767 000002 161434      ADD      #2,BPKP
3909 017266 062767 000002 161424      ADD      #2,BDPP
3910 017274 000167 177606      JMP      DPC0 ;CONTINUE
3911 017300 000207      DPC3:  RTS      PC ;RETURN
3912 017302 016704 161370      PICK: MOV      UNP,R4 ;GET UNIT POINTER
3913 017306 016467 000770 161406      MOV      PIK1(R4),BPKP ;SET PICK POINTER
3914 017314 016467 001010 161376      MOV      DRP1(R4),BDPP ;SET DROP POINTER
3915 017322 116704 161316      MOVB     TEMP1,R4 ;R4 = GOOD CHAR
3916 017326 116703 161314      MOVB     TEMP2,R3 ;R3 = BAD CHAR
3917 017332 112767 000001 161310      MOVB     #1,TEMP3 ;SET PICK FLAG
3918 017340 004767 177526      JSR      PC,DPC ;GO CHECK PICKS
3919 017344 000207      RTS      PC ;EXIT
3920 017346 012704 025330      DPPRT: MOV      #MSG26,R4
3921 017352 004767 004544      JSR      PC,TTOUT ;PRINT DROP HEADER
3922 017356 016704 161314      MOV      UNP,R4
3923 017362 016467 001010 161330      MOV      DRP1(R4),BDPP ;SET DROP POINTER
3924 017370 016467 000770 161324      MOV      PIK1(R4),BPKP ;SET PICK POINTER
3925 017376 062767 000016 161314      ADD      #16,BDPP
3926 017404 062767 000016 161310      ADD      #16,BPKP
3927 017412 012767 000010 161272      MOV      #10,BCNT ;SET NUMBER TO PRINT
3928 017420 017703 161274      DPPRT0: MOV      @BDPP,R3
3929 017424 004767 004644      JSR      PC,OCTP ;PRINT DROPS
3930 017430 005367 161256      DEC      BCNT ;SEE IF DONE
3931 017434 001404      BEQ      DPPRT1 ;IF NOT: BR
3932 017436 162767 000002 161254      SUB      #2,BDPP ;BUMP POINTER
3933 017444 000765      BR       DPPRT0 ;CONTINUE FOR ALL 8 BITS
3934 017446 012767 000010 161236      DPPRT1: MOV      #10,BCNT ;SET NUMBER TO PRINT
3935 017454 012704 025341      MOV      #MSG27,R4
3936 017460 004767 004436      JSR      PC,TTOUT ;PRINT PICK HEADER
3937 017464 017703 161232      DPPRT2: MOV      @BPKP,R3
3938 017470 004767 004600      JSR      PC,OCTP ;PRINT PICKS
3939 017474 005367 161212      DEC      BCNT ;SEE IF DONE
3940 017500 001404      BEQ      DPPRTX ;IF SO: BR
3941 017502 162767 000002 161212      SUB      #2,BPKP ;BUMP POINTER
3942 017510 000765      BR       DPPRT2 ;CONTINUE FOR ALL 8 BITS
3943 017512 000207      DPPRTX: RTS      PC ;RETURN

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3969 017514 016703 161036 ERCHK: MOV FMCNT,R3 ;GET FRAME COUNT
3970 017520 032703 000001 BIT #1,R3 ;SEE IF ODD
3971 017524 001401 BEQ ERO ;IF NOT: BR
3972 017526 005303 DEC R3 ;BUMP COUNT
3973 017530 005403 ERO: NEG R3
3974 017532 032767 000020 161012 BIT #20,UDES ;SEE IF CORE DUMP
3975 017540 001402 BEQ EROB ;IF NOT: BR
3976 017542 000241 CLC
3977 017544 006003 ROR R3 ;SET TO FC/2
3978 017546 032767 000010 161120 EROB: BIT #10,MTCT ;SEE IF WRITE OP
3979 017554 001414 BEQ ER1 ;IF SO: BR
3980 017556 032767 010000 160776 BIT #10000,RDCMD
3981 017564 001405 BEQ EROA
3982 017566 012703 033434 MOV #RDATA,R3
3983 017572 162703 000002 SUB #2,R3 ;SET POINTER
3984 017576 000405 BR ER2
3985 017600 062703 033434 EROA: ADD #RDATA,R3 ;BUILD EXPT READ ADDRESS
3986 017604 000402 BR ER2
3987 017606 062703 027426 ER1: ADD #WDATA,R3 ;BUILD EXPT WRITE ADDRESS
3988 017612 010367 001514 ER2: MOV R3,CADER ;SAVE ADDRESS
3989 017616 012704 000007 MOV #7,R4
3990 017622 012701 021334 MOV #BAER,R1
3991 017626 005021 ER2A0: CLR (R1)+ ;CLEAR FLAGS
3992 017630 005304 DEC R4
3993 017632 001375 BNE ER2A0
3994 017634 020377 160654 CMP R3,@BA ;SEE IF ADDRESS OK
3995 017640 001402 BEQ ER2A1 ;IF SO: BR
3996 017642 005267 001466 INC BAER ;SET BUS ADDRESS ERROR
3997 017646 032767 000010 161020 ER2A1: BIT #10,MTCT ;SEE IF WRITE OPER
3998 017654 001007 BNE ER2B ;IF NOT: BR
3999 017656 005777 160634 ER2A: TST @FC ;SEE IF FC=0

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4000	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	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		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	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		MOV	#1, R3		
4020	017770	000753			BR	ER2C		;GO CHECK FC FOR TM
4021	017772	032777	160000	160510	BIT	#160000, @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	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		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		INC	CONER		;SET CONT ERROR FLAG
4044	020106	032777	040000	160406	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		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		INC	DRVER		;SET DRIVER ERROR FLAG

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	015767	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, LRCSV	; 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	CR CER	; 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	LR CER	; 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	LR CER	; 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, ERSV	; SAVE ERROR REGISTER
4099	020420	032777	002000	160160		BIT	#2000, @SWR	; SEE IF PRINT
4100	020426	001420				BEQ	ERPT0	; 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	ERPT0	; IF SO: BR
4107	020454	022767	000002	000656	ERPTG1:	CMP	#2, DRIVER	; SEE IF TM STATUS ERROR
4108	020462	001402				BEQ	ERPT0	; IF SO: BR
4109	020464	000167	000510			JMP	ERPX0	
4110	020470	005267	160176		ERPT0:	INC	PFLG	
4111	020474	004767	002500			JSR	PC, PAPRT	; PRINT HEADER

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

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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      DRIVER
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
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,MTCT1
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      CRCV,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      DRIVER: 0
4223 021342 000000      FCER: 0

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4224 021344 000000
4225 021346 000000
4226 021350 000000
4227 021352 000000
4228 021354 000000

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

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; 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.

4238
4239 021356 032767 000010 157310 FRPRT:
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

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

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4279 021422 005067 157216
4280 021426 016777 157116 157064
4281 021434 016704 157236
4282 021440 032777 010000 157054
4283 021446 001046
4284 021450 005267 157170
4285 021454 001367
4286 021456 032777 002000 157122
4287 021464 001034
4288 021466 036467 022122 157140
4289 021474 001030
4290 021476 056467 022122 157130
4291 021504 004767 001470
4292 021510 032767 000010 157156
4293 021516 001005
4294 021520 012704 024750
4295 021524 004767 002372
4296 021530 000406
4297 021532 012704 024755
4298 021536 004767 002360
4299 021542 004767 177610
4300 021546 012704 025310
4301 021552 004767 002344
4302 021556 005726
4303 021560 000167 162432
4304 021564 016704 157106
4305 021570 046467 022122 157036

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*****
;TAPE COMMAND EXECUTE SUBROUTINE:
;
;THIS SUBROUTINE IS USED TO EXECUTE THE
;MAG TAPE COMMAND DESCRIBED BY THE READ
;OR WRITE ROUTINE. THE FINAL COMMAND IS
;SENT TO THE DEVICE REGISTER ALONG WITH THE
;INTERRUPT ENABLE AND GO BITS.
;ONCE THE COMMAND IS ISSUED, AN INTERRUPT
;TIMER IS STARTED AND IF NO INTERRUPT IS RETURNED
;BEFORE TIME OUT OCCURS, AN ERROR WILL BE
;PRINTED AND THE PROGRAM STOPPED. TESTING MAY
;BE RESUMED BY PRESSING THE CONTINUE SWITCH.
;TWO INTERRUPT HANDLERS ARE USED, ONE FOR MAG TAPE
;AND ANOTHER FOR TELETYPE (TTY).
;UPON RECEIPT OF A MAG TAPE INTERRUPT, HOUSEKEEPING
;IS PERFORMED AND CONTROL RETURNED TO THE CALLING
;ROUTINE (READ,WRITE,ETC).
;RECEIPT OF A TTY INTERRUPT WILL CAUSE THE
;PROGRAM TO CHECK FOR ENTRY OF A CNTRL C CHARACTER.
;IF NOT CNTRL C, THEN CONTINUATION OF WAIT FOR MAG
;TAPE INTERRUPT IS RETURNED. IF, HOWEVER, THE TTY
;INTERRUPT WAS CAUSED BY ENTRY OF A CNTRL C,
;THEN AT THIS TIME REQUESTS FOR NEW STALL VALUES
;ARE PRINTED AND THE RESPONSES ENTERED. RESUMPTION
;OF TAPE INTERRUPT WAIT IS THEN RESUMED.
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TAPG: CLR      TEMP1
      MOV      DVN,@CS      ;SET DRIVE NO.
TAPG0: MOV      UNP,R4      ;GET UNIT POINTER
      BIT      #10000,@DS   ;SEE IF HAVE MOL
      BNE      TAPG3       ;IF SO: BR
      INC      TEMP1       ;SEE IF TIMED OUT
      BNE      TAPG0       ;WAIT FOR READY
      BIT      #2000,@SWR   ;SKIP PRINT?
      BNE      MOLEX
      BIT      MOLTAB(4),MOLSW ;FIRST TIME?
      BNE      MOLEX       ;NO
      BIS      MOLTAB(4),MOLSW ;SET FLAG
      JSR      PC,PAPRT    ;PRINT CYCLE NUMBER
      BIT      #10,MTC1    ;SEE IF WRITE OP
      BNE      TAPG1       ;IF NOT: BR
      MOV      #MSG5,R4
      JSR      PC,TTOUT    ;PRINT WRITE ERR
      BR       TAPG2
TAPG1: MOV      #MSG6,R4
      JSR      PC,TTOUT    ;PRINT READ ERR
      JSR      PC,FRPRT    ;PRINT F OR R
TAPG2: MOV      #MSG25,R4
      JSR      PC,TTOUT    ;PRINT NO MOL ERR
MOLEX: POPSP
      JMP      START7
TAPG3: MOV      UNP,R4
      BIC      MOLTAB(4),MOLSW ;CLEAR FLAG

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4306	021576	032777	020000	156716		BIT	#20000,ADS	;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,ADS	
4312	021630	001374				BNE	1\$	;AWAIT PIP RESET
4313	021632	022767	000026	157034	TAPG3F:	CMP	#26,MTCT	;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,MTCT	;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	MTCT,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,MTCT	;SET INTERRUPT ENABLE AND GO
4341	022002	000240				NOP		
4342	022004	016777	156664	156476		MOV	MTCT,@C1	;EXECUTE COMMAND
4343	022012	005077	156566			CLR	@PSW	;CLEAR PRIORITY
4344	022016	005767	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

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SEQ 0098

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,TINP4 ;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 @RTRN ;RETURN

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4401 022234 012704 027162
4402 022240 004767 001656
4403 022244 012705 000652
4404 022250 012701 000001
4405 022254 012702 000001
4406 022260 012703 000000
4407 022264 004767 001374
4408 022270 012704 026757
4409 022274 004767 001622
4410 022300 012705 000744
4411 022304 012701 000001
4412 022310 012702 000001
4413 022314 012703 000000
4414 022320 004767 001340
4415 022324 005067 156410
4416 022330 004767 000130
4417 022334 012704 026711
4418 022340 004767 001556
4419 022344 012704 026737
4420 022350 004767 001546
4421 022354 016703 156360
4422 022360 004767 001710
4423 022364 012704 026746
4424 022370 004767 001526
4425 022374 012700 000746
4426 022400 005710
4427 022402 100404
4428 022404 012003
4429 022406 004767 001662
4430 022412 000772
4431 022414 004767 000216
4432 022420 004767 000406
4433 022424 022767 000007 156306
4434 022432 001403
4435 022434 005267 156300
4436 022440 000733
4437 022442 005767 156276
4438 022446 001005
4439 022450 012704 026670
4440 022454 004767 001442
4441 022460 000000
4442 022462 000720

;*****
;AUTO SEQUENCE
;
;THIS ROUTINE ,ENTERED VIA STARTING ADDRESS 240
;WILL EXERCISE ALL AVAILABLE SLAVES ON ALL AVAILABLE
;DRIVES IN BOTH PE AND NRZ ACCORDING TO THE PRESELECTED
;TEST PLAN. IF NRZ ONLY, PE TESTING WILL NOT BE ATTEMPTED.
;*****

: ASEQ: MOV #MSG108,R4
      JSR PC,TTOUT ;PRINT NRZ ONLY REQUEST
      MOV #NRZOF,R5 ;SET ADDRESS OF FLAG
      MOV #1,R1 ;SET SIZE OF ENTRY
      MOV #1,R2 ;SET UPPER LIMIT
      MOV #0,R3 ;SET LOWER LIMIT
      JSR PC,TTR ;GO GET RESPONSE
      MOV #MSG104,R4
      JSR PC,TTOUT ;REQUEST CONT OR NOT
      MOV #ASEQCF,R5 ;SET ADDRESS OF ENTRY
      MOV #1,R1 ;SET SIZE OF ENTRY
      MOV #1,R2 ;SET UPPER LIMIT
      MOV #0,R3 ;SET LOWER LIMIT
      JSR PC,TTR ;GO GET INPUT
      ASEQ0: CLR ADRVN ;CLEAR DRV NUM
      ASEQ1: JSR PC,HRDS ;GO SELECT HARDWARE CONFIGURATION
      MOV #MSG101,R4
      JSR PC,TTOUT ;PRINT DIVIDER
      MOV #MSG102,R4
      JSR PC,TTOUT ;PRINT TM02 NUMBER
      MOV ADRVN,R3
      JSR PC,OCTP ;PRINT TM02
      MOV #MSG103,R4
      JSR PC,TTOUT ;PRINT SLAVE HDR
      MOV #UN1,R0 ;POINT TO START OF SLAVE TABLE
      ASEQ2: TST (R0) ;SEE IF END
      BMI ASEQ3 ;IF SO: BR
      MOV (R0)+,R3
      JSR PC,OCTP ;PRINT SLAVE TABLE
      BR ASEQ2 ;DO ALL
      ASEQ3: JSR PC,AMOD1 ;GO DO MODE 1(NRZ)
      JSR PC,AMOD2 ;GO DO MODE 2(PE)
      ASEQ4: CMP #7,ADRVN ;SEE IF DONE ALL DRIVES
      BEQ ASEQX ;IF SO: BR
      INC ADRVN ;BUMP DRIVE NUMBER
      BR ASEQ1 ;CONTINUE
      ASEQX: TST ASEQCF ;SEE IF CONTINUOUS AUTO SEQ
      BNE ASEQXX ;IF SO: BR
      MOV #MSG100,R4
      JSR PC,TTOUT ;PRINT END OF PASS
      HALT
      ASEQXX: BR ASEQ0

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4443
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4446 022464 005067 162312
4447 022470 005067 156150
4448 022474 012777 000040 156016
4449 022502 016777 156232 156010
4450 022510 017701 156022
4451 022514 032777 010000 155776
4452 022522 001403
4453 022524 005726
4454 022526 000167 177672
4455 022532 032701 040000
4456 022536 001772
4457 022540 005000
4458 022542 012701 000746
4459 022546 010077 155770
4460 022552 032777 010000 155742
4461 022560 001403
4462 022562 005267 156056
4463 022566 010021
4464 022570 022700 000007
4465 022574 001402
4466 022576 005200
4467 022600 000762
4468 022602 005767 156036
4469 022606 001746
4470 022610 016767 156030 162164
4471 022616 000367 156022
4472 022622 056737 156016 162152
4473 022630 012711 177777
4474 022634 000207

;SUBROUTINE TO SELECT AUTO SEQUENCE HARDWARE*****
HRDS: CLR REOTC ;CLEAR EOT UNIT CNTR
CLR TEMP1
MOV #40,ACS ;INIT
MOV ADRVN,ACS ;SET DRIVE
MOV @DT,R1 ;READ DRIVE TYPE
BIT #10000,ACS ;TEST FOR NON-EXISTANT DRIVE
BEQ HRDS1 ;IF DRIVE AVAIL: BR
HRDS0: TST (SP)+ ;RESET STACK POINTER
JMP ASEQ4 ;IF NOT: BR
HRDS1: BIT #40000,R1 ;SEE IF DRIVE IS TAPE
BEQ HRDS0 ;IF NOT: BR
CLR RO
MOV #UN1,R1 ;SET START OF SLAVE TABLE
HRDS2: MOV RO,AC2 ;SELECT SLAVE
BIT #10000,ADS ;SEE IF SLAVE AVAIL FOR TEST(MOL)
BEQ HRDS3 ;IF NOT: BR
INC TEMP1 ;SET SLAVE FOUND FLAG
MOV RO,(R1)+ ;LOAD SLAVE TABLE
HRDS3: CMP #7,RO ;SEE IF DONE ALL SLAVES
BEQ HRDS4 ;IF SO: BR
INC RO ;ELSE BUMP SLAVE NUMBER
BR HRDS2 ;CONTINUE SELECTION
HRDS4: TST TEMP1 ;SEE IF FOUND ANY SLAVES
BEQ HRDS0 ;IF NOT: BR
MOV TEMP1,REOTC ;SET NUMBER OF UNITS
SWAB TEMP1
BIS TEMP1,REOTC ;SET EOT CNTR
MOV #-1,(R1) ;TERMINATE SLAVE TABLE
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,RWMDA ;GO REWIND ALL AVAIL SLAVES
MOV #50,ABLCNT ;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,ABLCNT ;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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4507
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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
      LDM (R1) ;SEE IF END 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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4553 023200 012704 025026
4554 023204 004767 000712
4555 023210 016703 155334
4556 023214 004767 001054
4557 023220 012704 025012
4558 023224 004767 000672
4559 023230 016703 155316
4560 023234 042703 177770
4561 023240 004767 001030
4562 023244 012704 026267
4563 023250 004767 000646
4564 023254 016703 155272
4565 023260 000303
4566 023262 042703 177770
4567 023266 004767 001002
4568 023272 012704 026273
4569 023276 004767 000620
4570 023302 005003
4571 023304 032767 000010 155240
4572 023312 001402
4573 023314 012703 000001
4574 023320 004767 000750
4575 023324 012704 026277
4576 023330 004767 000566
4577 023334 016703 155212
4578 023340 000241
4579 023342 006003
4580 023344 006003
4581 023346 006003
4582 023350 006003
4583 023352 042703 177760
4584 023356 004767 000712
4585 023362 012704 024767
4586 023366 004767 000530
4587 023372 032777 000400 155206
4588 023400 001406
4589 023402 012767 000122 155230
4590 023410 004767 000616
4591 023414 000412
4592 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
      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,ASWR ;SEE IF RANDOM DATA
      BEQ PAPRTB ;IF NOT: BR
      MOV #122,TOB
      JSR PC,TOG ;PRINT R
      BR PAPRTD
      TST ASEQF ;SEE IF AUTO SEQ

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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							

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*****  
:RANDOM NUMBER GENERATOR SUBROUTINE:  
:  
:THIS SUBROUTINE IS USED TO GENERATE THE RANDOM  
:NUMBERS REQUIRED FOR USE AS RANDOM DATA,  
:RECORD COUNT, AND CHARACTER COUNT.  
:*****
```

```
RANG:  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
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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      TTR1A      ;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      TTR1B      ;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      TTR3      ;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      TTR4      ;ELSE GO TO ERROR
4697 024026 010015              TTR4:  MOV      RO,(R5)      ;LOAD VALUE
4698 024030 000207              TTR5:  RTS      PC      ;EXIT
4699 024032 012704 026001      TINER: 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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4706 024050 005077 154534
4707 024054 005077 154532
4708 024060 005067 154556
4709 024064 005277 154520
4710 024070 105777 154514
4711 024074 100375
4712 024076 017767 154510 154536
4713 024104 105777 154504
4714 024110 100375
4715 024112 116777 154524 154476
4716 024120 000207
4717
4718
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4720 024122 112467 154512
4721 024126 122767 000043 154504
4722 024134 001444
4723 024136 122767 000045 154474
4724 024144 001407
4725 024146 122767 000041 154464
4726 024154 001435
4727 024156 004767 000050
4728 024162 000757
4729 024164 112767 000015 154446
4730 024172 004767 000034
4731 024176 012703 000006
4732 024202 005067 154432
4733 024206 004767 000020
4734 024212 005303
4735 024214 001372
4736 024216 112767 000012 154414
4737 024224 004767 000002
4738 024230 000734
4739 024232 105777 154356
4740 024236 100375
4741 024240 116777 154374 154350
4742 024246 000207
4743 024250 012703 000002
4744 024254 012767 000007 154356
4745 024262 004767 177744
4746 024266 005303
4747 024270 001371
4748 024272 000713
4749
4750

;TTY READ SUBROUTINE*****
TTIN: CLR @TKS
      CLR @TKB
      CLR TIB
      INC @TKS
TTIN1: TSTB @TKS
      BPL TTIN1
      MOV @TKB,TIB
TTIN2: TSTB @TPS
      BPL TTIN2
      MOVB TIB,@TPB
      RTS PC

;TTY OUTPUT SUBROUTINE*****
TTOUT: MOVB (R4)+,TOB
      CMPB #43,TOB
      BEQ TEX
      CMPB #45,TOB
      BEQ TCRLF
      CMPB #41,TOB
      BEQ TBELL ;DO BELL
      JSR PC,TOG
      BR TTOUT
TCRLF: MOVB #15,TOB
      JSR PC,TOG
      MOV #6,R3
TCRLFA: CLR TOB
      JSR PC,TOG
      DEC R3
      BNE TCRLFA ;DO FILLERS
      MOVB #12,TOB
      JSR PC,TOG
      BR TTOUT
TOG: TSTB @TPS
      BPL TOG
      MOVB TOB,@IPB
      RTS PC
TEX: MOV #2,R3
TBELL: MOV #7,TOB
TBELA: JSR PC,TOG
      DEC R3
      BNE TBELA
      BR TTOUT

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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 000001      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
4803                                ;FIRST CHAR FLAG

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4804
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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
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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
      MOVB 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
      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 #/

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4911						
4912	025173	045	040502	021440	MSG23B: .ASCII	/XBA #/
4913						
4914	025200	043045	020103	043	MSG23C: .ASCII	/XFC #/
4915						
4916	025205	045	051503	020062	MSG23D: .ASCII	/XCS2 #/
4917	025212	043				
4918						
4919	025213	045	051504	021440	MSG23E: .ASCII	/XDS #/
4920						
4921	025220	042445	020122	043	MSG23F: .ASCII	/XER #/
4922						
4923	025225	045	051501	021440	MSG23G: .ASCII	/XAS #/
4924						
4925	025232	041445	020113	043	MSG23H: .ASCII	/XCK #/
4926						
4927	025237	045	041104	021440	MSG23I: .ASCII	/XDB #/
4928						
4929	025244	046445	020122	043	MSG23J: .ASCII	/XMR #/
4930						
4931	025251	045	052104	021440	MSG23K: .ASCII	/XDT #/
4932						
4933	025256	052045	020103	043	MSG23L: .ASCII	/XTC #/
4934						
4935	025263	045	047123	021440	MSG23M: .ASCII	/XSN #/
4936						
4937	025270	020445	047516	044440	MSG24: .ASCII	/X!NO INTERRUPTX#/
4938	025276	052116	051105	052522		
4939	025304	052120	021445			
4940						
4941	025310	020445	047516	046440	MSG25: .ASCII	/X!NO MOL: HALTX#/
4942	025316	046117	020072	040510		
4943	025324	052114	021445			
4944						
4945	025330	042045	047522	051520	MSG26: .ASCII	/XDROPS: #/
4946	025336	020072	043			
4947						
4948	025341	045	044520	045503	MSG27: .ASCII	/XPICKS: #/
4949	025346	035123	021440			
4950						
4951	025352	021445			MSG28: .ASCII	/X#/
4952	025354	022445	052524	032464	MSG30: .ASCII	/X%TU45 AUTO SEQUENCE (CZTU1A0)X/
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 OCTALX#/
4959	025420	047105	051124	042511		
4960	025426	020123	047111	047440		
4961	025434	052103	046101	021445		
4962	025442	022445	052524	032464	MSG31: .ASCII	/X%TU45 DATA RELIABILITY TEST (CZTU1A0)XMAKE ENTRIES IN OCTALX#/
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	047503	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: HALT%%#/
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				

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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: HALT%#/
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#/

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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					

TM02/TU45 DATA RELIABILITY PROGRAM
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SEQ 0118

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

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

ABLCNT	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	DCERR4B	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	DS0	014206
AMOD2	023032	BTPT	000732	DATO	014414	DF0	016112	DS0A	014270
AMOD2A	023050	BTSTF	000730	DATOA	014444	DF0A	016006	DS0B	014266
AMOD2B	023070	BTUR	007324	DATOB	014452	DF0A0	016030	DS0C	014230
AMOD2X	023176	BT00	001610	DATOC	014522	DF0A1	016044	DS1	014320
APATS	015122	BT01	001714	DATOD	014530	DF0A2	016060	DS2	014340
AS	000526	BT02	002020	DATOE	014540	DF0A3	016074	DS2A	014350
ASEQ	022234	BT03	002124	DATOF	014554	DF0A4	016100	DS3	014354
ASEQCF	000744	BT04	002230	DAT1	014566	DF0B	015746	DS4	014364
ASEQF	000736	BT05	002334	DAT1A	014572	DF0B0	015770	DT	000536
ASEQX	022442	BT06	002440	DAT1B	014576	DF0C	015726	DVN	000550
ASEQXX	022462	BT07	002544	DAT10	014726	DF0C0	015736	DOFL	014564
ASEQ0	022324	B0	012146	DAT10A	014740	DF0D	015712	EMADDR	000654
ASEQ1	022330	B1	012214	DAT11	014760	DF0E	015704	EOTCO	002650
ASEQ2	022400	B2	012224	DAT11A	014766	DF0F	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	CL0	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	CRCER	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	DCHK0	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	PATRN	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
FCER	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	STARTG	003074	TINP	012334	UNP	000676	WTM1	006034
RSFR	007522	STARTH	003244	TINPA	012344	UNX	000766	WTM2	006044
RSFRX	007662	STARTI	003376	TINPB	012364	UN1	000746	WTM3	006054
RSFRO	007554	STARTJ	003412	TINPB0	012562	UN2	000750	WTM4	006136
RSFR1	007566	STARTK	003426	TINPB1	012410	UN3	000752	WTM4A	006176
RSFR2	007620	STARTL	004144	TINPC	012610	UN4	000754	W0	005424
RSFO	007454	STARTM	004162	TINPX	014140	UN5	000756	W1	005466
RSF1	007470	STARTN	004216	TINPO	012722	UN6	000760	W2	005510
RSR	007374	STARTO	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
RTN	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	STAR4O	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	WRTSB0	006740	YOZB	011330
RTY7	001064	STPX	004130	TINP4	013756	WRTSB1	006754	YOZC	011350
RTY8	001066	SWR	000606	TKB	000612	WRTSB2	006764	YOZC0	011440
RWND	005004	TAPG	021422	TKS	000610	WRTSB3	007040	YOZC1	011454
RWDA	005016	TAPG0	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	YOZD0	011604
RWDO1	005132	TAPG3	021564	TOG	024232	WRTY0	006254	YOZD1	011630
RWDO1A	005174	TAPG3A	021650	TPB	000616	WRTY1	006362	YOZD2	011576
RWDO2	005214	TAPG3B	021664	TPOS	014150	WRTY2	006364	YOZD3	011622
RWDO3	005224	TAPG3C	021704	TPOS1	014162	WRTY2A	006426	YOZD4	011556
RWDO4	005256	TAPG3D	021750	TPS	000614	WRTY2B	006446	YOZE	011634
RWDO5	005276	TAPG3E	021774	TSTAL	000576	WRTY3	006522	YOZF	011664
RWDO6	005316	TAPG3F	021632	TTIN	024050	WRTY3A	006540	YOZFO	011670
CVFL	014146	TAPG4	022022	TTINT	022142	WRTY4	006626	YOZG	011766
GERFL	000710	TAPG5	022036	TTINT0	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

.CZTU1A.SEQ/SOL_CZTU1A.P11
RUN-TIME: 31 65 5 SECONDS
RUN-TIME RATIO: 526/102=5.1

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

F 10
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SYMBOL TABLE

SEQ 0122

CORE USED: 5K (10 PAGES)