TM03/TU45

DATA RELIABILITY PROGRAM

CZTURA0

AH-E497A-MC

FICHE 1 OF 1

JUL 1978

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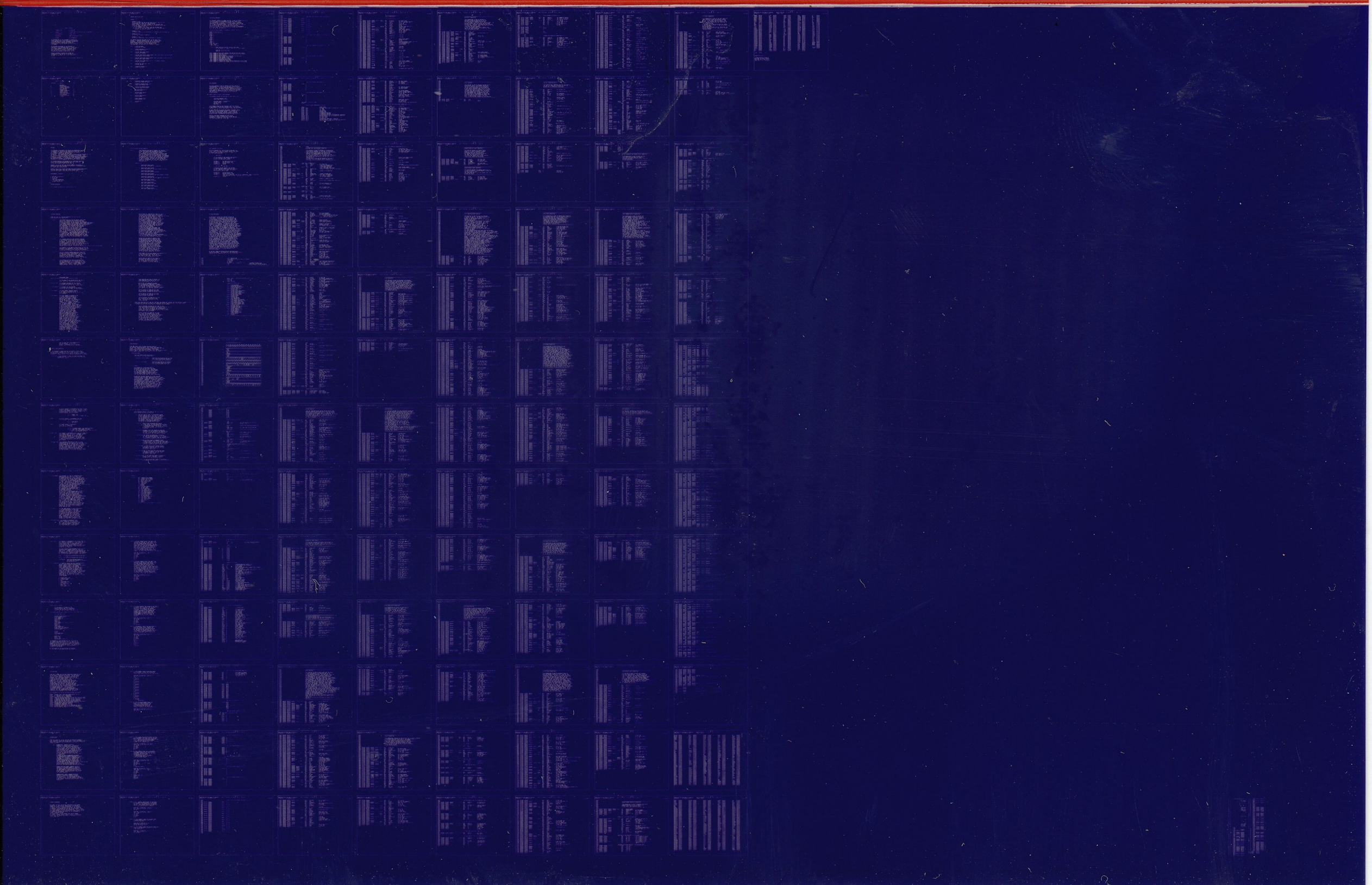
MADE IN USA



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IDENTIFICATION

PRODUCT CODE: AC-E496A-MC

PRODUCT TITLE: CZTURA0 TM03-TU45 DATA RELIBILITY PROGRAM

DATE CREATED: 25 MAY 1978

MAINTAINER: COMPUTER SPECIAL SYSTEMS

AUTHOR: CSS DIAGNOSTICS

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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 THE TU45 MAGNETIC
ON A MASSBUS THROUGH THE TM03 MAG TAPE
CONTROLLER. ANY COMBINATION OF TM03'S & TU45'S UP TO A MAXIMUM OF 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 TM03.

HOWEVER; THE RH AND TM03 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 TM03.

2. REQUIREMENTS (HARDWARE)

A. ANY PDP-11 PROCESSER
B. 8K OF CORE
C. TELETYPE
D. TM03 TAPE CONTROLLER
E. 1 TO 8 MAG TAPE DRIVES
F. MASSBUS CONTROLLER

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR LOADING BINARY TAPES

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(TM03 ADDRESS), SLAVE NUMBER, DENSITY,PARITY,FORMAT,RECORD COUNT,CHARACTER COUNT,PATTERN NUMBER,TAPE MARK AND STALL FOR READ,WRITE, AND TURNAROUND. ALL REPONSES SHOULD BE MADE IN OCTAL AND WITHIN THE LIMITS OF THE PARAMETER. A QUESTION MARK (?) WILL BE TYPED IF ANY CHARACTER ENTERED IS NOT BETWEEN 0 THRU 7 (OCTAL). THE CHARACTER MAY BE RETYPED FOLLOWING THE QUESTION MARK. IF THE RESPONSE IS NOT WITHIN ITS LIMITS. A QUESTION MARK (?) IS TYPED AND THE ENTIRE RESPONSE MAY BE RENTERED. SOME RESPONSES REQUIRE MORE THAN ONE (1) CHARACTER, BUT NONE REQUIRES MORE THAN SIX (6). RESPONSES 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 THERFORE 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.

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

INTERCHANGE READ.
**NOTE SEE ALSO SECTION 8-CONSOLE SWITCH SETTINGS

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 TM03) 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 PARITICULAR SLAVE'S NEEDS. AS MANY AS EIGHT (8) SLAVE NUMBER REQUESTS MAY BE USED, HOWEVER, AT LEAST ONE MUST BE USED. THE SLAVE NUMBERS AND THEIR RESPECTIVE DENSITY, PARITY AND FORMAT MAY BE ENTERED IN ANY ORDER. THE INFORMATION FOR EACH SLAVE ENTERED IS LOADED INTO A TABLE FOR REFERENCE IN TESTING. IF LESS THAN EIGHT(8) SLAVES ARE REQUIRED, THEN RESPONDING TO THE SLAVE NUMBER REQUEST WITH A CARRIAGE RETURN WILL TERMINATE THE SLAVE ENTRIES AND CONTINUE TO THE NEXT PARAMETER. IT SHOULD BE REMEMBERED

THAT AT LEAST ONE SLAVE NUMBER REQUEST
MUST BE ENTERED. IF THE FIRST
REQUEST IS RESPONDED TO BY A CARRIAGE
RETURN, THEN THE REQUEST WILL BE REPEATED.

4.1 AUTOMATIC MODE OPERATION

IF THE PROGRAM IS LOADED AND RUN IN AUTOMATIC (CHAIN) MODE
THE AUTO ACCEPT SEQUENCE TEST PLAN IS RUN. SEE SEC 11. BELOW;
THE SOFTWARE SWR IS INVOKED WITH A SWITCH SETTING OF 100000 (HALT
ON ERROR) IF LOADED VIA ACT11. NO OPERATOR INTERVENTION IS REQUIRED.

**EXCEPTION: IF THIS PROGRAM IS LOADED VIA TMDP CHAIN MODE THE
PROGRAM WILL TEST ALL SLAVES ON THE FIRST AVAILABLE
DRIVE EXCEPT SLAVE 0.

DENSITY: THE DESITY 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. 3 = 800BPI, NRZI
B. 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)
C. 16 = PDP-15 OR IBM COMPATABLE(TWO FRAMES PER WORD)
(DATA IS BYTE SWAPPED ON TAPE)

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

CHARACTER COUNT: THIS RESPONSE IS ENTERED AS FOUR (4) OCTAL CHARACTERS WITHIN THE LIMITS OF 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.

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. RESETTING OF THE RANDOM DATA SWITCH DOES NOT CAUSE REVERSION TO THE FIXED PATTERN, BUT WILL HOLD THE LAST GENERATED PATTERN UNTIL A RESTART IS DONE FROM LOCATION 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. (CZTUTA0) 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.

INTERCHANGE READ: THIS REQUEST IS RESPONDED TO BY A SINGLE CHARACTER INPUT OF EITHER ONE (1) OR ZERO (0). A RESPONSE OF ONE (1) WILL CAUSE ALL READING TO BE DONE IN THE INTERCHANGE MODE. A ZERO RESPONSE WILL CAUSE READING IN NORMAL MODE.

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 PARAMTERS EXCEPT FOR THE SLAVE DESCRIPTION VALUES (SLAVE NUMBER, DENSITY, PARITY, AND FORMAT) HAVE NOMINAL VALUES ALREADY STORED IN THE PROGRAM.
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 = 200
B. CHARACTER COUNT = 4000
C. PATTERN NUMBER = 1
D. TM=1
E. INTERCHANGE READ = 0
F. SINGLE PASS = 0
G. CRC CORRECTION = 0
H. READ STALL = 10
I. WRITE STALL = 10
J. TURN AROUND STALL = 10

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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

        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) 9 CHAN SN: 0022
        DENSITY=(3)
        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)
        INTERCHANGE READ=(1)
        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 AND ALL READING
WILL BE DONE IN INTERCHANGE MODE (MAINT MODE 0001).
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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 CZTUTA0)
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

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 APPROIATE 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.

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 B 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 CONTROL B WHILE DOING A YOZZLE. A YOZZLE STALL
REQUEST WILL BE PRINTED AND SHOULD BE RESPONDED TO WITH
THE DESIRED VALUE.

8. CONSOLE SWITCH SETTINGS

CONTROL:

1) CONTROL G < G>;
   SELECTS SOFTWARE SWR AND ALLOWS USER TO SELECT NEW SWITCHES.
   THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW=
   WHERE: XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWR.
   AFTER THE 'NEW=' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE
   OF THE FOLLOWING AT THE TTY:
     A) TYPE A NUMBER TO BE LOADED INTO THE SOFTWARE SWR
     B) IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWR
        CONTENTS WILL NOT BE CHANGED.

2) CONTROL A < A>;
   ALTERNATES USAGE OF THE SWR BETWEEN THE HARDWARE SWR & SOFTWARE SWR.

3) CONTROL B < B>;
   SEE SECTION 7 DYNAMIC PARAMETERS

4) CONTROL U < U>;
   DELETES ALL CHARACTERS TYPED IN RESPONSE TO A REQUEST.

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

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

SW14: 1=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

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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
```

SWITCH EXPLANATION AND EXAMPLES:

SW0-3: THESE SWITCHES ARE USED TO CONTROL THE SEQUENCE OF MAG TAPE OPERATIONS PREFORMED ON EACH AVAILABLE UNIT. THE BLOCK OF DATA DESCRIBED THROUGH THE RESPONSES TO TELETYPE REQUESTS AT INITIAL START WILL BE EITHER WRITTEN OR READ FROM EACH AVAILABLE UNIT IN THE ORDER THAT THEY WERE ENTERED. THE SEQUENCE OF OPERATIONS IS CALLED A CYCLE, AND WILL BE PERFORMED CONTINUOUSLY UNTIL STOPPED BY THE OPERATOR. WHEN END OF TAPE IS REACHED, THE UNIT WILL BE REWOUND AND FLAGGED AS UNAVAILABLE FOR TEST UNTIL ALL UNITS HAVE 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

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 UNSUCESSFUL, A SKIP ERASE IS DONE, A SUPECTED 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.

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.

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 TM03 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.

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 APPROPIATE TIME, AN ERROR IS PRINTED.

4. NO MEDIUM ON-LINE: BEFORE AN OPERATION IS ATTEMPTED,
THE TM03 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 UNITLL 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.

D. EXAMPLES:

GLOSSARY:

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

EXAMPLE 1: IN THIS EXAMPLE SLAVE 1 ON TM03 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 TM03 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
```

```
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
```

```
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
```

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
```

```
                                                    N  2
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
```

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
```

11. AUTO SEQUENCE

THE AUTO SEQUENCE (START AT ADDRESS 240) WILL EXECUTE A PREDETERMINED TEST PLAN ON ALL AVAILABLE SLAVES ON EACH AVAILABLE TM03. 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 TM03 AND ITS SLAVES ARE FOUND, A DIVIDER LINE OF ASTERICKS WILL BE PRINTED FOLLOWED BY A PRINTOUT OF THE TM03 AND ITS SLAVES BEING TESTED. AS EACH TM03 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).

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

12. TESTING PROCEDURES

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

%

```
1310                                    .LIST   BIN,LOC,SEQ
1311                                    .TITLE TM03/TU45 DATA RELIABILITY PROGRAM
1312                                    ;++B CZTURA0
1313                                    ;21 FEB 1977
1314                                    ;R. BARNES
1315                                    ;REVISED (++B) J.G.ADAMS MAY 1977       1)INCORRECT RECORD COUNT
1316                                    ;++B                                    STORED WHEN EOT REACHED ON WRITE
1317                                    ;++B                                    2)ADJUST STACK PTR ON BAD TAPE OVFLW
```

```
1318
1319                                    .MCALL  .$ACT11,.$EOP,$SAVE,$RESTORE,$CHAIN
1320                                    .NLIST  MC
1321                                    .LIST   ME
1322                                    .ENABLE ABS,AMA
1323
1324                                    ;CONSOLE SWITCHES************
1325
1326                                    ;SW15: 1=STOP ON ERROR
1327                                    ;       0=CONTINUE ON ERROR
1328                                    ;SW14: 1=PRINT READ/WRITE STATS
1329                                    ;       0=DO NOT PRINT STATS
1330                                    ;SW13: 1=DO NOT CHECK DATA
1331                                    ;       0=CHECK DATA
1332                                    ;SW12: 1=DO NOT CHECK WRITE ERRORS
1333                                    ;       0=CHECK WRITE ERRORS
1334                                    ;SW11: 1=DO NOT CHECK READ ERRORS
1335                                    ;       0=CHECK READ ERRORS
1336                                    ;SW10: 1=DO NOT PRINT ERRORS
1337                                    ;       0=PRINT ERRORS
1338                                    ;SW9:  1=REWIND TAPE
1339                                    ;       0=DO NOT REWIND
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                                    ;SW5:  1=YOZZLE ON CURRENT RECORD
1347                                    ;       0=DO NOT YOZZLE
1348                                    ;SW4:  1=DO BOTH READ AND WRITE RETRIES
1349                                    ;       0=INHIBIT RETRIES
1350                                    ;SW3:  1=DO NOT READ FORWARD
1351                                    ;       0=READ FORWARD
1352                                    ;SW2:  1=DO NOT READ REVERSE
1353                                    ;       0=READ REVERSE
1354                                    ;SW1:  1=READ FORWARD FIRST
1355                                    ;       0=READ REVERSE FIRST
1356                                    ;SW0:  1=DO NOT WRITE
1357                                    ;       0=WRITE
1358                                ;IF SWR <15::00> = 177777 OR NOT AVAILABLE USE SOFTWARE SWITCH REGISTER
```

```
                        ;TU45 REGISTER BITS**********

                        ;15 ;14 ;13 ;12 ;11 ;10 ;09 ;08 ;07 ;06 ;05 ;04 ;03 ;02 ;01 ;00 ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;CS1:   ;SC ;TRE;MCP;SPR;DNA;PSL;A17;A16;RDY;IE ;FUN;FUN;FUN;FUN;FUN;GO ;
                        ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;WC:    ; WORD                                                          ;
                        ; COUNT                                                         ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;BA:    ; BUS                                                           ;
                        ; ADDRESS                                                       ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;FC:    ; FRAME                                                         ;
                        ; COUNT                                                         ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;CS2:   ;DLT;WCE;UPE;NED;NEM;PGE;MXF;MDP;OR ;IR ;CLR;PAT;BAI;U2 ;U1 ;U0 ;
                        ;   ;   ;   ;   ;   ;   ;   ;ERR;   ;   ;   ;   ;   ;   ;   ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;DS:    ;ATA;ERR;PIP;MOL;WRL;EOT;SPR;DPR;DRY;SSC;PES;SDN;IDB;EOF;BOT;SLA;
                        ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;ER:    ;CDE;UNS;OPI;DTE;NEF;CS ;FCE;NSG;PEF;INC;DAT;FMT;CNT;RMR;ILR;ILF;
                        ;CRC;   ;   ;   ;ITM;   ;   ;LRC;VPE;BPE;   ;BPE;   ;   ;   ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;ATS:   ; ATTENTION                                                     ;
                        ; SUMMARY                                                       ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;CC:    ; CHECK                                                         ;
                        ; CHARACTER                                                     ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;DB:    ; DATA                                                          ;
                        ; BUFFER                                                        ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;MR:    ;DB ;DB ;DB ;DB ;DB ;DB ;DB ;DB ;WRT;MM ;OP ;OP ;OP ;OP ;MM ;
                        ; 7 ; 6 ; 5 ; 4 ; 3 ; 2 ; 1 ; 0 ; P ;CLK;CLK; 4 ; 3 ; 2 ; 1 ;GO ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;DT:    ; DRIVE      ; 7 ;   ;SLV;                                     ;
                        ; TYPE       ;CH ;   ;PR ;                                     ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;SN:    ; SERIAL                                                        ;
                        ; NUMBER                                                        ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                ;TC:    ;ACL;FCS;TCW;ENA;SPR;DEN;DEN;DEN;FMT;FMT;FMT;FMT;EVN;SSN;SSN;SSN;
                        ;   ;   ;   ;DT ;   ; 4 ; 2 ; 1 ; 8 ; 4 ; 2 ; 1 ;PAR; 4 ; 2 ; 1 ;
                        ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

```
1405                                    ;REGISTER EQUIVS************
1406
1407            000000                  R0=%0
1408            000001                  R1=%1
1409            000002                  R2=%2
1410            000003                  R3=%3
1411            000004                  R4=%4
1412            000005                  R5=%5
1413            000006                  SP=%6
1414            000007                  PC=%7
1415            000240                  NOP=240
1416
1417                                    ;TRAP CATCHERS***********
1418
1419            000020                  .=20
1420  000020    023646                  .WORD   TTOUT           ;SET IOT TRAP TO TTOUT ROUTINE
1421  000022    000340                  .WORD   340             ;PRIORITY LEVEL 7
1422
1423            000004                  TYPE=IOT                ;EQUATE TYPE TO AN IOT INSTRUCTION
1424            000034                  .=34
1425  000034    024020                  .WORD   OCTP            ;SET TRAP TRAP TO OCTP ROUTINE
1426  000036    000340                  .WORD   340
1427            104400                  TYPOCT=TRAP             ;EQUATE TYPOCT TO TRAP INSTRUCTION
1428
1429                                ;ACT11 HOOK ***********
1430            000040                  $SVPC=.                 ;SAVE CURRENT LOCATION CTR
1431            000046                  .=46
1432  000046    005022                  .WORD   $ENDAD          ;SET LOCATION 46
1433            000052                  .=52
1434  000052    000000                  .WORD   0               ;SET LOCATION 52 = 0
1435            000040                  .=$SVPC                 ;RESTORE LOCATION CTR
1436
1437                                    ;TTY INTERRUPT VECTOR**********
1438            000060                  .=60
1439  000060    021504                  .WORD   TTINT           ;TTY INTERRUPT HANDLER ADDRESS
1440  000062    000340                  .WORD   340             ;PRIORITY LEVEL 7
1441
1442                                    ;SOFTWARE SWITCH REGISTER*********
1443                                    ;INVOKED IF SWR <15::00> = 177777 OR NOT AVAILABLE
1444            000176                  .=176
1445  000176    000000          SWREG:  .WORD   0
1446
1447                                    ;START ADDRESS**********
1448            000200                  .=200
1449  000200    000137  003026          JMP     START           ;ENTER PARAMETERS VIA TTY
1450
1451            000204                  .=204
1452  000204    000137  003152          JMP     STARTC          ;USE FIXED PARAMETERS; HOLD DATA
1453
1454            000210                  .=210
1455  000210    005037  015030          CLR     RDFL
1456  000214    000137  003160          JMP     STARTA          ;USE FIXED PARAMETERS; NEW DATA
1457
1458                                    ;MAG TAPE INTERRUPT VECTOR**********
1459
1460            000224                  .=224
```

```
 1461  000224  021734                    MTINT                   ;MAG TAPE INTERRUPT HANDLER ADDRESS
 1462  000226  000340                    340
 1463
 1464                                    ;AUTO SEQUENCE START**********
 1465
 1466          000240                    .=240
 1467  000240  005237  000736            INC     ASEQF           ;SET AUTO SEQUENCE FLAG
 1468  000244  000137  003136            JMP     STAUT           ;GO TO START OF AUTO SEQUENCE
```

```
1469                                        ;SHORT CONVERSATION RESTART********
1470
1471            000300                      .=300
1472  000300    005237  014070            INC     SCVFL                   ;SET SHORT CONVERSATION FLAG
1473  000304    000137  003026            JMP     START                   ;ENTER SHORT PARAMETER LIST
1474
1475            000510                      .=510
1476                                        ;TU45 REGISTER EQUIVS**********
1477
1478  000510    172440                C1:     172440
1479  000512    172442                WC:     172442
1480  000514    172444                BA:     172444
1481  000516    172446                FC:     172446
1482  000520    172450                CS:     172450
1483  000522    172452                DS:     172452
1484  000524    172454                ER:     172454
1485  000526    172456                AS:     172456
1486  000530    172460                CC:     172460
1487  000532    172462                DB:     172462
1488  000534    172464                MR:     172464
1489  000536    172466                DT:     172466
1490  000540    172470                SN:     172470
1491  000542    172472                TC:     172472
1492
1493                                        ;CONSTANTS**********
1494
1495  000544    172440                REGS:   172440          ;STARTING REGISTER ADDRESS (CS1)
1496  000546    000224                VECT:   224             ;VECTOR ADDRESS (RH INTERRUPT)
1497  000550    000000                DVN:    0               ;DRIVE NUMBER
1498  000552    000000                UDES:   0               ;UNIT DESCRIPTION (PARITY,DENSITY,UNIT,FORMAT)
1499  000554    000200                RCNT:   200             ;RECORD COUNTER
1500  000556    174000                FMCNT:  174000          ;NUMBER OF CHAR (4 - 4000) OCTAL IN TWOS COMPLEMENT
1501  000560    000001                PATRN:  1               ;DATA PATTERN SELECTOR (0 - 15) OCTAL
1502  000562    000002                RDCMD:  2               ;READ COMMAND
1503  000564    000001                TMEX:   1               ;TAPE MARK FLAG: 1=TM 0=NO TM
1504  000566    000000                CRCC:   0               ;CRC CORRECTION FLAG (YES=1,NO=0)
1505  000570    000000                INTRF:  0               ;INTERCHANGE READ 1=YES 0=NO
1506  000572    000000                SPFLG:  0               ;SINGLE PASS 1=YES 0=NO
1507  000574    000010                RSTAL:  10              ;READ STALL
1508  000576    000010                WSTAL:  10              ;WRITE STALL
1509  000600    000010                TSTAL:  10              ;TURN AROUND STAL
1510  000602    002000                YSTAL:  2000            ;YOZZLE STAL
1511  000604    000010                RETRY:  10              ;READ RETRY NUMBER
1512  000606    177776                PSW:    177776          ;PROCESSOR STATUS
1513  000610    177570                SWR:    177570          ;CONSOLE SWITCHES
1514  000612    177560                TKS:    177560          ;TTY READ STATUS REGISTER
1515  000614    177562                TKB:    177562          ;TTY READ BUFFER
1516  000616    177564                TPS:    177564          ;TTY PUNCH STATUS REGISTER
1517  000620    177566                TPB:    177566          ;TTY PUNCH OUTPUT REGISTER
1518  000622    177550                PRS:    177550          ;H/S READER STATUS REGISTER
1519  000624    177552                PRB:    177552          ;H/S READER BUFFER
1520  000626    153624                RANBAS: 153624          ;RANDOM NUMBER GENERATOR BASE
1521  000630    032561                RANSAV: 032561          ;RANDOM NUMBER BUFFER
1522  000632    000200                RCSAV:  200             ;RECORD COUNT SAVE
1523  000634    174000                FCSAV:  174000          ;FRAME COUNT SAVE
```

```
1524
1525                                    ;FLAGS AND COUNTERS**********
1526
1527  000636  000000            TINF:   0               ;TTY ENTRY FLAG
1528  000640                    STFLG:
1529  000640  000000            TOB:    0               ;TTY OUTPUT BUFFER
1530  000642  000000            TIB:    0               ;TTY INPUT BUFFER
1531  000644  000000            TEMP1:  0               ;TEMP STORAGE
1532  000646  000000            TEMP2:  0               ;TEMP STORAGE
1533  000650  000000            TEMP3:  0               ;TEMP STORAGE
1534  000652  000000            NRZOF:  0               ;NRZ ONLY FLAG
1535  000654  000000            EMADDR: 0               ;ERROR MSG ADDRESS STORAGE
1536  000656  000000            BLCNTR: 0               ;BLOCK COUNTER
1537  000660  000000            BBC:    0               ;BAD RECORD COUNTER
1538  000662  000000            EOTREC: 0               ;EOT FLAG
1539  000664  000000            RTRN:   0               ;INTERRUUPT RETURN STORAGE
1540  000666  000000            HDRFL:  0               ;HEADER FLAG
1541  000670  000000            STAL:   0               ;DELAY STORAGE
1542  000672  000000            PFLG:   0               ;PRINT FLAG
1543  000674  000000            MTC1:   0               ;MAG TAPE CONT REGISTER BUFFER
1544  000676  000000            UNP:    0               ;UNIT TABLE POINTER
1545  000700  000000            TMFLG:  0               ;TAPE MARK FLAG
1546  000702  000000            RPCNT:  0               ;REPEAT COUNTER
1547  000704  000000            RTCNT:  0               ;RETRY COUNTER
1548  000706  000000            DERFL:  0               ;DATA ERROR FLAG
1549  000710  000000            SERFL:  0               ;STATUS ERROR FLAG
1550  000712  000000            BCNT:   0               ;BIT COUNTER
1551  000714  000000            RTYFL:  0               ;RETRY FLAG
1552  000716  000000            UPS:    0               ;UNIT POINTER SAVE
1553  000720  000000            BDPP:   0               ;BITS DROPPED POINTER
1554  000722  000000            BPKP:   0               ;BITS PICKED POINTER
1555  000724  000000            ERSAV:  0               ;ERROR SAVE LOC
1556  000726  000000            BTFLG:  0               ;BAD TAPE FLAG
1557  000730  000000            BTSTF:  0               ;STATISTIC PRINT FLAG
1558  000732  000000            BTPT:   0               ;BAD TAPE POINTER
1559  000734  000000            ERTFL:  0               ;ERASE FLAG
1560  000736                    ENDFLG:
1561  000736  000000            ASEQF:  0               ;AUTO SEQ FLAG
1562  000740  000000            ADRVN:  0               ;UTO SEQ DRIVE NUMBER
1563  000742  000000            ABLCNT: 0               ;AUTO BLOCK COUNTER
1564  000744  000001            ASEQCF: 1               ;AUTO SEQ CONTINUOUS FLAG
```

```
1565
1566                                    ;UNIT ORDER AND DESCRIPTION TABLE **********
1567
1568  000746  000000            UN1:    0               ;THIS TABLE IS LOADED
1569  000750  000000            UN2:    0               ;WITH UNIT NUMBERS AND
1570  000752  000000            UN3:    0               ;THEIR DESCRIPTIONS IN
1571  000754  000000            UN4:    0               ;THE ORDER THAT THEY
1572  000756  000000            UN5:    0               ;WILL BE TESTED
1573  000760  000000            UN6:    0
1574  000762  000000            UN7:    0
1575  000764  000000            UN8:    0
1576  000766  177777            UNX:    -1
1577
1578                                    ;UNIT DROPS AND PICKS POINTERS*********
1579
1580  000770  001210            PIK1:   BP00
1581  000772  001230            PIK2:   BP10
1582  000774  001250            PIK3:   BP20
1583  000776  001270            PIK4:   BP30
1584  001000  001310            PIK5:   BP40
1585  001002  001330            PIK6:   BP50
1586  001004  001350            PIK7:   BP60
1587  001006  001370            PIK8:   BP70
1588  001010  001410            DRP1:   BD00
1589  001012  001430            DRP2:   BD10
1590  001014  001450            DRP3:   BD20
1591  001016  001470            DRP4:   BD30
1592  001020  001510            DRP5:   BD40
1593  001022  001530            DRP6:   BD50
1594  001024  001550            DRP7:   BD60
1595  001026  001570            DRP8:   BD70
1596
1597                                    ;UNIT BAD TAPE POINTERS**********
1598
1599  001030  001610            BTADDR: BT00
1600  001032  001714                    BT01
1601  001034  002020                    BT02
1602  001036  002124                    BT03
1603  001040  002230                    BT04
1604  001042  002334                    BT05
1605  001044  002440                    BT06
1606  001046  002544                    BT07
1607
1608                                    ;UNIT WRITE RETRY COUNTER**********
1609
1610                                ;SET START OF STATISTICS TABLE
1611  001050                        STTBL:
1612  001050  000000            RTY1:   0
1613  001052  000000            RTY2:   0
1614  001054  000000            RTY3:   0
1615  001056  000000            RTY4:   0
1616  001060  000000            RTY5:   0
1617  001062  000000            RTY6:   0
1618  001064  000000            RTY7:   0
1619  001066  000000            RTY8:   0
1620
```

```
 1621                                   ;UNIT WRITE ERRORS**********
 1622
 1623  001070  000000                   WTER1:  0
 1624  001072  000000                   WTER2:  0
 1625  001074  000000                   WTER3:  0
 1626  001076  000000                   WTER4:  0
 1627  001100  000000                   WTER5:  0
 1628  001102  000000                   WTER6:  0
 1629  001104  000000                   WTER7:  0
 1630  001106  000000                   WTER8:  0
 1631
 1632                                   ;UNIT READ FORWARD ERRORS**********
 1633
 1634  001110  000000                   RDER1:  0
 1635  001112  000000                   RDER2:  0
 1636  001114  000000                   RDER3:  0
 1637  001116  000000                   RDER4:  0
 1638  001120  000000                   RDER5:  0
 1639  001122  000000                   RDER6:  0
 1640  001124  000000                   RDER7:  0
 1641  001126  000000                   RDER8:  0
 1642
 1643                                   ;UNIT DATA ERRORS FORWARD**********
 1644
 1645  001130  000000                   DATER1: 0
 1646  001132  000000                           0
 1647  001134  000000                           0
 1648  001136  000000                           0
 1649  001140  000000                           0
 1650  001142  000000                           0
 1651  001144  000000                           0
 1652  001146  000000                           0
 1653
 1654                                   ;UNIT READ REVERSE ERRORS**********
 1655
 1656  001150  000000                   RDERR1: 0
 1657  001152  000000                           0
 1658  001154  000000                           0
 1659  001156  000000                           0
 1660  001160  000000                           0
 1661  001162  000000                           0
 1662  001164  000000                           0
 1663  001166  000000                           0
 1664
 1665                                   ;UNIT DATA ERRORS REVERSE**********
 1666
 1667  001170  000000                   DEREV1: 0
 1668  001172  000000                           0
 1669  001174  000000                           0
 1670  001176  000000                           0
 1671  001200  000000                           0
 1672  001202  000000                           0
 1673  001204  000000                           0
 1674  001206  000000                           0
```

```
                                        ;DROPS + PICKS PER CHANNEL PER UNIT**********
                                
001210  000000                  BP00:   0
        001230                          .=.+16
001230  000000                  BP10:   0
        001250                          .=.+16
001250  000000                  BP20:   0
        001270                          .=.+16
001270  000000                  BP30:   0
        001310                          .=.+16
001310  000000                  BP40:   0
        001330                          .=.+16
001330  000000                  BP50:   0
        001350                          .=.+16
001350  000000                  BP60:   0
        001370                          .=.+16
001370  000000                  BP70:   0
        001410                          .=.+16
001410  000000                  BD00:   0
        001430                          .=.+16
001430  000000                  BD10:   0
        001450                          .=.+16
001450  000000                  BD20:   0
        001470                          .=.+16
001470  000000                  BD30:   0
        001510                          .=.+16
001510  000000                  BD40:   0
        001530                          .=.+16
001530  000000                  BD50:   0
        001550                          .=.+16
001550  000000                  BD60:   0
        001570                          .=.+16
001570  000000                  BD70:   0
        001610                          .=.+16
```

```
1711
1712                                        ;UNIT BAD TAPE COUNTER:16 PER SLAVE**********
1713
1714  001610  000000                BT00:   0
1715          001714                        .=.+102
1716  001714  000000                BT01:   0
1717          002020                        .=.+102
1718  002020  000000                BT02:   0
1719          002124                        .=.+102
1720  002124  000000                BT03:   0
1721          002230                        .=.+102
1722  002230  000000                BT04:   0
1723          002334                        .=.+102
1724  002334  000000                BT05:   0
1725          002440                        .=.+102
1726  002440  000000                BT06:   0
1727          002544                        .=.+102
1728  002544  000000                BT07:   0
1729          002650                        .=.+102
1730
1731                                        ;UNIT END OF TAPE COUNTERS 1 PER SLAVE*******
1732
1733  002650  000000                EOTC0:  0
1734  002652  000000                        0
1735  002654  000000                        0
1736  002656  000000                        0
1737  002660  000000                        0
1738  002662  000000                        0
1739  002664  000000                        0
1740  002666  000000                        0
1741
1742                                        ;UNIT READ FORWARD SOFT ERROR*******
1743
1744  002670  000000                RFSOFT: 0
1745  002672  000000                        0
1746  002674  000000                        0
1747  002676  000000                        0
1748  002700  000000                        0
1749  002702  000000                        0
1750  002704  000000                        0
1751  002706  000000                        0
1752
1753                                        ;UNIT READ REVERSE SOFT ERROR*******
1754
1755  002710  000000                RRSOFT: 0
1756  002712  000000                        0
1757  002714  000000                        0
1758  002716  000000                        0
1759  002720  000000                        0
1760  002722  000000                        0
1761  002724  000000                        0
1762  002726  000000                        0
1763
```

```
1764
1765                                        ;UNIT READ FORWARD HARD ERROR*******
1766
1767  002730  000000                RFHARD: 0
1768  002732  000000                        0
1769  002734  000000                        0
1770  002736  000000                        0
1771  002740  000000                        0
1772  002742  000000                        0
1773  002744  000000                        0
1774  002746  000000                        0
1775
1776                                        ;UNIT READ REVERSE HARD ERROR*******
1777
1778  002750  000000                RRHARD: 0
1779  002752  000000                        0
1780  002754  000000                        0
1781  002756  000000                        0
1782  002760  000000                        0
1783  002762  000000                        0
1784  002764  000000                        0
1785  002766  000000                        0
1786                                ;SET END OF STATISTICS TABLE
1787  002770                        ENDTBL:
1788
1789                                        ;DATA PATTERN GENERATORS************
1790
1791  002770  002770                DATBL:  .                       ;ENTRY TABLE
1792  002772  014302                DATA0:  DAT0                    ;EXTERNAL INPUT FROM H/S READER(SEE CZTUTA0)
1793  002774  014442                DATA1:  DAT1                    ;ALL ONES
1794  002776  014462                DATA2:  DAT2                    ;ALL ZEROS
1795  003000  014466                DATA3:  DAT3                    ;WALKING ONE
1796  003002  014512                DATA4:  DAT4                    ;WALKING ZERO
1797  003004  014522                DATA5:  DAT5                    ;ALTERNATING ONE/ZERO
1798  003006  014530                DATA6:  DAT6                    ;ALTERNATING ZERO/ONE
1799  003010  014536                DATA7:  DAT7                    ;ALTERNATING ONE/ZERO IN ALTERNATING CHARACTERS
1800  003012  014564                DATA10: DAT10                   ;WALKING ONE/ALL ONE IN ALTERNATING CHARACTERS
1801  003014  014614                DATA11: DAT11                   ;ALL BITS 0-377
1802  003016  014634                DATA12: DAT12                   ;ALL BITS 377-0
1803  003020  014656                DATA13: DAT13                   ;ALTERNATING CHARACTERS  0 AND 377
1804  003022  014666                DATA14: DAT14                   ;WALKING ZERO/ALL ZERO IN ALTERNATING CHARACTERS
1805  003024  014716                DATA15: DAT15                   ;AUTO SEQUENCE PATTERN 0,0,-1,-1,-1,0,0
1806
```

```
                                        .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 200, & 300**********
003026  012706  000500          START:  MOV     #500,SP         ;SET STACK PTR
003032  005037  000736                  CLR     ASEQF           ;CLEAR AUTO SEQUENCE FLAG
003036  005027                          CLR     (PC)+           ;;CLEAR CHAIN INDICATOR
003040  000000                  CHNFLG: .WORD   0               ;;CHAIN MODE INDICATOR
                                                                ;;1/0 = CHAIN/NOT CHAIN MODE
003042  022737  005022  000042          CMP     #$ENDAD,@#42    ;;BRANCH IF LOADED VIA ACT11 CHAIN MODE
003050  001404                          BEQ     50$
003052  005737  000042                  TST     @#42            ;;BRANCH IF IN DUMP MODE
003056  001413                          BEQ     52$
003060  000406                          BR      51$
003062  012737  000176  000610  50$:    MOV     #SWREG,SWR      ;;INVOKE SOFTWARE SWR
003070  012777  100000  175512          MOV     #100000,@SWR    ;;WITH HALT ON ERROR SET
003076  005237  003040          51$:    INC     CHNFLG          ;;SET CHNFLG = CHAIN MODE
003102  000137  003126                  JMP     3$              ;;GO TO CHAIN ADDRESS
003106                          52$:
003106  122737  000006  000041          CMPB    #6,@#41         ;BRANCH IF LOADED VIA TMDP
003114  001010                          BNE     STAUT
003116  012704  027251                  MOV     #MSG120,R4      ;ADVISE USER TO REMOVE TMDP FROM SLAVE
003122  000004                          TYPE
003124  000404                          BR      STAUT
003126  005237  000736          3$:     INC     ASEQF           ;SET AUTO SEQUENCE FLAG
003132  000137  022004                  JMP     ASEQ0           ;GO TO AUTO SEQUENCER

                                ;START 240**********
003136  012737  000001  000636  STAUT:  MOV     #1,TINF         ;SET TTY ENTRY FLAG
003144  005037  015030                  CLR     RDFL            ;CLEAR RANDOM DATA FLAG
003150  000405                          BR      STARTB

                                ;START 204**********
003152  005037  000636          STARTC: CLR     TINF            ;CLEAR TTY INPUT FLAG
003156  000432                          BR      STARTD

                                ;START 210**********
003160  005037  000636          STARTA: CLR     TINF            ;CLEAR TTY ENTRY FLAG
003164  012700  000640          STARTB: MOV     #STFLG,R0       ;GET STARTING ADDRESS OF FLAGS
003170  012701  000076                  MOV     #ENDFLG-STFLG,R1
003174  105020                  1$:     CLRB    (R0)+           ;CLEAR FLAGS AND COUNTERS
003176  005301                          DEC     R1
```

```
1863  003200  001375                        BNE     1$
1864  003202  012706  000500                MOV     #500,SP         ;SET STACK POINTER
1865  003206  004737  004276                JSR     PC,RANSET       ;GO RESET RANDOM BASE
1866  003212  012700  001050                MOV     #STTBL,R0       ;GET STARTING ADDRESS OF STAT TABLE
1867  003216  012701  001720                MOV     #ENDTBL-STTBL,R1        ;AND # OF BYTES IN TABLE
1868  003222  105020                2$:     CLRB    (R0)+           ;CLEAR STATISTIC COUNTERS
1869  003224  005301                        DEC     R1
1870  003226  001375                        BNE     2$
1871  003230  012737  177777  014276        MOV     #-1,PATS        ;PRESET PATTERN
1872  003236  012737  000001  000656  STARTE: MOV    #1,BLCNTR       ;PRESET BLOCK COUNTER
1873  003244  013746  000004        STARTD: MOV     @#4,-(SP)       ;SAVE ERROR TRAP VECTOR
1874  003250  013746  000006                MOV     @#6,-(SP)
1875  003254  022737  000176  000610        CMP     #SWREG,SWR      ;BRANCH IF SOFTWARE SWR
1876  003262  001413                        BEQ     2$              ;ALREADY SELECTED
1877  003264  012737  003310  000004        MOV     #1$,@#4         ;SET TIMEOUT TRAP TO 1$ BELOW
1878  003272  005037  000006                CLR     @#6
1879  003276  022777  177777  175304        CMP     #177777,@SWR    ;BRANCH IF SWR = 177777 TRAP
1880  003304  001402                        BEQ     2$              ;IF NOT AVAIL (1$) OTHERWISE
1881  003306  000404                        BR      3$              ;GO TO 3$
1882  003310  022626                1$:     CMP     (SP)+,(SP)+     ;RESET STACK
1883  003312  012737  000176  000610  2$:     MOV     #SWREG,SWR      ;SET SWR = SOFTWARE SWR
1884  003320  012637  000006        3$:     MOV     (SP)+,@#6       ;RESTORE ERROR TRAP
1885  003324  012637  000004                MOV     (SP)+,@#4
1886  003330  012706  000500                MOV     #500,SP
1887  003334  004737  012220                JSR     PC,TINP         ;GO GET PARAMETERS FROM TTY
1888  003340  012777  000040  175152        MOV     #40,@CS         ;INITIALIZE
1889  003346  005000                STAUTO: CLR     R0              ;POINT TO FIRST ENTRY
1890  003350  022760  177777  000746  1$:     CMP     #-1,UN1(R0)     ;BRANCH IF LAST ENTRY
1891  003356  001406                        BEQ     2$
1892  003360  042760  100000  000746        BIC     #100000,UN1(R0) ;CLEAR EOT FLAG
1893  003366  062700  000002                ADD     #2,R0           ;POINT TO NEXT UNIT ENTRY
1894  003372  000766                        BR      1$              ;CONTINUE CLEARING
1895  003374  013703  005054        2$:     MOV     REOTC,R3
1896  003400  000303                        SWAB    R3
1897  003402  110337  005054                MOVB    R3,REOTC        ;RESTORE EOT CNTR
1898  003406  012777  000100  175176  START1: MOV    #100,@TKS       ;SET KEYBOARD IE BIT
1899  003414  013700  000676                MOV     UNP,R0          ;R0 = UNIT TABLE POINTER
1900  003420  022760  177777  000746  STAR1A: CMP    #-1,UN1(R0)     ;BRANCH IF LAST ENTRY
1901  003426  001404                        BEQ     STAR1B
1902  003430  016037  000746  000552        MOV     UN1(R0),UDES    ;LOAD NEXT UNIT DESCRIPTION
1903  003436  000446                        BR      START4
1904  003440  005237  000656        STAR1B: INC     BLCNTR          ;BUMP BLOCK COUNTER
1905  003444  005737  000736                TST     ASEQF           ;SEE IF AUTO SEQ
1906  003450  001411                        BEQ     STAR1C          ;IF NOT: BR
1907  003452  023737  000656  000742        CMP     BLCNTR,ABLCNT   ;SEE IF DONE SEQ
1908  003460  001005                        BNE     STAR1C          ;IF NOT: BR
1909  003462  005037  000656                CLR     BLCNTR          ;RESET BLOCK CNTR
1910  003466  005037  000676                CLR     UNP             ;RESET UNIT POINTER
1911  003472  000207                        RTS     PC              ;RETURN TO AUTO SEQ
1912  003474  005037  000676        STAR1C: CLR     UNP
1913  003500  005000                        CLR     R0
1914  003502  016037  000746  000552        MOV     UN1(R0),UDES    ;LOAD FIRST UNIT DESCRIPTION
1915  003510  032777  000200  175072        BIT     #200,@SWR       ;SEE IF RANDOM RECORD SIZE
1916  003516  001402                        BEQ     START2          ;IF NOT: BR
1917  003520  004737  012134                JSR     PC,CCNTR        ;GO GENERATE RANDOM RECORD SIZE
1918  003524  032777  000400  175056  START2: BIT    #400,@SWR       ;SEE IF RANDOM DATA
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1919  003532  001402                          BEQ     START3          ;IF NOT: BR
1920  003534  004737  014766                  JSR     PC,DATR         ;GO GENERATE RANDOM DATA
1921  003540  032777  000100  175042  START3: BIT     #100,@SWR       ;SEE IF RANDOM RECORD COUNT
1922  003546  001402                          BEQ     START4          ;IF NOT: BR
1923  003550  004737  012174                  JSR     PC,RCNTR        ;GO GENERATE RANDOM RECORD COUNT
1924  003554  005760  000746          START4: TST     UN1(R0)         ;SEE IF REACHED EOT
1925  003560  100002                          BPL     STAR40          ;IF NOT: BR
1926  003562  000137  004264                  JMP     START7          ;ELSE GO TO NEXT UNIT
1927  003566  013777  000550  174724  STAR40: MOV     DVN,@CS         ;SET DRIVE NUMBER
1928  003574  013777  000552  174740          MOV     UDES,@TC        ;SET UNIT NUMBER
1929  003602  105777  174714                  TSTB    @DS             ;SEE IF UNIT AVAIL
1930  003606  100412                          BMI     STAR4A          ;IF SO: BR
1931  003610  005337  000670                  DEC     STAL
1932  003614  001357                          BNE     START4          ;AWAIT TUR
1933  003616  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
1934  003622  012704  025750                  MOV     #MSG49,R4
1935  003626  000004                          TYPE                    ;TYPE MSG
1936  003630  000000                          HALT                    ;STOP
1937  003632  000750                          BR      START4          ;RETRY
1938  003634  004737  014116          STAR4A: JSR     PC,DSUP         ;GO SET UP WRITE DATA
1939  003640  004737  005426                  JSR     PC,INIT         ;INIT SLAVE
1940  003644  004737  005056                  JSR     PC,RWND         ;REWIND
1941  003650  004737  005534                  JSR     PC,WRITE        ;WRITE
1942  003654  013737  000600  000670          MOV     TSTAL,STAL      ;SET TURN AROUND DELAY
1943  003662  004737  012124                  JSR     PC,STALL                ;DELAY
1944  003666  004737  007424                  JSR     PC,RSEQ         ;GO TO READ SEQUENCER
1945  003672  013737  000600  000670          MOV     TSTAL,STAL      ;SET TURN AROUND DELAY
1946  003700  004737  012124                  JSR     PC,STALL        ;DELAY
1947  003704  032777  040000  174676          BIT     #40000,@SWR     ;SEE IF SHOULD PRINT STATISTICS
1948  003712  001541                          BEQ     START5          ;IF NOT: BR
1949  003714  012700  000001                  MOV     #1,R0           ;SET RECORD COUNTER TO 1
1950  003720  004737  022602                  JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
1951  003724  004737  003734                  JSR     PC,STP          ;GO PRINT STATS
1952  003730  000137  004202                  JMP     STPX
1953  003734  004737  017106          STP:    JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
1954  003740  012704  026162                  MOV     #MSG65,R4
1955  003744  000004                          TYPE                    ;TYPE MSG
1956  003746  013704  000676                  MOV     UNP,R4
1957  003752  016403  001050                  MOV     RTY1(R4),R3
1958  003756  104400                          TYPOCT                  ;PRINT RETRIES
1959  003760  012704  026333                  MOV     #MSG73,R4
1960  003764  000004                          TYPE                    ;TYPE MSG
1961  003766  013704  000676                  MOV     UNP,R4
1962  003772  016403  001070                  MOV     WTER1(R4),R3
1963  003776  104400                          TYPOCT                  ;PRINT WRITE ERRORS
1964  004000  012704  026322                  MOV     #MSG72,R4
1965  004004  000004                          TYPE                    ;TYPE MSG
1966  004006  013704  000676                  MOV     UNP,R4
1967  004012  016403  001110                  MOV     RDER1(R4),R3
1968  004016  104400                          TYPOCT                  ;PRINT READ FORWARD ERRORS
1969  004020  012704  027126                  MOV     #MSG113,R4
1970  004024  000004                          TYPE                    ;TYPE MSG
1971  004026  013704  000676                  MOV     UNP,R4
1972  004032  016403  002670                  MOV     RFSOFT(R4),R3
1973  004036  104400                          TYPOCT                  ;PRINT FORWARD SOFT ERRORS
1974  004040  012704  027137                  MOV     #MSG114,R4
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1975  004044  000004                          TYPE                    ;TYPE MSG
1976  004046  013704  000676                  MOV     UNP,R4
1977  004052  016403  002730                  MOV     RFHARD(R4),R3
1978  004056  104400                          TYPOCT                  ;PRINT HARD FORWARE ERRORS
1979  004060  012704  026413                  MOV     #MSG77,R4
1980  004064  000004                          TYPE                    ;TYPE MSG
1981  004066  013704  000676                  MOV     UNP,R4
1982  004072  016403  001130                  MOV     DATER1(R4),R3
1983  004076  104400                          TYPOCT                  ;PRINT DATA ERROR FORWARD NUMBER
1984  004100  012704  026216                  MOV     #MSG68,R4
1985  004104  000004                          TYPE                    ;TYPE MSG
1986  004106  013704  000676                  MOV     UNP,R4
1987  004112  016403  001150                  MOV     RDERR1(R4),R3
1988  004116  104400                          TYPOCT                  ;PRINT REVESE ERROR NUMBER
1989  004120  012704  027126                  MOV     #MSG113,R4
1990  004124  000004                          TYPE                    ;TYPE MSG
1991  004126  013704  000676                  MOV     UNP,R4
1992  004132  016403  002710                  MOV     RRSOFT(R4),R3
1993  004136  104400                          TYPOCT                  ;PRINT REVERSE SOFT ERROR
1994  004140  012704  027137                  MOV     #MSG114,R4
1995  004144  000004                          TYPE                    ;TYPE MSG
1996  004146  013704  000676                  MOV     UNP,R4
1997  004152  016403  002750                  MOV     RRHARD(R4),R3
1998  004156  104400                          TYPOCT
1999  004160  012704  026402                  MOV     #MSG76,R4
2000  004164  000004                          TYPE                    ;TYPE MSG
2001  004166  013704  000676                  MOV     UNP,R4
2002  004172  016403  001170                  MOV     DEREV1(R4),R3
2003  004176  104400                          TYPOCT                  ;PRINT DATA REVERSE ERROR NUMBER
2004  004200  000207                          RTS     PC              ;RETURN
2005  004202  005237  000730          STPX:   INC     BTSTF           ;SET STAT ONLY PRINT
2006  004206  004737  007334                  JSR     PC,BTPRT        ;PRINT BAD TAPE STATS
2007  004212  005037  000730                  CLR     BTSTF           ;CLEAR FLAG
2008  004216  017700  174366          START5: MOV     @SWR,R0         ;LOAD SWR
2009  004222  042700  177762                  BIC     #177762,R0      ;MASK READ/WRITE SWITCHES
2010  004226  022700  000015                  CMP     #15,R0          ;SEE IF HAVE READ OR WRITE
2011  004232  001417                          BEQ     START8          ;IF NOT: BR
2012  004234  105777  174262          START6: TSTB    @DS             ;SEE IF HAVE UNIT READY
2013  004240  100411                          BMI     START7          ;IF SO: BR
2014  004242  005337  000670                  DEC     STAL
2015  004246  001372                          BNE     START6          ;DELAY FOR TUR
2016  004250  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
2017  004254  012704  025750                  MOV     #MSG49,R4
2018  004260  000004                          TYPE                    ;TYPE MSG
2019  004262  000000                          HALT                    ;STOP
2020  004264  062737  000002  000676  START7: ADD     #2,UNP          ;POINT TO NEXT UNIT
2021  004272  000137  003406          START8: JMP     START1          ;CONTINUE
2022
2023                                          ;RANDOM BASE RESET**********
2024
2025  004276  012737  153624  000626  RANSET: MOV     #153624,RANBAS  ;RESET BASE
2026  004304  012737  032561  000630          MOV     #32561,RANSAV   ;RESET BUFFER
2027  004312  013737  000632  000554          MOV     RCSAV,RCNT      ;RESET RECORD COUNT
2028  004320  013737  000634  000556          MOV     FCSAV,FMCNT     ;RESET FRAME COUNT
2029  004326  000207                          RTS     PC
2030
```

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2031                                    ;*****************************************************
2032                                    ;REWIND FROM EOT:
2033                                    ;
2034                                    ;WHEN ANY TRANSPORT BEING TESTED REACHES END OF TAPE
2035                                    ;DURING A READ OR WRITE OPERATION, IT WILL BE REWOUND
2036                                    ;AND FLAGGED AS UNAVAILABLE UNTIL ALL AVAILABLE UNITS
2037                                    ;HAVE REACHED EOT AT WHICH TIME ALL TESTING WILL BE RESUMED
2038                                    ;AT A BLOCK COUNT OF ONE (1).  A MESSAGE WILL BE
2039                                    ;PRINTED ON THE SUPERVISORS CONSOLE AS EACH UNIT REACHES
2040                                    ;EOT AND IS REWOUND.
2041                                    ;*****************************************************
2042
2043  004330  013777  000552  174204  REOT:   MOV     UDES,@TC        ;LOAD TAPE CONTROL REGISTER
2044  004336  012777  000011  174144          MOV     #11,@C1         ;DRIVE CLEAR
2045  004344  105777  174152          1$:     TSTB    @DS             ;WAIT FOR DRY
2046  004350  100375                          BPL     1$
2047  004352  012777  000007  174130          MOV     #7,@C1          ;START REWIND
2048  004360  005737  000726                  TST     BTFLG           ;SEE IF BAD TAPE OVERFLOW REWIND
2049  004364  001004                          BNE     REOT1A          ;IF SO: BR
2050  004366  013700  000662                  MOV     EOTREC,R0
2051  004372  042700  100000                  BIC     #100000,R0      ;SET RECORD NUMBER OF EOT
2052  004376  005037  000662          REOT1A: CLR     EOTREC          ;CLEAR EOT INDICATOR & REC COUNT
2053  004402  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
2054  004406  022737  000002  000726          CMP     #2,BTFLG        ;SEE IF POSITION ERROR
2055  004414  001003                          BNE     REOT1B          ;IF NOT: BR
2056  004416  012704  027017                  MOV     #MSG109,R4      ;SET POSITION ERROR MSG
2057  004422  000406                          BR      REOT1F
2058  004424  022737  000001  000726  REOT1B: CMP     #1,BTFLG        ;SEE IF BAD TAPE OVERFLOW
2059  004432  001004                          BNE     REOT1C          ;IF NOT: BR
2060  004434  012704  026645                  MOV     #MSG106,R4      ;SET BAD TAPE OVERFLOW MSG
2061  004440  000004                  REOT1F: TYPE                    ;TYPE MSG
2062  004442  000412                          BR      REOT1E
2063  004444  012704  024650          REOT1C: MOV     #MSG20,R4       ;SET EOT MSG
2064  004450  000004                          TYPE                    ;TYPE MSG
2065  004452  013704  000676                  MOV     UNP,R4
2066  004456  005264  002650                  INC     EOTC0(R4)       ;BUMP CNTR
2067  004462  016403  002650                  MOV     EOTC0(R4),R3
2068  004466  104400                          TYPOCT                  ;PRINT EOT CNTR
2069  004470  012704  026672          REOT1E: MOV     #MSG16A,R4
2070  004474  000004                          TYPE                    ;TYPE MSG
2071  004476  005037  000726                  CLR     BTFLG           ;CLEAR BAD TAPE FLAG
2072  004502  004737  003734                  JSR     PC,STP          ;PRINT STATS
2073  004506  004737  007334                  JSR     PC,BTPRT        ;PRINT BAD TAPE STATS
2074  004512  105777  174004          REOT2:  TSTB    @DS             ;BRANCH IF DRY SET
2075  004516  100414                          BMI     REOT2A
2076  004520  005337  000670                  DEC     STAL
2077  004524  001372                          BNE     REOT2           ;WAIT DRY
2078  004526  012737  024507  000654          MOV     #MSG6,EMADDR
2079  004534  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
2080  004540  012704  026124                  MOV     #MSG60,R4
2081  004544  000004                          TYPE                    ;TYPE MSG
2082  004546  000000                          HALT
2083  004550  105337  005054          REOT2A: DECB    REOTC           ;SEE IF LAST UNIT TO REACH EOT
2084  004554  001410                          BEQ     REOT3           ;IF SO: BR
2085  004556  013700  000676                  MOV     UNP,R0
2086  004562  052760  100000  000746          BIS     #100000,UN1(R0) ;SET EOT FLAG
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 2087  004570  005726                          TST     (SP)+           ;RESET STACK POINTER
 2088  004572  000137  004264                  JMP     START7          ;GO TO NEXT UNIT
 2089  004576  000337  005054          REOT3:  SWAB    REOTC
 2090  004602  013700  005054                  MOV     REOTC,R0
 2091  004606  000337  005054                  SWAB    REOTC
 2092  004612  110037  005054                  MOVB    R0,REOTC        ;RESTORE EOT UNIT COUNTER
 2093  004616  005037  000676                  CLR     UNP
 2094  004622  013700  000676                  MOV     UNP,R0          ;POINT TO FIRST UNIT
 2095  004626  016037  000746  000552  REOT4:  MOV     UN1(R0),UDES    ;LOAD UNIT DESCRIPTION
 2096  004634  013777  000552  173700          MOV     UDES,@TC        ;LOAD COMMAND REGISTER
 2097  004642  032777  020000  173652  REOT5:  BIT     #20000,@DS
 2098  004650  001374                          BNE     REOT5           ;AWAIT PIP RESET
 2099  004652  032777  000002  173642          BIT     #2,@DS          ;SEE IF HAVE BOT
 2100  004660  001012                          BNE     REOT6           ;IF SO: BR
 2101  004662  012700  000001                  MOV     #1,R0
 2102  004666  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
 2103  004672  012704  025715                  MOV     #MSG48,R4
 2104  004676  000004                          TYPE                    ;TYPE MSG
 2105  004700  000000                          HALT
 2106  004702  013700  000676                  MOV     UNP,R0
 2107  004706  042760  100000  000746  REOT6:  BIC     #100000,UN1(R0) ;CLEAR EOT FLAG
 2108  004714  062737  000002  000676          ADD     #2,UNP
 2109  004722  013700  000676                  MOV     UNP,R0          ;POINT TO NEXT UNIT
 2110  004726  022760  177777  000746          CMP     #-1,UN1(R0)     ;BRANCH IF NOT LAST UNIT
 2111  004734  001334                          BNE     REOT4
 2112  004736  005037  000676          REOT7:  CLR     UNP             ;CLEAR UNIT POINTER
 2113  004742  005037  000636                  CLR     TINF            ;CLEAR TTY INPUT FLAG
 2114  004746  005737  000736                  TST     ASEQF           ;SEE IF AUTO SEQ
 2115  004752  001402                          BEQ     REOTX           ;IF NOT: BR
 2116  004754  005726                          TST     (SP)+           ;RESET STACK POINTER
 2117  004756  000207                          RTS     PC              ;RETURN TO AUTO SEQ
 2118  004760  004737  004276          REOTX:  JSR     PC,RANSET       ;GO RESET RANDOM BASE
 2119  004764  012737  177777  014276          MOV     #-1,PATS        ;PRESET PATTERN
 2120  004772  005037  015030                  CLR     RDFL            ;CLEAR RANDOM FLAG
 2121  004776  005737  000572                  TST     SPFLG           ;SEE IF SINGLE PASS
 2122  005002  001422                          BEQ     REOTXX          ;IF NOT: BR
 2123  005004  012704  026525          TEND:   MOV     #MSG100,R4
 2124  005010  000004                          TYPE                    ;TYPE MSG
 2125  005012  013700  000042                  MOV     @#42,R0         ;GET ACT11 RETURN ADDRESS
 2126  005016  001405                          BEQ     HERE            ;BRANCH IF NOT ACT11
 2127  005020  000005                          RESET
 2128  005022  004710          $ENDAD: JSR     PC,(R0)
 2129  005024  000240                          NOP
 2130  005026  000240                          NOP
 2131  005030  000240                          NOP
 2132  005032  000240          HERE:   NOP
 2133  005034  005737  003040                  TST     CHNFLG          ;BRANCH IF NOT CHAIN MODE
 2134  005040  001402                          BEQ     1$
 2135  005042  000137  022004                  JMP     ASEQ0           ;RETURN TO AUTO SEQUENCER
 2136  005046  000000          1$:     HALT
 2137  005050  000137  003236          REOTXX: JMP     STARTE          ;RESTART AT BLOCK NUMBER ONE
 2138  005054  000000          REOTC:  0               ;EOT UNIT COUNTER
```

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                                        ;*********************************************************
                                        ;REWIND ALL AVAIL TAPES:
                                        ;
                                        ;THIS ROUTINE; ENTERED VIA CONSOLE SWITCH NINE (9),
                                        ;WILL REWIND ALL AVAILABLE TAPES TO BOT NO MATTER
                                        ;WHERE THEY ARE CURRENTLY POSITIONED AND RESUME TESTING
                                        ;ON THE CURRENTLY SELECTED UNIT.
                                        ;*********************************************************

005056  032777  001000  173524  RWND:   BIT     #1000,@SWR      ;SEE IF SHOULD REWIND
005064  001001                          BNE     RWNDA           ;IF SO: BR
005066  000207                          RTS     PC              ;ELSE EXIT
005070  013737  000676  000716  RWNDA:  MOV     UNP,UPS         ;SAVE UNIT POINTER
005076  005037  000676                  CLR     UNP             ;CLEAR POINTER
005102  005037  000662                  CLR     EOTREC          ;CLEAR EDT FLAG
005106  000337  005054                  SWAB    REOTC
005112  013700  005054                  MOV     REOTC,R0
005116  000337  005054                  SWAB    REOTC
005122  110037  005054                  MOVB    R0,REOTC        ;RESTORE EOT UNIT COUNTER
005126  013700  000676          RWND0:  MOV     UNP,R0          ;POINT TO UNIT ENTRY
005132  022760  177777  000746          CMP     #-1,UN1(R0)     ;BRANCH IF LAST ENTRY
005140  001445                          BEQ     RWND2
005142  005760  000746                  TST     UN1(R0)         ;SEE IF ALREADY REWINDING
005146  100433                          BMI     RWND1A          ;IF SO: BR
005150  016037  000746  000552          MOV     UN1(R0),UDES    ;SET UNIT DESCRIPTION
005156  013777  000552  173356          MOV     UDES,@TC        ;LOAD COMMAND REGISTER
005164  012777  000011  173316          MOV     #11,@C1         ;DRIVE CLEAR
005172  012777  000007  173310          MOV     #7,@C1          ;START REWIND
005200  105777  173316          1$:     TSTB    @DS
005204  100414                          BMI     RWND1A          ;IF DRY: BR
005206  005337  000670                  DEC     STAL
005212  001372                          BNE     1$              ;AWAIT DRY
005214  012737  024507  000654          MOV     #MSG6,EMADDR
005222  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
005226  012704  026245                  MOV     #MSG70,R4
005232  000004                          TYPE                    ;TYPE MSG
005234  000000                          HALT
005236  042760  100000  000746  RWND1A: BIC     #100000,UN1(R0) ;CLEAR EOT FLAG
005244  062737  000002  000676          ADD     #2,UNP          ;BUMP POINTER
005252  000725                          BR      RWND0           ;DO NEXT UNIT
005254  005037  000676          RWND2:  CLR     UNP             ;CLEAR POINTER
005260  013700  000676          RWND3:  MOV     UNP,R0          ;POINT TO UNIT ENTRY
005264  022760  177777  000746          CMP     #-1,UN1(R0)     ;BRANCH IF LAST ENTRY
005272  001441                          BEQ     RWNDX
005274  016037  000746  000552          MOV     UN1(R0),UDES    ;SET UNIT DESCRIPTION
005302  013777  000552  173232          MOV     UDES,@TC        ;LOAD COMMAND REGISTER
005310  032777  020000  173204  1$:     BIT     #20000,@DS
005316  001374                          BNE     1$              ;AWAIT PIP RESET
005320  013777  000552  173214          MOV     UDES,@TC        ;LOAD UNIT DESCRIPTION
005326  032777  000002  173166          BIT     #2,@DS          ;SEE IF HAVE BOT
005334  001407                          BEQ     RWND6           ;IF NOT: BR
005336  062737  000002  000676  RWND5:  ADD     #2,UNP          ;BUMP POINTER
005344  012777  000011  173136          MOV     #11,@C1         ;DRIVE CLEAR
005352  000742                          BR      RWND3           ;DO NEXT UNIT
005354  012700  000001          RWND6:  MOV     #1,R0
005360  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
```

```
 2195  005364  012704  025715                MOV     #MSG48,R4
 2196  005370  000004                        TYPE                    ;TYPE MSG
 2197  005372  000000                        HALT
 2198  005374  000760                        BR      RWND5           ;DO NEXT UNIT
 2199  005376  013737  000716  000676  RWNDX: MOV     UPS,UNP         ;RESTORE UNIT POINTER
 2200  005404  013700  000676                MOV     UNP,R0
 2201  005410  016037  000746  000552        MOV     UN1(R0),UDES    ;RESET UNIT DESCRIPTION
 2202  005416  013777  000552  173116        MOV     UDES,@TC
 2203  005424  000207                        RTS     PC              ;RETURN TO TEST
 2204
 2205
 2206                                        ;*******************************************************
 2207                                        ;INITIALIZE SELECTED SALVE
 2208                                        ;THIS ROUTINE REWINDS AND SETS THE PROPER DENSITY IF
 2209                                        ;THE DENSITY REQUIRED FOR THE TEST IS DIFFERENT FROM
 2210                                        ;THE DENSITY AT WHICH THE SLAVE IS SELECTED.
 2211                                        ;*******************************************************
 2212
 2213  005426  013746  000552        INIT:   MOV     UDES,-(SP)      ;GET UNIT DESCRIPTION
 2214  005432  013777  000550  173060        MOV     DVN,@CS         ;LOAD DRIVE #
 2215  005440  011677  173076                MOV     (SP),@TC        ;LOAD SLAVE # & SLAVE DESCRIPTION
 2216  005444  042716  174377                BIC     #174377,(SP)    ;CLEAR ALL BUT DENSITY BITS
 2217  005450  022726  001400                CMP     #1400,(SP)+     ;BRANCH IF NOT NRZ
 2218  005454  001005                        BNE     1$
 2219  005456  032777  000040  173036        BIT     #40,@DS         ;BRANCH IF SLAVE IS IN PE MODE
 2220  005464  001422                        BEQ     4$              ;PES = 0
 2221  005466  000404                        BR      2$
 2222  005470  032777  000040  173024  1$:   BIT     #40,@DS         ;BRANCH IF SLAVE IS IN PE MODE
 2223  005476  001015                        BNE     4$              ;PES =  1
 2224  005500  012777  000007  173002  2$:   MOV     #7,@C1          ;LOAD REWIND COMMAND
 2225  005506  105777  173010          20$:  TSTB    @DS             ;WAIT FOR READY
 2226  005512  100375                        BPL     20$
 2227  005514  032777  020000  173000  3$:   BIT     #20000,@DS      ;WAIT FOR PIP = 0
 2228  005522  001374                        BNE     3$
 2229  005524  012777  000011  172756        MOV     #11,@C1         ;CLEAR DRIVE
 2230  005532  000207                4$:     RTS     PC
```

```
                                                ;*********************************************************
                                                ;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).
                                                ;*********************************************************

005534  032777  000001  173046  WRITE:  BIT     #1,@SWR          ;SEE IF SHOULD WRITE
005542  001402                          BEQ     WRTE
005544  000137  006332                  JMP     WEX              ;IF NOT: BR
005550  013700  000554          WRTE:   MOV     RCNT,R0          ;R0=RECORD COUNT
005554  012737  024502  000654  W0:     MOV     #MSG5,EMADDR     ;SET ERROR MSG ADDRESS
005562  013777  000556  172726          MOV     FMCNT,@FC        ;LOAD CHAR COUNT
005570  012777  027346  172716          MOV     #WDATA,@BA       ;SET DATA ADDR
005576  112737  000060  000674          MOVB    #60,MTC1         ;SET WRITE OP COMMAND
005604  012737  005616  000664          MOV     #W1,RTRN         ;SET RETURN ADDRESS
005612  000137  021072                  JMP     TAPG             ;GO EXECUTE COMMAND
005616  032777  002000  172676  W1:     BIT     #2000,@DS        ;SEE IF EOT
005624  001414                          BEQ     W2               ;IF NOT AT EOT: BR
005626  005737  000662                  TST     EOTREC           ;BRANCH IF WRITTEN PAST EOT
005632  100411                          BMI     W2
005634  010037  000662                  MOV     R0,EOTREC        ;SAVE RECORD COUNT
005640  052737  100000  000662          BIS     #100000,EOTREC   ;++B SET EOT INDICATOR
005646  005337  000662                  DEC     EOTREC           ;++B ADJUST RECORD COUNT
005652  012700  000002                  MOV     #2,R0            ;SET TO WRITE 1 LAST RECORD
005656  032777  010000  172724  W2:     BIT     #10000,@SWR      ;SEE IF SHOULD CHECK ERRORS
005664  001002                          BNE     W3               ;IF NOT: BR
005666  004737  017244                  JSR     PC,ERCHK         ;GO CHECK ERRORS
005672  013737  000576  000670  W3:     MOV     WSTAL,STAL       ;SET DELAY
005700  004737  012124                  JSR     PC,STALL         ;DELAY
```

```
2287  005704  005737  000714              TST     RTYFL           ;SEE IF RETRY TIME
2288  005710  001401                      BEQ     W3A             ;IF NOT: BR
2289  005712  000207                      RTS     PC              ;ELSE RETURN
2290  005714  005737  000710      W3A:    TST     SERFL           ;SEE IF WRITE ERROR
2291  005720  001450                      BEQ     W5              ;IF NOT: BR
2292  005722  013704  000676              MOV     UNP,R4
2293  005726  005264  001070              INC     WTER1(R4)       ;BUMP WRITE ERROR
2294  005732  005037  000710              CLR     SERFL           ;CLEAR STATUS ERROR FLAG
2295  005736  032777  000020  172644      BIT     #20,@SWR        ;SEE IF RETRY
2296  005744  001436                      BEQ     W5              ;IF NOT: BR
2297  005746  013703  000724              MOV     ERSAV,R3
2298  005752  042703  102700              BIC     #102700,R3      ;MASK UNRECOVERABLE ERROR
2299  005756  001410                      BEQ     W4              ;IF SO: BR
2300  005760  004737  022602              JSR     PC,PAPRT        ;PRINT HEADER
2301  005764  012704  026424              MOV     #MSG78,R4
2302  005770  000004                      TYPE                    ;TYPE MSG
2303  005772  004737  011244              JSR     PC,NRTP         ;PRINT ER FOR NON-RETRYABLE
2304  005776  000421                      BR      W5
2305  006000  013704  000676      W4:     MOV     UNP,R4
2306  006004  005264  001050              INC     RTY1(R4)        ;BUMP RETRY CNTR
2307  006010  032777  002000  172572      BIT     #2000,@SWR      ;SEE IF PRINT ERRORS
2308  006016  001003                      BNE     W4A             ;IF NOT: BR
2309  006020  012704  026140              MOV     #MSG64,R4
2310  006024  000004                      TYPE                    ;TYPE MSG
2311  006026  005037  000704      W4A:    CLR     RTCNT           ;CLEAR RETRY NUMBER
2312  006032  005037  000702              CLR     RPCNT           ;CLEAR REPEAT COUNTER
2313  006036  004737  006374              JSR     PC,WRTY         ;GO RETRY WRITE ERROR
2314  006042  005037  000714      W5:     CLR     RTYFL           ;CLEAR RETRY COUNTER
2315  006046  005300                      DEC     R0              ;SEE IF DONE ALL
2316  006050  001241                      BNE     W0              ;IF NOT: BR
2317  006052  005737  000564      W6:     TST     TMEX            ;SEE IF TM
2318  006056  001525                      BEQ     WEX             ;IF NOT: BR
2319  006060  005237  000700              INC     TMFLG           ;SET TM FLAG
2320  006064  012737  026045  000654  WTM:  MOV     #MSG54,EMADDR   ;POINT TO TM ERROR MSG
2321  006072  012737  000026  000674      MOV     #26,MTC1        ;SET TM OP CODE
2322  006100  012777  000000  172410      MOV     #0,@FC          ;LOAD FRAME COUNTER
2323  006106  012777  027346  172400      MOV     #WDATA,@BA      ;LOAD BUS ADDRESS
2324  006114  012737  006126  000664      MOV     #WTM0,RTRN      ;SAVE RETURN ADDRESS
2325  006122  000137  021072              JMP     TAPG            ;WRITE TM
2326  006126  032777  010000  172454  WTM0:  BIT     #10000,@SWR     ;SEE IF SHOULD CHECK ERRORS
2327  006134  001076                      BNE     WEX
2328  006136  032777  000004  172356      BIT     #4,@DS          ;SEE IF TM STATUS
2329  006144  001011                      BNE     WTM1            ;IF SO: BR
2330  006146  012737  027346  021012      MOV     #WDATA,CADER    ;SET EXPT BUS ADDRESS
2331  006154  012737  000001  021020      MOV     #1,DRVER        ;INDICATE ERROR
2332  006162  004737  020064              JSR     PC,ERPT         ;PRINT TM ERROR
2333  006166  000404                      BR      WTM2
2334  006170  012703  027346      WTM1:   MOV     #WDATA,R3       ;SET EXPT ADDRESS
2335  006174  004737  017340              JSR     PC,ER2          ;GO CHECK FOR OTHER ERRORS
2336  006200  005737  000714      WTM2:   TST     RTYFL           ;SEE IF RETRY
2337  006204  001401                      BEQ     WTM3            ;IF NOT: BR
2338  006206  000207                      RTS     PC              ;ELSE RETURN TO RETRY ROUTINE
2339  006210  005737  000710      WTM3:   TST     SERFL           ;SEE IF WRITE ERROR
2340  006214  001446                      BEQ     WEX             ;IF NOT: BR
2341  006216  013704  000676              MOV     UNP,R4
2342  006222  005264  001070              INC     WTER1(R4)       ;BUMP WRITE ERROR
```

```
                                                        N  4
 2343  006226  032777  000020  172354          BIT     #20,@SWR        ;SEE IF SHOULD RETRY
 2344  006234  001436                          BEQ     WEX             ;IF NOT: BR
 2345  006236  013703  000724                  MOV     ERSAV,R3
 2346  006242  042703  102700                  BIC     #102700,R3      ;MASK UNRECOVERABLE ERROR
 2347  006246  001410                          BEQ     WTM4            ;IF SO: BR
 2348  006250  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
 2349  006254  012704  026424                  MOV     #MSG78,R4
 2350  006260  000004                          TYPE                    ;TYPE MSG
 2351  006262  004737  011244                  JSR     PC,NRTP         ;PRINT ER FOR NON-RETRYABLE
 2352  006266  000421                          BR      WEX
 2353  006270  005037  000702          WTM4:   CLR     RPCNT           ;CLEAR REPEAT CNTR
 2354  006274  013704  000676                  MOV     UNP,R4
 2355  006300  005264  001050                  INC     RTY1(R4)        ;BUMP RETRY CNTR
 2356  006304  005037  000704                  CLR     RTCNT           ;CLEAR RETRY CNTR
 2357  006310  032777  002000  172272          BIT     #2000,@SWR      ;SEE IF PRINT ERRORS
 2358  006316  001003                          BNE     WTM4A           ;IF NOT: BR
 2359  006320  012704  026140                  MOV     #MSG64,R4
 2360  006324  000004                          TYPE                    ;TYPE MSG
 2361  006326  004737  006374          WTM4A:  JSR     PC,WRTY         ;GO DO RETRY
 2362  006332  005037  000714          WEX:    CLR     RTYFL           ;CLEAR RETRY FLAG
 2363  006336  005037  000700                  CLR     TMFLG           ;CLEAR TAPE MARK FLAG
 2364  006342  005737  000662                  TST     EOTREC          ;BRANCH IF NOT AT EOT
 2365  006346  100011                          BPL     WRWX
 2366  006350  017703  172234          WRW:    MOV     @SWR,R3
 2367  006354  042703  177763                  BIC     #177763,R3
 2368  006360  022703  000014                  CMP     #14,R3          ;SEE IF WRITE ONLY
 2369  006364  001002                          BNE     WRWX            ;IF NOT: BR
 2370  006366  000137  004330                  JMP     REOT            ;ELSE REWIND
 2371  006372  000207          WRWX:   RTS     PC                      ;EXIT
```

```
2372                                            ;*************************
2373                                            ;WRITE ERROR RETRY
2374                                            ;
2375                                            ;*************************
2376
2377  006374  012737  000001  000714  WRTY:   MOV     #1,RTYFL        ;SET RETRY FLAG
2378  006402  004737  006776          WRTY0:  JSR     PC,WRTSB        ;GO SPACE REVERSE FOR REPEAT
2379  006406  005737  000700                  TST     TMFLG           ;SEE IF TAPE MARK TIME
2380  006412  001003                          BNE     WRTYTM          ;IF SO: BR
2381  006414  004737  005554                  JSR     PC,WO           ;REWRITE RECORD
2382  006420  000402                          BR      WRTYR           ;GO ON
2383  006422  004737  006064          WRTYTM: JSR     PC,WTM          ;GO WRITE TAPE MARK AGAIN
2384  006426  005737  000710          WRTYR:  TST     SERFL           ;REWRITE GOOD
2385  006432  001024                          BNE     WRTY2           ;IF NOT: BR
2386  006434  005237  000702                  INC     RPCNT           ;BUMP REPEAT COUNTER
2387  006440  022737  000004  000702        CMP     #4,RPCNT        ;SEE IF FOUR GOOD REPEATS
2388  006446  001355                          BNE     WRTY0           ;IF NOT: REPEAT
2389  006450  032777  002000  172132        BIT     #2000,@SWR      ;SEE IF PRINT
2390  006456  001011                          BNE     WRTY1           ;IF NOT: BR
2391  006460  012704  026632                  MOV     #MSG105,R4
2392  006464  000004                          TYPE                    ;TYPE MSG
2393  006466  012704  026162                  MOV     #MSG65,R4
2394  006472  000004                          TYPE                    ;TYPE MSG
2395  006474  013703  000704                  MOV     RTCNT,R3
2396  006500  104400                          TYPOCT                  ;PRINT RETRY NUMBER
2397  006502  000207          WRTY1:  RTS     PC                      ;RESUME TESTING
2398  006504  013703  000724          WRTY2:  MOV     ERSAV,R3        ;GET ER
2399  006510  005037  000650                  CLR     TEMP3           ;CLEAR RECOVERABLE ERROR INDICATOR
2400  006514  042703  102700                  BIC     #102700,R3      ;MASK RECOVERABLE BITS
2401  006520  001413                          BEQ     WRTY2A          ;IF RECOVERABLE: BR
2402  006522  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
2403  006526  012704  026424                  MOV     #MSG78,R4
2404  006532  000004                          TYPE                    ;TYPE MSG
2405  006534  004737  011244                  JSR     PC,NRTP         ;PRINT ER
2406  006540  012737  000001  000650        MOV     #1,TEMP3        ;SET FLAG
2407  006546  000407                          BR      WRTY2B
2408  006550  032777  002000  172032  WRTY2A: BIT     #2000,@SWR      ;SEE IF PRINT
2409  006556  001025                          BNE     WRTY3           ;IF NOT: BR
2410  006560  012704  027051                  MOV     #MSG110,R4
2411  006564  000004                          TYPE                    ;TYPE MSG
2412  006566  012704  026162          WRTY2B: MOV     #MSG65,R4
2413  006572  000004                          TYPE                    ;TYPE MSG
2414  006574  013703  000704                  MOV     RTCNT,R3
2415  006600  104400                          TYPOCT                  ;PRINT RETRY NUMBER
2416  006602  012704  027073                  MOV     #MSG111,R4
2417  006606  000004                          TYPE                    ;TYPE MSG
2418  006610  013703  000702                  MOV     RPCNT,R3
2419  006614  104400                          TYPOCT                  ;PRINT REPEAT NUMBER
2420  006616  005737  000650                  TST     TEMP3           ;SEE IF DID NON-RECOVERABLE
2421  006622  001403                          BEQ     WRTY3           ;IF NOT: BR
2422  006624  005037  000650                  CLR     TEMP3           ;CLEAR FLAG
2423  006630  000207                          RTS     PC              ;EXIT
2424  006632  005737  000704          WRTY3:  TST     RTCNT           ;SEE IF FIRST RETRY
2425  006636  001004                          BNE     WRTY3A          ;IF NOT: BR
2426  006640  013704  000676                  MOV     UNP,R4
2427  006644  005364  001070                  DEC     WTER1(R4)       ;DECREMENT WRITE ERROR CNTR
```

```
 2428  006650  013704  000676          WRTY3A: MOV     UNP,R4              ;GET UNIT NUMBER
 2429  006654  016437  001030  000732          MOV     BTADDR(R4),BTPT ;GET ADDRESS OF UNIT BAD TAPE CNTR
 2430  006662  017704  172044                  MOV     @BTPT,R4            ;GET COUNTER
 2431  006666  005724                          TST     (R4)+               ;SET POINTER OFFSET
 2432  006670  010477  172036                  MOV     R4,@BTPT
 2433  006674  013703  000732                  MOV     BTPT,R3
 2434  006700  060304                          ADD     R3,R4               ;SET ABSOLUTE POINTER
 2435  006702  013714  000656                  MOV     BLCNTR,(R4)         ;SET BLOCK NUMBER
 2436  006706  062704  000040                  ADD     #40,R4              ;ADD RCNT OFFSET
 2437  006712  013714  000554                  MOV     RCNT,(R4)
 2438  006716  160014                          SUB     R0,(R4)             ;SET RECORD NUMBER
 2439  006720  005214                          INC     (R4)                ;CORRECT RECORD NUMBER
 2440  006722  022777  000040  172002          CMP     #40,@BTPT           ;SEE IF TOO MANY BAD SPOTS
 2441  006730  001002                          BNE     WRTY4               ;IF NOT: BR
 2442  006732  000137  007172                  JMP     BTOV                ;ELSE GO TO BAD TAPE OVERFLOW
 2443  006736  005237  000704          WRTY4:  INC     RTCNT               ;BUMP RETRY COUNTER
 2444  006742  022737  000004  000704          CMP     #4,RTCNT            ;SEE IF DONE 4 RETRIES
 2445  006750  001410                          BEQ     WRTY5               ;IF SO: BR
 2446  006752  013704  000676                  MOV     UNP,R4
 2447  006756  005264  001050                  INC     RTY1(R4)            ;BUMP RETRY COUNTER
 2448  006762  005237  000734                  INC     ERTFL               ;SET ERASE FLAG
 2449  006766  000137  006402                  JMP     WRTY0               ;DO NEXT RETRY
 2450  006772  000137  007410          WRTY5:  JMP     BTUR                ;ELSE GO TO BAD TAPE UNRECOVERABLE
 2451
 2452                                          ;WRITE RETRY BACKSPACE-ERASE SUBROUTINE**********
 2453
 2454  006776  005037  000710          WRTSB:  CLR     SERFL               ;CLEAR FLAG
 2455  007002  013737  000600  000670          MOV     TSTAL,STAL
 2456  007010  004737  012124                  JSR     PC,STALL            ;DO TURN AROUND DELAY
 2457  007014  012737  026173  000654          MOV     #MSG66,EMADDR       ;SET ERROR CODE
 2458  007022  012777  177777  171466          MOV     #-1,@FC             ;SET TO BACKSPACE 1 RECORD
 2459  007030  012777  033354  171456          MOV     #RDATA,@BA          ;SET BA
 2460  007036  004737  012054                  JSR     PC,BKRT             ;GO BACKSPACE
 2461  007042  005737  000710                  TST     SERFL               ;SEE IF ERROR
 2462  007046  001406                          BEQ     WRTSB1              ;IF NOT: BR
 2463  007050  012737  000002  000726  WRTSB0: MOV     #2,BTFLG            ;SET FLAG
 2464  007056  022626                          CMP     (SP)+,(SP)+         ;RESET STACK
 2465  007060  000137  004330                  JMP     REOT                ;GO REWIND AND REMOVE FROM TESTING
 2466  007064  005737  000734          WRTSB1: TST     ERTFL               ;SEE IF SHOULD ERASE
 2467  007070  001001                          BNE     WRTSB2              ;IF SO: BR
 2468  007072  000207                          RTS     PC                  ;RETURN
 2469  007074  005037  000734          WRTSB2: CLR     ERTFL               ;CLEAR ERASE FLAG
 2470  007100  005037  000702                  CLR     RPCNT               ;CLEAR REPEAT CNTR
 2471  007104  005037  000710                  CLR     SERFL               ;CLEAR FLAG
 2472  007110  012737  026206  000654          MOV     #MSG67,EMADDR       ;SET ERROR CODE
 2473  007116  005077  171374                  CLR     @FC                 ;CLEAR FRAME COUNT
 2474  007122  012737  000024  000674          MOV     #24,MTC1            ;SET ERASE OP-CODE
 2475  007130  012777  027346  171356          MOV     #WDATA,@BA          ;SET BA
 2476  007136  012737  007150  000664          MOV     #WRTSB3,RTRN        ;SET RETURN ADDRESS
 2477  007144  000137  021072                  JMP     TAPG                ;GO ERASE
 2478  007150  012703  027346          WRTSB3: MOV     #WDATA,R3           ;SET EXPT BA
 2479  007154  004737  017340                  JSR     PC,ER2              ;GO CHECK ERRORS
 2480  007160  005737  000710                  TST     SERFL               ;SEE IF ERROR
 2481  007164  001737                          BEQ     WRTSB1              ;IF NOT: BR
 2482  007166  000137  007050                  JMP     WRTSB0
 2483
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2484                                        ;BAD TAPE OVERFLOW SUBROUTINE**********
2485
2486  007172  005037  000714        BTOV:   CLR     RTYFL           ;CLEAR RETRY FLAG
2487  007176  012737  000001  000726        MOV     #1,BTFLG        ;SET BAD TAPE OVERFLOW FLAG
2488  007204  005726                        TST     (SP)+           ;++B ADJUST STACK PTR
2489  007206  000137  004330                JMP     REOT            ;GO REWIND AND REMOVE FROM TESTING
2490  007212  013701  000732        BTOV0:  MOV     BTPT,R1         ;SET TABLE POINTER
2491  007216  005721                        TST     (R1)+
2492  007220  005000                        CLR     R0
2493  007222  010003                BTOV1:  MOV     R0,R3
2494  007224  000241                        CLC
2495  007226  006003                        ROR     R3              ;R3=R3/2 FOR CORRECT NUMBER
2496  007230  104400                        TYPOCT                  ;PRINT ENTRY NUMBER
2497  007232  012704  024577                MOV     #MSG13+1,R4
2498  007236  000004                        TYPE                    ;TYPE MSG
2499  007240  011103                        MOV     (R1),R3
2500  007242  104400                        TYPOCT                  ;PRINT BLOCK NUMBER
2501  007244  012704  024604                MOV     #MSG14,R4
2502  007250  000004                        TYPE                    ;TYPE MSG
2503  007252  062701  000040                ADD     #40,R1          ;SET POINTER OFFSET FOR RECOED NUMBER
2504  007256  012103                        MOV     (R1)+,R3
2505  007260  104400                        TYPOCT                  ;PRINT RECORD NUMBER
2506  007262  162701  000040                SUB     #40,R1          ;RESET POINTER FOR BLOCK NUMBER
2507  007266  005720                        TST     (R0)+
2508  007270  020077  171436                CMP     R0,@BTPT        ;SEE IF DONE
2509  007274  001404                        BEQ     BTOV2           ;IF SO: BR
2510  007276  012704  025131                MOV     #MSG28,R4
2511  007302  000004                        TYPE                    ;TYPE MSG
2512  007304  000746                        BR      BTOV1           ;CONTINUE
2513  007306  005737  000730        BTOV2:  TST     BTSTF           ;SEE IF STAT ONLY PRINT
2514  007312  001007                        BNE     BTOVX           ;IF SO: BR
2515  007314  012703  000041                MOV     #41,R3          ;SET SIZE OF TABLE
2516  007320  013704  000732                MOV     BTPT,R4         ;SET POINTER
2517  007324  005024                BTOV3:  CLR     (R4)+           ;CLEAR TABLE
2518  007326  005303                        DEC     R3              ;SEE IF DONE
2519  007330  001375                        BNE     BTOV3           ;IF NOT: BR
2520  007332  000207                BTOVX:  RTS     PC              ;RETURN
2521
```

```
2522
2523                                        ;BAD TAPE STATISTIC PRINT********
2524
2525  007334  012704  025131        BTPRT:  MOV     #MSG28,R4
2526  007340  000004                        TYPE                    ;TYPE MSG
2527  007342  013704  000676                MOV     UNP,R4
2528  007346  016437  001030  000732        MOV     BTADDR(R4),BTPT ;SET TABLE POINTER
2529  007354  017703  171352                MOV     @BTPT,R3
2530  007360  000241                        CLC
2531  007362  006003                        ROR     R3              ;CORRECT NUMBER
2532  007364  104400                        TYPOCT                  ;PRINT NUMBER OF BAD SPOTS
2533  007366  012704  027105                MOV     #MSG112,R4
2534  007372  000004                        TYPE                    ;TYPE MSG
2535  007374  005777  171332                TST     @BTPT           ;SEE IF ANY BAD SPOTS
2536  007400  001001                        BNE     BTPRT1          ;IF SO: BR
2537  007402  000207                        RTS     PC              ;ELSE RETURN
2538  007404  000137  007212        BTPRT1: JMP     BTOV0           ;PRINT STATS
2539
2540                                        ;BAD TAPE UNRECOVERABLE SUBROUTINE**********
2541
2542  007410  004737  022602        BTUR:   JSR     PC,PAPRT        ;PRINT HEADER
2543  007414  012704  026733                MOV     #MSG107,R4
2544  007420  000004                        TYPE                    ;TYPE MSG
2545  007422  000207                        RTS     PC              ;RESUME TESTING
2546
```

```
2547                                    ;*********************************************************
2548                                    ;READ SEQUENCER:
2549                                    ;
2550                                    ;THIS ROUTINE IS USED TO DETERMINE THE SEQUENCE
2551                                    ;IN WHICH READ TAPE OPERATIONS ARE TO BE PERFORMED.
2552                                    ;THIS IS NECESSARY WHEN THE UNIT BEING TESTED IS
2553                                    ;CAPABLE OF READING DATA IN BOTH THE FORWARD AND
2554                                    ;REVERSE DIRECTIONS.  CONSOLE SWITCHES ONE (1), TWO (2),
2555                                    ;AND THREE (3) ARE USED TO DETERMINE THE READ SEQUENCE.
2556                                    ;CONSOLE SWITCH ONE (1) DETERMINES WHETHER TO READ
2557                                    ;THE BLOCK OF DATA FORWARD FIRST OR REVERSE FIRST.
2558                                    ;SWITCH TWO (2) DISALLOWS READING IN THE REVERSE
2559                                    ;DIRECTION AND SWITCH THREE (3) DISALLOWS READING IN
2560                                    ;THE FORWARD DIRECTION.
2561                                    ;*********************************************************
2562
2563  007424  012737  000002  000562  RSEQ:   MOV     #2,RDCMD
2564  007432  017704  171152                  MOV     @SWR,R4         ;READ SWITCHES
2565  007436  042704  177763                  BIC     #177763,R4      ;MASK READ BITS & SEE IF BOTH READS
2566  007442  001004                          BNE     RSR             ;IF NOT: BR
2567  007444  032777  000002  171136          BIT     #2,@SWR         ;SEE IF READ REVERSE FIRST
2568  007452  001050                          BNE     RSFR            ;IF NOT: BR
2569  007454  032777  000004  171126  RSR:    BIT     #4,@SWR         ;SEE IF SHOULD READ REVERSE
2570  007462  001005                          BNE     RSF             ;IF NOT: BR
2571  007464  012737  010000  000562          MOV     #10000,RDCMD    ;LOAD READ REVERSE COMMAND
2572  007472  004737  007736                  JSR     PC,READ         ;GO READ REVERSE
2573  007476  032777  000010  171104  RSF:    BIT     #10,@SWR        ;SEE IF SHOULD READ FORWARD
2574  007504  001025                          BNE     RSEX            ;IF NOT: BR
2575  007506  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF HAVE READ REVERSE
2576  007514  001406                          BEQ     RSF0            ;IF NOT: BR
2577  007516  013737  000600  000670          MOV     TSTAL,STAL
2578  007524  004737  012124                  JSR     PC,STALL        ;DO READ STALL
2579  007530  000406                          BR      RSF1
2580  007532  032777  000001  171050  RSF0:   BIT     #1,@SWR         ;SEE IF WRITE
2581  007540  001002                          BNE     RSF1            ;IF NOT: BR
2582  007542  004737  011700                  JSR     PC,BKSP         ;GO BACKSPACE
2583  007546  012737  000002  000562  RSF1:   MOV     #2,RDCMD        ;LOAD READ FORWARD COMMAND
2584  007554  004737  007736                  JSR     PC,READ         ;GO READ
2585  007560  005737  000662          RSEX:   TST     EOTREC          ;BRANCH IF NOT AT EOT
2586  007564  100002                          BPL     1$
2587  007566  000137  004330                  JMP     REOT            ;ELSE GO TO REWIND
2588  007572  000207                  1$:     RTS     PC              ;EXIT
2589
2590  007574  012737  010000  000562  RSFR:   MOV     #10000,RDCMD
2591  007602  032777  000010  171000          BIT     #10,@SWR        ;SEE IF SHOULD READ FORWARD
2592  007610  001013                          BNE     RSFR1           ;IF NOT: BR
2593  007612  032777  000001  170770          BIT     #1,@SWR         ;SEE IF WRITE
2594  007620  001002                          BNE     RSFR0           ;IF NOT: BR
2595  007622  004737  011700                  JSR     PC,BKSP         ;GO BACKSPACE TO START
2596  007626  012737  000002  000562  RSFR0:  MOV     #2,RDCMD        ;LOAD READ FORWARD COMMAND
2597  007634  004737  007736                  JSR     PC,READ         ;GO READ FORWARD
2598  007640  032777  000004  170742  RSFR1:  BIT     #4,@SWR         ;SEE IF SHOULD READ REVERSE
2599  007646  001344                          BNE     RSEX            ;IF NOT: BR
2600  007650  032737  010000  000562          BIT     #10000,RDCMD
2601  007656  001005                          BNE     RSFR2           ;IF READ REVERSE: BR
2602  007660  013737  000600  000670          MOV     TSTAL,STAL      ;DO READ STALL
```

```
 2603  007666  004737  012124                        JSR     PC,STALL
 2604  007672  012737  010000  000562  RSFR2:  MOV     #10000,RDCMD    ;LOAD READ REVERSE
 2605  007700  004737  007736                        JSR     PC,READ         ;GO READ REVERSE
 2606  007704  005737  000662                        TST     EOTREC          ;SEE IF AT END OF TAPE
 2607  007710  100011                                BPL     RSFRX           ;IF NOT: BR
 2608  007712  163737  000554  000662                SUB     RCNT,EOTREC
 2609  007720  005437  000662                        NEG     EOTREC          ;SET TO PROPER RECORD NUMBER
 2610  007724  005237  000662                        INC     EOTREC
 2611  007730  000137  004330                        JMP     REOT            ;ELSE GO TO REWIND
 2612  007734  000207                      RSFRX:  RTS     PC              ;EXIT
 2613
```

```
                                        ;*********************************************************
                                        ;READ ROUTINE:
                                        ;
                                        ;THIS ROUTINE PERFORMS THE READ OPERATION DETERMINED
                                        ;BY THE READ SEQUENCE ROUTINE ONE RECORD AT A TIME.
                                        ;AT THE END OF EACH READ OPERATION THE STATUS REGISTER
                                        ;IS SCANNED FOR EITHER END OF TAPE OR BEGINNING OF TAPE.
                                        ;IF EOT WAS REACHED, CONTROL WILL BE PASSED TO
                                        ;THE EOT SUBROUTINE TO REWIND THE UNIT AND FLAG IT
                                        ;UNAVAILABLE UNTIL ALL UNITS HAVE REACHED EOT.
                                        ;IF BOT WAS REACHED AN ERROR IS PRINTED AND THE
                                        ;PROGRAM WILL HALT.  TESTING MAY BE RESUMED BY PRESSING
                                        ;THE CONTINUE SWITCH.
                                        ;IF A TAPE MARK IS EXPECTED (TM=1) THEN THE
                                        ;READ ROUTINE EXPECTS THE FIRST RECORD OF A
                                        ;READ REVERSE TO BE A TM, AND THE LAST RECORD
                                        ;OF A READ FORWARD TO BE A TM.  REMEMBER
                                        ;THAT THE TM ADDS ONE (1) TO THE TOTAL NUMBER
                                        ;OF RECORDS IN A BLOCK.
                                        ;CONSOLE SWITCHES ELEVEN (11) AND THIRTEEN (13) DETERMINE WHETHER
                                        ;OR NOT TO CHECK FOR STATUS ERRORS (11) OR DATA ERRORS (13),
                                        ;CONSOLE SWITCH FIVE (5) IS USED TO CAUSE A CONTINUOUS
                                        ;READ AND SPACE (FORWARD OR REVERSE) OF THE CURRENT
                                        ;RECORD ON TAPE (YOZZLE).
                                        ;*********************************************************

007736  013700  000554          READ:   MOV     RCNT,R0         ;LOAD REC CNTR
007742  005737  000662                  TST     EOTREC          ;SEE IF EOT
007746  100013                          BPL     RDA             ;IF NOT: BR
007750  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ FORWARD
007756  001407                          BEQ     RDA             ;IF SO: BR
007760  042737  100000  000662          BIC     #100000,EOTREC  ;CLEAR FLAG
007766  013703  000662                  MOV     EOTREC,R3       ;GET MODIFIED RECORD COUNT
007772  160300                          SUB     R3,R0           ;SET RECORD AT
007774  005200                          INC     R0              ;SET TO PROPER NUMBER OF RECORDS
007776  012737  024507  000654  RDA:    MOV     #MSG6,EMADDR    ;SET ERROR MSG ADDRESS
010004  005037  000700                  CLR     TMFLG
010010  032737  010000  000562          BIT     #10000,RDCMD
010016  001406                          BEQ     RD0             ;IF READ FORWARD: BR
010020  005737  000564                  TST     TMEX            ;SEE IF TM
010024  001403                          BEQ     RD0             ;IF NOT: BR
010026  005237  000700                  INC     TMFLG           ;SET TM FLAG
010032  005200                          INC     R0
010034  013777  000556  170454  RD0:    MOV     FMCNT,@FC       ;LOAD CHAR CNTR
010042  012777  033354  170444          MOV     #RDATA,@BA      ;LOAD DATA ADDR
010050  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
010056  001417                          BEQ     RD1A            ;IF NOT: BR
010060  013703  000556                  MOV     FMCNT,R3
010064  005103                          COM     R3
010066  032737  000020  000552          BIT     #20,UDES        ;SEE IF CORE DUMP
010074  001402                          BEQ     RD1             ;IF NOT: BR
010076  000241                          CLC
010100  006003                          ROR     R3              ;R3 = FC/2
010102  060377  170406          RD1:    ADD     R3,@BA          ;SET REVERSE BUS ADDRESS
010106  012737  000076  000674          MOV     #76,MTC1        ;SET READ REVERSE
010114  000403                          BR      RD1B
```

```
 2670  010116  012737  000070  000674  RD1A:   MOV     #70,MTC1        ;SET READ FORWARD
 2671  010124  012737  010136  000664  RD1B:   MOV     #RD2,RTRN       ;SET INTERRUPT RETURN ADDRESS
 2672  010132  000137  021072          RD1D:   JMP     TAPG            ;GO EXECUTE TAPE COMMAND
 2673  010136  032737  010000  000562  RD2:    BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2674  010144  001014                          BNE     RD3             ;IF SO: BR
 2675  010146  032777  002000  170346          BIT     #2000,@DS       ;SEE IF EOT
 2676  010154  001410                          BEQ     RD3             ;IF NOT: BR
 2677  010156  005737  000700                  TST     TMFLG           ;SEE IF TM
 2678  010162  001005                          BNE     RD3             ;IF SO: BR
 2679  010164  010037  000662                  MOV     R0,EOTREC
 2680  010170  052737  100000  000662          BIS     #100000,EOTREC  ;SET EOT FLAG
 2681  010176  032777  000002  170316  RD3:    BIT     #2,@DS          ;SEE IF AT LOAD POINT
 2682  010204  001410                          BEQ     RD4             ;IF NOT: BR
 2683  010206  004737  022602                  JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
 2684  010212  012704  024710                  MOV     #MSG22,R4
 2685  010216  000004                          TYPE                    ;TYPE MSG
 2686  010220  000000                          HALT
 2687  010222  000137  003160                  JMP     STARTA          ;RESTART
 2688  010226  032777  004000  170354  RD4:    BIT     #4000,@SWR      ;SEE IF SHOULD CHECK ERRORS
 2689  010234  001121                          BNE     RD5             ;IF NOT: BR
 2690  010236  005737  000700                  TST     TMFLG
 2691  010242  001472                          BEQ     RD4B            ;IF NO TM EXPT: BR
 2692  010244  032777  000004  170250          BIT     #4,@DS
 2693  010252  001024                          BNE     RD4A            ;IF TM RECVD: BR
 2694  010254  012737  033354  021012          MOV     #RDATA,CADER    ;SAVE EXPT BUS ADDRESS
 2695  010262  012737  000002  021020          MOV     #2,DRVER        ;SET TM STATUS ERROR FLAG
 2696  010270  004737  020064                  JSR     PC,ERPT         ;GO PRINT TM ERROR
 2697  010274  013704  000676                  MOV     UNP,R4
 2698  010300  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2699  010306  001403                          BEQ     1$              ;IF NOT: BR
 2700  010310  005264  001150                  INC     RDERR1(R4)      ;BUMP READ REVERSE ERROR
 2701  010314  000502                          BR      RD6
 2702  010316  005264  001110          1$:     INC     RDER1(R4)       ;BUMP READ FORWARD ERROR
 2703  010322  000477                          BR      RD6
 2704  010324  012703  033354          RD4A:   MOV     #RDATA,R3
 2705  010330  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2706  010336  001007                          BNE     RD4A0           ;IF SO: BR
 2707  010340  032737  002000  000552          BIT     #2000,UDES      ;SEE IF IN PE
 2708  010346  001025                          BNE     RD4A2           ;IF SO: BR
 2709  010350  062703  000002                  ADD     #2,R3
 2710  010354  000422                          BR      RD4A2
 2711  010356  013704  000556          RD4A0:  MOV     FMCNT,R4
 2712  010362  005104                          COM     R4
 2713  010364  032737  000020  000552          BIT     #20,UDES        ;SEE IF CORE DUMP
 2714  010372  001402                          BEQ     RD4A1           ;IF NOT: BR
 2715  010374  000241                          CLC
 2716  010376  006004                          ROR     R4              ;SET TO FC/2
 2717  010400  060403          RD4A1:  ADD     R4,R3           ;SET EXPT BUS ADDRESS
 2718  010402  042703  000001                  BIC     #1,R3           ;MAKE EXPT ADDRESS EVEN
 2719  010406  032737  002000  000552          BIT     #2000,UDES      ;SEE IF IN PE
 2720  010414  001002                          BNE     RD4A2           ;IF SO: BR
 2721  010416  162703  000002                  SUB     #2,R3
 2722  010422  004737  017340          RD4A2:  JSR     PC,ER2
 2723  010426  000402                          BR      RD4C
 2724  010430  004737  017244          RD4B:   JSR     PC,ERCHK        ;GO CHECK ERRORS
 2725  010434  005737  000710          RD4C:   TST     SERFL
```

```
 2726  010440  001417                          BEQ     RD5             ;IF NO ERROR: BR
 2727  010442  013704  000676                  MOV     UNP,R4
 2728  010446  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2729  010454  001003                          BNE     RD4D            ;IF SO: BR
 2730  010456  005264  001110                  INC     RDER1(R4)       ;BUMP READ FORWARD ERROR
 2731  010462  000402                          BR      RD4E
 2732  010464  005264  001150          RD4D:   INC     RDERR1(R4)      ;BUMP READ REVERSE ERROR
 2733  010470  004737  010672          RD4E:   JSR     PC,RDRTY        ;GO RETRY
 2734  010474  005037  000714                  CLR     RTYFL           ;CLEAR RETRY FLAG
 2735  010500  032777  020000  170102  RD5:    BIT     #20000,@SWR     ;SEE IF SHOULD DO DATA CHECK
 2736  010506  001005                          BNE     RD6             ;IF NOT; BR
 2737  010510  005737  000700                  TST     TMFLG
 2738  010514  001002                          BNE     RD6
 2739  010516  004737  015374                  JSR     PC,DCHK         ;GO CHECK DATA
 2740  010522  005037  000710          RD6:    CLR     SERFL           ;CLEAR STATUS ERROR FLAG
 2741  010526  004737  014240                  JSR     PC,DS3          ;CLEAR BUFFER
 2742  010532  032777  000040  170050          BIT     #40,@SWR        ;SEE IF SHOULD YOZZLE
 2743  010540  001402                          BEQ     RD7             ;IF NOT: BR
 2744  010542  004737  011260                  JSR     PC,YOZ          ;ELSE GO YOZZLE
 2745  010546  013737  000574  000670  RD7:    MOV     RSTAL,STAL      ;SET DELAY
 2746  010554  004737  012124                  JSR     PC,STALL        ;STALL
 2747  010560  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2748  010566  001403                          BEQ     RD7A            ;IF NOT: BR
 2749  010570  005037  000700                  CLR     TMFLG           ;CLEAR TAPE MARK FLAG
 2750  010574  000405                          BR      RD10
 2751  010576  005737  000662          RD7A:   TST     EOTREC          ;SEE IF EOT FOUND
 2752  010602  100002                          BPL     RD10            ;IF NOT: BR
 2753  010604  012700  000001                  MOV     #1,R0           ;SET TO EOT
 2754  010610  005300                  RD10:   DEC     R0
 2755  010612  001402                          BEQ     RD11            ;IF DONE ALL: BR
 2756  010614  000137  010034                  JMP     RD0
 2757  010620  032737  010000  000562  RD11:   BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2758  010626  001016                          BNE     RDEX            ;IF SO: BR
 2759  010630  005737  000662                  TST     EOTREC          ;SEE IF FOUND EOT
 2760  010634  100413                          BMI     RDEX            ;IF SO: BR
 2761  010636  005737  000564                  TST     TMEX            ;SEE IF TM EXPECTED
 2762  010642  001410                          BEQ     RDEX            ;IF NOT: BR
 2763  010644  005737  000700                  TST     TMFLG           ;SEE IF TM FOUND
 2764  010650  001005                          BNE     RDEX            ;IF SO: BR
 2765  010652  005237  000700                  INC     TMFLG           ;ELSE SET FLAG
 2766  010656  005200                          INC     R0              ;SET RECORD COUNT TO ONE
 2767  010660  000137  010034                  JMP     RD0             ;GO READ TM
 2768  010664  005037  000700          RDEX:   CLR     TMFLG
 2769  010670  000207                  RDX:    RTS     PC              ;EXIT
```

```
2770                                    ;*********************************************************
2771                                    ;READ ERROR RETRY SUBROUTINE:
2772                                    ;
2773                                    ;THIS SUBROUTINE WILL RETRY ALL DATA RELATED
2774                                    ;READ ERRORS UP TO EIGHT (8) TIMES.  IF ALL
2775                                    ;FOUR RETRIES ARE BAD, IT IS CONSIDERED
2776                                    ;A HARD ERROR.  IF ANY ARE GOOD, IT IS A
2777                                    ;SOFT ERROR.  RETRIES MAY BE INHIBITED
2778                                    ;VIA SWITCH FOUR (SW4=0: INHIBIT RETRIES)
2779                                    ;*********************************************************
2780
2781  010672  032777  000020  167710  RDRTY:  BIT     #20,@SWR        ;SEE IF RETRY INHIBITED
2782  010700  001001                   BNE     RDRT0           ;IF NOT: BR
2783  010702  000207                   RTS     PC              ;ELSE RETURN
2784  010704  013703  000724          RDRT0:  MOV     ERSAV,R3
2785  010710  042703  102700                  BIC     #102700,R3      ;MARK NON-RECOVERABLE ERROR BITS
2786  010714  001410                   BEQ     RDRT1           ;IF NOT: BR
2787  010716  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
2788  010722  012704  026465                  MOV     #MSG79,R4
2789  010726  000004                   TYPE                    ;TYPE MSG
2790  010730  004737  011244                  JSR     PC,NRTP         ;PRINT ER FOR NON-RETRYABLE ERROR
2791  010734  000207          RDRT1A: RTS     PC              ;RETURN
2792  010736  032777  002000  167644  RDRT1:  BIT     #2000,@SWR      ;SEE IF PRINT INHIBITED
2793  010744  001003                   BNE     RDRT1B          ;IF SO: BR
2794  010746  012704  026140                  MOV     #MSG64,R4
2795  010752  000004                   TYPE                    ;TYPE MSG
2796  010754  005037  000704          RDRT1B: CLR     RTCNT           ;CLEAR RETRY COUNTER
2797  010760  005037  000710          RDRTG:  CLR     SERFL           ;CLEAR STATUS ERROR FLAG
2798  010764  012737  000002  000714          MOV     #2,RTYFL        ;SET READ RETRY FLAG
2799  010772  004737  011260                  JSR     PC,YOZ          ;GO TO YOZZLE TO RETRY READ
2800  010776  005737  000710                  TST     SERFL           ;SEE IF RETRY ERROR
2801  011002  001031                   BNE     RDRT5           ;IF SO: BR
2802  011004  032777  002000  167576          BIT     #2000,@SWR
2803  011012  001011                   BNE     RDRT2
2804  011014  012704  026632                  MOV     #MSG105,R4
2805  011020  000004                   TYPE                    ;TYPE MSG
2806  011022  012704  026162                  MOV     #MSG65,R4
2807  011026  000004                   TYPE                    ;TYPE MSG
2808  011030  013703  000704                  MOV     RTCNT,R3
2809  011034  104400                   TYPOCT                  ;PRINT RETRY NUMBER
2810  011036  013704  000676          RDRT2:  MOV     UNP,R4
2811  011042  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
2812  011050  001003                   BNE     RDRT3           ;IF SO: BR
2813  011052  005264  002670                  INC     RFSOFT(R4)      ;ELSO BUMP FORWARD SOFT ERROR COUNTER
2814  011056  000402                   BR      RDRT4
2815  011060  005264  002710          RDRT3:  INC     RRSOFT(R4)      ;BUMP ERRORS SOFT CNTR
2816  011064  000207          RDRT4:  RTS     PC              ;RETURN
2817  011066  013703  000724          RDRT5:  MOV     ERSAV,R3        ;GET ER
2818  011072  005037  000650                  CLR     TEMP3           ;CLEAR RECOVERABLE ERROR INDICATOR
2819  011076  042703  102700                  BIC     #102700,R3      ;MASK RECOVERABLE BITS
2820  011102  001413                   BEQ     RDRT5A          ;IF RECOVERABLE: BR
2821  011104  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
2822  011110  012704  026465                  MOV     #MSG79,R4
2823  011114  000004                   TYPE                    ;TYPE MSG
2824  011116  004737  011244                  JSR     PC,NRTP         ;PRINT ER
2825  011122  012737  000001  000650          MOV     #1,TEMP3        ;SET FLAG
```

```
 2826  011130  000404                          BR      RDRT5B
 2827  011132  032777  002000  167450  RDRT5A: BIT     #2000,@SWR      ;SEE IF PRINT INHIBITED
 2828  011140  001014                          BNE     RDRT6           ;IF SO: BR
 2829  011142  012704  026162          RDRT5B: MOV     #MSG65,R4
 2830  011146  000004                          TYPE                    ;TYPE MSG
 2831  011150  013703  000704                  MOV     RTCNT,R3
 2832  011154  104400                          TYPOCT                  ;PRINT RETRY NUMBER
 2833  011156  005737  000650                  TST     TEMP3           ;SEE IF DID NON-RECOVERABLE
 2834  011162  001403                          BEQ     RDRT6           ;IF NOT: BR
 2835  011164  005037  000650                  CLR     TEMP3           ;CLEAR FLAG
 2836  011170  000207                          RTS     PC              ;EXIT
 2837  011172  005237  000704          RDRT6:  INC     RTCNT
 2838  011176  023737  000704  000604          CMP     RTCNT,RETRY     ;SEE IF DONE 8 RETRIES
 2839  011204  001265                          BNE     RDRTG           ;IF NOT: BR
 2840  011206  012704  027150                  MOV     #MSG115,R4
 2841  011212  000004                          TYPE                    ;TYPE MSG
 2842  011214  013704  000676                  MOV     UNP,R4
 2843  011220  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 2844  011226  001003                          BNE     RDRT7           ;IF SO: BR
 2845  011230  005264  002730                  INC     RFHARD(R4)      ;BUMP FORWARD HARD ERROR CNTR
 2846  011234  000402                          BR      RDRTX
 2847  011236  005264  002750          RDRT7:  INC     RRHARD(R4)      ;BUMP REVERSE HARD ERROR CNTR
 2848  011242  000207                  RDRTX:  RTS     PC              ;RETURN
 2849
 2850  011244  013703  000724          NRTP:   MOV     ERSAV,R3        ;GET ER REGISTER
 2851  011250  104400                          TYPOCT                  ;PRINT ER
 2852  011252  004737  021036                  JSR     PC,FRPRT        ;PRINT F OR R
 2853  011256  000207                          RTS     PC              ;RETURN
```

```
                                        ;*********************************************************
                                        ;YOZZLE SUBROUTINE:
                                        ;
                                        ;THIS SUBROUTINE, ENTERED VIA SWITCH FIVE (5), IS USED TO PERFORM
                                        ;A CONTINUOUS READ AND SPACE OVER OF THE CURRENT RECORD ON TAPE.
                                        ;FULL STATUS AND DATA CHECKING MAY BE PERFORMED
                                        ;OR NOT VIA CONSOLE SWITCHES ELEVEN (11) AND THIRTEEN (13).
                                        ;A SOFTWARE DELAY IS PERFORMED BETWEEN EACH READ
                                        ;AND SPACE OPERATION AND MAY BE VARIED BY TYPING
                                        ;CNTRL C ON THE TTY AND ENTERING A VALUE IN RESPONSE
                                        ;TO THE PRINTED REQUEST.
                                        ;*********************************************************

011260  013737  000602  000670  YOZ:    MOV     YSTAL,STAL
011266  004737  012124                  JSR     PC,STALL        ;DO YOZZLE STALL
011272  012777  177777  167216  YOZ0:   MOV     #-1,@FC         ;SET TO 1 RECORD SPACING
011300  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
011306  001404                          BEQ     YOZA            ;IF NOT: BR
011310  112737  000030  000674          MOVB    #30,MTC1        ;SET TO SPACE FORWARD
011316  000403                          BR      YOZB
011320  112737  000032  000674  YOZA:   MOVB    #32,MTC1        ;SET TO SPACE REVERSE
011326  012737  011346  000664  YOZB:   MOV     #YOZC,RTRN      ;SET RETURN ADDRESS
011334  012737  177775  000670          MOV     #177775,STAL    ;SET TIME MULTIPLIER
011342  000137  021072                  JMP     TAPG            ;GO YOZZLE
011346  005737  000700          YOZC:   TST     TMFLG           ;SEE IF TM
011352  001404                          BEQ     1$              ;IF NOT: BR
011354  012737  040000  000670          MOV     #40000,STAL     ;SET TM STALL
011362  000403                          BR      2$
011364  013737  000602  000670  1$:     MOV     YSTAL,STAL
011372  004737  012124          2$:     JSR     PC,STALL        ;DO YOZZLE STALL
011376  012777  033354  167110          MOV     #RDATA,@BA      ;SET BUS ADDRESS
011404  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
011412  001416                          BEQ     YOZC1           ;IF NOT: BR
011414  013703  000556                  MOV     FMCNT,R3
011420  005103                          COM     R3
011422  032737  000020  000552          BIT     #20,UDES        ;SEE IF CORE DUMP
011430  001401                          BEQ     YOZC0           ;IF NOT: BR
011432  006203                          ASR     R3              ;R3 = FC/2
011434  060377  167054          YOZC0:  ADD     R3,@BA          ;SET REVERSE BUS ADDRESS
011440  012737  000076  000674          MOV     #76,MTC1        ;SET READ REVERSE
011446  000403                          BR      YOZC2
011450  012737  000070  000674  YOZC1:  MOV     #70,MTC1        ;SET READ FORWARD
011456  013777  000556  167032  YOZC2:  MOV     FMCNT,@FC       ;SET CHARACTER COUNT
011464  012737  011476  000664          MOV     #YOZD,RTRN      ;SET RETURN ADDRESS
011472  000137  021072                  JMP     TAPG            ;GO READ
011476  032777  004000  167104  YOZD:   BIT     #4000,@SWR      ;SEE IF SHOULD CHECK ERRORS
011504  001050                          BNE     YOZE            ;IF NOT: BR
011506  005737  000700                  TST     TMFLG           ;SEE IF TAPE MARK TIME
011512  001443                          BEQ     YOZD1           ;IF NOT: BR
011514  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
011522  001425                          BEQ     YOZD0           ;IF NOT: BR
011524  012703  033354                  MOV     #RDATA,R3
011530  013704  000556                  MOV     FMCNT,R4
011534  005104                          COM     R4
011536  032737  000020  000552          BIT     #20,UDES        ;SEE IF CORE DUMP
011544  001401                          BEQ     YOZD4           ;IF NOT: BR
```

```
2910  011546  006204                          ASR     R4              ;SET TO FC/2
2911  011550  060403                  YOZD4:  ADD     R4,R3           ;SET EXPT BUS ADDRESS
2912  011552  042703  000001                  BIC     #1,R3           ;MAKE EXPT ADDRESS EVEN
2913  011556  032737  002000  000552          BIT     #2000,UDES      ;SEE IF PE
2914  011564  001001                          BNE     YOZD2           ;IF SO: BR
2915  011566  005743                          TST     -(R3)           ;SET EXPT BA
2916  011570  004737  017340          YOZD2:  JSR     PC,ER2          ;GO CHECK ERRORS
2917  011574  000430                          BR      YOZF
2918  011576  012703  033354          YOZD0:  MOV     #RDATA,R3
2919  011602  032737  002000  000552          BIT     #2000,UDES      ;SEE IF PE
2920  011610  001001                          BNE     YOZD3           ;IF SO: BR
2921  011612  005723                          TST     (R3)+           ;SET EXPT BA
2922  011614  004737  017340          YOZD3:  JSR     PC,ER2          ;GO CHECK ERRORS
2923  011620  000416                          BR      YOZF
2924  011622  004737  017244          YOZD1:  JSR     PC,ERCHK        ;ELSE GO CHECK ERRORS
2925  011626  005737  000714          YOZE:   TST     RTYFL           ;SEE IF RETRY
2926  011632  001013                          BNE     YOZG            ;IF SO: BR
2927  011634  032777  020000  166746          BIT     #20000,@SWR     ;SEE IF SHOULD CHECK DATA
2928  011642  001005                          BNE     YOZF            ;IF NOT: BR
2929  011644  005737  000700                  TST     TMFLG           ;SEE IF TAPE MARK
2930  011650  001002                          BNE     YOZF            ;IF SO: BR
2931  011652  004737  015374                  JSR     PC,DCHK         ;ELSE GO CHECK DATA
2932  011656  004737  014240          YOZF:   JSR     PC,DS3          ;GO CLEAR DATA AREA
2933  011662  032777  000040  166720  YOZG:   BIT     #40,@SWR        ;SEE IF SHOULD CONTINUE YOZZLE
2934  011670  001402                          BEQ     YOZH            ;IF NOT: BR
2935  011672  000137  011272                  JMP     YOZO
2936  011676  000207                  YOZH:   RTS     PC              ;EXIT
2937
```

```
2938
2939                                    ;*********************************************************
2940                                    ;BACKSPACE SUBROUTINE:
2941                                    ;
2942                                    ;THIS SUBROUTINE IS USED TO PERFORM THE
2943                                    ;BACKSPACE OPERATION REQUIRED BY THE READ
2944                                    ;ROUTINE FOR READ FORWARD AFTER WRITING.
2945                                    ;IF A TAPE MARK IS EXPECTED (TM=1) THEN THE SPACE
2946                                    ;ROUTINE ASSUMES THAT THE TM WILL BE FIRST WHEN
2947                                    ;BACKSPACING.  THEREFORE TWO OPERATIONS ARE REQUIRED
2948                                    ;TO SPACE OVER A BLOCK.  FIRST SPACE OVER THE TM, THEN
2949                                    ;SPACE OVER THE DATA RECORDS.
2950                                    ;A CHECK FOR RECORD COUNT ZERO IS MADE AT THE
2951                                    ;END OF THE SPACE OPERATION TO ASSURE THAT PROPER
2952                                    ;TAPE POSITIONING WAS DONE.
2953                                    ;*********************************************************
2954
2955  011700  013737  000600  000670  BKSP:   MOV     TSTAL,STAL
2956  011706  004737  012124                  JSR     PC,STALL        ;DO TURN AROUND STALL
2957  011712  012737  024537  000654          MOV     #MSG10,EMADDR
2958  011720  012777  033354  166566          MOV     #RDATA,@BA
2959  011726  005737  000564                  TST     TMEX            ;SEE IF TM
2960  011732  001440                          BEQ     B0              ;IF NOT: BR
2961  011734  012777  177777  166554          MOV     #-1,@FC
2962  011742  012737  000032  000674          MOV     #32,MTC1
2963  011750  012737  011762  000664          MOV     #BKTM,RTRN
2964  011756  000137  021072                  JMP     TAPG            ;SPACE TO TM
2965  011762  032777  010000  166620  BKTM:   BIT     #10000,@SWR     ;SEE IF SHOULD CHECK ERROR
2966  011770  001021                          BNE     B0              ;IF NOT: BR
2967  011772  012737  026054  000654          MOV     #MSG55,EMADDR
2968  012000  032777  000004  166514          BIT     #4,@DS          ;SEE IF TM
2969  012006  001006                          BNE     BKTM0           ;IF SO: BR
2970  012010  012737  033354  021012          MOV     #RDATA,CADER
2971  012016  004737  020064                  JSR     PC,ERPT         ;PRINT ERROR
2972  012022  000404                          BR      B0
2973  012024  012703  033354          BKTM0:  MOV     #RDATA,R3
2974  012030  004737  017340                  JSR     PC,ER2
2975  012034  013700  000554          B0:     MOV     RCNT,R0
2976  012040  005400                          NEG     R0              ;BUILD SPACE AMOUNT
2977  012042  012737  024537  000654          MOV     #MSG10,EMADDR   ;SET ERROR MESG ADDRESS
2978  012050  010077  166442                  MOV     R0,@FC
2979  012054  012737  000032  000674  BKRT:   MOV     #32,MTC1        ;SET SPACE REVERSE
2980  012062  012737  012100  000664          MOV     #B1,RTRN        ;SET RETURN ADDRESS
2981  012070  010037  000670                  MOV     R0,STAL         ;SET INTERRUPT TIME MULTIPLIER
2982  012074  000137  021072                  JMP     TAPG            ;GO DO SPACE
2983  012100  012703  033354          B1:     MOV     #RDATA,R3
2984  012104  004737  017340                  JSR     PC,ER2
2985  012110  013737  000600  000670  B2:     MOV     TSTAL,STAL      ;DO STALL
2986  012116  004737  012124                  JSR     PC,STALL        ;STALL
2987  012122  000207                          RTS     PC              ;EXIT
2988
```

```
2989
2990                                    ;*********************************************************
2991                                    ;STALL ROUTINE:
2992                                    ;
2993                                    ;THIS ROUTINE IS USED TO PROVIDE SOFTWARE DELAYS
2994                                    ;DURING READ, WRITE, TURN AROUND, AND YOZZLE.
2995                                    ;THE DELAY TIMES MAY BE SET BY THE OPERATOR AT
2996                                    ;INITIAL START FROM 200(8) OR MAY BE MODIFIED
2997                                    ;AT ANY TIME BY ENTERING CNTRL C ON THE TTY AND
2998                                    ;INSERTING NEW VALUES IN RESPONSE TO THE REQUEST.
2999                                    ;THE READ STALL AND THE WRITE STALL ARE DELAYS
3000                                    ;EXECUTED BETWEEN EACH RECORD OF THE DATA BLOCK.
3001                                    ;THE TURN AROUND STALL IS EXECUTED EACH TIME
3002                                    ;THE DIRECTION OF TAPE MOVEMENT IS CHANGED AND
3003                                    ;ALSO EACH TIME THE TAPE OPERATION CHANGES FROM
3004                                    ;WRITE TO READ OR READ TO WRITE. THE YOZZLE
3005                                    ;STALL IS EXECUTED ONLY DURING THE YOZZLE ROUTINE.
3006                                    ;*********************************************************
3007
3008  012124  005337  000670  STALL:  DEC     STAL
3009  012130  001375                  BNE     STALL           ;DELAY
3010  012132  000207                  RTS     PC              ;EXIT
```

```
3011
3012                                    ;*******************************************************
3013                                    ;RANDOM CHARACTER COUNT GENERATOR:
3014                                    ;
3015                                    ;THIS ROUTINE ENTERED VIA CONSOLE SWITCH
3016                                    ;SEVEN (7) IS USED TO GENERATE A RANDOM
3017                                    ;CHARACTER COUNT FOR EACH DATA BLOCK.
3018                                    ;ALL RECORDS WITHIN A GIVEN BLOCK WILL BE
3019                                    ;THE SAME, BUT EACH BLOCK WILL VARY.
3020                                    ;THE LIMITS ARE TWENTY (20) TO FOUR THOUSAND
3021                                    ;(4000) OCTAL CHARACTERS PER RECORD.
3022                                    ;*******************************************************
3023
3024  012134  012701  177760       CCNTR:  MOV     #-20,R1         ;SET HIGH LIMIT
3025  012140  012702  175000               MOV     #-3000,R2       ;SET LOW LIMIT
3026  012144  004737  023164               JSR     PC,RANG         ;GO GENERATE NUMBER
3027  012150  042737  000001  000630       BIC     #1,RANSAV
3028  012156  013737  000630  000556       MOV     RANSAV,FMCNT    ;SET CHAR COUNT
3029  012164  012737  177777  014276       MOV     #-1,PATS        ;PRESET DATA PATTERN
3030  012172  000207                       RTS     PC              ;EXIT
3031
3032                                    ;*******************************************************
3033                                    ;RANDOM RECORD COUNT GENERATOR:
3034                                    ;
3035                                    ;THIS ROUTINE ENTERED VIA CONSOLE SWITCH SIX (6)
3036                                    ;IS USED TO GENERATE A RANDOM NUMBER OF RECORDS
3037                                    ;FOR EACH BLOCK OF DATA.
3038                                    ;THE LIMITS ARE ONE (1) TO FIVE HUNDRED (500) OCTAL
3039                                    ;RECORDS PER BLOCK.
3040                                    ;*******************************************************
3041
3042  012174  012702  000001       RCNTR:  MOV     #1,R2           ;SET LOW LIMIT
3043  012200  012701  000500               MOV     #500,R1         ;SET HIGH LIMIT
3044  012204  004737  023164               JSR     PC,RANG         ;GO GENERATE NUMBER
3045  012210  013737  000630  000554       MOV     RANSAV,RCNT     ;SET RECORD COUNT
3046  012216  000207                       RTS     PC              ;EXIT
3047
3048
```

```
3049
3050                                    ;*********************************************************
3051                                    ;TEST CONDITION ENTRY ROUTINE:
3052                                    ;
3053                                    ;THIS ROUTINE IS USED TO ALLOW THE OPERATOR
3054                                    ;TO ENTER, AT THE TTY, THE NECESSARY PARAMETERS
3055                                    ;TO RUN THE PROGRAM AS HE WISHES.  THE
3056                                    ;ROUTINE IS ONLY ENTERED UPON INITIAL STARTING
3057                                    ;FROM LOCATION 200(8).
3058                                    ;THE MAIN PURPOSE OF THIS ROUTINE IS TO ESTABLISH
3059                                    ;A TABLE OF DEVICES TO BE TESTED.  THIS TABLE
3060                                    ;CONSISTS OF AN ENTRY FOR EACH OF ONE (1) TO
3061                                    ;EIGHT (8) DEVICES.  EACH ENTRY CONTAINS THE
3062                                    ;SLAVE NUMBER, DENSITY, PARITY, AND
3063                                    ;FORMAT.  THE INFORMATION IS ENTERED
3064                                    ;IN RESPONSE TO PRINTED REQUESTS AT THE TTY.
3065                                    ;SLAVES MAY BE ENTERED IN ANY ORDER.  EACH
3066                                    ;PARAMETER IS CHECKED FOR LEGALITY BEFORE BEING
3067                                    ;SET INTO THE TABLE.
3068                                    ;THE DRIVE NUMBER REQUEST WILL ALSO CHECK THE MASSBUS
3069                                    ;FOR THE PRESENCE OF THE REQUESTED DRIVE.  IF IT IS NOT FOUND,
3070                                    ;A NON-EXIST DRIVE MESSAGE WILL BE PRINTED AND ANOTHER DRIVE
3071                                    ;REQUEST MADE.  WHEN THE DRIVE IS FOUND, THE RESPONSE IS STORED
3072                                    ;AND CONTROL PASSED TO THE SLAVE SELECT ROUTINE.
3073                                    ;THE SLAVE SELECT ROUTINE ALSO CHECKS FOR THE PRESENCE OF THE
3074                                    ;SLAVE.  IF IT IS NOT PRESENT, A MESSAGE IS PRINTED AND ANOTHER
3075                                    ;REQUEST IS ISSUED.  WHEN THE SELECTED SLAVE IS FOUND TO BE
3076                                    ;PRESENT, A MESSAGE IS PRINTED IF IT IS A 7 CHANNEL DRIVE
3077                                    ;TO ASSIST IN SELECTING DENSITY, PARITY, AND FORMAT.
3078                                    ;UPON COMPLETION OF THE DEVICE TABLE, REQUESTS
3079                                    ;ARE PRINTED FOR ENTRY OF THE NUMBER OF CHARACTERS
3080                                    ;PER RECORD AND THE NUMBER OF RECORDS PER BLOCK.  THE
3081                                    ;NEXT REQUEST IS FOR A PATTERN NUMBER TO BE USED
3082                                    ;FOR WRITING AND CHECKING OF READ DATA.
3083                                    ;FOLLOWING THE PATTERN REQUEST IS THE TAPE MARK OPTION.
3084                                    ;RESPONDING TO THE REQUEST (TM=) WITH A ONE (1)
3085                                    ;WILL CAUSE THE PROGRAM TO WRITE A TM AT THE
3086                                    ;END OF EACH DATA BLOCK AND TO EXPECT THE
3087                                    ;TM TO BE DETECTED IN EITHER READ FORWARD AND REVERSE
3088                                    ;OR DURING SPACE OPERATION.  A RESPONSE OF ZERO (TM=0)
3089                                    ;DISALLOWS WRITTING OF THE TM AND CAUSES THE READ
3090                                    ;AND SPACE ROUTINES TO EXPECT NO TM TO BE PRESENT.
3091                                    ;THE LAST REQUESTS ARE FOR ENTRY OF THE DESIRED
3092                                    ;WRITE, READ, AND TURN AROUND STALLS.
3093                                    ;*********************************************************
3094
3095  012220  005737  000636    TINP:  TST     TINF            ;SEE IF SHOULD INPUT FROM TTY
3096  012224  001002                   BNE     1$              ;IF SO: BR
3097  012226  000137  013706           JMP     TINP4           ;GET SWITCHES
3098  012232  005037  000676    1$:    CLR     UNP             ;CLEAR TABLE POINTER
3099  012236  005037  005054           CLR     REOTC           ;CLEAR EOT UNIT COUNTER
3100  012242  012700  000010           MOV     #10,R0          ;SET SIZE OF TABLE
3101  012246  012701  000746           MOV     #UN1,R1         ;SET START OF TABLE
3102  012252  005021             3$:    CLR     (R1)+           ;CLEAR TABLE
3103  012254  005300                   DEC     R0              ;SEE IF DONE
3104  012256  001375                   BNE     3$              ;IF NOT: BR
```

```
3105  012260  012704  025200                  MOV     #MSG31,R4
3106  012264  005737  000736                  TST     ASEQF           ;SEE IF AUTO SEQ
3107  012270  001402                          BEQ     4$              ;IF NOT: BR
3108  012272  012704  025133                  MOV     #MSG30,R4       ;SET AUTO SEQ HDR
3109  012276  010446                  4$:     MOV     R4,-(SP)        ;SAVE ADDRESS OF MESSAGE
3110  012300  000004                          TYPE                    ;TYPE MSG
3111  012302  105036                          CLRB    @(SP)+          ;DO NOT TYPE TITLE ON RESTART
3112  012304  012704  025255                  MOV     #MSG31A,R4      ;TYPE INSTRUCTION
3113  012310  000004                          TYPE
3114  012312  105037  025255                  CLRB    MSG31A          ;DO NOT TYPE STARTUP INSTRUCTIONS ON RESTART
3115  012316  005737  014070                  TST     SCVFL           ;SEE IF SHORT CONVERSATION
3116  012322  001067                          BNE     6$              ;IF SO: BR
3117  012324  012704  026344                  MOV     #MSG74,R4
3118  012330  000004                          TYPE                    ;TYPE MSG
3119  012332  013703  000544                  MOV     REGS,R3
3120  012336  104400                          TYPOCT                  ;PRINT CURRENT REG START
3121  012340  012705  000544                  MOV     #REGS,R5        ;SAVE ADDRESS LOCATION
3122  012344  012701  000007                  MOV     #7,R1           ;SET SIZE OF ENTRY
3123  012350  012702  176400                  MOV     #176400,R2      ;SET UPPER LIMIT
3124  012354  012703  172300                  MOV     #172300,R3      ;SET LOWER LIMIT
3125  012360  004737  023352                  JSR     PC,TTR          ;GO GET RESPONSE
3126  012364  012704  026367                  MOV     #MSG75,R4
3127  012370  000004                          TYPE                    ;TYPE MSG
3128  012372  013703  000546                  MOV     VECT,R3
3129  012376  104400                          TYPOCT                  ;PRINT CURRENT VECTOR
3130  012400  012705  000546                  MOV     #VECT,R5        ;SET SAVE LOCATION
3131  012404  012701  000004                  MOV     #4,R1           ;SET SIZE OF ENTRY
3132  012410  012702  000224                  MOV     #224,R2         ;SET UPPER LIMIT
3133  012414  012703  000150                  MOV     #150,R3         ;SET LOWER LIMIT
3134  012420  004737  023352                  JSR     PC,TTR          ;GO GET RESPONSE
3135  012424  013700  000546                  MOV     VECT,R0         ;GET VECTOR ADDRESS
3136  012430  012720  021734                  MOV     #MTINT,(R0)+    ;LOAD VECTOR WITH HANDLER ADDRESS
3137  012434  012710  000340                  MOV     #340,(R0)       ;LOAD PRIORITY LEVEL
3138  012440  013700  000544                  MOV     REGS,R0         ;GET STARTING REGISTER ADDRESS
3139  012444  012701  000016                  MOV     #16,R1          ;SET NUMBER OF REGISTERS
3140  012450  012702  000510                  MOV     #C1,R2          ;GET FIRST ADDRESS LOCATION
3141  012454  010022                  5$:     MOV     R0,(R2)+        ;BUILD TABLE OF ADDRESSES
3142  012456  062700  000002                  ADD     #2,R0           ;BUMP ADDRESS
3143  012462  005301                          DEC     R1              ;SEE IF DONE
3144  012464  001373                          BNE     5$              ;IF NOT: BR
3145  012466  005737  000736                  TST     ASEQF           ;SEE IF AUTO SEQ
3146  012472  001403                          BEQ     6$              ;IF NOT: BR
3147  012474  005726                          TST     (SP)+           ;RESET STACK POINTER
3148  012476  000137  021752                  JMP     ASEQ            ;GO TO AUTO SEQUENCE
3149  012502  012777  000040  166010  6$:     MOV     #40,@CS         ;INITIALIZE
3150  012510  012704  026011                  MOV     #MSG52,R4
3151  012514  000004                          TYPE                    ;TYPE MSG
3152  012516  012705  000550                  MOV     #DVN,R5         ;GET ADDRESS
3153  012522  012701  000002                  MOV     #2,R1           ;SET SIZE OF RESPONSE
3154  012526  012702  000007                  MOV     #7,R2           ;SET UPPER LIMIT
3155  012532  012703  000000                  MOV     #0,R3           ;SET LOWER LIMIT
3156  012536  004737  023352                  JSR     PC,TTR          ;GO GET DRIVE NUMBER
3157  012542  013777  000550  165750          MOV     DVN,@CS
3158  012550  005777  165734                  TST     @C1             ;ACCESS DRIVE
3159  012554  032777  010000  165736          BIT     #10000,@CS      ;SEE IF NED
3160  012562  001411                          BEQ     TINP0           ;IF NOT: BR
```

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3161  012564  012704  026301                MOV     #MSG71,R4
3162  012570  000004                        TYPE                    ;TYPE MSG
3163  012572  013704  000510                MOV     C1,R4
3164  012576  005204                        INC     R4
3165  012600  152714  000100                BISB    #100,(R4)       ;CLEAR TRE
3166  012604  000736                        BR      6$              ;RETRY DVN
3167  012606  012704  025342        TINP0:  MOV     #MSG32,R4
3168  012612  000004                        TYPE                    ;TYPE MSG
3169  012614  005037  000646                CLR     TEMP2           ;CLEAR BUFFER
3170  012620  012705  000646                MOV     #TEMP2,R5       ;SET UNIT DESCRIPTION BUFFER ADDRESS
3171  012624  012701  000002                MOV     #2,R1           ;SET NUMBER OF CHARACTERS TO INPUT
3172  012630  012702  000007                MOV     #7,R2           ;SET MAXIMUM LIMIT
3173  012634  012703  000000                MOV     #0,R3           ;SET MINIMUM LIMIT
3174  012640  004737  023352                JSR     PC,TTR          ;GO GET UNIT NUMBER
3175  012644  005737  000644                TST     TEMP1           ;SEE IF HAVE NEW PARAMETER
3176  012650  001012                        BNE     TINP0B          ;IF SO: BR
3177  012652  005737  000676                TST     UNP             ;SEE IF FIRST ENTRY
3178  012656  001753                        BEQ     TINP0
3179  012660  013700  000676                MOV     UNP,R0
3180  012664  012760  177777  000746        MOV     #-1,UN1(R0)     ;SET END UNIT TABLE
3181  012672  000137  013272                JMP     TINP2C          ;GO GET RECORD COUNT
3182  012676  013700  000676        TINP0B: MOV     UNP,R0
3183  012702  042760  000007  000746        BIC     #7,UN1(R0)      ;CLEAR UNIT NUMBER
3184  012710  004737  014102                JSR     PC,TPOS1        ;GO LOAD UNIT NUMBER TO PROPER POSITION
3185  012714  012777  000040  165576        MOV     #40,@CS
3186  012722  013777  000550  165570        MOV     DVN,@CS
3187  012730  016077  000746  165604        MOV     UN1(R0),@TC     ;LOAD UNIT NUMBER
3188  012736  032777  002000  165572 TINP0C: BIT     #2000,@DT       ;SEE  IF SLAVE PRESENT
3189  012744  001004                        BNE     TINP0D          ;IF SO: BR
3190  012746  012704  026067                MOV     #MSG57,R4
3191  012752  000004                        TYPE                    ;TYPE MSG
3192  012754  000714                        BR      TINP0           ;REDO
3193  012756  017703  165554        TINP0D: MOV     @DT,R3          ;GET CONTENTS OF DT REG
3194  012762  042703  000007                BIC     #7,R3           ;CLEAR DRIVE TYPE #
3195  012766  022703  142050                CMP     #142050,R3      ;SEE IF 9TRK TM03,TU45
3196  012772  001410                        BEQ     TINP0E          ;IF SO: BR
3197  012774  012704  025764                MOV     #MSG50,R4       ;ILLEGAL DRIVE TYPE
3198  013000  000004                        TYPE                    ;TYPE MSG
3199  013002  017703  165530                MOV     @DT,R3
3200  013006  042703  000007                BIC     #7,R3           ;CLEAR SLAVE #
3201  013012  104400                        TYPOCT                  ;PRINT DRIVE TYPE REGISTER
3202  013014  012704  024531        TINP0E: MOV     #MSG9,R4
3203  013020  000004                        TYPE                    ;TYPE MSG
3204  013022  017703  165512                MOV     @SN,R3
3205  013026  004737  024334                JSR     PC,SNPT         ;PRINT SERIAL NUMBER
3206  013032  012704  025363        TINP1:  MOV     #MSG33,R4
3207  013036  000004                        TYPE                    ;TYPE MSG
3208  013040  005037  000646                CLR     TEMP2           ;CLEAR BUFFER
3209  013044  012701  000002                MOV     #2,R1           ;SET NUMBER OF CHARACTERS TO INPUT
3210  013050  012702  000004                MOV     #4,R2           ;SET MAXIMUM LIMIT
3211  013054  012703  000003                MOV     #3,R3           ;SET MINIMUM LIMIT
3212  013060  004737  023352                JSR     PC,TTR          ;GO GET DENSITY
3213  013064  005737  000644                TST     TEMP1           ;SEE IF HAVE NEW PARAMETER
3214  013070  001407                        BEQ     TINP2           ;IF NOT: BR
3215  013072  042737  003400  000552        BIC     #3400,UDES      ;ELSE CLEAR OLD PARAMETER
3216  013100  012703  000010                MOV     #10,R3          ;SET POSITION FACTOR
```

```
 3217  013104  004737  014072              JSR     PC,TPOS         ;GO LOAD DENSITY INTO PROPER POSITION
 3218  013110  012704  025377      TINP2:  MOV     #MSG34,R4
 3219  013114  000004                      TYPE                    ;TYPE MSG
 3220  013116  005037  000646              CLR     TEMP2           ;CLR BUFFER
 3221  013122  012701  000002              MOV     #2,R1           ;SET NUMBER OF CHARACTERS TO INPUT
 3222  013126  012702  000001              MOV     #1,R2           ;SET MAXIMUM LIMIT
 3223  013132  012703  000000              MOV     #0,R3           ;SET MINIMUM LIMIT
 3224  013136  004737  023352              JSR     PC,TTR          ;GO INPUT PARITY
 3225  013142  005737  000644              TST     TEMP1           ;SEE IF HAVE NEW PARAMETER
 3226  013146  001407                      BEQ     TINP2A          ;IF NOT: BR
 3227  013150  042737  000010  000552      BIC     #10,UDES        ;ELSE CLEAR OLD PARAMETER
 3228  013156  012703  000003              MOV     #3,R3           ;SET POSITION FACTOR
 3229  013162  004737  014072              JSR     PC,TPOS         ;GO LOAD PARITY TO PROPER POSITION
 3230  013166  012704  026032      TINP2A: MOV     #MSG53,R4
 3231  013172  000004                      TYPE                    ;TYPE MSG
 3232  013174  005037  000646              CLR     TEMP2
 3233  013200  012701  000003              MOV     #3,R1
 3234  013204  012702  000017              MOV     #17,R2
 3235  013210  012703  000000              MOV     #0,R3
 3236  013214  004737  023352              JSR     PC,TTR          ;GO GET FORMAT
 3237  013220  005737  000644              TST     TEMP1           ;SEE IF NEW PARAMETER
 3238  013224  001407                      BEQ     TINP2B          ;IF NOT: BR
 3239  013226  042737  000170  000552      BIC     #170,UDES
 3240  013234  012703  000004              MOV     #4,R3
 3241  013240  004737  014072              JSR     PC,TPOS
 3242  013244  005237  005054      TINP2B: INC     REOTC           ;BUMP EOT UNIT COUNTER
 3243  013250  022737  000016  000676      CMP     #16,UNP         ;SEE IF DONE UNITS
 3244  013256  001405                      BEQ     TINP2C          ;IF SO: BR
 3245  013260  062737  000002  000676      ADD     #2,UNP          ;POINT TO NEXT UNIT
 3246  013266  000137  012606              JMP     TINP0           ;ELSE LOOK FOR NEXT UNIT
 3247  013272  005037  000676      TINP2C: CLR     UNP             ;CLEAR UNIT POINTER
 3248  013276  013700  005054              MOV     REOTC,R0
 3249  013302  000337  005054              SWAB    REOTC
 3250  013306  110037  005054              MOVB    R0,REOTC        ;SET UNIT EOT COUNTER
 3251  013312  012704  025412      TINP3:  MOV     #MSG35,R4
 3252  013316  000004                      TYPE                    ;TYPE MSG
 3253  013320  013703  000554              MOV     RCNT,R3
 3254  013324  104400                      TYPOCT                  ;PRINT RECORD COUNT
 3255  013326  012705  000554              MOV     #RCNT,R5        ;SET RECORD COUNT ADDRESS
 3256  013332  012701  000007              MOV     #7,R1           ;SET NUMBER OF CHARACTERS TO INPUT
 3257  013336  012702  177777              MOV     #-1,R2          ;SET MAXIMUM LIMIT
 3258  013342  012703  000001              MOV     #1,R3           ;SET MINIMUM LIMIT
 3259  013346  004737  023352              JSR     PC,TTR          ;GO GET RECORD COUNT
 3260  013352  013737  000554  000632      MOV     RCNT,RCSAV      ;SAVE RECORD COUNT
 3261  013360  012704  025433              MOV     #MSG36,R4
 3262  013364  000004                      TYPE                    ;TYPE MSG
 3263  013366  005437  000556              NEG     FMCNT
 3264  013372  013703  000556              MOV     FMCNT,R3
 3265  013376  104400                      TYPOCT                  ;PRINT CHAR COUNT
 3266  013400  012705  000556              MOV     #FMCNT,R5       ;SET CHARACTER COUNT ADDRESS
 3267  013404  012701  000007              MOV     #7,R1           ;SET NUMBER OF CHARACTERS TO INPUT
 3268  013410  012702  004000              MOV     #4000,R2        ;SET MAXIMUM LIMIT
 3269  013414  012703  000004              MOV     #4,R3           ;SET MINIMUM LIMIT
 3270  013420  004737  023352              JSR     PC,TTR          ;GO GET CHARACTER COUNT
 3271  013424  005437  000556              NEG     FMCNT           ;SET TO TWO'S COMPLIMENT
 3272  013430  013737  000556  000634      MOV     FMCNT,FCSAV     ;SAVE FRAME COUNT
```

```
3273  013436  012704  025452          MOV     #MSG37,R4       ;PRINT PATTERN NUMBER REQUEST
3274  013442  000004                  TYPE                    ;TYPE MSG
3275  013444  013703  000560          MOV     PATRN,R3
3276  013450  104400                  TYPOCT                  ;PRINT PATTERN
3277  013452  005037  014440          CLR     DOFL            ;CLEAR EXTERNAL DATA FLAG
3278  013456  012705  000560          MOV     #PATRN,R5       ;SET PATTERN NUMBER ADDRESS
3279  013462  012701  000003          MOV     #3,R1           ;SET NUMBER OF CHARACTERS TO INPUT
3280  013466  012702  000015          MOV     #15,R2          ;SET MAXIMUM LIMIT
3281  013472  012703  000000          MOV     #0,R3           ;SET MINIMUM LIMIT
3282  013476  004737  023352          JSR     PC,TTR          ;GO GET PATTERN NUMBER
3283  013502  012704  026227          MOV     #MSG69,R4
3284  013506  000004                  TYPE                    ;TYPE MSG
3285  013510  013703  000564          MOV     TMEX,R3
3286  013514  104400                  TYPOCT                  ;PRINT CURRENT TM FLAG SETTING
3287  013516  012705  000564          MOV     #TMEX,R5        ;GET TM FLAG ADDRESS
3288  013522  012701  000002          MOV     #2,R1           ;SET SIZE OF RESPONSE
3289  013526  012702  000001          MOV     #1,R2           ;SET UPPER LIMIT
3290  013532  012703  000000          MOV     #0,R3           ;SET LOWER LIMIT
3291  013536  004737  023352          JSR     PC,TTR          ;TM 1=YES
3292  013542  012704  024663          MOV     #MSG21,R4
3293  013546  000004                  TYPE                    ;TYPE MSG
3294  013550  013703  000570          MOV     INTRF,R3
3295  013554  104400                  TYPOCT                  ;PRINT CURRENT SETTING
3296  013556  012705  000570          MOV     #INTRF,R5       ;GET FLAG ADDRESS
3297  013562  012701  000002          MOV     #2,R1           ;SET SIZE OF RESPONSE
3298  013566  012702  000001          MOV     #1,R2           ;SET UPPER LIMIT
3299  013572  012703  000000          MOV     #0,R3           ;SET LOWER LIMIT
3300  013576  004737  023352          JSR     PC,TTR          ;GO GET RESPONSE
3301  013602  012704  025475          MOV     #MSG38,R4
3302  013606  000004                  TYPE                    ;TYPE MSG
3303  013610  013703  000572          MOV     SPFLG,R3
3304  013614  104400                  TYPOCT                  ;PRINT CURRENT SETTING
3305  013616  012705  000572          MOV     #SPFLG,R5       ;SET ADDRESS OF FLAG
3306  013622  012701  000002          MOV     #2,R1           ;SET SIZE OF RESPONSE
3307  013626  012702  000001          MOV     #1,R2           ;SET UPPER LIMIT
3308  013632  012703  000000          MOV     #0,R3           ;SET LOWER LIMIT
3309  013636  004737  023352          JSR     PC,TTR          ;GO GET RESPONSE
3310  013642  012704  025515  TINP3A:  MOV     #MSG39,R4
3311  013646  000004                  TYPE                    ;TYPE MSG
3312  013650  013703  000566          MOV     CRCC,R3
3313  013654  104400                  TYPOCT
3314  013656  012705  000566          MOV     #CRCC,R5
3315  013662  012701  000002          MOV     #2,R1
3316  013666  012702  000001          MOV     #1,R2
3317  013672  012703  000000          MOV     #0,R3
3318  013676  004737  023352          JSR     PC,TTR
3319  013702  004737  023216          JSR     PC,GTSWR        ;GET SWITCHES
3320  013706  005737  014070  TINP4:   TST     SCVFL           ;BRANCH IF SHORT CONVERSATION
3321  013712  001063                  BNE     TINPX
3322  013714  005737  000636  1$:     TST     TINF            ;BRANCH IF NO TTY INPUT
3323  013720  001460                  BEQ     TINPX
3324  013722  012704  025555          MOV     #MSG40,R4
3325  013726  000004                  TYPE                    ;TYPE MSG
3326  013730  013703  000574          MOV     RSTAL,R3
3327  013734  104400                  TYPOCT                  ;PRINT READ STALL
3328  013736  012705  000574          MOV     #RSTAL,R5       ;SET READ STALL ADDRESS
```

```
 3329  013742  012701  000007              MOV     #7,R1           ;SET NUMBER OF CHARACTERS TO INPUT
 3330  013746  012702  177777              MOV     #-1,R2          ;SET MAXIMUM LIMIT
 3331  013752  012703  000001              MOV     #1,R3           ;SET MINIMUM LIMIT
 3332  013756  004737  023352              JSR     PC,TTR          ;GO GET READ STALL
 3333  013762  012704  025604              MOV     #MSG41,R4
 3334  013766  000004                       TYPE                    ;TYPE MSG
 3335  013770  013703  000576              MOV     WSTAL,R3
 3336  013774  104400                       TYPOCT                  ;PRINT READ STALL
 3337  013776  012705  000576              MOV     #WSTAL,R5       ;SET WRITE STALL ADDRESS
 3338  014002  012701  000007              MOV     #7,R1           ;SET NUMBER OF CHARACTERS TO INPUT
 3339  014006  012702  177777              MOV     #-1,R2          ;SET MAXIMUM LIMIT
 3340  014012  012703  000001              MOV     #1,R3           ;SET MINIMUM LIMIT
 3341  014016  004737  023352              JSR     PC,TTR          ;GO GET WRITE STALL
 3342  014022  012704  025616              MOV     #MSG42,R4
 3343  014026  000004                       TYPE                    ;TYPE MSG
 3344  014030  013703  000600              MOV     TSTAL,R3
 3345  014034  104400                       TYPOCT                  ;PRINT TA STALL
 3346  014036  012705  000600              MOV     #TSTAL,R5       ;SET TURN AROUND STALL ADDRESS
 3347  014042  012701  000007              MOV     #7,R1           ;SET NUMBER OF CHARACTERS TO INPUT
 3348  014046  012702  177777              MOV     #-1,R2          ;SET MAXIMUM LIMIT
 3349  014052  012703  000001              MOV     #1,R3           ;SET MINIMUM LIMIT
 3350  014056  004737  023352              JSR     PC,TTR          ;GO GET TURN AROUND STALL
 3351  014062  005037  014070      TINPX:  CLR     SCVFL           ;CLEAR SHORT CONVERSATION FLAG
 3352  014066  000207                       RTS     PC              ;EXIT
 3353  014070  000000              SCVFL:  0                       ;SHORT CONVERSATION FLAG
 3354
 3355                                       ;UNIT DESCRIPTION POSITIONING SUBROUTINE**********
 3356
 3357  014072  006337  000646      TPOS:   ASL     TEMP2           ;POSITION CHARACTER
 3358  014076  005303                       DEC     R3              ;SEE IF DONE
 3359  014100  001374                       BNE     TPOS            ;IF NOT: BR
 3360  014102  013700  000676      TPOS1:  MOV     UNP,R0          ;LOAD UNIT POINTER
 3361  014106  053760  000646  000746       BIS     TEMP2,UN1(R0)   ;LOAD CHARACTER INTO UN1(R0)
 3362  014114  000207                       RTS     PC              ;EXIT
 3363
```

```
3364
3365                                    ;*********************************************************
3366                                    ;DATA SETUP ROUTINE:
3367                                    ;
3368                                    ;THIS ROUTINE IS USED TO GENERATE INTO THE ENTIRE
3369                                    ;WRITE BUFFER (4000 OCTAL CHARACTERS) THE DATA PATTERN
3370                                    ;SELECTED BY THE OPERATOR.  THERE ARE 15 (8) FIXED
3371                                    ;DATA PATTERNS AVAILABLE AND ONE SELECTION (DATA PATTERN 0)
3372                                    ;WHICH WILL READ ANY PATTERN PRESENTED AT THE
3373                                    ;HIGH SPEED PAPER TAPE READER.  THIS TAPE MUST BE PREPARED
3374                                    ;BY USING THE PROGRAM CALLED DTC. (CZTUTA0)
3375                                    ;RANDOM DATA MAY ALSO BE USED VIA CONSOLE
3376                                    ;SWITCH EIGHT (8).
3377                                    ;THIS ROUTINE IS ALSO USED TO CLEAR OUT THE
3378                                    ;READ BUFFER (4000 OCTAL CHARACTERS) BEFORE EACH
3379                                    ;RECORD IS READ.
3380                                    ;*********************************************************
3381
3382  014116  005737  015030        DSUP:   TST     RDFL            ;SEE IF DID RANDOM DATA
3383  014122  001044                        BNE     DS2A            ;IF NOT: BR
3384  014124  005737  000736        DS0:    TST     ASEQF           ;SEE IF AUTO SEQ
3385  014130  001406                        BEQ     DS0C            ;IF NOT: BR
3386  014132  005737  000560                TST     PATRN           ;SEE IF AUTO RANDOM
3387  014136  100003                        BPL     DS0C            ;IF NOT: BR
3388  014140  004737  014766                JSR     PC,DATR         ;ELSE GO GENERATE RANDOM DATA
3389  014144  000207                        RTS     PC              ;RETURN
3390  014146  023737  000560  014276 DS0C:   CMP     PATRN,PATS      ;SEE IF NEW PATTERN
3391  014154  001014                        BNE     DS0A            ;IF SO: BR
3392  014156  013703  000552                MOV     UDES,R3         ;GET UNIT DESCRIPTION
3393  014162  042703  177767                BIC     #177767,R3      ;MASK EVEN PARITY
3394  014166  023703  014300                CMP     PARS,R3         ;SEE IF SAME AS LAST TIME
3395  014172  001404                        BEQ     DS0B            ;IF SO: BR
3396  014174  010337  014300                MOV     R3,PARS         ;SAVE PARITY
3397  014200  004737  015032                JSR     PC,CRCLRC       ;GO GENERATE EXPT CRC/LRC
3398  014204  000207                DS0B:   RTS     PC
3399  014206  012703  027346        DS0A:   MOV     #WDATA,R3       ;R3 = ADDRS OF WRITE BUFFER
3400  014212  013701  000560                MOV     PATRN,R1        ;R1 = PATTERN SELECTOR
3401  014216  010137  014276                MOV     R1,PATS
3402  014222  062701  000001                ADD     #1,R1           ;BUMP POINTER
3403  014226  006301                        ASL     R1              ;MAKE PATTERN SELECTOR EVEN
3404  014230  004771  002770                JSR     PC,@DATBL(R1)   ;GO GENERATE PATTERN
3405  014234  004737  015032        DS2A:   JSR     PC,CRCLRC       ;GO GENERATE EXPT CRC/LRC
3406  014240  013702  000556        DS3:    MOV     FMCNT,R2        ;R2=BUFFER SIZE
3407  014244  006202                        ASR     R2              ;R2=FRAME CMT/2
3408  014246  012701  033354                MOV     #RDATA,R1       ;R1=READ DATA START
3409  014252  005021                DS4:    CLR     (R1)+           ;CLEAR BUFFER
3410  014254  005202                        INC     R2              ;SEE IF DONE ALL
3411  014256  001375                        BNE     DS4             ;IF NOT: BR
3412  014260  013737  000552  014300        MOV     UDES,PARS       ;GET UNIT DESCRIPTION
3413  014266  042737  177767  014300        BIC     #177767,PARS    ;MASK PARITY
3414  014274  000207                        RTS     PC              ;EXIT
3415  014276  177777                PATS:   -1                      ;PATTERN NUMBER SAVE
3416  014300  000000                PARS:   0
3417
3418
```

```
3419
3420                                        ;EXTERNAL DATA INPUT FROM H/S READER (256 CHARACTER MAXIMUM)
3421
3422  014302  005737  014440        DAT0:   TST     D0FL            ;SEE IF SHOULD DO EXTERNAL INPUT
3423  014306  001352                        BNE     DS2A            ;IF NOT: BR
3424  014310  012737  000001 014440        MOV     #1,D0FL         ;SET EXTERNAL FLAG
3425  014316  005077  164300                CLR     @PRS            ;CLEAR READER STATUS
3426  014322  005037  000644                CLR     TEMP1           ;CLEAR FOR USE AS CHARACTER FLAG
3427  014326  052777  000001 164266 DAT0A:  BIS     #1,@PRS         ;START READER
3428  014334  105777  164262        DAT0B:  TSTB    @PRS            ;SEE IF DONE
3429  014340  100375                        BPL     DAT0B           ;IF NOT : BR
3430  014342  005001                        CLR     R1              ;CLEAR SAVE LOCATION
3431  014344  117701  164254                MOVB    @PRB,R1         ;SAVE CHARACTER
3432  014350  005737  000644                TST     TEMP1           ;SEE IF HAVE FOUND START CHARACTER
3433  014354  001011                        BNE     DAT0C           ;IF SO : BR
3434  014356  105701                        TSTB    R1              ;SEE IF CHARACTER IS 0
3435  014360  001762                        BEQ     DAT0A           ;IF SO : BR
3436  014362  012737  000001 000644        MOV     #1,TEMP1        ;ELSE SET CHARACTER FOUND FLAG
3437  014370  010137  000646                MOV     R1,TEMP2        ;SAVE DATA SIZE
3438  014374  010102                        MOV     R1,R2           ;SAVE DATA SIZE
3439  014376  000753                        BR      DAT0A           ;GO GET FIRST DATA CHAR
3440  014400  110123        DAT0C:  MOVB    R1,(R3)+        ;LOAD BUFFER
3441  014402  005302                        DEC     R2              ;SEE IF READ ALL
3442  014404  001350                        BNE     DAT0A           ;IF NOT : BR
3443  014406  012701  027346        DAT0D:  MOV     #WDATA,R1       ;R1 = START OF WRITE BUFFER
3444  014412  013702  000646                MOV     TEMP2,R2        ;R2 = SIZE OF DATA FIELD
3445  014416  112123        DAT0E:  MOVB    (R1)+,(R3)+     ;REPEAT LOAD OF DATA FIELD
3446  014420  022703  033354                CMP     #RDATA,R3       ;SEE IF DONE
3447  014424  003002                        BGT     DAT0F           ;IF NOT: BR
3448  014426  000137  014234                JMP     DS2A            ;EXIT
3449  014432  005302        DAT0F:  DEC     R2              ;SEE IF AT END OF DATA FIELD
3450  014434  001370                        BNE     DAT0E           ;IF NOT : BR
3451  014436  000763                        BR      DAT0D           ;ELSE RESTART FILL
3452  014440  000000        D0FL:   0               ;EXTERNAL DATA FLAG=1 IF ALREADY DONE
3453
```

```
3454                                        ;ALL ONES**********
3455
3456  014442  012701  177777    DAT1:     MOV     #-1,R1          ;R1=DATA
3457  014446  012702  002002    DAT1A:    MOV     #2002,R2        ;R2=WORD COUNT +2
3458  014452  010123              1$:     MOV     R1,(R3)+        ;LOAD BUFFER
3459  014454  005302                      DEC     R2              ;SEE IF DONE
3460  014456  001375                      BNE     1$              ;IF NOT: BR
3461  014460  000207                      RTS     PC
3462
3463                                        ;ALL ZEROS**********
3464
3465  014462  005001    DAT2:     CLR     R1              ;R1=DATA
3466  014464  000770              BR      DAT1A           ;LOAD BUFFER
3467
3468                                        ;WALKING ONE**********
3469
3470  014466  012701  000001    DAT3:     MOV     #1,R1           ;R1=DATA
3471  014472  000241              CLC
3472  014474  012702  004004    DAT3A:    MOV     #4004,R2        ;R2=CHARACTER COUNT+4
3473  014500  110123              1$:     MOVB    R1,(R3)+        ;LOAD BUFFER
3474  014502  106101                      ROLB    R1              ;SET NEXT CHARACTER
3475  014504  005302                      DEC     R2              ;SEE IF DONE
3476  014506  001374                      BNE     1$              ;IF NOT: BR
3477  014510  000207                      RTS     PC
3478
3479                                        ;WALKING ZERO**********
3480
3481  014512  012701  000376    DAT4:     MOV     #376,R1         ;R1=START OF DATA
3482  014516  000261              SEC
3483  014520  000765              BR      DAT3A           ;LOAD BUFFER
3484
3485                                        ;ALTERNATING ONE/ZERO**********
3486
3487
3488  014522  012701  052525    DAT5:     MOV     #52525,R1       ;R1=DATA
3489  014526  000747              BR      DAT1A           ;LOAD BUFFER
3490
3491                                        ;ALTERNATING ZERO/ONE**********
3492
3493  014530  012701  125252    DAT6:     MOV     #125252,R1      ;R1=DATA
3494  014534  000744              BR      DAT1A           ;LOAD BUFFER
3495
3496                                        ;ONE/ZERO IN ALTERNATING WORDS**********
3497
3498  014536  012701  125252    DAT7:     MOV     #125252,R1      ;SET WORD 1
3499  014542  012702  052525              MOV     #52525,R2       ;SET WORD 2
3500  014546  012704  001002              MOV     #1002,R4        ;SET NUMBER OF ENTRIES
3501  014552  010123              1$:     MOV     R1,(R3)+        ;LOAD WORD 1
3502  014554  010223                      MOV     R2,(R3)+        ;LOAD WORD 2
3503  014556  005304                      DEC     R4              ;SEE IF DONE
3504  014560  001374                      BNE     1$              ;IF NOT: BR
3505  014562  000207                      RTS     PC
3506
```

```
3507                                        ;WALKING ONE/ALL ONE IN ALTERNATING CHARS****
3508
3509  014564  012702  002002    DAT10:  MOV     #2002,R2        ;SET BUFFER SIZE
3510  014570  012701  000001            MOV     #1,R1           ;SET WALK BASE
3511  014574  000241                    CLC
3512  014576  012713  177400    1$:     MOV     #177400,(R3)    ;LOAD ALL ONE BYTE
3513  014602  050123                    BIS     R1,(R3)+        ;LOAD WALK BYTE
3514  014604  106101                    ROLB    R1              ;WALK ONE
3515  014606  005302                    DEC     R2
3516  014610  001372                    BNE     1$              ;DO FULL BUFFER
3517  014612  000207                    RTS     PC
3518
3519                                        ;ALL BITS 0-377**********
3520
3521  014614  005001    DAT11:  CLR     R1              ;R1=STARTING DATA
3522  014616  012702  004004            MOV     #4004,R2        ;R2=CHARACTER COUNT+4
3523  014622  110123    1$:     MOVB    R1,(R3)+        ;LOAD BUFFER
3524  014624  105201                    INCB    R1              ;BUMP DATA
3525  014626  005302                    DEC     R2              ;SEE IF DONE
3526  014630  001374                    BNE     1$              ;IF NOT: BR
3527  014632  000207                    RTS     PC              ;RETURN
3528
3529                                        ;ALL BITS 377-0**********
3530
3531  014634  012701  000377    DAT12:  MOV     #377,R1         ;R1=STARTING DATA
3532  014640  012702  004004            MOV     #4004,R2        ;R2=CHARACTER COUNT+4
3533  014644  110123    1$:     MOVB    R1,(R3)+        ;LOAD BUFFER
3534  014646  105301                    DECB    R1              ;BUMP DATA
3535  014650  005302                    DEC     R2              ;SEE IF DONE
3536  014652  001374                    BNE     1$              ;IF NOT: BR
3537  014654  000207                    RTS     PC              ;RETURN
3538
3539                                        ;ALTERNATING CHARACTERS 0 AND 377**********
3540
3541  014656  012701  000377    DAT13:  MOV     #377,R1         ;R1 = DATA
3542  014662  000137  014446            JMP     DAT1A           ;LOAD BUFFER
3543
3544                                        ;WALKING ZERO/ALL ZERO IN ALTERNATING CHARS******
3545
3546  014666  012702  002002    DAT14:  MOV     #2002,R2        ;SET BUFFER SIZE
3547  014672  012701  000376            MOV     #376,R1         ;SET WALK BASE
3548  014676  000261                    SEC
3549  014700  010113    1$:     MOV     R1,(R3)         ;LOAD WALK BYTE
3550  014702  042723  177400            BIC     #177400,(R3)+   ;CLEAR HIGH BYTE
3551  014706  106101                    ROLB    R1              ;WALK ZERO BIT
3552  014710  005302                    DEC     R2
3553  014712  001372                    BNE     1$              ;FILL BUFFER
3554  014714  000207                    RTS     PC              ;RETURN
3555
```

```
3556                                        ;AUTO SEQUENCE PATTERN*********
3557
3558  014716  012702  000200        DAT15:  MOV     #200,R2         ;SET NUMBER OF ENTRIES
3559  014722  012701  014746        1$:     MOV     #APATS,R1       ;SET START OF PATTERN
3560  014726  012704  000010                MOV     #10,R4          ;SET SIZE OF PATTERN
3561  014732  012123                2$:     MOV     (R1)+,(R3)+     ;FILL BUFFER
3562  014734  005304                        DEC     R4              ;SEE IF DONE PATTERN
3563  014736  001375                        BNE     2$              ;IF NOT: BR
3564  014740  005302                        DEC     R2              ;SEE IF DONE BUFER
3565  014742  001367                        BNE     1$              ;IF NOT: BR
3566  014744  000207                        RTS     PC              ;RETURN
3567
3568  014746  000000                APATS:  0
3569  014750  177400                        177400
3570  014752  000377                        377
3571  014754  000000                        0
3572  014756  177777                        -1
3573  014760  000377                        377
3574  014762  177400                        177400
3575  014764  177777                        -1
3576
3577                                        ;RANDOM DATA GENERATOR SUBROUTINE**********
3578
3579  014766  013704  000556        DATR:   MOV     FMCNT,R4        ;SET NUMBER OF FRAMES
3580  014772  012703  027346                MOV     #WDATA,R3       ;SET ADDRESS OF START OF BUFFER
3581  014776  012701  177777                MOV     #-1,R1          ;SET HIGH LIMIT
3582  015002  005002                        CLR     R2              ;SET LOW LIMIT
3583  015004  004737  023164        1$:     JSR     PC,RANG         ;GO GENERATE NUMBER
3584  015010  013723  000630                MOV     RANSAV,(R3)+    ;LOAD BUFFER
3585  015014  005204                        INC     R4              ;SEE IF DONE WHOLE BUFFER
3586  015016  001372                        BNE     1$              ;IF NOT: BR
3587  015020  012737  000001  015030        MOV     #1,RDFL         ;SET RANDOM DATA FLAG
3588  015026  000207                        RTS     PC              ;EXIT
3589  015030  000000                RDFL:   0                       ;RANDOM DATA SELECT FLAG
```

```
3590
3591                                    ;*************************************************************
3592                                    ;CRC/LRC CHARACTER BUILD;
3593                                    ;
3594                                    ;THIS ROUTINE WILL CONSTRUCT AND SAVE THE EXPECTED
3595                                    ;CRC AND LRC CHARACTERS ACCORDING TO DATA AND
3596                                    ;RECORD SIZE IF OPERATING IN NRZ MODE
3597                                    ;*************************************************************
3598
3599  015032  013700  000556   CRCLRC: MOV     FMCNT,R0        ;SET RECORD SIZE
3600  015036  005400                   NEG     R0
3601  015040  012701  027346           MOV     #WDATA,R1       ;SET START OF BUFFER
3602  015044  005037  015366           CLR     XORS
3603  015050  111104            CL0:   MOVB    (R1),R4         ;GET CHARACTER
3604  015052  004737  015240           JSR     PC,CLP          ;GO GET PARITY OF CHARACTER
3605  015056  004737  015342           JSR     PC,XOR          ;XOR CHARACTER
3606  015062  000241                   CLC
3607  015064  006004                   ROR     R4              ;ROTATE 1 RIGHT
3608  015066  103014                   BCC     CL2             ;IF NO CARRY: BR
3609  015070  052704  000400           BIS     #400,R4         ;SET BIT NINE
3610  015074  000241                   CLC
3611  015076  010405            CL1:   MOV     R4,R5           ;SAVE CHARACTER
3612  015100  042705  177703           BIC     #177703,R5
3613  015104  005105                   COM     R5
3614  015106  042705  177703           BIC     #177703,R5
3615  015112  042704  000074           BIC     #74,R4
3616  015116  050504                   BIS     R5,R4           ;COMPLIMENT BITS 2,3,4,5
3617  015120  010437  015366    CL2:   MOV     R4,XORS
3618  015124  005300                   DEC     R0
3619  015126  001350                   BNE     CL0             ;BRANCH IF NOT LAST CHAR
3620  015130  013704  015366    CLLAST: MOV    XORS,R4
3621  015134  005137  015366           COM     XORS
3622  015140  042737  177050  015366   BIC     #177050,XORS
3623  015146  042704  177727           BIC     #177727,R4      ;COMPLIMENT ALL BUT BITS 3&5
3624  015152  050437  015366           BIS     R4,XORS
3625  015156  013737  015366  015370   MOV     XORS,EXCRC      ;SAVE EXPECTED CRC
3626  015164  013700  000556           MOV     FMCNT,R0
3627  015170  005400                   NEG     R0
3628  015172  012701  027346           MOV     #WDATA,R1       ;DO EXPT LRC
3629  015176  005037  015366           CLR     XORS
3630  015202  111104            CL3:   MOVB    (R1),R4
3631  015204  004737  015240           JSR     PC,CLP          ;GET PARITY
3632  015210  004737  015342           JSR     PC,XOR          ;XOR CHARACTER
3633  015214  005300                   DEC     R0
3634  015216  001371                   BNE     CL3             ;DO ALL FOR LRC
3635  015220  013704  015370           MOV     EXCRC,R4
3636  015224  004737  015342           JSR     PC,XOR          ;XOR CRC TO DATA
3637  015230  013737  015366  015372   MOV     XORS,EXLRC      ;SAVE EXPT LRC
3638  015236  000207                   RTS     PC              ;RETURN
3639  015240  005704            CLP:   TST     R4              ;SEE IF 0 CHAR
3640  015242  001010                   BNE     CLPE            ;IF NOT: BR
3641  015244  032737  000010  000552   BIT     #10,UDES        ;SEE IF EVEN PARITY
3642  015252  001404                   BEQ     CLPE            ;IF NOT: BR
3643  015254  012704  000420           MOV     #420,R4         ;SET 0 CHAR EVEN PARITY
3644  015260  005201                   INC     R1              ;BUMP POINTER
3645  015262  000207                   RTS     PC              ;RETURN
```

```
3646  015264  005046                  CLPE:   CLR     -(SP)           ;CLEAR WORLING SPACE ON STACK
3647  015266  106304                  1$:     ASLB    R4              ;SHIFT DATA
3648  015270  005516                          ADC     (SP)            ;ADDUP # OF 1 BITS
3649  015272  105704                          TSTB    R4              ;BRANCH IF ALL 0''S LEFT
3650  015274  001374                          BNE     1$
3651  015276  112104                          MOVB    (R1)+,R4
3652  015300  042704  177400                BIC     #177400,R4
3653  015304  106026                          RORB    (SP)+           ;BRANCH IF ODD # OF 1 BITS
3654  015306  103405                          BCS     CLP2
3655  015310  032737  000010  000552        BIT     #10,UDES        ;SEE IF SHOULD BE EVEN PARITY
3656  015316  001406                          BEQ     CLP3            ;IF NOT: BR
3657  015320  000207                          RTS     PC              ;ELSE EXIT
3658  015322  032737  000010  000552  CLP2:   BIT     #10,UDES        ;SEE IF SHOULD BE ODD PARITY
3659  015330  001001                          BNE     CLP3            ;IF NOT: BR
3660  015332  000207                          RTS     PC              ;ELSE EXIT
3661  015334  052704  000400          CLP3:   BIS     #400,R4         ;SET PARITY BIT
3662  015340  000207                          RTS     PC
3663
3664  015342  010446                  XOR:    MOV     R4,-(SP)
3665  015344  043716  015366                BIC     XORS,(SP)
3666  015350  040437  015366                BIC     R4,XORS         ;XOR SUBROUTINE: R4 WITH XORS
3667  015354  052637  015366                BIS     (SP)+,XORS
3668  015360  013704  015366                MOV     XORS,R4
3669  015364  000207                          RTS     PC
3670
3671  015366  000000                  XORS:   0                       ;XOR SAVE
3672  015370  000000                  EXCRC:  0                       ;EXPECTED CRC
3673  015372  000000                  EXLRC:  0                       ;EXPECTED LRC
3674
```

```
3675
3676                                    ;*********************************************************
3677                                    ;DATA CHECK SUBROUTINE:
3678                                    ;
3679                                    ;THIS SUBROUTINE IS USED TO COMPARE EACH CHARACTER
3680                                    ;OF DATA READ FROM TAPE WITH THE EXPECTED CHARACTER.
3681                                    ;ANY ERROR DETECTED WILL CAUSE CONTROL TO BE
3682                                    ;PASSED TO AN ERROR PRINT SUBROUTINE AND A
3683                                    ;SUBROUTINE TO ACCUMULATE THE NUMBER OF BITS
3684                                    ;DROPPED AND PICKED UP FROM EACH CHARACTER.
3685                                    ;THE NUMBER OF READ ERRORS IS ALSO ACCUMULATED.
3686                                    ;DATA CHECKING MAY BE TERMINATED BY USE OF
3687                                    ;CONSOLE SWITCH THIRTEEN (13).
3688                                    ;*********************************************************
3689
3690  015374  005037  000660        DCHK:   CLR     BBC             ;CLEAR BAD RECORD CNTR
3691  015400  005037  000706                CLR     DERFL           ;CLEAR DATA ERROR FLAG
3692  015404  013705  000556                MOV     FMCNT,R5        ;LOAD CHAR COUNT
3693  015410  032737  000020  000552        BIT     #20,UDES        ;SEE IF CORE DUMP
3694  015416  001401                        BEQ     DCHK0           ;IF NOT: BR
3695  015420  006205                        ASR     R5              ;R5 = FC/2
3696  015422  012701  027346        DCHK0:  MOV     #WDATA,R1       ;SET WRITE DATA ADDR
3697  015426  012702  033354                MOV     #RDATA,R2       ;SET READ DATA ADDR
3698  015432  032737  000010  000552        BIT     #10,UDES        ;SEE IF EVEN PARITY
3699  015440  001430                        BEQ     DF0C0           ;IF NOT: BR
3700  015442  032737  000020  000552        BIT     #20,UDES        ;SEE IF CORE DUMP PARITY
3701  015450  001024                        BNE     DF0C0           ;IF SO: BR
3702  015452  032737  002000  000552        BIT     #2000,UDES      ;SEE IF PE MODE
3703  015460  001020                        BNE     DF0C0           ;IF SO: BR
3704  015462  105711                DF0F:   TSTB    (R1)            ;SEE IF 0 CHAR
3705  015464  001404                        BEQ     DF0D            ;IF SO: BR
3706  015466  005201                        INC     R1              ;BUMP POINTER
3707  015470  005205                DF0E:   INC     R5              ;SEE IF DONE
3708  015472  001373                        BNE     DF0F            ;IF NOT: BR
3709  015474  000406                        BR      DF0C            ;ELSE CONTINUE
3710  015476  112721  000020        DF0D:   MOVB    #20,(R1)+       ;SET 20 IN PLACE OF 0
3711  015502  012737  177777  014276        MOV     #-1,PATS        ;SET PATTERN GENERATE FLAG
3712  015510  000767                        BR      DF0E
3713  015512  013705  000556        DF0C:   MOV     FMCNT,R5        ;RESET CHAR CNT
3714  015516  012701  027346                MOV     #WDATA,R1       ;RESET DATA ADDRESS
3715  015522  032737  010000  000562 DF0C0:  BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3716  015530  001462                        BEQ     DF0             ;IF NOT: BR
3717  015532  013704  000556        DF0B:   MOV     FMCNT,R4        ;GET FRAME COUNT
3718  015536  005404                        NEG     R4              ;SET TO WHOLE NUMBER
3719  015540  032737  000020  000552        BIT     #20,UDES        ;SEE IF CORE DUMP
3720  015546  001402                        BEQ     DF0B0           ;IF NOT: BR
3721  015550  000241                        CLC
3722  015552  006004                        ROR     R4              ;SET TO FC/2
3723  015554  060401                DF0B0:  ADD     R4,R1           ;POINT TO START OF WRITE DATA
3724  015556  060402                        ADD     R4,R2           ;POINT TO START OF READ DATA
3725  015560  032737  000001  000556        BIT     #1,FMCNT        ;SEE IF ODD FRAME COUNT
3726  015566  001401                        BEQ     DF0A            ;IF NOT: BR
3727  015570  105722                        TSTB    (R2)+           ;BUMP POINTER
3728  015572  032737  000020  000552 DF0A:   BIT     #20,UDES        ;SEE IF CORE DUMP
3729  015600  001431                        BEQ     DF0A4           ;IF NOT: BR
3730  015602  000241                        CLC
```

```
 3731  015604  132742  000001              BITB    #1,-(R2)        ;SEE IF BIT 0 = 1
 3732  015610  001401                      BEQ     DF0A0           ;IF NOT: BR
 3733  015612  000261                      SEC
 3734  015614  106012              DF0A0:  RORB    (R2)
 3735  015616  000241                      CLC
 3736  015620  132712  000001              BITB    #1,(R2)
 3737  015624  001401                      BEQ     DF0A1
 3738  015626  000261                      SEC
 3739  015630  106012              DF0A1:  RORB    (R2)            ;POSITION BITS FOR REVERSE CORE DUMP
 3740  015632  000241                      CLC
 3741  015634  132712  000001              BITB    #1,(R2)
 3742  015640  001401                      BEQ     DF0A2
 3743  015642  000261                      SEC
 3744  015644  106012              DF0A2:  RORB    (R2)
 3745  015646  000241                      CLC
 3746  015650  132712  000001              BITB    #1,(R2)
 3747  015654  001401                      BEQ     DF0A3
 3748  015656  000261                      SEC
 3749  015660  106012              DF0A3:  RORB    (R2)
 3750  015662  005202                      INC     R2              ;RESET POINTER
 3751  015664  124142              DF0A4:  CMPB    -(R1),-(R2)     ;TEST DATA CHARACTER
 3752  015666  001010                      BNE     DF1             ;IF NOT GOOD: BR
 3753  015670  105037  000660              CLRB    BBC             ;CLEAR BAD RECORD COUNTER
 3754  015674  000411                      BR      DF2
 3755  015676  122122              DF0:    CMPB    (R1)+,(R2)+     ;CHECK DATA
 3756  015700  001003                      BNE     DF1             ;IF BAD: BR
 3757  015702  105037  000660              CLRB    BBC             ;CLEAR BAD RECORD CNTR
 3758  015706  000404                      BR      DF2
 3759  015710  004737  016522      DF1:    JSR     PC,DRPKF        ;GO GET DROPS AND PICKS
 3760  015714  004737  016006              JSR     PC,DERR         ;GO DO PRINT
 3761  015720  005205              DF2:    INC     R5              ;BUMP CHAR CNTR
 3762  015722  001405                      BEQ     DF3             ;IF DONE ALL: BR
 3763  015724  032737  010000  000562      BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 3764  015732  001761                      BEQ     DF0             ;IF NOT: BR
 3765  015734  000716                      BR      DF0A            ;ELSE CONTINUE READ REV
 3766  015736  005037  000666      DF3:    CLR     HDRFL           ;CLEAR HEADER FLAG
 3767  015742  005737  000706              TST     DERFL           ;SEE IF HAD DATA ERROR
 3768  015746  001416                      BEQ     DFX             ;IF NOT: BR
 3769  015750  005737  000710              TST     SERFL
 3770  015754  001013                      BNE     DFX             ;IF NOT DATA ERROR ONLY: BR
 3771  015756  013704  000676              MOV     UNP,R4
 3772  015762  032737  010000  000562      BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 3773  015770  001003                      BNE     DF4             ;IF SO: BR
 3774  015772  005264  001130              INC     DATER1(R4)      ;BUMP DATA ERROR FORWARD COUNTER
 3775  015776  000402                      BR      DFX
 3776  016000  005264  001170      DF4:    INC     DEREV1(R4)      ;BUMP REVERSE DATA ERROR
 3777  016004  000207              DFX:    RTS     PC              ;EXIT
 3778
```

```
3779
3780                                    ;*********************************************************
3781                                    ;DATA ERROR SUBROUTINE:
3782                                    ;
3783                                    ;THIS SUBROUTINE IS USED TO PRINT OUT ANY
3784                                    ;ERRORS FOUND DURING THE DATA CHECK.
3785                                    ;EACH CHARACTER FOUND BAD WILL BE PRINTED
3786                                    ;IN BIT FORMAT ALONG WITH ITS EXPECTED CHARACTER.
3787                                    ;AN ERROR HEADER CONSISTING OF THE UNIT NUMBER,
3788                                    ;BLOCK NUMBER, RECORD NUMBER, SIZE OF RECORD, AND
3789                                    ;ERROR TYPE (READ FORWARD, READ REVERSE, WRITE, ETC)
3790                                    ;IS PRINTED ONLY ONCE FOR EACH RECORD FOUND BAD.
3791                                    ;A COUNT IS MADE OF THE NUMBER OF SUCCESSIVE BAD
3792                                    ;CHARACTERS, AND IF TEN (10) SUCCESSIVE BAD CHARACTERS
3793                                    ;ARE FOUND IN A SINGLE RECORD, A MESSAGE INDICATING
3794                                    ;A BAD RECORD CONDITION IS PRINTED AND THE NEXT
3795                                    ;TWENTY (20) CHARACTERS ARE SKIPPED BEFORE CHECKING
3796                                    ;IS RESUMED.  IF THE BAD RECORD CONDITION IS FOUND
3797                                    ;THREE TIMES IN A RECORD, ALL REMAINING DATA IS
3798                                    ;SKIPPED EXCEPT THE FINAL TEN (10) CHARACTERS.
3799                                    ;THIS SKIPPING IS OF COURSE ONLY POSSIBLE IN
3800                                    ;RECORDS WHICH CONTAIN A SUFFICIENT NUMBER OF CHARACTERS.
3801                                    ;PRINTING OF ERRORS MAY BE DISALLOWED AT ANY TIME
3802                                    ;BY SETTING CONSOLE SWITCH TEN (10) TO A ONE.
3803                                    ;THE OPERATOR MAY CAUSE THE PROGRAM TO HALT ON ANY ERROR
3804                                    ;BY SETTING CONSOLE SWITCH FIFTEEN (15) TO A ONE.
3805                                    ;*********************************************************
3806
3807  016006  032777  002000  162574  DERR:   BIT     #2000,@SWR      ;BRANCH IF NO ERROR
3808  016014  001067                    BNE     DERR4           ;PRINTOUT DESIRED
3809  016016  005237  000672          DERR0:  INC     PFLG            ;SET PRINT FLAG
3810  016022  005737  000666                  TST     HDRFL           ;SEE IF HAVE PRINTED HEADER
3811  016026  001007                    BNE     DERR0A          ;IF SO: BR
3812  016030  004737  022602                  JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3813  016034  012704  024456                  MOV     #MSG1,R4        ;LOAD ERROR MSG ADDR
3814  016040  000004                    TYPE                    ;TYPE MSG
3815  016042  004737  021036                  JSR     PC,FRPRT        ;PRINT F OR R
3816  016046  012704  024475          DERR0A: MOV     #MSG4,R4
3817  016052  000004                    TYPE                    ;TYPE MSG
3818  016054  010203                    MOV     R2,R3
3819  016056  162703  033354                  SUB     #RDATA,R3       ;POINT TO CHAR
3820  016062  005303                    DEC     R3
3821  016064  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3822  016072  001402                    BEQ     DERR0B          ;IF NOT: BR
3823  016074  010503                    MOV     R5,R3           ;GET CHAR NUMBER
3824  016076  005103                    COM     R3
3825  016100  104400          DERR0B: TYPOCT                  ;PRINT CHAR NUMBER
3826  016102  012704  024463                  MOV     #MSG2,R4
3827  016106  000004                    TYPE                    ;TYPE MSG
3828  016110  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3829  016116  001402                    BEQ     DERR0C          ;IF NOT: BR
3830  016120  111103                    MOVB    (R1),R3         ;GET CHAR
3831  016122  000401                    BR      DERR0D
3832  016124  114103          DERR0C: MOVB    -(R1),R3        ;LOAD EXPECTED DATA
3833  016126  004737  024234  DERR0D:  JSR     PC,DOUT         ;GO PRINT CHAR
3834  016132  012704  024470                  MOV     #MSG3,R4
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3835  016136  000004                          TYPE                    ;TYPE MSG
3836  016140  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3837  016146  001402                          BEQ     DERR1           ;IF NOT: BR
3838  016150  111203                          MOVB    (R2),R3         ;GET CHAR
3839  016152  000401                          BR      DERR2
3840  016154  114203                  DERR1:  MOVB    -(R2),R3
3841  016156  004737  024234          DERR2:  JSR     PC,DOUT         ;PRINT BAD CHAR
3842  016162  032737  010000  000562          BIT     #10000,RDCMD    ;BRANCH IF NOT READ
3843  016170  001001                          BNE     DERR4           ;REVERSE
3844  016172  122122                  DERR3:  CMPB    (R1)+,(R2)+     ;RESET POINTERS
3845  016174  105237  000660          DERR4:  INCB    BBC             ;BUMP BAD RECORD CNTR
3846  016200  122737  000010  000660          CMPB    #10,BBC         ;SEE IF BLD BTH
3847  016206  001123                          BNE     DEREX           ;IF NOT: BR
3848  016210  032777  002000  162372          BIT     #2000,@SWR      ;SEE IF PRINT INHIBIT
3849  016216  001003                          BNE     1$              ;IF SO: BR
3850  016220  012704  024611                  MOV     #MSG15,R4
3851  016224  000004                          TYPE                    ;TYPE MSG
3852  016226  105037  000660          1$:     CLRB    BBC             ;RESET BAD RECORD CNTR
3853  016232  000337  000660                  SWAB    BBC             ;POSITION BLD BTH AMOUNT
3854  016236  105237  000660                  INCB    BBC             ;BUMP AMOUNT
3855  016242  122737  000003  000660          CMPB    #3,BBC          ;SEE IF HAD 3 BLD BTHS
3856  016250  101054                          BHI     DERR4B          ;IF NOT: BR
3857  016252  000337  000660                  SWAB    BBC             ;REPOSITION BBC
3858  016256  022705  177767                  CMP     #177767,R5      ;SEE IF ON LAST EIGHT CHARS
3859  016262  101473                          BLOS    DERR6           ;IF SO: BR
3860  016264  012705  177767                  MOV     #177767,R5      ;SET CHAR CNTR TO 8
3861  016270  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3862  016276  001416                          BEQ     DERR4A          ;IF NOT: BR
3863  016300  012701  027346                  MOV     #WDATA,R1       ;GET START OF BUFFER
3864  016304  012702  033354                  MOV     #RDATA,R2       ;GET START OF BUFFER
3865  016310  062701  000010                  ADD     #10,R1
3866  016314  062702  000010                  ADD     #10,R2          ;POINT TO START +10
3867  016320  032737  000001  000556          BIT     #1,FMCNT        ;SEE IF ODD FRAME COUNT
3868  016326  001453                          BEQ     DEREX           ;IF NOT: BR
3869  016330  105722                          TSTB    (R2)+           ;BUMP POINTER
3870  016332  000451                          BR      DEREX
3871  016334  013737  000556  000644  DERR4A: MOV     FMCNT,TEMP1     ;LOAD CHAR COUNT
3872  016342  005137  000644                  COM     TEMP1
3873  016346  005237  000644                  INC     TEMP1
3874  016352  162737  000010  000644          SUB     #10,TEMP1       ;POINT TO BUFFER -8
3875  016360  013701  000644                  MOV     TEMP1,R1        ;POINT TO NEXT CHAR
3876  016364  062701  027346                  ADD     #WDATA,R1       ;POINT TO NEXT WRITE CHAR
3877  016370  013702  000644                  MOV     TEMP1,R2        ;POINT TO END OF READ DATA -8 FORWARD
3878  016374  062702  033354                  ADD     #RDATA,R2       ;POINT TO NEXT CHAR
3879  016400  000426                          BR      DEREX           ;EXIT
3880  016402  000337  000660          DERR4B: SWAB    BBC             ;REPOSITION BBC
3881  016406  000241                          CLC
3882  016410  062705  000024                  ADD     #24,R5          ;SKIP 20 CHARS
3883  016414  103416                          BCS     DERR6           ;IF EXCEED RECORD SIZE: BR
3884  016416  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3885  016424  001405                          BEQ     DERR5           ;IF NOT: BR
3886  016426  162701  000024                  SUB     #24,R1
3887  016432  162702  000024                  SUB     #24,R2          ;RESET POINTERS
3888  016436  000407                          BR      DEREX
3889  016440  062701  000024          DERR5:  ADD     #24,R1          ;SKIP 20 CHARS
3890  016444  062702  000024                  ADD     #24,R2          ;SKIP FORWARD 20 CHARS
```

```
 3891  016450  000402                      BR      DEREX
 3892  016452  012705  177777      DERR6:  MOV     #-1,R5          ;SET TO EOR
 3893  016456  005777  162126      DEREX:  TST     @SWR            ;BRANCH IF NOT HALT ON ERROR
 3894  016462  100012                      BPL     DEREX1
 3895  016464  000000                      HALT
 3896  016466  005737  000672              TST     PFLG            ;SEE IF PRINTED
 3897  016472  001006                      BNE     DEREX1          ;IF SO: BR
 3898  016474  032777  002000  162106      BIT     #2000,@SWR      ;SEE IF SHOULD PRINT
 3899  016502  001002                      BNE     DEREX1          ;IF NOT: BR
 3900  016504  000137  016016              JMP     DERR0           ;ELSE PRINT
 3901  016510  005037  000672      DEREX1: CLR     PFLG            ;CLEAR FLAG
 3902  016514  005237  000706              INC     DERFL           ;BUMP DATA ERROR FLAG
 3903  016520  000207                      RTS     PC              ;RETURN
 3904
```

```
3905
3906                                    ;*********************************************************
3907                                    ;DROPS AND PICKS SUBROUTINE:
3908                                    ;
3909                                    ;THIS SUBROUTINE IS USED TO ACCUMULATE FROM
3910                                    ;EACH BAD DATA CHARACTER FOUND THE NUMBER
3911                                    ;OF BITS WHICH WERE EITHER DROPPED OR PICKED UP.
3912                                    ;TWO COUNTERS PER SLAVE ARE USED TO ACCUMULATE THIS
3913                                    ;INFORMATION AND CAN STORE UP TO 32K DROPS
3914                                    ;OR PICKS BEFORE OVERFLOWING.  IF OVERFLOW IS
3915                                    ;ABOUT TO OCCUR, THESE ACCUMULATORS ARE
3916                                    ;PRINTED IN OCTAL AND RESET TO ZERO.
3917                                    ;THE CONTENTS OF THE ACCUMULATORS MAY BE
3918                                    ;DISPLAYED AT ANY TIME BY SETTING CONSOLE
3919                                    ;SWITCH FOURTEEN TO A ONE (1). THE PRINTOUT WILL OCCUR
3920                                    ;AT THE END OF THE CURRENT BLOCK CYCLE.
3921                                    ;*********************************************************
3922
3923  016522  005037  000644       DRPKF:  CLR     TEMP1
3924  016526  005037  000646               CLR     TEMP2
3925  016532  005037  000650               CLR     TEMP3
3926  016536  111137  000644               MOVB    (R1),TEMP1      ;LOAD GOOD CHAR
3927  016542  111237  000646               MOVB    (R2),TEMP2      ;LOAD BAD CHAR
3928  016546  013704  000676               MOV     UNP,R4
3929  016552  016437  000770  000722       MOV     PIK1(R4),BPKP
3930  016560  016437  001010  000720       MOV     DRP1(R4),BDPP
3931  016566  032737  010000  000562       BIT     #10000,RDCMD    ;SEE IF READ REVERSE
3932  016574  001005                       BNE     DRPK            ;IF SO: BR
3933  016576  124142                       CMPB    -(R1),-(R2)     ;POINT TO CHAR
3934  016600  112137  000644               MOVB    (R1)+,TEMP1     ;LOAD GOOD CHAR
3935  016604  112237  000646               MOVB    (R2)+,TEMP2     ;LOAD BAD CHAR
3936  016610  004737  016622       DRPK:   JSR     PC,DROP         ;GET DROPS
3937  016614  004737  017042               JSR     PC,PICK         ;GET PICKS
3938  016620  000207                       RTS     PC              ;EXIT
3939  016622  113703  000644       DROP:   MOVB    TEMP1,R3        ;R3 = GOOD CHAR
3940  016626  113704  000646               MOVB    TEMP2,R4        ;R4 = BAD CHAR
3941  016632  140403               DPC:    BICB    R4,R3           ;GET DROPS/PICKS
3942  016634  001001                       BNE     DPCG            ;IF SOME: BR
3943  016636  000207                       RTS     PC              ;RETURN
3944  016640  012737  000010  000712 DPCG:  MOV     #10,BCNT        ;SET NUMBER TO CHECK
3945  016646  132703  000001       DPC0:   BITB    #1,R3           ;SEE IF DROPPED OR PICKED THIS BIT
3946  016652  001455                       BEQ     DPC2            ;IF NOT: BR
3947  016654  105737  000650               TSTB    TEMP3           ;SEE IF ON PICKS
3948  016660  001016                       BNE     DPC1            ;IF SO: BR
3949  016662  005277  162032               INC     @BDPP           ;BUMP DROP CNTR
3950  016666  005777  162026               TST     @BDPP
3951  016672  100045                       BPL     DPC2            ;IF NO OVERFLOW: BR
3952  016674  032777  002000  161706       BIT     #2000,@SWR      ;SEE IF HAVE PRINTED DATA
3953  016702  001402                       BEQ     DPC0A           ;IF SO: BR
3954  016704  004737  022602               JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
3955  016710  004737  017106       DPC0A:  JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
3956  016714  000415                       BR      DPC2A
3957  016716  005277  162000       DPC1:   INC     @BPKP           ;BUMP PICK CNTR
3958  016722  005777  161774               TST     @BPKP           ;SEE IF OVERFLOW
3959  016726  100027                       BPL     DPC2            ;IF NOT: BR
3960  016730  032777  002000  161652       BIT     #2000,@SWR      ;SEE IF HAVE PRINTED DATA
```

```
                                                    K 7
 3961  016736  001402                        BEQ     DPC1A           ;IF SO: BR
 3962  016740  004737  022602                JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
 3963  016744  004737  017106        DPC1A:  JSR     PC,DPPRT        ;PRINT DROPS AND PICKS
 3964  016750  013704  000676        DPC2A:  MOV     UNP,R4
 3965  016754  016403  001010                MOV     DRP1(R4),R3     ;SET DROP POINTER
 3966  016760  016404  000770                MOV     PIK1(R4),R4     ;SET PICK POINTER
 3967  016764  012737  000010  000712        MOV     #10,BCNT        ;SET NUMBER OF BITS
 3968  016772  005023                DPC2B:  CLR     (R3)+           ;CLEAR DROPS
 3969  016774  005024                        CLR     (R4)+           ;CLEAR PICK
 3970  016776  005337  000712                DEC     BCNT            ;SEE IF DONE
 3971  017002  001373                        BNE     DPC2B           ;IF NOT: BR
 3972  017004  000207                        RTS     PC              ;EXIT
 3973  017006  000241                DPC2:   CLC
 3974  017010  106003                        RORB    R3              ;GET NEXT BIT
 3975  017012  005337  000712                DEC     BCNT            ;SEE IF DONE
 3976  017016  001410                        BEQ     DPC3
 3977  017020  062737  000002  000722        ADD     #2,BPKP
 3978  017026  062737  000002  000720        ADD     #2,BDPP
 3979  017034  000137  016646                JMP     DPC0            ;CONTINUE
 3980  017040  000207                DPC3:   RTS     PC              ;RETURN
 3981  017042  013704  000676        PICK:   MOV     UNP,R4          ;GET UNIT POINTER
 3982  017046  016437  000770  000722        MOV     PIK1(R4),BPKP   ;SET PICK POINTER
 3983  017054  016437  001010  000720        MOV     DRP1(R4),BDPP   ;SET DROP POINTER
 3984  017062  113704  000644                MOVB    TEMP1,R4        ;R4 = GOOD CHAR
 3985  017066  113703  000646                MOVB    TEMP2,R3        ;R3 = BAD CHAR
 3986  017072  112737  000001  000650        MOVB    #1,TEMP3        ;SET PICK FLAG
 3987  017100  004737  016632                JSR     PC,DPC          ;GO CHECK PICKS
 3988  017104  000207                        RTS     PC              ;EXIT
 3989  017106  012704  025107        DPPRT:  MOV     #MSG26,R4
 3990  017112  000004                        TYPE                    ;TYPE MSG
 3991  017114  013704  000676                MOV     UNP,R4
 3992  017120  016437  001010  000720        MOV     DRP1(R4),BDPP   ;SET DROP POINTER
 3993  017126  016437  000770  000722        MOV     PIK1(R4),BPKP   ;SET PICK POINTER
 3994  017134  062737  000016  000720        ADD     #16,BDPP
 3995  017142  062737  000016  000722        ADD     #16,BPKP
 3996  017150  012737  000010  000712        MOV     #10,BCNT        ;SET NUMBER TO PRINT
 3997  017156  017703  161536        DPPRT0: MOV     @BDPP,R3
 3998  017162  104400                        TYPOCT                  ;PRINT DROPS
 3999  017164  005337  000712                DEC     BCNT            ;SEE IF DONE
 4000  017170  001404                        BEQ     DPPRT1          ;IF NOT: BR
 4001  017172  162737  000002  000720        SUB     #2,BDPP         ;BUMP POINTER
 4002  017200  000766                        BR      DPPRT0          ;CONTINUE FOR ALL 8 BITS
 4003  017202  012737  000010  000712  DPPRT1: MOV     #10,BCNT        ;SET NUMBER TO PRINT
 4004  017210  012704  025120                MOV     #MSG27,R4
 4005  017214  000004                        TYPE                    ;TYPE MSG
 4006  017216  017703  161500        DPPRT2: MOV     @BPKP,R3
 4007  017222  104400                        TYPOCT                  ;PRINT PICKS
 4008  017224  005337  000712                DEC     BCNT            ;SEE IF DONE
 4009  017230  001404                        BEQ     DPPRTX          ;IF SO: BR
 4010  017232  162737  000002  000722        SUB     #2,BPKP         ;BUMP POINTER
 4011  017240  000766                        BR      DPPRT2          ;CONTINUE FOR ALL 8 BITS
 4012  017242  000207                DPPRTX: RTS     PC              ;RETURN
```

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                        ;*********************************************************
                        ;STATUS CHECK SUBROUTINE:
                        ;
                        ;THIS SUBROUTINE IS USED TO PERFORM A CHECK OF
                        ;BOTH THE MASSBUS CONTROLLER (RH11) AND THE TAPE
                        ;CONTROLLER (TM03).  THE RH11 IS CHECKED FOR ERRORS
                        ;AS REFLECTED IN REGISTERS CS1 AND CS2 AND ALSO THAT
                        ;THE BUS ADDRESS (BA) AND WORD COUNT (WC) ARE
                        ;CORRECT.  THE TM03 IS CHECKED FOR DRIVE STATIS (DS),
                        ;DRIVE ERRORS (ER), AND PROPER FRAME COUNT.  THE SPECIAL
                        ;CHECK CHARACTERS (CRC+LRC) ARE ALSO CHECKED WHEN
                        ;APPROPIATE (IE: NRZ READ OR WRITE).  CERTAIN TYPES
                        ;OF DRIVE ERRORS IN PE OPERATION WILL BE ACCOMPANIED
                        ;BY THE DISPLAY OF THE DEAD TRACK REGISTER (CC).  THESE
                        ;TYPES ARE ER BITS 15,10,7,6.  THE PRINTOUTS OF BAD
                        ;CRC,LRC,FC, AND BA WILL SHOW BOTH THE EXPECTED AND
                        ;RECEIVED VALUES (IE: EXPT-RCVD).  ONLY THOSE REGISTERS
                        ;WHICH ARE IN ERROR WILL BE PRINTED AND ALL PRINTOUTS
                        ;ARE IN OCTAL FORMAT WITH NO LEADING ZEROS.  AS IN
                        ;DATA ERRORS, STATUS ERRORS ARE PRECEEDED BY HEADER
                        ;DESCRIBING THE HARDWARE UNDER TEST, THE BLOCKING
                        ;INFORMATION, AND THE ERROR TYPE.
                        ;*********************************************************
017244  013703  000556  ERCHK:  MOV     FMCNT,R3        ;GET FRAME COUNT
017250  032703  000001           BIT     #1,R3           ;SEE IF ODD
017254  001401                   BEQ     ER0             ;IF NOT: BR
017256  005303                   DEC     R3              ;BUMP COUNT
017260  005403           ER0:    NEG     R3
017262  032737  000020  000552   BIT     #20,UDES        ;SEE IF CORE DUMP
017270  001401                   BEQ     ER0B            ;IF NOT: BR
017272  006203                   ASR     R3              ;SET TO FC/2
017274  032737  000010  000674   ER0B:   BIT     #10,MTC1        ;SEE IF WRITE OP
017302  001414                   BEQ     ER1             ;IF SO: BR
017304  032737  010000  000562   BIT     #10000,RDCMD
017312  001405                   BEQ     ER0A
017314  012703  033354           MOV     #RDATA,R3
017320  162703  000002           SUB     #2,R3           ;SET POINTER
017324  000405                   BR      ER2
017326  062703  033354   ER0A:   ADD     #RDATA,R3       ;BUILD EXPT READ ADDRESS
017332  000402                   BR      ER2
017334  062703  027346   ER1:    ADD     #WDATA,R3       ;BUILD EXPT WRITE ADDRESS
017340  010337  021012   ER2:    MOV     R3,CADER        ;SAVE ADDRESS
017344  012704  000007           MOV     #7,R4
017350  012701  021014           MOV     #BAER,R1
017354  005021           ER2A0:  CLR     (R1)+           ;CLEAR FLAGS
017356  005304                   DEC     R4
017360  001375                   BNE     ER2A0
017362  020377  161126           CMP     R3,@BA          ;SEE IF ADDRESS OK
017366  001402                   BEQ     ER2A1           ;IF SO: BR
017370  005237  021014           INC     BAER            ;SET BUS ADDRESS ERROR
017374  032737  000010  000674   ER2A1:  BIT     #10,MTC1        ;SEE IF WRITE OPER
017402  001006                   BNE     ER2B            ;IF NOT: BR
017404  005777  161106   ER2A:   TST     @FC             ;SEE IF FC=0
017410  001441                   BEQ     ER3             ;IF SO: BR
```

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 4069  017412  005237  021022                 INC     FCER            ;SET FC ERROR
 4070  017416  000436                         BR      ER3
 4071  017420  032737  000040  000674  ER2B:  BIT     #40,MTC1        ;SEE IF SPACE OPER
 4072  017426  001766                         BEQ     ER2A            ;IF SO: BR
 4073  017430  005737  000700                 TST     TMFLG           ;SEE IF TM TIME
 4074  017434  001011                         BNE     ER2D            ;IF SO: BR
 4075  017436  013703  000556                 MOV     FMCNT,R3
 4076  017442  005403                         NEG     R3              ;R3 = EXPT RECORD SIZE
 4077  017444  020377  161046          ER2C:  CMP     R3,@FC          ;SEE IF FC = EXPT
 4078  017450  001421                         BEQ     ER3             ;IF SO: BR
 4079  017452  005237  021022                 INC     FCER            ;SET FC ERROR FLAG
 4080  017456  000416                         BR      ER3
 4081  017460  032737  002000  000552  ER2D:  BIT     #2000,UDES      ;SEE IF PE
 4082  017466  001346                         BNE     ER2A            ;IF SO: BR
 4083  017470  032737  010000  000562         BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 4084  017476  001003                         BNE     ER2E            ;IF SO: BR
 4085  017500  012703  000002                 MOV     #2,R3
 4086  017504  000757                         BR      ER2C            ;LOOK FOR EXPT = 2
 4087  017506  012703  000001          ER2E:  MOV     #1,R3
 4088  017512  000754                         BR      ER2C            ;GO CHECK FC FOR TM
 4089  017514  032777  160000  160766  ER3:   BIT     #160000,@C1     ;SEE IF COUNT ERROR
 4090  017522  001437                         BEQ     ER4
 4091  017524  017703  160770                 MOV     @CS,R3          ;GET CONT STATUS REG
 4092  017530  042703  000307                 BIC     #307,R3         ;MASK OUT IR,OR,UNIT NO. & SEE IF OTHER ERRORS
 4093  017534  001406                         BEQ     ER3A            ;IF NOT: BR
 4094  017536  005737  000700                 TST     TMFLG           ;SEE IF TAPE MARK TIME
 4095  017542  001425                         BEQ     ER3B            ;IF NOT: BR
 4096  017544  042703  001000                 BIC     #1000,R3        ;MASK MISSED TRANS & BR IF OTHER ERRORS
 4097  017550  001022                         BNE     ER3B
 4098  017552  032777  060000  160730  ER3A:  BIT     #60000,@C1      ;SEE IF EITHER TRE OR MCPE
 4099  017560  001420                         BEQ     ER4             ;IF NOT: BR
 4100  017562  005737  000700                 TST     TMFLG           ;SEE IF TM TIME
 4101  017566  001413                         BEQ     ER3B            ;IF NOT: BR
 4102  017570  017703  160730                 MOV     @ER,R3          ;GET ERROR REGISTER
 4103  017574  032737  000010  000552         BIT     #10,UDES        ;SEE IF EVEN PARITY
 4104  017602  001402                         BEQ     ER3A1           ;IF NOT: BR
 4105  017604  042703  000100                 BIC     #100,R3         ;MASK PAR
 4106  017610  042703  001000          ER3A1: BIC     #1000,R3        ;MASK FCE
 4107  017614  001402                         BEQ     ER4             ;IF NO ERRORS EXCEPT FCE: BR
 4108  017616  005237  021016          ER3B:  INC     CONER           ;SET CONT ERROR FLAG
 4109  017622  032777  040000  160672  ER4:   BIT     #40000,@DS      ;SEE IF DRIVE ERROR
 4110  017630  001420                         BEQ     ER6             ;IF NOT: BR
 4111  017632  005737  000700                 TST     TMFLG           ;SEE IF TAPE MARK TIME
 4112  017636  001413                         BEQ     ER4A            ;IF NOT: BR
 4113  017640  017703  160660                 MOV     @ER,R3          ;GET ER
 4114  017644  032737  000010  000552         BIT     #10,UDES        ;SEE IF EVEN PARITY
 4115  017652  001402                         BEQ     ER4A1           ;IF NOT: BR
 4116  017654  042703  000100                 BIC     #100,R3         ;MASK PAR
 4117  017660  042703  001000          ER4A1: BIC     #1000,R3        ;MASK OUT FCE & BRANCH IF
 4118  017664  001402                         BEQ     ER6             ;NO OTHER ERRORS
 4119  017666  005237  021020          ER4A:  INC     DRVER           ;SET DRIVER ERROR FLAG
 4120  017672  032737  002000  000552  ER6:   BIT     #2000,UDES
 4121  017700  001071                         BNE     ERPT            ;IF IN PE MODE: BR
 4122  017702  032777  020000  160700         BIT     #20000,@SWR     ;SEE IF NO DATA CHECK
 4123  017710  001065                         BNE     ERPT            ;IF NOT: BR (ALLOW READ OF UNKNOWN TAPES)
 4124  017712  032737  000040  000674         BIT     #40,MTC1        ;SEE IF WRITE OR READ OP
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4125  017720  001461                          BEQ     ERPT            ;IF NOT: BR
4126  017722  005737  000700                  TST     TMFLG           ;SEE IF TAPE MARK TIME
4127  017726  001413                          BEQ     ER6A            ;IF NOT: BR
4128  017730  013737  015370  021034          MOV     EXCRC,CRCSV     ;SAVE CRC
4129  017736  013737  015372  021032          MOV     EXLRC,LRCSV     ;SAVE LRC
4130  017744  005037  015370                  CLR     EXCRC
4131  017750  012737  000023  015372          MOV     #23,EXLRC       ;SET CRC/LRC FOR TM
4132  017756  032737  000060  000552  ER6A:    BIT     #60,UDES        ;SEE IF FORMAT 14
4133  017764  001037                          BNE     ERPT            ;IF NOT: BR
4134  017766  017703  160536                  MOV     @CC,R3          ;GET CRC CHARACTER
4135  017772  042703  177000                  BIC     #177000,R3
4136  017776  023703  015370                  CMP     EXCRC,R3
4137  020002  001402                          BEQ     ER7             ;IF CRC GOOD: BR
4138  020004  005237  021026                  INC     CRCER           ;SET ERROR FLAG
4139  020010  017703  160520          ER7:    MOV     @MR,R3          ;GET LRC
4140  020014  000303                          SWAB    R3
4141  020016  005703                          TST     R3
4142  020020  100002                          BPL     ER10
4143  020022  052703  000400                  BIS     #400,R3
4144  020026  042703  177000          ER10:   BIC     #177000,R3
4145  020032  023703  015372                  CMP     EXLRC,R3
4146  020036  001412                          BEQ     ERPT            ;IF LRC GOOD: BR
4147  020040  010337  021030                  MOV     R3,ACTLRC       ;SAVE ACTUAL LRC
4148  020044  005237  021024                  INC     LRCER           ;SET LRC ERROR FLAG
4149  020050  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
4150  020056  001402                          BEQ     ERPT            ;IF NOT: BR
4151  020060  005037  021024                  CLR     LRCER           ;ELSE CLEAR LRC ERROR
4152  020064  012703  000006          ERPT:   MOV     #6,R3
4153  020070  005037  000710                  CLR     SERFL           ;CLEAR ERROR FLAG
4154  020074  005037  000724                  CLR     ERSAV
4155  020100  012704  021014                  MOV     #BAER,R4
4156  020104  005724                  ERPTT:  TST     (R4)+           ;SEE IF ANY ERROR
4157  020106  001004                          BNE     ERPTG           ;IF SO: BR
4158  020110  005303                          DEC     R3
4159  020112  001374                          BNE     ERPTT
4160  020114  000137  020746                  JMP     ERPX1
4161  020120  005237  000710          ERPTG:  INC     SERFL           ;SET ERROR FLAG
4162  020124  017737  160374  000724          MOV     @ER,ERSAV       ;SAVE ERROR REGISTER
4163  020132  032777  002000  160450          BIT     #2000,@SWR      ;SEE IF PRINT
4164  020140  001420                          BEQ     ERPTO           ;IF SO: BR
4165  020142  022737  000002  000714          CMP     #2,RTYFL        ;SEE IF READ RETRY
4166  020150  001006                          BNE     ERPTG1          ;IF NOT: BR
4167  020152  013703  000704                  MOV     RTCNT,R3
4168  020156  005203                          INC     R3              ;BUMP RETRY COUNT
4169  020160  020337  000604                  CMP     R3,RETRY        ;SEE IF LAST RETRY
4170  020164  001406                          BEQ     ERPTO           ;IF SO: BR
4171  020166  022737  000002  021020  ERPTG1: CMP     #2,DRVER        ;SEE IF TM STATUS ERROR
4172  020174  001402                          BEQ     ERPTO           ;IF SO: BR
4173  020176  000137  020626                  JMP     ERPXO
4174  020202  005237  000672          ERPTO:  INC     PFLG
4175  020206  004737  022602                  JSR     PC,PAPRT        ;PRINT HEADER
4176  020212  013704  000654                  MOV     EMADDR,R4
4177  020216  000004                          TYPE                    ;TYPE MSG
4178  020220  004737  021036                  JSR     PC,FRPRT        ;PRINT F OR R
4179  020224  005737  000700                  TST     TMFLG
4180  020230  001407                          BEQ     ERPT1
```

```
 4181  020232  022737  026045  000654          CMP     #MSG54,EMADDR
 4182  020240  001403                          BEQ     ERPT1
 4183  020242  012704  026063                  MOV     #MSG56,R4       ;PRINT TM
 4184  020246  000004                          TYPE                    ;TYPE MSG
 4185  020250  005737  021016          ERPT1:  TST     CONER
 4186  020254  001414                          BEQ     ERPT2           ;IF NO CONT ERROR: BR
 4187  020256  012704  024737                  MOV     #MSG23,R4
 4188  020262  000004                          TYPE                    ;TYPE MSG
 4189  020264  017703  160220                  MOV     @C1,R3
 4190  020270  104400                          TYPOCT                  ;PRINT CONTROL '
 4191  020272  012704  024764                  MOV     #MSG23D,R4      ;PRINT CS TAG
 4192  020276  000004                          TYPE                    ;TYPE MSG
 4193  020300  017703  160214                  MOV     @CS,R3
 4194  020304  104400                          TYPOCT                  ;PRINT CONT STATUS
 4195  020306  005737  021020          ERPT2:  TST     DRVER
 4196  020312  001414                          BEQ     ERPT3           ;IF SO DRIVE ERROR: BR
 4197  020314  012704  024772                  MOV     #MSG23E,R4
 4198  020320  000004                          TYPE                    ;TYPE MSG
 4199  020322  017703  160174                  MOV     @DS,R3
 4200  020326  104400                          TYPOCT                  ;PRINT DRIVE STATUS
 4201  020330  012704  024777                  MOV     #MSG23F,R4
 4202  020334  000004                          TYPE                    ;TYPE MSG
 4203  020336  017703  160162                  MOV     @ER,R3
 4204  020342  104400                          TYPOCT                  ;PRINT DRIVE ERROR
 4205  020344  005737  021014          ERPT3:  TST     BAER
 4206  020350  001416                          BEQ     ERPT4           ;IF NO BA ERROR: BR
 4207  020352  012704  024752                  MOV     #MSG23B,R4
 4208  020356  000004                          TYPE                    ;TYPE MSG
 4209  020360  017703  160130                  MOV     @BA,R3
 4210  020364  104400                          TYPOCT                  ;PRINT BUS ADDRESS
 4211  020366  012737  000255  000640          MOV     #255,TOB
 4212  020374  004737  023756                  JSR     PC,TOG          ;PRINT /
 4213  020400  013703  021012                  MOV     CADER,R3
 4214  020404  104400                          TYPOCT                  ;PRINT EXPT BUS ADDRESS
 4215  020406  005737  021022          ERPT4:  TST     FCER
 4216  020412  001406                          BEQ     ERPT5           ;IF NO FC ERROR: BR
 4217  020414  012704  024757                  MOV     #MSG23C,R4
 4218  020420  000004                          TYPE                    ;TYPE MSG
 4219  020422  017703  160070                  MOV     @FC,R3
 4220  020426  104400                          TYPOCT                  ;PRINT FRAME COUNT
 4221  020430  012704  024745          ERPT5:  MOV     #MSG23A,R4
 4222  020434  000004                          TYPE                    ;TYPE MSG
 4223  020436  017703  160050                  MOV     @WC,R3
 4224  020442  104400                          TYPOCT                  ;PRINT WORD COUNT
 4225  020444  005737  021026                  TST     CRCER
 4226  020450  001420                          BEQ     ERPT5A          ;IF NO CRC ERROR: BR
 4227  020452  012704  026110                  MOV     #MSG58,R4
 4228  020456  000004                          TYPE                    ;TYPE MSG
 4229  020460  017703  160044                  MOV     @CC,R3
 4230  020464  042703  177000                  BIC     #177000,R3
 4231  020470  104400                          TYPOCT                  ;PRINT ACTUAL CRC
 4232  020472  012737  000255  000640          MOV     #255,TOB
 4233  020500  004737  023756                  JSR     PC,TOG
 4234  020504  013703  015370                  MOV     EXCRC,R3
 4235  020510  104400                          TYPOCT                  ;PRINT EXPECTED CRC
 4236  020512  005737  021024          ERPT5A: TST     LRCER
```

```
 4237  020516  001416                          BEQ     ERPT6           ;IF NO LRC ERROR: BR
 4238  020520  012704  026116                  MOV     #MSG59,R4
 4239  020524  000004                          TYPE                    ;TYPE MSG
 4240  020526  013703  021030                  MOV     ACTLRC,R3
 4241  020532  104400                          TYPOCT                  ;PRINT ACTUAL LRC
 4242  020534  012737  000255  000640          MOV     #255,TOB
 4243  020542  004737  023756                  JSR     PC,TOG
 4244  020546  013703  015372                  MOV     EXLRC,R3
 4245  020552  104400                          TYPOCT                  ;PRINT EXPECTED LRC
 4246  020554  005737  021020          ERPT6:  TST     DRVER
 4247  020560  001421                          BEQ     ERPT7           ;IF NO DRIVE ERROR: BR
 4248  020562  032737  002000  000552          BIT     #2000,UDES
 4249  020570  001415                          BEQ     ERPT7           ;IF NO PE: BR
 4250  020572  017704  157726                  MOV     @ER,R4
 4251  020576  042704  075477                  BIC     #75477,R4       ;MASK OUT ALL BUT BITS 15,10,7,6
 4252  020602  001410                          BEQ     ERPT7           ;IF NO CONDITIONALS SET: BR
 4253  020604  012704  025011                  MOV     #MSG23H,R4
 4254  020610  000004                          TYPE                    ;TYPE MSG
 4255  020612  017703  157712                  MOV     @CC,R3
 4256  020616  042703  177000                  BIC     #177000,R3      ;MASK CC
 4257  020622  104400                          TYPOCT                  ;PRINT CHECK CHARACTERS
 4258  020624  000240          ERPT7:  NOP
 4259  020626  005777  157756          ERPX0:  TST     @SWR            ;BRANCH IF NOT HALT ON ERROR
 4260  020632  100012                          BPL     ERPX
 4261  020634  000000                          HALT
 4262  020636  005737  000672                  TST     PFLG            ;SEE IF HAVE PRINTED
 4263  020642  001006                          BNE     ERPX            ;IF SO: BR
 4264  020644  032777  002000  157736          BIT     #2000,@SWR      ;SEE IF SHOULD PRINT
 4265  020652  001002                          BNE     ERPX            ;IF NOT: BR
 4266  020654  000137  020202                  JMP     ERPT0           ;PRINT ERROR
 4267  020660  005037  000672          ERPX:   CLR     PFLG
 4268  020664  005737  000566                  TST     CRCC            ;BRANCH IF CRC ERROR
 4269  020670  001007                          BNE     1$              ;CORRECTION DESIRED
 4270  020672  012777  000040  157620          MOV     #40,@CS         ;ELSE INIT
 4271  020700  013777  000550  157612          MOV     DVN,@CS         ;RESET DRIVE NUMBER
 4272  020706  000414                          BR      2$
 4273  020710  012777  000011  157572  1$:     MOV     #11,@C1         ;DRIVE CLEAR
 4274  020716  017704  157604                  MOV     @AS,R4
 4275  020722  010477  157600                  MOV     R4,@AS          ;CLEAR AS
 4276  020726  013704  000510                  MOV     C1,R4
 4277  020732  005204                          INC     R4
 4278  020734  152714  000100                  BISB    #100,(R4)       ;RESET TRE
 4279  020740  013777  000552  157574  2$:     MOV     UDES,@TC        ;RESET TC
 4280  020746  032737  000040  000674  ERPX1:  BIT     #40,MTC1
 4281  020754  001415                          BEQ     ERPX2           ;IF NOT READ/WRITE OP: BR
 4282  020756  005737  000700                  TST     TMFLG
 4283  020762  001412                          BEQ     ERPX2           ;IF NOT TM TIME: BR
 4284  020764  032737  002000  000552          BIT     #2000,UDES      ;CHECK UDES
 4285  020772  001006                          BNE     ERPX2           ;BR IF PE
 4286  020774  013737  021034  015370          MOV     CRCSV,EXCRC     ;RESTORE CRC
 4287  021002  013737  021032  015372          MOV     LRCSV,EXLRC     ;RESTORE LRC
 4288  021010  000207          ERPX2:  RTS     PC              ;EXIT
 4289  021012  000000          CADER:  0                       ;EXPT ADDRESS SAVE
 4290  021014  000000          BAER:   0
 4291  021016  000000          CONER:  0
 4292  021020  000000          DRVER:  0
```

```
 4293  021022  000000                  FCER:   0
 4294  021024  000000                  LRCER:  0
 4295  021026  000000                  CRCER:  0
 4296  021030  000000                  ACTLRC: 0
 4297  021032  000000                  LRCSV:  0
 4298  021034  000000                  CRCSV:  0
 4299
 4300                                  ;*********************************************************
 4301                                  ;F FOR FORWARD/R FOR REVERSE PRINT SUBROUTINE:
 4302                                  ;
 4303                                  ;THIS SUBROUTINE IS USED TO PRINT OUT THE
 4304                                  ;TAPE DIRECTION USED WHEN ANY ERROR IS
 4305                                  ;DETECTED IN STATUS OF READ OR WRITE, DATA, OR
 4306                                  ;SPACING OPERATIONS.
 4307                                  ;*********************************************************
 4308
 4309  021036  032737  000010  000674  FRPRT:  BIT     #10,MTC1        ;SEE IF WRITE COMMAND
 4310  021044  001411                          BEQ     2$              ;IF SO: BR
 4311  021046  012704  024645                  MOV     #MSG17,R4       ;SET TO TYPE REVERSE MSG
 4312  021052  032737  000002  000674          BIT     #2,MTC1         ;BRANCH IF REVERSE
 4313  021060  001002                          BNE     1$
 4314  021062  012704  024642                  MOV     #MSG16,R4       ;SET FORWARD MESSAGE
 4315  021066  000004                  1$:     TYPE                    ;TYPE MSG
 4316  021070  000207                  2$:     RTS     PC              ;EXIT
 4317
```

```
4318
4319                                    ;*********************************************************
4320                                    ;TAPE COMMAND EXECUTE SUBROUTINE:
4321                                    ;
4322                                    ;THIS SUBROUTINE IS USED TO EXECUTE THE
4323                                    ;MAG TAPE COMMAND DESCRIBED BY THE READ
4324                                    ;OR WRITE ROUTINE.  THE FINAL COMMAND IS
4325                                    ;SENT TO THE DEVICE REGISTER ALONG WITH THE
4326                                    ;INTERRUPT ENABLE AND GO BITS.
4327                                    ;ONCE THE COMMAND IS ISSUED, AN INTERRUPT
4328                                    ;TIMER IS STARTED AND IF NO INTERRUPT IS RETURNED
4329                                    ;BEFORE TIME OUT OCCURS, AN ERROR WILL BE
4330                                    ;PRINTED AND THE PROGRAM STOPPED.  TESTING MAY
4331                                    ;BE RESUMED BY PRESSING THE CONTINUE SWITCH.
4332                                    ;TWO INTERRUPT HANDLERS ARE USED, ONE FOR MAG TAPE
4333                                    ;AND ANOTHER FOR TELETYPE (TTY).
4334                                    ;UPON RECEIPT OF A MAG TAPE INTERRUPT, HOUSEKEEPING
4335                                    ;IS PERFORMED AND CONTROL RETURNED TO THE CALLING
4336                                    ;ROUTINE (READ,WRITE,ETC).
4337                                    ;RECEIPT OF A TTY INTERRUPT WILL CAUSE THE
4338                                    ;PROGRAM TO CHECK FOR ENTRY OF A CNTRL C CHARACTER.
4339                                    ;IF NOT CNTRL C, THEN CONTINUATION OF WAIT FOR MAG
4340                                    ;TAPE INTERRUPT IS RETURNED.  IF, HOWEVER, THE TTY
4341                                    ;INTERRUPT WAS CAUSED BY ENTRY OF A CNTRL C,
4342                                    ;THEN AT THIS TIME REQUESTS FOR NEW STALL VALUES
4343                                    ;ARE PRINTED AND THE RESPONSES ENTERED.  RESUMPTION
4344                                    ;OF TAPE INTERRUPT WAIT IS THEN RESUMED.
4345                                    ;*********************************************************
4346
4347  021072  005037  000644        TAPG:   CLR     TEMP1
4348  021076  013777  000550  157414        MOV     DVN,@CS         ;SET DRIVE NO.
4349  021104  032777  010000  157410  TAPG0:  BIT     #10000,@DS      ;SEE IF HAVE MOL
4350  021112  001026                        BNE     TAPG3           ;IF SO: BR
4351  021114  005237  000644                INC     TEMP1           ;SEE IF TIMED OUT
4352  021120  001371                        BNE     TAPG0           ;WAIT FOR READY
4353  021122  004737  022602                JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
4354  021126  032737  000010  000674        BIT     #10,MTC1        ;SEE IF WRITE OP
4355  021134  001004                        BNE     TAPG1           ;IF NOT: BR
4356  021136  012704  024502                MOV     #MSG5,R4
4357  021142  000004                        TYPE                    ;TYPE MSG
4358  021144  000405                        BR      TAPG2
4359  021146  012704  024507        TAPG1:  MOV     #MSG6,R4
4360  021152  000004                        TYPE                    ;TYPE MSG
4361  021154  004737  021036                JSR     PC,FRPRT        ;PRINT F OR R
4362  021160  012704  025067        TAPG2:  MOV     #MSG25,R4
4363  021164  000004                        TYPE                    ;TYPE MSG
4364  021166  000000                        HALT
4365  021170  032777  020000  157324  TAPG3:  BIT     #20000,@DS      ;SEE IF PIP RESET
4366  021176  001411                        BEQ     TAPG3F          ;IF SO: BR
4367  021200  004737  022602                JSR     PC,PAPRT        ;PRINT HEADER
4368  021204  012704  027173                MOV     #MSG116,R4
4369  021210  000004                        TYPE                    ;TYPE MSG
4370  021212  032777  020000  157302  1$:     BIT     #20000,@DS
4371  021220  001374                        BNE     1$              ;AWAIT PIP RESET
4372  021222  022737  000026  000674  TAPG3F: CMP     #26,MTC1        ;SEE IF WRITE TM
4373  021230  001003                        BNE     TAPG3A          ;IF NOT: BR
```

```
 4374  021232  012704  177777                MOV     #-1,R4          ;ELSE SET FC FOR -1
 4375  021236  000406                      BR      TAPG3B
 4376  021240  013704  000556      TAPG3A: MOV     FMCNT,R4
 4377  021244  032704  000001              BIT     #1,R4
 4378  021250  001401                      BEQ     TAPG3B
 4379  021252  005304                      DEC     R4
 4380  021254  000261      TAPG3B: SEC
 4381  021256  006004                      ROR     R4              ;SET WC = FC/2 FOR NORMAL FORMAT
 4382  021260  032737  000020  000552      BIT     #20,UDES        ;SEE IF CORE DUMP FORMAT
 4383  021266  001402                      BEQ     TAPG3C          ;IF NOT: BR
 4384  021270  000261                      SEC
 4385  021272  006004                      ROR     R4              ;SET WC = FC/4 FOR CORE DUMP
 4386  021274  010477  157212      TAPG3C: MOV     R4,@WC          ;SET WORD COUNT
 4387  021300  012777  000011  157202      MOV     #11,@C1         ;DRIVE CLEAR
 4388  021306  017777  157204  157202      MOV     @FC,@FC         ;RESET FC LOADED
 4389  021314  005737  000570              TST     INTRF           ;SEE IF INTERCHANGE READ
 4390  021320  001407                      BEQ     TAPG3D          ;IF NOT: BR
 4391  021322  032737  000040  000674      BIT     #40,MTC1        ;SEE IF READ OP
 4392  021330  001403                      BEQ     TAPG3D          ;IF NOT: BR
 4393  021332  012777  000003  157174      MOV     #3,@MR          ;SET INTERCHANGE READ MAINT. MODE
 4394  021340  013704  000674      TAPG3D: MOV     MTC1,R4         ;GET COMMAND
 4395  021344  042704  177707              BIC     #177707,R4      ;MASK OP CODE
 4396  021350  022704  000030              CMP     #30,R4          ;SEE IF SPACE OP CODE
 4397  021354  001403                      BEQ     TAPG3E          ;IF SO: BR
 4398  021356  012737  177740  000670      MOV     #-40,STAL       ;SET INTERRUPT DELAY MULT TO 40
 4399  021364  052737  000101  000674  TAPG3E: BIS     #101,MTC1       ;SET INTERRUPT ENABLE AND GO
 4400  021372  000240                      NOP
 4401  021374  013777  000674  157106      MOV     MTC1,@C1        ;EXECUTE COMMAND
 4402  021402  005077  157200              CLR     @PSW            ;CLEAR PRIORITY
 4403  021406  005037  000644              CLR     TEMP1
 4404  021412  005237  000644      TAPG4:  INC     TEMP1           ;SEE IF HAVE TIMED OUT
 4405  021416  001375                      BNE     TAPG4           ;IF NOT: BR
 4406  021420  005237  000670              INC     STAL
 4407  021424  001372                      BNE     TAPG4           ;DO TIME DELAY MULTIPLIER
 4408  021426  012777  000340  157152  TAPG5:  MOV     #340,@PSW       ;RESET PRIORITY
 4409  021434  032777  002000  157146      BIT     #2000,@SWR      ;SEE IF SHOULD PRINT ERRORS
 4410  021442  001012                      BNE     TAPG6           ;IF NOT: BR
 4411  021444  004737  022602              JSR     PC,PAPRT        ;PRINT CYCLE NUMBER
 4412  021450  013704  000654              MOV     EMADDR,R4
 4413  021454  000004                      TYPE                    ;TYPE MSG
 4414  021456  004737  021036              JSR     PC,FRPRT        ;PRINT F OR R
 4415  021462  012704  025047              MOV     #MSG24,R4
 4416  021466  000004                      TYPE                    ;TYPE MSG
 4417  021470  005777  157114      TAPG6:  TST     @SWR            ;BRANCH IF NOT HALT ON ERROR
 4418  021474  100001                      BPL     TAPG7
 4419  021476  000000                      HALT
 4420  021500  000137  021736      TAPG7:  JMP     MTINTA          ;RETURN TO CALLING ROUTINE
 4421
```

```
 4422
 4423                                          ;TTY INTERRUPT HANDLER
 4424  021504  017746  157104          TTINT:  MOV     @TKB,-(SP)      ;GET CHARACTER
 4425  021510  042716  000200                  BIC     #200,(SP)       ;STRIP PARITY BIT
 4426  021514  122716  000003                  CMPB    #3,(SP)         ;BRANCH IF NOT  C
 4427  021520  001005                          BNE     1$
 4428  021522  000005                          RESET                   ;RESET ALL I/O
 4429  021524  005077  157056                  CLR     @PSW            ;CLEAR PSW
 4430  021530  000137  000200                  JMP     @#200           ;RESTART PROGRAM
 4431  021534  122716  000001          1$:     CMPB    #1,(SP)         ;BRANCH IF NOT  A
 4432  021540  001016                          BNE     2$
 4433  021542  022737  000176  000610        CMP     #SWREG,SWR      ;BRANCH IF HARDWARE SWR IS INVOKED
 4434  021550  001015                          BNE     3$
 4435  021552  012737  177570  000610        MOV     #177570,SWR     ;INVOKE HARWARE SWR
 4436  021560  004737  023306                  JSR     PC,.SAVE        ;SAVE REGISTERS ON THE STACK
 4437  021564  012704  027317                  MOV     #MSG121,R4      ;TYPE 'HARDWARE SWR IN USE'
 4438  021570  000004                          TYPE
 4439  021572  004737  023330                  JSR     PC,.RESTORE     ;RESTORE REGISTERS
 4440  021576  022716  000007          2$:     CMP     #7,(SP)         ;BRANCH IF NOT  G
 4441  021602  001005                          BNE     4$
 4442  021604  012737  000176  000610  3$:     MOV     #SWREG,SWR      ;INVOKE SOFTWARE SWR
 4443  021612  004737  023216                  JSR     PC,GTSWR        ;GET SWITCHES
 4444  021616  022716  000002          4$:     CMP     #2,(SP)         ;BRANCH IF NOT  B
 4445  021622  001042                          BNE     6$
 4446  021624  004737  023306                  JSR     PC,.SAVE        ;SAVE REGISTERS ON THE STACK
 4447  021630  005237  014070                  INC     SCVFL           ;SET FLAG
 4448  021634  004737  013642                  JSR     PC,TINP3A       ;GO CHECK CRC CORRECTION
 4449  021640  032777  000040  156742        BIT     #40,@SWR        ;BRANCH IF NOT YOZZLING
 4450  021646  001426                          BEQ     5$
 4451  021650  012704  025642                  MOV     #MSG44,R4       ;REQUEST NEW YOZZLE STALL
 4452  021654  000004                          TYPE                    ;TYPE MSG
 4453  021656  013703  000602                  MOV     YSTAL,R3
 4454  021662  104400                          TYPOCT                  ;PRINT PRESENT STALL
 4455  021664  012705  000602                  MOV     #YSTAL,R5       ;SET ADDRESS OF YSTL
 4456  021670  012701  000007                  MOV     #7,R1           ;SET NUMBER OF CHAR TO INPUT
 4457  021674  012702  177777                  MOV     #-1,R2          ;SET MAXIMUM LIMIT
 4458  021700  012703  002000                  MOV     #2000,R3        ;SET MINIMUM LIMIT
 4459  021704  004737  023352                  JSR     PC,TTR          ;GO GET VALUE
 4460  021710  004737  023330                  JSR     PC,.RESTORE     ;RESTORE REGISTERS
 4461  021714  005726                          TST     (SP)+           ;POP CHARACTER OF THE STACK
 4462  021716  012716  011260                  MOV     #YOZ,(SP)       ;RETURN TO 'YOZ'
 4463  021722  000002                          RTI                     ;RETURN TO YOZ
 4464  021724  004737  023330          5$:     JSR     PC,.RESTORE
 4465  021730  005726                  6$:     TST     (SP)+           ;POP CHARACTER OFF THE STACK
 4466  021732  000002                          RTI                     ;RETURN
 4467
 4468                                          ;MAG TAPE INTERRUPT HANDLER
 4469  021734  000240                  MTINT:  NOP
 4470  021736  042777  000037  156570  MTINTA: BIC     #37,@MR         ;CLEAR MAINT MODE
 4471  021744  013716  000664                  MOV     RTRN,(SP)       ;SET RETURN TO (RTRN)
 4472  021750  000002                          RTI                     ;RETURN
```

```
                                        ;************************************
                                        ;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.
                                        ;************************************

021752  012704  026615          ASEQ:   MOV     #MSG104,R4
021756  000004                          TYPE                    ;TYPE MSG
021760  012705  000744                  MOV     #ASEQCF,R5      ;SET ADDRESS OF ENTRY
021764  012701  000002                  MOV     #2,R1           ;SET SIZE OF ENTRY
021770  012702  000001                  MOV     #1,R2           ;SET UPPER LIMIT
021774  012703  000000                  MOV     #0,R3           ;SET LOWER LIMIT
022000  004737  023352                  JSR     PC,TTR          ;GO GET INPUT
022004  005037  000740          ASEQ0:  CLR     ADRVN           ;CLEAR DRV NUM
022010  004737  022122          ASEQ1:  JSR     PC,HRDS         ;GO SELECT HARDWARE CONFIGURATION
022014  012704  026546                  MOV     #MSG101,R4
022020  000004                          TYPE                    ;TYPE MSG
022022  012704  026575                  MOV     #MSG102,R4
022026  000004                          TYPE                    ;TYPE MSG
022030  013703  000740                  MOV     ADRVN,R3
022034  104400                          TYPOCT                  ;PRINT TM03
022036  012704  026604                  MOV     #MSG103,R4
022042  000004                          TYPE                    ;TYPE MSG
022044  012700  000746                  MOV     #UN1,R0         ;POINT TO START OF SLAVE TABLE
022050  005710                  ASEQ2:  TST     (R0)            ;SEE IF END
022052  100403                          BMI     ASEQ3           ;IF SO: BR
022054  012003                          MOV     (R0)+,R3
022056  104400                          TYPOCT                  ;PRINT SLAVE TABLE
022060  000773                          BR      ASEQ2           ;DO ALL
022062  004737  022306          ASEQ3:  JSR     PC,AMOD1        ;GO DO MODE 1(NRZ)
022066  004737  022446                  JSR     PC,AMOD2        ;GO DO MODE 2(PE)
022072  022737  000007  000740  ASEQ4:  CMP     #7,ADRVN        ;SEE IF DONE ALL DRIVES
022100  001403                          BEQ     ASEQX           ;IF SO: BR
022102  005237  000740                  INC     ADRVN           ;BUMP DRIVE NUMBER
022106  000740                          BR      ASEQ1           ;CONTINUE
022110  005737  000744          ASEQX:  TST     ASEQCF          ;SEE IF CONTINUOUS AUTO SEQ
022114  001333                          BNE     ASEQ0           ;++B CONTINUE TESTING
022116  000137  005004                  JMP     TEND
```

```
 4514
 4515                                   ;SUBROUTINE TO SELECT AUTO SEQUENCE HARDWARE********
 4516
 4517  022122  005037  005054          HRDS:   CLR     REOTC           ;CLEAR EOT UNIT CNTR
 4518  022126  005037  000644                  CLR     TEMP1
 4519  022132  012777  000040  156360          MOV     #40,@CS         ;INIT
 4520  022140  013777  000740  156352          MOV     ADRVN,@CS       ;SET DRIVE
 4521  022146  032777  010000  156344          BIT     #10000,@CS      ;TEST FOR NON-EXISTANT DRIVE
 4522  022154  001403                          BEQ     2$              ;IF DRIVE AVAIL: BR
 4523  022156  005726                  1$:     TST     (SP)+           ;RESET STACK POINTER
 4524  022160  000137  022072                  JMP     ASEQ4           ;GO SEE IF TRIED ALL DRIVES
 4525  022164  005000                  2$:     CLR     R0
 4526  022166  012701  000746                  MOV     #UN1,R1         ;SET START OF SLAVE TABLE
 4527  022172  005737  003040                  TST     CHNFLG          ;BRANCH IF NOT IN CHAIN MODE
 4528  022176  001410                          BEQ     3$
 4529  022200  122737  000006  000041          CMPB    #6,@#41         ;BRANCH IF NOT LOADED VIA TMDP
 4530  022206  001004                          BNE     3$
 4531  022210  005737  000740                  TST     ADRVN           ;BRANCH IF NOT DRIVE 0
 4532  022214  001001                          BNE     3$
 4533  022216  005200                          INC     R0              ;DO NOT TEST SLAVE 0
 4534  022220  010077  156316          3$:     MOV     R0,@TC          ;SELECT SLAVE
 4535  022224  032777  010000  156270          BIT     #10000,@DS      ;SEE IF SLAVE AVAIL FOR TEST(MOL)
 4536  022232  001403                          BEQ     4$              ;IF NOT: BR
 4537  022234  005237  000644                  INC     TEMP1           ;SET SLAVE FOUND FLAG
 4538  022240  010021                          MOV     R0,(R1)+        ;LOAD SLAVE TABLE
 4539  022242  005200                  4$:     INC     R0              ;STEP TO NEXT SLAVE
 4540  022244  022700  000010                  CMP     #10,R0          ;BRANCH IF ALL SLAVE NOT DONE
 4541  022250  001363                          BNE     3$
 4542  022252  005737  000644          5$:     TST     TEMP1           ;SEE IF FOUND ANY SLAVES
 4543  022256  001737                          BEQ     1$              ;IF NOT: BR
 4544  022260  013737  000644  005054          MOV     TEMP1,REOTC     ;SET NUMBER OF UNITS
 4545  022266  000337  000644                  SWAB    TEMP1
 4546  022272  053737  000644  005054          BIS     TEMP1,REOTC     ;SET EOT CNTR
 4547  022300  012711  177777                  MOV     #-1,(R1)        ;TERMINATE SLAVE TABLE
 4548  022304  000207                          RTS     PC              ;RETURN TO SEQ
```

```
 4549
 4550                                   ;SUBROUTINE TO SELECT NRZ AUTO TEST MODE**********
 4551
 4552  022306  005037  000656          AMOD1:  CLR     BLCNTR          ;ASSURE BLOCK COUNTER IS 0
 4553  022312  012701  000746                  MOV     #UN1,R1         ;GET START OF SLAVE TABLE
 4554  022316  052721  001700          1$:     BIS     #1700,(R1)+     ;SET ALL SLAVE TO NRZ,NORM,ODD
 4555  022322  022711  177777                  CMP     #-1,(R1)        ;LOOP UNTIL REACED END OF TABLE
 4556  022326  001373                          BNE     1$
 4557  022330  004737  005070                  JSR     PC,RWNDA        ;GO REWIND ALL AVAIL SLAVES
 4558  022334  012737  000050  000742          MOV     #50,ABLCNT      ;SET NUMBER OF BLOCKS FOR MODE 1
 4559  022342  012737  174000  000556          MOV     #-4000,FMCNT    ;SET FC = 4000
 4560  022350  012737  000100  000554          MOV     #100,RCNT       ;SET REC CNTR = 100
 4561  022356  013737  000740  000550          MOV     ADRVN,DVN       ;SELECT DRIVE
 4562  022364  012737  000001  000560          MOV     #1,PATRN        ;SELECT PATTERN 1
 4563  022372  005037  000564                  CLR     TMEX            ;ASSURE NO TMK
 4564  022376  005037  000570                  CLR     INTRF           ;ASSURE NORMAL READ
 4565  022402  004737  003346                  JSR     PC,STAUTO       ;GO DO AUTO MODE 1
 4566  022406  012737  000010  000560          MOV     #10,PATRN       ;SELECT PATTERN 10
 4567  022414  004737  003346                  JSR     PC,STAUTO       ;GO DO PATTERN 10
 4568  022420  012737  000014  000560          MOV     #14,PATRN       ;SELECT PATTERN 14
 4569  022426  004737  003346                  JSR     PC,STAUTO
 4570  022432  012737  177777  000560  3$:     MOV     #-1,PATRN       ;SELECT AUTO RANDOM DATA
 4571  022440  004737  003346                  JSR     PC,STAUTO
 4572  022444  000207                          RTS     PC              ;RETURN TO SEQ
```

```
4573
4574                                    ;SUBROUTINE TO SELECT PE AUTO TEST MODE**********
4575
4576  022446  005037  000656        AMOD2:  CLR     BLCNTR          ;CLEAR BLOCK CNTR
4577  022452  012701  000746                MOV     #UN1,R1         ;SET START OF SLAVE TABLE
4578  022456  042711  001700        1$:     BIC     #1700,(R1)      ;CLEAR NRZ
4579  022462  052721  002300                BIS     #2300,(R1)+     ;SET TO PE NORM, ODD
4580  022466  022711  177777                CMP     #-1,(R1)        ;LOOP UNTIL END OF TABLE
4581  022472  001371                        BNE     1$
4582  022474  004737  005070                JSR     PC,RWNDA        ;REWIND ALL SLAVES
4583  022500  012737  000006  000742        MOV     #6,ABLCNT       ;SET AUTO BLOCK COUNT
4584  022506  012737  174000  000556        MOV     #-4000,FMCNT    ;SET FC = 4000
4585  022514  012737  000100  000554        MOV     #100,RCNT       ;SET REC CNTR TO 100
4586  022522  012737  000010  000560        MOV     #10,PATRN       ;SELECT PATTERN 10
4587  022530  004737  003346                JSR     PC,STAUTO       ;GO DO AUTO SEQ
4588  022534  012737  000014  000560        MOV     #14,PATRN       ;SELECT PATTERN 14
4589  022542  004737  003346                JSR     PC,STAUTO
4590  022546  012737  000015  000560        MOV     #15,PATRN       ;SELECT PATTERN 15
4591  022554  004737  003346                JSR     PC,STAUTO
4592  022560  012737  177777  000742        MOV     #-1,ABLCNT      ;FORCE TO END OF TAPE
4593  022566  012737  177777  000560        MOV     #-1,PATRN       ;SELECT AUTO RANDOM DATA
4594  022574  004737  003346                JSR     PC,STAUTO
4595  022600  000207            3$:     RTS     PC                  ;RETURN TO SEQ
4596
4597
```

```
4598
4599                                    ;*********************************************************
4600                                    ;ERROR HEADER PRINT SUBROUTINE:
4601                                    ;
4602                                    ;THIS ROUTINE IS USED TO PRINT OUT A HEADER
4603                                    ;WITH EACH ERROR MESSAGE.  THE PRINT IS IN TWO
4604                                    ;LINES AND CONTAINS THE FOLLOWING INFORMATION.
4605                                    ;LINE 1:  DRIVE NO. SLAVE NO. DENSITY PARITY FORMAT
4606                                    ;LINE 2:  CURRENT BLOCK NUMBER, RECORD NUMBER IN
4607                                    ;WHICH THE ERROR OCCURED PLUS THE TOTAL NUMBER
4608                                    ;OF RECORDS IN THIS BLOCK, THE RECORD SIZE (NUMBER
4609                                    ;OF CHARACTERS), AND THE ERROR TYPE (READ,WRITE, SPACE, ETC)
4610                                    ;PLUS THE TAPE DIRECTION (FORWARD OR REVERSE).
4611                                    ;ALL NUMBERS ARE IN OCTAL.
4612                                    ;*********************************************************
4613
4614  022602  012704  024560        PAPRT:  MOV     #MSG12,R4
4615  022606  000004                       TYPE                    ;TYPE MSG
4616  022610  013703  000550               MOV     DVN,R3
4617  022614  104400                       TYPOCT                  ;PRINT DRIVE NUMBER
4618  022616  012704  024544               MOV     #MSG11,R4
4619  022622  000004                       TYPE                    ;TYPE MSG
4620  022624  013703  000552               MOV     UDES,R3
4621  022630  042703  177770               BIC     #177770,R3
4622  022634  104400                       TYPOCT                  ;PRINT UNIT NUMBER
4623  022636  012704  026124               MOV     #MSG60,R4
4624  022642  000004                       TYPE                    ;TYPE MSG
4625  022644  013703  000552               MOV     UDES,R3
4626  022650  000303                       SWAB    R3
4627  022652  042703  177770               BIC     #177770,R3
4628  022656  104400                       TYPOCT                  ;PRINT DENSITY
4629  022660  012704  026130               MOV     #MSG61,R4
4630  022664  000004                       TYPE                    ;TYPE MSG
4631  022666  005003                       CLR     R3
4632  022670  032737  000010  000552       BIT     #10,UDES
4633  022676  001402                       BEQ     PAPRT0
4634  022700  012703  000001               MOV     #1,R3
4635  022704  104400                PAPRT0: TYPOCT                  ;PRINT PARITY
4636  022706  012704  026134               MOV     #MSG62,R4
4637  022712  000004                       TYPE                    ;TYPE MSG
4638  022714  013703  000552               MOV     UDES,R3
4639  022720  000241                       CLC
4640  022722  006003                       ROR     R3
4641  022724  006003                       ROR     R3
4642  022726  006003                       ROR     R3              ;PONTION FORMAT
4643  022730  006003                       ROR     R3
4644  022732  042703  177760               BIC     #177760,R3
4645  022736  104400                       TYPOCT                  ;PRINT FORMAT
4646  022740  012704  024521               MOV     #MSG8,R4
4647  022744  000004                       TYPE                    ;TYPE MSG
4648  022746  032777  000400  155634       BIT     #400,@SWR       ;SEE IF RANDOM DATA
4649  022754  001406                       BEQ     PAPRTB          ;IF NOT: BR
4650  022756  012737  000122  000640 PAPRTA: MOV     #122,TOB
4651  022764  004737  023756               JSR     PC,TOG          ;PRINT R
4652  022770  000411                       BR      PAPRTD
4653  022772  005737  000736        PAPRTB: TST     ASEQF           ;SEE IF AUTO SEQ
```

```
 4654  022776  001403                          BEQ     PAPRTC          ;IF NOT: BR
 4655  023000  005737  000560                   TST     PATRN           ;SEE IF AUTO RANDOM
 4656  023004  100764                          BMI     PAPRTA          ;IF SO: BR
 4657  023006  013703  000560          PAPRTC: MOV     PATRN,R3
 4658  023012  104400                          TYPOCT                  ;PRINT PATRN NUMBER
 4659  023014  012704  024576          PAPRTD: MOV     #MSG13,R4
 4660  023020  000004                          TYPE                    ;TYPE MSG
 4661  023022  013703  000656                   MOV     BLCNTR,R3
 4662  023026  104400                          TYPOCT                  ;PRINT NUMBER
 4663  023030  012704  024604                   MOV     #MSG14,R4
 4664  023034  000004                          TYPE                    ;TYPE MSG
 4665  023036  010003                          MOV     R0,R3
 4666  023040  032737  000010  000674          BIT     #10,MTC1        ;SEE IF WRITE OPERATION
 4667  023046  001404                          BEQ     PAPRT1          ;IF SO: BR
 4668  023050  032737  010000  000562          BIT     #10000,RDCMD    ;SEE IF READ REVERSE
 4669  023056  001016                          BNE     PAPRT3          ;IF SO: BR
 4670  023060  013703  000554          PAPRT1: MOV     RCNT,R3
 4671  023064  005737  000700                   TST     TMFLG           ;SEE IF TAPE MARK TIME
 4672  023070  001010                          BNE     PAPRT2          ;IF SO: BR
 4673  023072  022737  012100  000664          CMP     #B1,RTRN
 4674  023100  001003                          BNE     PAPRTY          ;IF NOT BACK SPACE: BR
 4675  023102  005737  000714                   TST     RTYFL
 4676  023106  001402                          BEQ     PAPRT3          ;IF NOT RETRY: BR
 4677  023110  160003          PAPRTY: SUB     R0,R3           ;GET RECORD NUMBER
 4678  023112  005203          PAPRT2: INC     R3
 4679  023114  104400          PAPRT3: TYPOCT                  ;PRINT RECORD NUMBER
 4680  023116  012737  000055  000640          MOV     #55,TOB         ;LOAD DASH (-)
 4681  023124  004737  023756                   JSR     PC,TOG          ;PRINT DASH (-)
 4682  023130  013703  000554                   MOV     RCNT,R3
 4683  023134  104400                          TYPOCT                  ;PRINT RECORD COUNT
 4684  023136  012704  024514                   MOV     #MSG7,R4
 4685  023142  000004                          TYPE                    ;TYPE MSG
 4686  023144  013703  000556                   MOV     FMCNT,R3        ;GET CHARACTER COUNT
 4687  023150  005403                          NEG     R3              ;FORM TWO'S COMPLEMENT
 4688  023152  104400                          TYPOCT                  ;PRINT RECORD SIZE
 4689  023154  012737  000001  000666          MOV     #1,HDRFL        ;SET HEADER FLAG
 4690  023162  000207                          RTS     PC              ;RETURN
 4691
```

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

023164  063737  000630  000626  RANG:   ADD     RANSAV,RANBAS
023172  063737  000626  000630          ADD     RANBAS,RANSAV   ;GET NEW NUMBER
023200  023701  000630                  CMP     RANSAV,R1       ;SEE IF NUMBER TOO BIG
023204  101367                          BHI     RANG            ;IF SO: BR
023206  020237  000630                  CMP     R2,RANSAV       ;SEE IF NUMBER TOO SMALL
023212  101364                          BHI     RANG            ;IF SO: BR
023214  000207                          RTS     PC              ;EXIT

                                    ;SUBROUTINE TO GET NEW SOFTWARE SWR

023216  022737  000176  000610  GTSWR:  CMP     #SWREG,SWR      ;BRANCH IF SOFTWARE SWR
023224  001027                          BNE     1$              ;NOT INVOKED
023226  004737  023306                  JSR     PC,.SAVE        ;SAVE REGISTERS ON THE STACK
023232  012704  024436                  MOV     #$MSWR,R4       ;TYPE 'SWR = '
023236  000004                          TYPE                    ;TYPE MSG
023240  017703  155344                  MOV     @SWR,R3         ;GET CURRENT SWR
023244  104400                          TYPOCT
023246  012704  024446                  MOV     #$MNEW,R4       ;ASK FOR NEW SETTING
023252  000004                          TYPE                    ;TYPE MSG
023254  013705  000610                  MOV     SWR,R5          ;TTR ROUTINE RETURNS VALUE TO (R5)
023260  012701  000007                  MOV     #7,R1           ;LIMIT RESPONSE TO 7 CHARS
023264  012702  177777                  MOV     #177777,R2      ;BETWEEN 0 AND 177777
023270  012703  000000                  MOV     #0,R3
023274  004737  023352                  JSR     PC,TTR          ;GET RESPONSE
023300  004737  023330                  JSR     PC,.RESTORE     ;RESTORE REGISTERS
023304  000207                  1$:     RTS     PC              ;RETURN

                                    ;;ROUTINE TO SAVE REGISTERS ON THE STACK
023306  010546                  .SAVE:  MOV     %5,-(SP)        ;;R5 IS SAVED AT 12(SP)
023310  010446                          MOV     %4,-(SP)        ;;R4 IS SAVED AT 10(SP)
023312  010346                          MOV     %3,-(SP)        ;;R3 IS SAVED AT 6(SP)
023314  010246                          MOV     %2,-(SP)        ;;R2 IS SAVED AT 4(SP)
023316  010146                          MOV     %1,-(SP)        ;;R1 IS SAVED AT 2(SP)
023320  010046                          MOV     %0,-(SP)        ;;R0 IS SAVED AT (SP)
023322  016646  000014                  MOV     14(SP),-(SP)    ;;PUSH RETURN PC ON THE STACK
023326  000207                          RTS     PC              ;;RETURN TO CALLER

                                    ;;ROUTINE TO RESTORE REGISTERS SAVED ON THE STACK
023330  012666  000014          .RESTORE:MOV    (SP)+,14(SP)    ;;STORE RETURN PC ON STACK
023334  012600                          MOV     (SP)+,%0
023336  012601                          MOV     (SP)+,%1
023340  012602                          MOV     (SP)+,%2
023342  012603                          MOV     (SP)+,%3
023344  012604                          MOV     (SP)+,%4
023346  012605                          MOV     (SP)+,%5
023350  000207                          RTS     PC              ;;RETURN
```

```
                                        ;*********************************************************
                                        ;TTY ENTRY SUBROUTINE:
                                        ;
                                        ;THIS SUBROUTINE IS USED BY THE TEST CONDITION
                                        ;ENTRY ROUTINE TO READ THE RESPONSE ENTERED
                                        ;AT THE TTY AND CHECK THEM FOR LEGALITY AND
                                        ;LIMITS.  ALL RESPONSE MUST BE TYPED IN OCTAL
                                        ;(0-7) AND MUST FALL WITHIN THE LIMITS SET BY
                                        ;THE CALLING ROUTINE.
                                        ;IF AN ENTRY IS ILLEGAL OR OUTSIDE THE LIMITS,
                                        ;A QUESTION MARK IS TYPED (?) AND THE RESPONSE
                                        ;MAY BE REENTERED.
                                        ;ENTRIES MAY NOT EXCEED SIX (6) CHARACTERS AND
                                        ;MAY BE TERMINATED AT LESS THAN SIX BY TYPING A
                                        ;CARRIAGE RETURN
                                        ;*********************************************************

023352  010146          TTR:    MOV     R1,-(SP)        ;SAVE CHAR COUNT
023354  011601          10$:    MOV     (SP),R1         ;RESTORE CHAR COUNT (FOR  U)
023356  005037  000644          CLR     TEMP1           ;CLEAR FIRST CHARACTER FLAG
023362  005000                  CLR     R0
023364  004737  023604  1$:     JSR     PC,TTIN         ;GO READ CHARACTER
023370  122737  000003  000642  CMPB    #3,TIB          ;BRANCH IF NOT  C
023376  001003                  BNE     11$
023400  000005                  RESET
023402  000137  000200          JMP     @#200   ;RESTART AT 200
023406  122737  000015  000642  11$:    CMPB    #15,TIB         ;SEE IF CR
023414  001004                  BNE     2$              ;IF NOT: BR
023416  005737  000644          TST     TEMP1           ;SEE IF FIRST CHARACTER
023422  001457                  BEQ     9$              ;IF SO: BR
023424  000451                  BR      6$              ;ELSE GO LOAD VALUE
023426  122737  000025  000642  2$:     CMPB    #25,TIB         ;BRANCH IF NOT CONTROL U
023434  001004                  BNE     21$
023436  012704  025131          MOV     #MSG28,R4       ;TYPE <CR><LF>
023442  000004                  TYPE                    ;TYPE MSG
023444  000743                  BR      10$
023446  122737  000177  000642  21$:    CMPB    #177,TIB                ;BRANCH IF NOT 'RUBOUT'
023454  001011                  BNE     3$
023456  000241                  CLC                     ;REMOVE LAST CHARACTER
023460  006000                  ROR     R0
023462  006200                  ASR     R0
023464  006200                  ASR     R0
023466  012704  027247          MOV     #MSG118,R4      ;TYPE ' '
023472  000004                  TYPE                    ;TYPE MSG
023474  005201                  INC     R1              ;DEC CHAR RECEIVED COUNT
023476  000732                  BR      1$              ;GET NEXT CHARACTER
023500  122737  000060  000642  3$:     CMPB    #60,TIB         ;SEE IF CHAR IS LESS THAN 0
023506  101027                  BHI     TINER
023510  122737  000070  000642  4$:     CMPB    #70,TIB         ;SEE IF CHAR IS GREATER THAN 7
023516  101423                  BLOS    TINER
023520  005237  000644          5$:     INC     TEMP1           ;SET FIRST CHARACTER FLAG
023524  006300                  ASL     R0
023526  006300                  ASL     R0              ;SHIFT 3 LEFT
023530  006300                  ASL     R0
023532  042737  177770  000642  BIC     #177770,TIB     ;STRIP ASCII
023540  053700  000642          BIS     TIB,R0          ;LOAD CHARACTER
```

```
 4804  023544  005301                    DEC     R1              ;SEE IF DONE
 4805  023546  001306                    BNE     1$              ;IF NOT: BR
 4806  023550  020002            6$:     CMP     R0,R2           ;SEE IF EXCEEDED MAXIMUM LIMIT
 4807  023552  101005                    BHI     TINER
 4808  023554  020300            7$:     CMP     R3,R0           ;SEE IF BELOW MINIMUM LIMIT
 4809  023556  101003                    BHI     TINER
 4810  023560  010015            8$:     MOV     R0,(R5)         ;LOAD VALUE
 4811  023562  005726            9$:     TST     (SP)+           ;POP CHAR COUNT OFF STACK
 4812  023564  000207                    RTS     PC              ;EXIT
 4813
 4814  023566  012704  025636    TINER:  MOV     #MSG43,R4
 4815  023572  000004                    TYPE                    ;TYPE MSG
 4816  023574  005726                    TST     (SP)+           ;POP CHAR COUNT OFF STACK
 4817  023576  162716  000020            SUB     #20,(SP)        ;RESET SP TO START OF VALUE ROUTINE
 4818  023602  000207                    RTS     PC              ;REDO VALUE ENTRY
```

```
                                        ;TTY READ SUBROUTINE**********
                                
023604  005277  155002          TTIN:   INC     @TKS
023610  105777  154776          1$:     TSTB    @TKS
023614  100375                          BPL     1$
023616  017737  154772  000642          MOV     @TKB,TIB
023624  042737  000200  000642          BIC     #200,TIB        ;STRIP PARITY BIT
023632  013737  000642  000640          MOV     TIB,TOB         ;MOVE CHAR TO TTY OUTPUT BFR
023640  004737  023756                  JSR     PC,TOG          ;ECHO CHARACTER
023644  000207                          RTS     PC

                                        ;TTY OUTPUT SUBROUTINE***********

023646  112437  000640          TTOUT:  MOVB    (R4)+,TOB
023652  105737  000640                  TSTB    TOB
023656  001436                          BEQ     3$
023660  122737  000045  000640          CMPB    #45,TOB
023666  001407                          BEQ     1$
023670  122737  000041  000640          CMPB    #41,TOB
023676  001436                          BEQ     TBELL           ;DO BELL
023700  004737  023756                  JSR     PC,TOG
023704  000760                          BR      TTOUT
023706  112737  000015  000640  1$:     MOVB    #15,TOB
023714  004737  023756                  JSR     PC,TOG
023720  012703  000006                  MOV     #6,R3
023724  005037  000640          2$:     CLR     TOB
023730  004737  023756                  JSR     PC,TOG
023734  005303                          DEC     R3
023736  001372                          BNE     2$              ;DO FILLERS
023740  112737  000012  000640          MOVB    #12,TOB
023746  004737  023756                  JSR     PC,TOG
023752  000735                          BR      TTOUT
023754  000002                  3$:     RTI                     ;RETURN

023756  105777  154634          TOG:    TSTB    @TPS
023762  100375                          BPL     TOG
023764  113777  000640  154626          MOVB    TOB,@TPB
023772  000207                          RTS     PC              ;RETURN

023774  012703  000002          TBELL:  MOV     #2,R3
024000  012737  000007  000640  1$:     MOV     #7,TOB
024006  004737  023756                  JSR     PC,TOG
024012  005303                          DEC     R3
024014  001371                          BNE     1$
024016  000713                          BR      TTOUT
```

```
                                        ;OCTAL OUTPUT SUBROUTINE************

024020  005037  024232        OCTP:   CLR     OFL             ;CLEAR FLAG FOR LEADING ZERO
024024  010304                        MOV     R3,R4           ;SEE IF NUMBER IS ZERO
024026  001003                        BNE     OCTP0           ;IF NOT ZERO: BR
024030  004737  024212                JSR     PC,OCTPG1       ;ELSE PRINT ZERO
024034  000447                        BR      OCTP3           ;SPACE AND EXIT
024036  005704                OCTP0:  TST     R4              ;BRANCH IF MSD = 0
024040  100006                        BPL     OCTP1
024042  012704  000001                MOV     #1,R4
024046  004737  024170                JSR     PC,OCTPG        ;PRINT 1
024052  000137  024064                JMP     OCTP2
024056  005004                OCTP1:  CLR     R4
024060  004737  024170                JSR     PC,OCTPG        ;PRINT 0
024064  010304                OCTP2:  MOV     R3,R4
024066  006004                        ROR     R4
024070  006004                        ROR     R4
024072  006004                        ROR     R4              ;POSITION DIGIT
024074  006004                        ROR     R4
024076  000304                        SWAB    R4
024100  004737  024170                JSR     PC,OCTPG        ;PRINT DIGIT 2
024104  010304                        MOV     R3,R4
024106  006004                        ROR     R4
024110  000304                        SWAB    R4
024112  004737  024170                JSR     PC,OCTPG        ;PRINT DIGIT 3
024116  010304                        MOV     R3,R4
024120  006104                        ROL     R4
024122  006104                        ROL     R4
024124  000304                        SWAB    R4
024126  004737  024170                JSR     PC,OCTPG        ;PRINT DIGIT 4
024132  010304                        MOV     R3,R4
024134  006004                        ROR     R4
024136  006004                        ROR     R4
024140  006004                        ROR     R4
024142  004737  024170                JSR     PC,OCTPG
024146  010304                        MOV     R3,R4
024150  004737  024170                JSR     PC,OCTPG        ;PRINT DIGIT 5
024154  012737  000240  000640 OCTP3:  MOV     #240,TOB
024162  004737  023756                JSR     PC,TOG          ;PRINT SPACE
024166  000002                        RTI                     ;EXIT
024170  042704  177770        OCTPG:  BIC     #177770,R4
024174  001004                        BNE     OCTPG0
024176  005737  024232                TST     OFL
024202  001001                        BNE     OCTPG0
024204  000207                        RTS     PC

024206  005237  024232        OCTPG0: INC     OFL
024212  052704  000260        OCTPG1: BIS     #260,R4
024216  010437  000640                MOV     R4,TOB
024222  004737  023756                JSR     PC,TOG
024226  010304                        MOV     R3,R4
024230  000207                        RTS     PC
024232  000000                OFL:    0                       ;FIRST CHAR FLAG
```

```
                                        ;DATA CHARACTER OUTPUT SUBROUTINE************
                                DOUT:   MOV     #10,R4          ;SET NUMBER TO PRINT
                                        MOVB    R3,TOB
                                1$:     TSTB    @TPS
                                        BPL     1$
                                        TSTB    TOB
                                        BPL     2$
                                        MOV     #061,@TPB
                                        BR      3$
                                2$:     MOV     #060,@TPB
                                3$:     ASL     TOB
                                        DEC     R4
                                        BNE     1$
                                        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
                                        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
                                SNPG:   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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 4972
 4973                                   ;ERROR MESSAGES**********
 4974
 4975  024436  051445  051127  036440  $MSWR:  .ASCIZ  /%SWR = /
 4976  024444  000040
 4977  024446  047040  053505  036440  $MNEW:  .ASCIZ  / NEW = /
 4978  024454  000040
 4979  024456  042052  020105     000  MSG1:   .ASCIZ  /*DE /
 4980  024463     045  035507  000040  MSG2:   .ASCIZ  /%G; /
 4981  024470  041045  020073     000  MSG3:   .ASCIZ  /%B; /
 4982  024475     045  047103  000040  MSG4:   .ASCIZ  /%CN /
 4983  024502  053452  020105     000  MSG5:   .ASCIZ  /*WE /
 4984  024507     052  042522  000040  MSG6:   .ASCIZ  /*RE /
 4985  024514  051052  020123     000  MSG7:   .ASCIZ  /*RS /
 4986  024521     052  040520  051124  MSG8:   .ASCIZ  /*PATRN /
 4987  024526  020116     000
 4988  024531     045  047123  020072  MSG9:   .ASCIZ  /%SN: /
 4989  024536     000
 4990  024537     052  042523  000040  MSG10:  .ASCIZ  /*SE /
 4991  024544  051452  040514  042526  MSG11:  .ASCIZ  /*SLAVE NO. /
 4992  024552  047040  027117  000040
 4993  024560  022445  042045  044522  MSG12:  .ASCIZ  /%%%DRIVE NO. /
 4994  024566  042526  047040  027117
 4995  024574  000040
 4996  024576  025045  047102  000040  MSG13:  .ASCIZ  /%*BN /
 4997  024604  051052  020116     000  MSG14:  .ASCIZ  /*RN /
 4998  024611     045  020041  020040  MSG15:  .ASCIZ  /%!         BAD RECORD%%/
 4999  024616  020040  020040  020040
 5000  024624  041040  042101  051040
 5001  024632  041505  051117  022504
 5002  024640  000045
 5003  024642  043040     000          MSG16:  .ASCIZ  / F/
 5004  024645     040  000122          MSG17:  .ASCIZ  / R/
 5005  024650  020041  047505  020124  MSG20:  .ASCIZ  /! EOT NO: /
 5006  024656  047516  020072     000
 5007
 5008  024663     045  047111  042524  MSG21:  .ASCIZ  /%INTERCHANGE READ = /
 5009  024670  041522  040510  043516
 5010  024676  020105  042522  042101
 5011  024704  036440  000040
 5012  024710  020445  046111  042514  MSG22:  .ASCIZ  /%!ILLEGAL BOT: HALT%%%/
 5013  024716  040507  020114  047502
 5014  024724  035124  044040  046101
 5015  024732  022524  022445     000
 5016  024737     045  051503  020061  MSG23:  .ASCIZ  /%CS1 /
 5017  024744     000
 5018  024745     045  041527  000040  MSG23A: .ASCIZ  /%WC /
 5019  024752  041045  020101     000  MSG23B: .ASCIZ  /%BA /
 5020  024757     045  041506  000040  MSG23C: .ASCIZ  /%FC /
 5021  024764  041445  031123  000040  MSG23D: .ASCIZ  /%CS2 /
 5022  024772  042045  020123     000  MSG23E: .ASCIZ  /%DS /
 5023  024777     045  051105  000040  MSG23F: .ASCIZ  /%ER /
 5024  025004  040445  020123     000  MSG23G: .ASCIZ  /%AS /
 5025  025011     045  045503  000040  MSG23H: .ASCIZ  /%CK /
 5026  025016  042045  020102     000  MSG23I: .ASCIZ  /%DB /
 5027  025023     045  051115  000040  MSG23J: .ASCIZ  /%MR /
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 5028  025030  042045  020124     000  MSG23K: .ASCIZ  /%DT /
 5029  025035     045  041524  000040  MSG23L: .ASCIZ  /%TC /
 5030  025042  051445  020116     000  MSG23M: .ASCIZ  /%SN /
 5031  025047     045  047041  020117  MSG24:  .ASCIZ  /%!NO INTERRUPT%/
 5032  025054  047111  042524  051122
 5033  025062  050125  022524     000
 5034  025067     045  047041  020117  MSG25:  .ASCIZ  /%!NO MOL: HALT%/
 5035  025074  047515  035114  044040
 5036  025102  046101  022524     000
 5037  025107     045  051104  050117  MSG26:  .ASCIZ  /%DROPS: /
 5038  025114  035123  000040
 5039  025120  050045  041511  051513  MSG27:  .ASCIZ  /%PICKS: /
 5040  025126  020072     000
 5041  025131     045     000          MSG28:  .ASCIZ  /%/
 5042  025133     045  052045  047515  MSG30:  .ASCIZ  '%%TM03-TU45 AUTO SEQUENCE (CZTURA0)%';++B
 5043  025140  026463  052524  032464
 5044  025146  040440  052125  020117
 5045  025154  042523  052521  047105
 5046  025162  042503  024040  055103
 5047  025170  052524  040522  024460
 5048  025176  000045
 5049  025200  022445  046524  031460  MSG31:  .ASCIZ  '%%TM03-TU45 DATA RELIABILITY TEST (CZTURA0)%';++B
 5050  025206  052055  032125  020065
 5051  025214  040504  040524  051040
 5052  025222  046105  040511  044502
 5053  025230  044514  054524  052040
 5054  025236  051505  020124  041450
 5055  025244  052132  051125  030101
 5056  025252  022451     000
 5057  025255     124  050131  020105  MSG31A: .ASCIZ  /TYPE <CR> TO TERMINATE ALL REQUESTS &  C TO RESTART%/
 5058  025262  041474  037122  052040
 5059  025270  020117  042524  046522
 5060  025276  047111  052101  020105
 5061  025304  046101  020114  042522
 5062  025312  052521  051505  051524
 5063  025320  023040  057040  020103
 5064  025326  047524  051040  051505
 5065  025334  040524  052122  000045
 5066  025342  051445  040514  042526  MSG32:  .ASCIZ  /%SLAVE NUMBER = /
 5067  025350  047040  046525  042502
 5068  025356  020122  020075     000
 5069  025363     045  042504  051516  MSG33:  .ASCIZ  /%DENSITY = /
 5070  025370  052111  020131  020075
 5071  025376     000
 5072  025377     045  040520  044522  MSG34:  .ASCIZ  /%PARITY = /
 5073  025404  054524  036440  000040
 5074  025412  051045  041505  051117  MSG35:  .ASCIZ  /%RECORD COUNT = /
 5075  025420  020104  047503  047125
 5076  025426  020124  020075     000
 5077  025433     045  044103  051101  MSG36:  .ASCIZ  /%CHAR COUNT = /
 5078  025440  041440  052517  052116
 5079  025446  036440  000040
 5080  025452  050045  052101  042524  MSG37:  .ASCIZ  /%PATTERN NUMBER = /
 5081  025460  047122  047040  046525
 5082  025466  042502  020122  020075
 5083  025474     000
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5084  025475     045  044523  043516  MSG38:  .ASCIZ  /%SINGLE PASS = /
5085  025502  042514  050040  051501
5086  025510  020123  020075     000
5087  025515     045  051103  020103  MSG39:  .ASCIZ  /%CRC CORRECTION (YES=1,NO=0) = /
5088  025522  047503  051122  041505
5089  025530  044524  047117  024040
5090  025536  042531  036523  026061
5091  025544  047516  030075  020051
5092  025552  020075     000
5093  025555     045  042445  052116  MSG40:  .ASCIZ  /%%ENTER STALLS%READ = /
5094  025562  051105  051440  040524
5095  025570  046114  022523  042522
5096  025576  042101  036440  000040
5097  025604  053445  044522  042524  MSG41:  .ASCIZ  /%WRITE = /
5098  025612  036440  000040
5099
5100  025616  052045  051125  020116  MSG42:  .ASCIZ  /%TURN AROUND = /
5101  025624  051101  052517  042116
5102  025632  036440  000040
5103  025636  037445  000045          MSG43:  .ASCIZ  /%?%/
5104  025642  042445  052116  051105  MSG44:  .ASCIZ  /%ENTER YOZZLE STALL = /
5105  025650  054440  055117  046132
5106  025656  020105  052123  046101
5107  025664  020114  020075     000
5108  025671     045  051105  020122  MSG45:  .ASCIZ  /%ERR AMT /
5109  025676  046501  020124     000
5110  025703     045  041506  000040  MSG46:  .ASCIZ  /%FC /
5111  025710  041445  020101     000  MSG47:  .ASCIZ  /%CA /
5112  025715     045  047041  020117  MSG48:  .ASCIZ  /%!NO BOT ON REWIND: HALT%%/
5113  025722  047502  020124  047117
5114  025730  051040  053505  047111     ``
5115  025736  035104  044040  046101
5116  025744  022524  000045
5117  025750  047045  052117  040440  MSG49:  .ASCIZ  /%NOT AVAIL /
5118  025756  040526  046111  000040
5119  025764  044445  046114  043505  MSG50:  .ASCIZ  /%ILLEGAL DRIVE TYPE /
5120  025772  046101  042040  044522
5121  026000  042526  052040  050131
5122  026006  020105     000
5123  026011     045  051104  053111  MSG52:  .ASCIZ  /%DRIVE NUMBER = /
5124  026016  020105  052516  041115
5125  026024  051105  036440  000040
5126  026032  043045  051117  040515  MSG53:  .ASCIZ  /%FORMAT = /
5127  026040  020124  020075     000
5128  026045     052  042527  052040  MSG54:  .ASCIZ  /*WE TM/
5129  026052  000115
5130  026054  051452  020105  046524  MSG55:  .ASCIZ  /*SE TM/
5131  026062     000
5132  026063     040  046524     000  MSG56:  .ASCIZ  / TM/
5133  026067     045  047516  026516  MSG57:  .ASCIZ  /%NON-EXIST SLAVE/
5134  026074  054105  051511  020124
5135  026102  046123  053101  000105
5136  026110  041445  041522  000040  MSG58:  .ASCIZ  /%CRC /
5137  026116  046045  041522  000040  MSG59:  .ASCIZ  /%LRC /
5138  026124  042052  000040          MSG60:  .ASCIZ  /*D /
5139  026130  050052  000040          MSG61:  .ASCIZ  /*P /
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                                                    J  9
 5140  026134  043052  000040          MSG62:  .ASCIZ  /*F /
 5141  026140  025045  051117  043511  MSG64:  .ASCIZ  /%*ORIGINAL ERROR*/
 5142  026146  047111  046101  042440
 5143  026154  051122  051117  000052
 5144  026162  051045  052105  054522  MSG65:  .ASCIZ  /%RETRY: /
 5145  026170  020072     000
 5146  026173     052  051441  020105  MSG66:  .ASCIZ  /*!SE RTRY /
 5147  026200  052122  054522  000040
 5148  026206  020452  051105  051501  MSG67:  .ASCIZ  /*!ERASE/
 5149  026214  000105
 5150  026216  051045  051105  053105  MSG68:  .ASCIZ  /%REREV: /
 5151  026224  020072     000
 5152  026227     045  040524  042520  MSG69:  .ASCIZ  /%TAPE MARK = /
 5153  026234  046440  051101  020113
 5154  026242  020075     000
 5155  026245     045  047041  020117  MSG70:  .ASCIZ  /%!NO DRY FROM REWIND: HALT%/
 5156  026252  051104  020131  051106
 5157  026260  046517  051040  053505
 5158  026266  047111  035104  044040
 5159  026274  046101  022524     000
 5160  026301     045  047516  026516  MSG71:  .ASCIZ  /%NON-EXIST DRIVE/
 5161  026306  054105  051511  020124
 5162  026314  051104  053111  000105
 5163  026322  051045  043105  042127  MSG72:  .ASCIZ  /%REFWD: /
 5164  026330  020072     000
 5165  026333     045  052127  051105  MSG73:  .ASCIZ  /%WTERR: /
 5166  026340  035122  000040
 5167  026344  051045  043505  051511  MSG74:  .ASCIZ  /%REGISTER START = /
 5168  026352  042524  020122  052123
 5169  026360  051101  020124  020075
 5170  026366     000
 5171  026367     045  042526  052103  MSG75:  .ASCIZ  /%VECTOR = /
 5172  026374  051117  036440  000040
 5173  026402  042045  051105  053105  MSG76:  .ASCIZ  /%DEREV: /
 5174  026410  020072     000
 5175  026413     045  042504  053506  MSG77:  .ASCIZ  /%DEFWD: /
 5176  026420  035104  000040
 5177  026424  020445  047516  026516  MSG78:  .ASCIZ  /%!NON-RETRYABLE WRITE ERROR: ER /
 5178  026432  042522  051124  040531
 5179  026440  046102  020105  051127
 5180  026446  052111  020105  051105
 5181  026454  047522  035122  042440
 5182  026462  020122     000
 5183  026465     045  047041  047117  MSG79:  .ASCIZ  /%!NON-RETRYABLE READ ERROR: ER /
 5184  026472  051055  052105  054522
 5185  026500  041101  042514  051040
 5186  026506  040505  020104  051105
 5187  026514  047522  035122  042440
 5188  026522  020122     000
 5189  026525     045  020441  047105  MSG100: .ASCIZ  /%!!END OF PASS %/
 5190  026532  020104  043117  050040
 5191  026540  051501  020123  000045
 5192  026546  022445  025052  025052  MSG101: .ASCIZ  /%%********************/
 5193  026554  025052  025052  025052
 5194  026562  025052  025052  025052
 5195  026570  025052  025052     000
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 5196  026575     052  046524  031460  MSG102: .ASCIZ  /*TM03 /
 5197  026602  000040
 5198  026604  051452  040514  042526  MSG103: .ASCIZ  /*SLAVES /
 5199  026612  020123     000
 5200  026615     045  052501  047524  MSG104: .ASCIZ  /%AUTO CONT: /
 5201  026622  041440  047117  035124
 5202  026630  000040
 5203  026632  051045  041505  053117  MSG105: .ASCIZ  /%RECOVERED/
 5204  026640  051105  042105     000
 5205  026645     052  020441  040502  MSG106: .ASCIZ  /*!!BAD TAPE OVERFLOW/
 5206  026652  020104  040524  042520
 5207  026660  047440  042526  043122
 5208  026666  047514  000127
 5209  026672  051045  053505  047111  MSG16A: .ASCIZ  /%REWIND TAPE; RESTART AT BLOCK 1/
 5210  026700  020104  040524  042520
 5211  026706  020073  042522  052123
 5212  026714  051101  020124  052101
 5213  026722  041040  047514  045503
 5214  026730  030440     000
 5215  026733     045  020441  047125  MSG107: .ASCIZ  /%!!UNRECOVERABLE BAD SPOT/
 5216  026740  042522  047503  042526
 5217  026746  040522  046102  020105
 5218  026754  040502  020104  050123
 5219  026762  052117     000
 5220  026765     045  040502  020104          .ASCIZ  /%BAD RECORD LEFT ON TAPE%/
 5221  026772  042522  047503  042122
 5222  027000  046040  043105  020124
 5223  027006  047117  052040  050101
 5224  027014  022505     000
 5225  027017     052  020441  047520  MSG109: .ASCIZ  /*!!POSITION LOST IN RETRY/
 5226  027024  044523  044524  047117
 5227  027032  046040  051517  020124
 5228  027040  047111  051040  052105
 5229  027046  054522     000
 5230  027051     045  052523  050123  MSG110: .ASCIZ  /%SUSPECT BAD TAPE/
 5231  027056  041505  020124  040502
 5232  027064  020104  040524  042520
 5233  027072     000
 5234  027073     045  042522  042520  MSG111: .ASCIZ  /%REPEAT: /
 5235  027100  052101  020072     000
 5236  027105     040  040502  020104  MSG112: .ASCIZ  / BAD TAPE SPOTS%/
 5237  027112  040524  042520  051440
 5238  027120  047520  051524  000045
 5239
 5240  027126  020045  047523  052106  MSG113: .ASCIZ  /% SOFT: /
 5241  027134  020072     000
 5242
 5243  027137     045  044040  051101  MSG114: .ASCIZ  /% HARD: /
 5244  027144  035104  000040
 5245
 5246  027150  020445  044041  051101  MSG115: .ASCIZ  /%!!HARD READ ERROR/
 5247  027156  020104  042522  042101
 5248  027164  042440  051122  051117
 5249  027172     000
 5250  027173     045  052441  044516  MSG116: .ASCIZ  /%!UNIT IS REWINDING: TEST WILL START AT BOT/
 5251  027200  020124  051511  051040
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 5252  027206  053505  047111  044504
 5253  027214  043516  020072  042524
 5254  027222  052123  053440  046111
 5255  027230  020114  052123  051101
 5256  027236  020124  052101  041040
 5257  027244  052117     000
 5258  027247     134     000          MSG118: .ASCIZ  / /
 5259  027251     045  042522  047515  MSG120: .ASCIZ  /%REMOVE TMDP FROM SLAVE TO BE TESTED%/
 5260  027256  042526  052040  042115
 5261  027264  020120  051106  046517
 5262  027272  051440  040514  042526
 5263  027300  052040  020117  042502
 5264  027306  052040  051505  042524
 5265  027314  022504     000
 5266  027317     045  040510  042122  MSG121: .ASCIZ  /%HARDWARE SWR IN USE%/
 5267  027324  040527  042522  051440
 5268  027332  051127  044440  020116
 5269  027340  051525  022505     000
 5270
 5271          027346                          .EVEN
 5272  027346  000000                  WDATA:  0                       ;WRITE BUFFER
 5273
 5274          033354                          .=.+4004
 5275  033354  000000                  RDATA:  0                       ;READ BUFFER
 5276
 5277          000001                          .END
```

ABLCNT	000742	BTPT	000732	DAT0B	014334	DF0D	015476	ER	000524
ACTLRC	021030	BTSTF	000730	DAT0C	014400	DF0E	015470	ERCHK	017244
ADRVN	000740	BTUR	007410	DAT0D	014406	DF0F	015462	ERPT	020064
AMOD1	022306	BT00	001610	DAT0E	014416	DF1	015710	ERPTG	020120
AMOD2	022446	BT01	001714	DAT0F	014432	DF2	015720	ERPTG1	020166
APATS	014746	BT02	002020	DAT1	014442	DF3	015736	ERPTT	020104
AS	000526	BT03	002124	DAT1A	014446	DF4	016000	ERPT0	020202
ASEQ	021752	BT04	002230	DAT10	014564	DOUT	024234	ERPT1	020250
ASEQCF	000744	BT05	002334	DAT11	014614	DOUTD	024310	ERPT2	020306
ASEQF	000736	BT06	002440	DAT12	014634	DPC	016632	ERPT3	020344
ASEQX	022110	BT07	002544	DAT13	014656	DPCG	016640	ERPT4	020406
ASEQ0	022004	B0	012034	DAT14	014666	DPC0	016646	ERPT5	020430
ASEQ1	022010	B1	012100	DAT15	014716	DPC0A	016710	ERPT5A	020512
ASEQ2	022050	B2	012110	DAT2	014462	DPC1	016716	ERPT6	020554
ASEQ3	022062	CADER	021012	DAT3	014466	DPC1A	016744	ERPT7	020624
ASEQ4	022072	CC	000530	DAT3A	014474	DPC2	017006	ERPX	020660
BA	000514	CCNTR	012134	DAT4	014512	DPC2A	016750	ERPX0	020626
BAER	021014	CHNFLG	003040	DAT5	014522	DPC2B	016772	ERPX1	020746
BBC	000660	CLLAST	015130	DAT6	014530	DPC3	017040	ERPX2	021010
BCNT	000712	CLP	015240	DAT7	014536	DPPRT	017106	ERSAV	000724
BDPP	000720	CLPE	015264	DB	000532	DPPRTX	017242	ERTFL	000734
BD00	001410	CLP2	015322	DCHK	015374	DPPRT0	017156	ER0	017260
BD10	001430	CLP3	015334	DCHK0	015422	DPPRT1	017202	ER0A	017326
BD20	001450	CL0	015050	DEREV1	001170	DPPRT2	017216	ER0B	017274
BD30	001470	CL1	015076	DEREX	016456	DROP	016622	ER1	017334
BD40	001510	CL2	015120	DEREX1	016510	DRPK	016610	ER10	020026
BD50	001530	CL3	015202	DERFL	000706	DRPKF	016522	ER2	017340
BD60	001550	CONER	021016	DERR	016006	DRP1	001010	ER2A	017404
BD70	001570	CRCC	000566	DERR0	016016	DRP2	001012	ER2A0	017354
BKRT	012054	CRCER	021026	DERR0A	016046	DRP3	001014	ER2A1	017374
BKSP	011700	CRCLRC	015032	DERR0B	016100	DRP4	001016	ER2B	017420
BKTM	011762	CRCSV	021034	DERR0C	016124	DRP5	001020	ER2C	017444
BKTM0	012024	CS	000520	DERR0D	016126	DRP6	001022	ER2D	017460
BLCNTR	000656	C1	000510	DERR1	016154	DRP7	001024	ER2E	017506
BPKP	000722	DATA0	002772	DERR2	016156	DRP8	001026	ER3	017514
BP00	001210	DATA1	002774	DERR3	016172	DRVER	021020	ER3A	017552
BP10	001230	DATA10	003012	DERR4	016174	DS	000522	ER3A1	017610
BP20	001250	DATA11	003014	DERR4A	016334	DSUP	014116	ER3B	017616
BP30	001270	DATA12	003016	DERR4B	016402	DS0	014124	ER4	017622
BP40	001310	DATA13	003020	DERR5	016440	DS0A	014206	ER4A	017666
BP50	001330	DATA14	003022	DERR6	016452	DS0B	014204	ER4A1	017660
BP60	001350	DATA15	003024	DFX	016004	DS0C	014146	ER6	017672
BP70	001370	DATA2	002776	DF0	015676	DS2A	014234	ER6A	017756
BTADDR	001030	DATA3	003000	DF0A	015572	DS3	014240	ER7	020010
BTFLG	000726	DATA4	003002	DF0A0	015614	DS4	014252	EXCRC	015370
BTOV	007172	DATA5	003004	DF0A1	015630	DT	000536	EXLRC	015372
BTOVX	007332	DATA6	003006	DF0A2	015644	DVN	000550	FC	000516
BTOV0	007212	DATA7	003010	DF0A3	015660	DOFL	014440	FCER	021022
BTOV1	007222	DATBL	002770	DF0A4	015664	EMADDR	000654	FCSAV	000634
BTOV2	007306	DATER1	001130	DF0B	015532	ENDFLG	000736	FMCNT	000556
BTOV3	007324	DATR	014766	DF0B0	015554	ENDTBL	002770	FRPRT	021036
BTPRT	007334	DAT0	014302	DF0C	015512	EOTC0	002650	GTSWR	023216
BTPRT1	007404	DAT0A	014326	DF0C0	015522	EOTREC	000662	HDRFL	000666

HERE	005032	MSG23M	025042	MSG73	026333	RANSET	004276	RD6	010522
HRDS	022122	MSG24	025047	MSG74	026344	RCNT	000554	RD7	010546
INIT	005426	MSG25	025067	MSG75	026367	RCNTR	012174	RD7A	010576
INTRF	000570	MSG26	025107	MSG76	026402	RCSAV	000632	READ	007736
LRCER	021024	MSG27	025120	MSG77	026413	RDA	007776	REGS	000544
LRCSV	021032	MSG28	025131	MSG78	026424	RDATA	033354	REOT	004330
MR	000534	MSG3	024470	MSG79	026465	RDCMD	000562	REOTC	005054
MSG1	024456	MSG30	025133	MSG8	024521	RDERR1	001150	REOTX	004760
MSG10	024537	MSG31	025200	MSG9	024531	RDER1	001110	REOTXX	005050
MSG100	026525	MSG31A	025255	MTC1	000674	RDER2	001112	REOT1A	004376
MSG101	026546	MSG32	025342	MTINT	021734	RDER3	001114	REOT1B	004424
MSG102	026575	MSG33	025363	MTINTA	021736	RDER4	001116	REOT1C	004444
MSG103	026604	MSG34	025377	NOP =	000240	RDER5	001120	REOT1E	004470
MSG104	026615	MSG35	025412	NRTP	011244	RDER6	001122	REOT1F	004440
MSG105	026632	MSG36	025433	NRZOF	000652	RDER7	001124	REOT2	004512
MSG106	026645	MSG37	025452	OCTP	024020	RDER8	001126	REOT2A	004550
MSG107	026733	MSG38	025475	OCTPG	024170	RDEX	010664	REOT3	004576
MSG109	027017	MSG39	025515	OCTPG0	024206	RDFL	015030	REOT4	004626
MSG11	024544	MSG4	024475	OCTPG1	024212	RDRTG	010760	REOT5	004642
MSG110	027051	MSG40	025555	OCTP0	024036	RDRTX	011242	REOT6	004706
MSG111	027073	MSG41	025604	OCTP1	024056	RDRTY	010672	REOT7	004736
MSG112	027105	MSG42	025616	OCTP2	024064	RDRT0	010704	RETRY	000604
MSG113	027126	MSG43	025636	OCTP3	024154	RDRT1	010736	RFHARD	002730
MSG114	027137	MSG44	025642	OFL	024232	RDRT1A	010734	RFSOFT	002670
MSG115	027150	MSG45	025671	PAPRT	022602	RDRT1B	010754	RPCNT	000702
MSG116	027173	MSG46	025703	PAPRTA	022756	RDRT2	011036	RRHARD	002750
MSG118	027247	MSG47	025710	PAPRTB	022772	RDRT3	011060	RRSOFT	002710
MSG12	024560	MSG48	025715	PAPRTC	023006	RDRT4	011064	RSEQ	007424
MSG120	027251	MSG49	025750	PAPRTD	023014	RDRT5	011066	RSEX	007560
MSG121	027317	MSG5	024502	PAPRTY	023110	RDRT5A	011132	RSF	007476
MSG13	024576	MSG50	025764	PAPRT0	022704	RDRT5B	011142	RSFR	007574
MSG14	024604	MSG52	026011	PAPRT1	023060	RDRT6	011172	RSFRX	007734
MSG15	024611	MSG53	026032	PAPRT2	023112	RDRT7	011236	RSFR0	007626
MSG16	024642	MSG54	026045	PAPRT3	023114	RDX	010670	RSFR1	007640
MSG16A	026672	MSG55	026054	PARS	014300	RD0	010034	RSFR2	007672
MSG17	024645	MSG56	026063	PATRN	000560	RD1	010102	RSF0	007532
MSG2	024463	MSG57	026067	PATS	014276	RD1A	010116	RSF1	007546
MSG20	024650	MSG58	026110	PFLG	000672	RD1B	010124	RSR	007454
MSG21	024663	MSG59	026116	PICK	017042	RD1D	010132	RSTAL	000574
MSG22	024710	MSG6	024507	PIK1	000770	RD10	010610	RTCNT	000704
MSG23	024737	MSG60	026124	PIK2	000772	RD11	010620	RTRN	000664
MSG23A	024745	MSG61	026130	PIK3	000774	RD2	010136	RTYFL	000714
MSG23B	024752	MSG62	026134	PIK4	000776	RD3	010176	RTY1	001050
MSG23C	024757	MSG64	026140	PIK5	001000	RD4	010226	RTY2	001052
MSG23D	024764	MSG65	026162	PIK6	001002	RD4A	010324	RTY3	001054
MSG23E	024772	MSG66	026173	PIK7	001004	RD4A0	010356	RTY4	001056
MSG23F	024777	MSG67	026206	PIK8	001006	RD4A1	010400	RTY5	001060
MSG23G	025004	MSG68	026216	PRB	000624	RD4A2	010422	RTY6	001062
MSG23H	025011	MSG69	026227	PRS	000622	RD4B	010430	RTY7	001064
MSG23I	025016	MSG7	024514	PSW	000606	RD4C	010434	RTY8	001066
MSG23J	025023	MSG70	026245	RANBAS	000626	RD4D	010464	RWND	005056
MSG23K	025030	MSG71	026301	RANG	023164	RD4E	010470	RWNDA	005070
MSG23L	025035	MSG72	026322	RANSAV	000630	RD5	010500	RWNDX	005376

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RWND0   005126          STTBL   001050          TINP2C  013272          WRTE    005550          W2      005656
RWND1A  005236          SWR     000610          TINP3   013312          WRTSB   006776          W3      005672
RWND2   005254          SWREG   000176          TINP3A  013642          WRTSB0  007050          W3A     005714
RWND3   005260          TAPG    021072          TINP4   013706          WRTSB1  007064          W4      006000
RWND5   005336          TAPG0   021104          TKB     000614          WRTSB2  007074          W4A     006026
RWND6   005354          TAPG1   021146          TKS     000612          WRTSB3  007150          W5      006042
SCVFL   014070          TAPG2   021160          TMEX    000564          WRTY    006374          W6      006052
SERFL   000710          TAPG3   021170          TMFLG   000700          WRTYR   006426          XOR     015342
SN      000540          TAPG3A  021240          TOB     000640          WRTYTM  006422          XORS    015366
SNPG    024412          TAPG3B  021254          TOG     023756          WRTY0   006402          YOZ     011260
SNPT    024334          TAPG3C  021274          TPB     000620          WRTY1   006502          YOZA    011320
SPFLG   000572          TAPG3D  021340          TPOS    014072          WRTY2   006504          YOZB    011326
STAL    000670          TAPG3E  021364          TPOS1   014102          WRTY2A  006550          YOZC    011346
STALL   012124          TAPG3F  021222          TPS     000616          WRTY2B  006566          YOZC0   011434
START   003026          TAPG4   021412          TSTAL   000600          WRTY3   006632          YOZC1   011450
STARTA  003160          TAPG5   021426          TTIN    023604          WRTY3A  006650          YOZC2   011456
STARTB  003164          TAPG6   021470          TTINT   021504          WRTY4   006736          YOZD    011476
STARTC  003152          TAPG7   021500          TTOUT   023646          WRTY5   006772          YOZD0   011576
STARTD  003244          TBELL   023774          TTR     023352          WRW     006350          YOZD1   011622
STARTE  003236          TC      000542          TYPE  = 000004          WRWX    006372          YOZD2   011570
START1  003406          TEMP1   000644          TYPOCT= 104400          WSTAL   000576          YOZD3   011614
START2  003524          TEMP2   000646          UDES    000552          WTER1   001070          YOZD4   011550
START3  003540          TEMP3   000650          UNP     000676          WTER2   001072          YOZE    011626
START4  003554          TEND    005004          UNX     000766          WTER3   001074          YOZF    011656
START5  004216          TIB     000642          UN1     000746          WTER4   001076          YOZG    011662
START6  004234          TINER   023566          UN2     000750          WTER5   001100          YOZH    011676
START7  004264          TINF    000636          UN3     000752          WTER6   001102          YOZ0    011272
START8  004272          TINP    012220          UN4     000754          WTER7   001104          YSTAL   000602
STAR1A  003420          TINPX   014062          UN5     000756          WTER8   001106          $ENDAD  005022
STAR1B  003440          TINP0   012606          UN6     000760          WTM     006064          $MNEW   024446
STAR1C  003474          TINP0B  012676          UN7     000762          WTM0    006126          $MSWR   024436
STAR4A  003634          TINP0C  012736          UN8     000764          WTM1    006170          $SVPC = 000040
STAR40  003566          TINP0D  012756          UPS     000716          WTM2    006200          .     = 033356
STAUT   003136          TINP0E  013014          VECT    000546          WTM3    006210          .RESTO  023330
STAUTO  003346          TINP1   013032          WC      000512          WTM4    006270          .SAVE   023306
STFLG   000640          TINP2   013110          WDATA   027346          WTM4A   006326
STP     003734          TINP2A  013166          WEX     006332          W0      005554
STPX    004202          TINP2B  013244          WRITE   005534          W1      005616

. ABS.  033356      000


 ERRORS DETECTED:  0

 ,CZTURA.SEQ/SOL_CZTURA.P11
 RUN-TIME: 60 108 6 SECONDS
 RUN-TIME RATIO: 894/175=5.0
 CORE USED:  14K  (28 PAGES)
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