

# TM11

TM11 DATA RELIABILITY 9 TRACK  
CZTMBE0

AH-9399E-MC

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FICHE 1 OF 1

MAR 1978

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MADE IN USA

This microfiche card contains a grid of frames, each containing a small table of data. The data is organized into columns and rows, with some frames containing headers and footers. The data appears to be related to the 'TM11 DATA RELIABILITY 9 TRACK' mentioned in the header. The frames are arranged in a regular grid pattern, with some frames containing more detailed data than others. The data is presented in a structured format, likely for automated processing or manual review.



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## 1. ABSTRACT

THE TM11 DATA RELIABILITY PROGRAM COLLECTS STATISTICAL INFORMATION PERTAINING TO THE DATA RELIABILITY OF THE TM11, TU10 WHEN RUN FOR EXTENDED PERIODS OF TIME. IT USES A NUMBER OF DIFFERENT PARAMETERS CONTROLLING DATA PATTERNS, RECORD LENGTHS, WRITING AND READING SEQUENCES AND STOPPING MODES (NONSTOP, START-STOP, RANDOM STALL DELAY).

## 2. REQUIREMENTS

## 2.1 EQUIPMENT

PDP-11 WITH TM11 AND 1 TO 8 TU10 TAPE UNITS (9 CHANNEL ONLY)

## 2.2 STORAGE

## 2.2.1 PROGRAM STORAGE

THE ROUTINE REQUIRES 4K OF MEMORY.

## 2.3 PRELIMINARY PROGRAMS

THE TM11 INSTRUCTION TEST AND TM11 DRIVE FUNCTION TIMER MUST RUN PROPERLY BEFORE ATTEMPTING TO USE THIS PROGRAM.

## 3. LOADING PROCEDURE

## 3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED:

1. ABSOLUTE LOADER MUST BE IN MEMORY.
2. PLACE BINARY TAPE IN READER.
3. LOAD ADDRESS \*7500 (\* DETERMINED BY LOCATION OF LOADER)
4. PRESS "START" (PROGRAM WILL LOAD).

## 4. STARTING PROCEDURE

## 4.1 CONTROL SWITCH SETTINGS

FOR INITIAL OPERATION OF PROGRAM ALL SWITCHES SHOULD BE = 0 (OR DOWN).

\*\*\*IF SOFTWARE SWITCH REGISTER IS USED THE PROGRAM WILL ALLOW MODIFICATION OF THE SOFTWARE SWITCH REGISTER IMMEDIATELY AFTER THE START OF PROGRAM. THE PROGRAM WILL TYPE THE FOLLOWING\*  
SMR=XXXXXX NEW= (REFER TO SECTION 5.1 FOR OPERATOR OPTIONS.)

## 4.2 STARTING ADDRESS

200 - BASIC TEST (AUTOMATIC PARAMETER AND UNIT SELECTION)

204 - OPERATOR CONTROLLED PARAMETER TEST (WITH 4K MEMORY AVAILABLE)

001

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SEQ 0003

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210 - " " " " ( " BK " " )

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4.3 PROGRAM AND/OR OPERATOR ACTION  
LOAD PROGRAM INTO MEMORY  
SET DESIRED TU10 TAPE UNITS ON-LINE AND WRITE ENABLED  
LOAD STARTING ADDRESS 200 (204 OR 210 TO SELECT PARAMETERS AND UNITS)  
START PROGRAM-PROGRAM WILL BEGIN TESTING FOR LOAD ADDRESS OF 200 OTHERWI  
SELECT TAPE UNITS (REFERENCE 4.3.1)  
SELECT PARAMETERS (REFERENCE 4.3.2)  
TYPE CARRIAGE RETURN AND PROGRAM WILL BEGIN TESTING.  
\*\*\*THE PROGRAM WILL ALLOW THE LOADING OF SOFTWARE SWITCH REGISTER  
AFTER PROGRAM HAS BEEN STARTED BY TYPING OUT THE FOLLOWING  
SWR=XXXXXX NEW= (REFER TO SECT 5.1 FOR OPERATOR ACTION).

4.3.1 TAPE UNIT SELECTION

STARTING THE PROGRAM AT 200 WILL RESULT IN AUTOMATIC SELECTION  
OF THE UNITS TO BE TESTED (REFERENCE 4.3.1.2) OTHERWISE STARTING  
AT 204 OR 210 WILL ALLOW OPERATOR TO SELECT THE UNITS.

THE PROGRAM WILL TYPE "SELECT UNITS". ANY CONFIGURATION OF  
1 TO 8 UNITS MAY BE SELECTED BY TYPING THE UNIT NUMBERS ON  
THE TELETYPE. ANY SEQUENCE OF NUMBERS MAY BE TYPED. AFTER  
EACH NUMBER IS TYPED A COMMA (,) WILL BE PRINTED. TYPING THE  
SAME UNIT NUMBER TWICE WILL CAUSE THAT UNIT NUMBER TO BE DELETED.  
TYPING ANY KEY OTHER THAN 0 THRU 7 WILL CAUSE A QUESTION MARK  
(?) TO BE PRINTED AND THAT KEY WILL BE IGNORED.

TO TERMINATE UNIT SELECTION TYPE A CARRIAGE RETURN. WHEN  
CARRIAGE RETURN IS TYPED THE PROGRAM WILL CONTINUE TO THE  
"PARAMETER SELECTION" UNLESS NO UNITS WERE SELECTED AND IN  
THAT EVENT WILL RETURN TO THE BEGINNING OF "SELECT UNITS".

4.3.1.1 TAPE UNIT SELECTION EXAMPLES

SELECT UNITS 3,4,5  
SELECT UNITS 5,3,4

IN EITHER CASE, UNITS 3,4,5 ARE SELECTED.

SELECT UNITS  
SELECT UNITS

A CARRIAGE RETURN WAS TYPED WITH NO UNITS SELECTED.

SELECT UNITS 1,9?,1,2

ONLY UNIT 2 SELECTED, UNIT 1 WAS DELETED (TYPED TWICE)  
AND THE 9 WAS IGNORED.

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## 4.3.1.2 AUTOMATIC UNIT SELECTION

STARTING AT 200 WILL RESULT IN AUTOMATIC SELECTION OF UNITS TO BE TESTED. A UNIT WILL BE SELECTED FOR TESTING IF IT MEETS THE FOLLOWING CRITERIA:

1. IT IS ON-LINE
2. IT IS NINE(9) TRACK
3. IT IS WRITE ENABLED

IF THE ABOVE CRITERIA IS NOT MEET BY A LEAST ONE(1) UNIT OPERATOR SELECTION WILL BE REQUIRED (REFERENCE 4.3.1).

## 4.3.2 PARAMETER SELECTION

STARTING THE PROGRAM AT 200 WILL RESULT IN AN AUTOMATIC SELECTION OF TEST PARAMETERS (REFERENCE 4.3.2.8) OTHERWISE STARTING AT ADDRESS 204 OR 210 WILL ALLOW OPERATOR TO SELECT PARAMETERS. THERE ARE FIVE TYPES OF PARAMETERS TO BE CONTROLLED BY THE OPERATOR. THEY INCLUDE: TEST NUMBER, PATTERN, RECORD LENGTH, WRITE MODE, AND READ MODE. THE PROGRAM WILL PRINT:

"TST PAT RLS WMO RMO"

TST=TEST NUMBER  
PAT=PATTERN  
RLS=RECORD LENGTH SEQUENCE  
WMO=WRITE START/STOP MODE  
RMO=READ START/STOP MODE

## 4.3.2.1 TEST NUMBER

THERE ARE 6 TESTS AVAILABLE FOR SELECTION (0 THRU 5).

TEST	DESCRIPTION
0	WRITE 1 RECORD, REPEAT ON ALL UNITS, CONTINUE TO END OF TAPE.
1	WRITE 256 RECORDS, REPEAT FOR ALL UNITS, CONTINUE TO END OF TAPE.
2	WRITE 256 RECORDS, REPEAT FOR ALL UNITS, BACKSPACE 256 RECORDS, REPEAT FOR ALL UNITS, READ 256 RECORDS, REPEAT FOR ALL UNITS, CONTINUE TO END OF TAPE.
3	WRITE 1 RECORD, REPEAT FOR ALL UNITS, BACKSPACE, REPEAT FOR ALL UNITS, READ 1 RECORD, REPEAT FOR ALL UNITS, CONTINUE TO END OF TAPE.
4	WRITE 1 RECORD, REPEAT FOR ALL UNITS, REPEAT FOR 256 RECORDS, BACKSPACE 256 RECORDS, REPEAT FOR ALL UNITS, READ 1 RECORD, REPEAT FOR ALL UNITS, REPEAT FOR 256

GO1

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RECORDS, CONTINUE TO END OF TAPE.

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READ 1 RECORD, REPEAT FOR ALL UNITS, CONTINUE TO END  
OF TAPE.

4.3.2.2 PATTERN

THERE ARE 8 DATA PATTERNS AVAILABLE FOR SELECTION (0 THRU 7)

PATTERN	DESCRIPTION	DATA	CHANNELS
0	HALF FREQUENCY, OUTSIDE SKEW	010	001
		004	400
		010	001
		004	400
		ETC.	ETC.
1	SLIDING "1"	000	040
		200	004
		100	010
		040	020
		020	100
		010	001
		004	400
		002	002
		001	200
ETC.	ETC.		
2	HIGH FREQUENCY, ALTERNATING CHANNELS	274	525
		274	525
		ETC.	ETC.

PATTERN	DESCRIPTION	DATA	CHANNELS
3	THREE 0'S, THRU 1'S, THRU 0'S	037	703
		037	703
		037	703
		300	054
		300	054
		300	054
		076	523
		076	523
		076	523
		201	244
		201	244
		201	244
		174	531
		174	531
		174	531
		003	242
		003	242
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		370	135
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007	602		
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SEQ 0008

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ETC. ETC.

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4 INCREMENTING PATTERN

000 040  
001 200  
002 002  
003 202  
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377 777  
ETC. ETC.

5 EACH CHANNEL 3 BITS

000 040  
000 040  
000 040  
200 004  
200 004  
200 004  
100 010  
100 010  
100 010  
040 020  
040 020  
040 020  
020 100  
020 100

PATTERN DESCRIPTION

DATA CHANNELS

020 100  
010 001  
010 001  
010 001  
004 400  
004 400  
004 400  
002 002  
002 002  
002 002  
001 200  
001 200  
001 200  
ETC. ETC.

6 HIGH FREQUENCY ALL CHANNELS

377 777  
377 777  
ETC. ETC.

7 RANDOM

? ?

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4.3.2.3 RECORD LENGTH SEQUENCE

THERE ARE 4 TYPES OF RECORD LENGTH SEQUENCES FOR SELECTION (0 THRU 3)

RLS	DESCRIPTION
0	MINIMUM LENGTH RECORDS (4 BYTES)
1	MAXIMUM LENGTH RECORDS (1024 BYTES)
2	VARYING LENGTH RECORDS, MINIMUM TO MAXIMUM (1ST RECORD=4 BYTES, EACH SUCCESSIVE RECORD IS 4 BYTES LONGER UNTIL 256TH RECORD=1024 BYTES)
3	VARYING LENGTH RECORDS, MAXIMUM TO MINIMUM (1ST RECORD=1048 BYTES, EACH SUCCESSIVE RECORD IS 4 BYTES SHORTER UNTIL 256TH RECORD=4 BYTES)

4.3.2.4 WRITE START/STOP MODE

THERE ARE 3 TYPES OF WRITE MODES FOR SELECTION (0 THRU 2)

WMO	DESCRIPTION
0	NONSTOP - NO WAITING BETWEEN WRITE OPERATIONS. NEW COMMAND IS ISSUED WHEN CU READY SETS.
1	START/STOP - FULL STOP BETWEEN WRITE OPERATIONS. NEW COMMAND IS ISSUED WHEN TU READY SETS.
2	RANDOM - FULL STOP WITH RANDOM DELAY (1-256 MILLISECONDS)

4.3.2.5 READ START/STOP MODE

THERE ARE 3 TYPES OF MODES FOR SELECTION (0 THRU 2)

RMO	DESCRIPTION
0	NONSTOP - NO WAITING BETWEEN READ OPERATIONS. NEW COMMAND IS ISSUED WHEN CU READY SETS.
1	START/STOP - FULL STOP BETWEEN READ OPERATIONS. NEW COMMAND IS ISSUED WHEN TU READY SETS.
2	RANDOM - FULL STOP WITH RANDOM DELAY (1-256 MILLISECONDS)

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4.3.2.6 FINAL TEST SELECT APPROVAL

AFTER SELECTING RMO, IF ALL PARAMETERS SELECTED ARE LEGAL, "OK" WILL BE PRINTED. IF THE PARAMETERS SELECTED STILL CORRESPOND TO THE OPERATORS INTENTIONS HE MUST TYPE A CARRIAGE RETURN TO SAVE THE PARAMETERS. TYPING ANY OTHER KEY NOW, OR IN FACT AT ANY TIME DURING PARAMETER SELECTION TYPING AN ILLEGAL KEY WILL CAUSE THE PRESENT PARAMETERS TO BE DELETED AND A NEW PARAMETER SELECTION TO BE INITIATED. UP TO TEN SETS OF PARAMETER SELECTIONS CAN BE MADE. EACH SET WILL BE EXECUTED AFTER THE PREVIOUS SET REACHES END OF TAPE. TO TERMINATE PARAMETER SELECTION A SECOND CARRIAGE RETURN MUST BE TYPED AFTER SELECTING A SET OF PARAMETERS.

4.3.2.7 TEST SELECTION EXAMPLES

TST	PAT	RLS	WMO	RMO	
3	2	1	0	0	OK (CR)
3	K?				
0	0	2	2	2	OKX?
0	1	2	1	0	OK (CR)

TWO PARAMETERS SETS WERE SELECTED BY THE ABOVE SEQUENCE

TEST3, PATTERN 2, MAXIMUM RECORD LENGTH, WRITE NONSTOP, AND READ NONSTOP.

TEST 0, PATTERN 1, VARYING RECORD LENGTH (MIN TO MAX), WRITE START/STOP, READ NONSTOP.

(NOTE: EVEN THOUGH TEST 0 IS A WRITE ONLY TEST, ALL PARAMETERS MUST BE SATISFIED.) (IN THIS CASE RMO HAS NO EFFECT)

IN THE SECOND PARAMETER SET A "K" WAS TYPED WHICH WAS ILLEGAL AND THE SET WAS REINITIALIZED.

IN THE THIRD PARAMETER SET AN "X" WAS TYPED INSTEAD OF A CARRIAGE RETURN AND THE PARAMETERS WERE IGNORED. AFTER AT LEAST ONE GOOD SET WAS SELECTED A CARRIAGE RETURN WAS TYPED AT THE BEGINNING OF THE PARAMETER SELECTION AND THE PROGRAM WOULD START TESTING.

4.3.2.8 AUTOMATIC PARAMETER SELECTION

STARTING AT 200 WILL CAUSE THE FOLLOWING TEST PARAMETERS TO BE SELECTED AUTOMATICALLY :

TST	PAT	RLS	WMO	RMO
3	6	1	1	1
2	7	2	2	2

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## 5.0 OPERATING PROCEDURE

## 5.1 OPERATIONAL SWITCH SETTINGS

IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER. IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH REGISTER (LOC. 176) IS USED.

## CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY DOING THE FOLLOWING:

- 1) TYPE CONTROL G <↑G>; THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.
- 2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)
- 3) 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 LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED) IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.
  - B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

THE OPERATIONAL SWITCH SETTINGS ARE USED TO:

- A. ALTER ERROR RECOVERY PROCEDURES
- B. DELETE ERROR PRINTOUTS
- C. CAUSE A TEST SEQUENCE TO BE REPEATED WITH A VARIATION THE PATTERN, RECORD LENGTH SEQUENCE, WRITE MODE, OR READ MODE

## 5.1.1 SWITCHES TO ALTER ERROR RECOVERY

THE FUNCTION PERFORMED IS WITH THE SWITCH IN THE "1" (OR UP) POSITION.

SW	FUNCTION	PURPOSE
3	PRINT AFTER	USE OF THIS SWITCH WILL CAUSE

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(000010)PARITY ERRORS

THE DATA READ TO BE COMPARED WITH THE DATA WRITTEN AFTER A PARITY ERROR HAS OCCURRED  
NOTE: THE PARITY ERROR BIT SETTING IN THE STATUS REGISTER IS CAUSED BY THE LOGICAL 'OR' OF BOTH LATERAL (CHARACTER) AND LONGITUDINAL (CHANNEL) PARITY ERRORS.

4 DELETE READ RE-TRYS  
(000020)

USE OF THIS SWITCH WILL CAUSE DELETION OF THE NORMAL SEQUENCE OF TRYING TO RE-READ A RECORD AFTER A READ ERROR. THIS WOULD BE USEFUL FOR SCOPING READ OPERATIONS.

5 DELETE WRITE XIRG  
(000040)

USE OF THIS SWITCH WILL CAUSE RECORDS WITH WRITE ERRORS TO BE LEFT ON TAPE. THE READ PASS WITH DATA TYPEOUTS SELECTED WOULD BE USEFUL FOR DETERMINING WRITE ERROR ORIGINS.

6 WRITE STATISTICAL  
(000100)RECOVERY

USE OF THIS SWITCH WILL CAUSE A BACKSPACE 2 RECORDS, SPACE FORWARD 1 RECORD, REWRITE RECORD SEQUENCE TO BE USED INSTEAD OF WRITE XIRG SO THAT THE RECORD WILL BE REWRITTEN ON APPROXIMATELY THE SAME AREA OF TAPE WHERE THE WRITE ERROR OCCURRED. THIS METHOD KEEPS THE INTER-RECORD GAP FROM GETTING LARGER. DATA IS WRITTEN OVER THE SAME SPOT ON TAPE TO TRY AND FIND BAD TAPE.

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5.1.2 SWITCHES TO CONTROL ERROR PRINTOUTS

THE FUNCTION PERFORMED IS WITH THE SWITCH IN THE "1" (OR UP) POSITION.

SW	FUNCTION	PURPOSE
13 (020000)	SUPPRESS ERROR PRINTOUT	THE STATISTICS CONCERNING THE NUMBER AND TYPES OF ERRORS WILL BE PRINTED WHEN THE TAPE UNIT REACHES END OF TAPE. FOR LONG PERIODS OF TESTING (OVERNIGHT, ETC) IT MAY BE SUFFICIENT TO RECEIVE THIS INFORMATION AND NOT HAVE A TYPEOUT EACH TIME AN ERROR OCCURRED.
8 (000400)	PRINT ERROR STATISTICS	AFTER COMPLETION OF EVERY RECORD LENGTH SEQUENCE INSTEAD OF AFTER END OF TAPE AS IS NORMAL.

5.1.3 SWITCH TO ALTER TEST PARAMETERS

THE FUNCTION PERFORMED IS WITH EACH SWITCH IN THE "1" (OR UP) POSITION.

SW	FUNCTION	PURPOSE
0	CHANGE PATTERN	AFTER COMPLETION OF A TEST SEQUENCE REPEAT WITH NEXT PATTERN. UNTIL PATTERN 7 IS REACHED.

THIS FEATURE IS USEFUL FOR TESTING MANY COMBINATIONS OF TEST PATTERNS WITHOUT REQUIRING THE OPERATOR TO TYPE IN A LARGE NUMBER OF PARAMETERS.

EXAMPLE:

TST	PAT	RLS	WMO	RMO
3	2	0	0	0
4	6	0	0	0

WITH SW0=1

TEST 3 WILL BE EXECUTED 6 TIMES (PATTERNS 2-7) AND THEN TEST 4 WILL BE EXECUTED 2 TIMES (PATTERNS 6,7)

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6. ERRORS

6.1 WRITE ERRORS

THE FOLLOWING ERROR TYPEOUTS ARE POSSIBLE DURING A WRITE OPERATION.

A. WRITE STATUS ERROR

COMD	STATUS	RECORD	LENGTH	EXPECTED	ACTUAL
XXXXXX	XXXXXX				

THIS WILL OCCUR IF ERROR (BIT 15 OF COMMAND REGISTER) SETS ON A WRITE COMMAND. THE CONTENTS OF THE COMMAND AND STATUS REGISTERS IS PRINTED ALONG WITH THE RECORD NUMBER AND RECORD LENGTH.

B. XIRG WRITTEN 4 TIMES

THIS WILL OCCUR IF A WRITE STATUS ERROR CANNOT BE ELIMINATED IN 4 ATTEMPTS AT RE-WRITING THE RECORD WITH EXTENDED INTERRECORD GAP. NOT POSSIBLE DURING TEST 0 OR 1 AS THESE ARE "WRITE ONLY" TESTS AND IT IS NOT ABSOLUTELY NECESSARY FOR THE RECORDS TO BE WRITTEN PROPERLY. SETTING SWITCH 5 TO A "1" WILL DELETE "WRITE WITH XIRG".

C. END OF TAPE

DRV	PAT	MODE	RECORD	LENGTH
0	7	SSTP	1276	MAX

WRITE ERRORS = 5  
RECOVERED AT 1 = 3  
RECOVERED AT 3 = 1  
PERMANENT BADSPOT = 1

DRV = UNIT NUMBER  
PAT = PATTERN NUMBER  
MODE = WRITE START/STOP MODE  
RECORD = NUMBER OF RECORDS  
LENGTH = LENGTH OF RECORDS

ON UNIT 0, USING PATTERN 7, WRITE MODE START/STOP, 1276 RECORDS OF MAXIMUM (1024 BYTES) LENGTH WERE WRITTEN. DURING THAT TIME 5 WRITE STATUS ERRORS OCCURRED, 3 WERE RECOVERED ON THE 1ST RE-WRITE, 1 RECOVERED ON THE 3RD RE-WRITE. THE REMAINING ERROR NOT RECOVERED IS CONSIDERED TO BE CAUSED BY A PERMANENT BAD SPOT ON TAPE.



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6.2 READ ERRORS

THE FOLLOWING ERROR TYPEOUTS ARE POSSIBLE DURING A READ OPERATION:

A. READ STATUS ERROR

COMD	STATUS	RECORD	LENGTH	EXPECTED	ACTUAL
XXXXXX	XXXXXX	47	4	XXXXXX	XXXXXX

THIS WILL OCCUR WHEN ERROR (BIT 15 OF COMMAND REGISTER) SETS DURING A READ OPERATION. THE CONTENTS OF THE COMMAND AND STATUS REGISTERS IS PRINTED ALONG WITH THE RECORD NUMBER AND RECORD LENGTH. ALSO PRINTED OUT IF SW<03> IS SET TO A 1 (SEE SECTION 5.1.1) ARE THE EXPECTED AND ACTUAL DATA VALUES FOR A READ STATUS ERROR CAUSED BY A PARITY ERROR

B. READ DATA ERROR

COMD	STATUS	RECORD	LENGTH	EXPECTED	ACTUAL
XXXXXX	XXXXXX	107	1024	177777	175777

THIS WILL OCCUR WHEN THE DATA READ DOES NOT AGREE WITH THE DATA WRITTEN. THE CONTENTS OF THE COMMAND AND STATUS REGISTERS IS PRINTED, ALONG WITH THE RECORD NUMBER AND RECORD LENGTH. ALSO PRINTED IS THE CONTENTS OF THE MEMORY ADDRESS FROM WHICH THE DATA WAS WRITTEN (EXPECTED) AND THE CONTENTS OF THE MEMORY ADDRESS INTO WHICH IT WAS READ (ACTUAL). THIS INDICATES THE FIRST DATA TRANSFER ERROR FOUND FOR THE RECORD. NO ATTEMPT IS MADE TO DETERMINE IF THERE ARE OTHER DATA ERRORS IN THE RECORD.

C. READ PASS

END OF TAPE

DRV	PAT	MODE	RECORD	LENGTH
3	4	NSTP	1276	M-MAX

READ STATUS ERRORS = 3  
DATA ERRORS = 1  
NON RECOVERABLE ERRORS = 0

ON UNIT 3, USING PATTERN 4, READ MODE NONSTOP, 1276 RECORDS OF VARYING LENGTH (4 TO 1024) WERE READ. DURING THAT TIME 2 READ STATUS ERRORS AND 1 DATA ERROR OCCURRED. THERE WERE 0 NON-RECOVERABLE ERRORS WHICH INDICATES THAT THE STATUS AND DATA ERRORS WERE ELIMINATED BY RE-READING THE RECORD UP TO THREE TIMES.

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## 6.3 ERROR RECOVERY PROCEDURES

## 6.3.1 WRITE ERROR RECOVERY

THE PROCEDURE TO RECOVER FROM A WRITE ERROR IS DETERMINED BY THE FOLLOWING:

- A. IS IT A "WRITE ONLY" TEST OR WILL THE DATA BE READ?
- B. IS "WRITE STATISTICAL RECOVERY" SELECTED (SW 6=1)?
- C. IS "DELETE WRITE WITH XIRG" SELECTED (SW 5=1)?

6.3.1.1 IF IT IS A "WRITE ONLY" TEST AND "WRITE STATISTICAL RECOVERY" IS NOT SELECTED (SW 6=0) THE WRITE ERROR IS SIMPLY COUNTED AND THE PROGRAM PROCEEDS TO THE NEXT RECORD.

6.3.1.2 IF IT IS A "WRITE ONLY" TEST AND "WRITE STATISTICAL RECOVERY" IS SELECTED (SW 6=1), A WRITE ERROR IS COUNTED AND THEN A RECOVERY SEQUENCE (BACKSPACE 2 RECORDS, SPACE FORWARD 1 RECORD, REWRITE RECORD) IS ENTERED. THIS RECOVERY SEQUENCE WILL BE REPEATED UP TO 7 TIMES IF THE WRITE ERROR PERSISTS. IF A WRITE ERROR IS NOT ELIMINATED AFTER THE 8TH ATTEMPT IT IS COUNTED AS A PERMANENT BAD SPOT ON TAPE. STATISTICS ARE SAVED TO INDICATE HOW MANY TIMES THE REWRITE SEQUENCE HAD TO BE REPEATED TO RECOVER FROM EACH WRITE ERROR.

6.3.1.3 IF IT IS A "WRITE AND READ" TEST AND "WRITE STATISTICAL RECOVERY" IS SELECTED (SW 6=1) AND "WRITE WITH XIRG" IS NOT DELETED (SW 5=0) THE PROGRAM WILL FIRST ATTEMPT TO DO A "WRITE STATISTICAL RECOVERY". IF A PERMANENT BAD SPOT IS ENCOUNTERED THE PROGRAM WILL THEN ATTEMPT TO RECOVER WITH A "WRITE WITH XIRG". FAILURE TO RECOVER AT THIS POINT SHOULD RESULT IN A READ ERROR DURING THE READ PASS.

6.3.1.4 IF IT IS A "WRITE AND READ" TEST AND "WRITE STATISTICAL RECOVERY" IS NOT SELECTED (SW 6=0) AND "WRITE WITH XIRG" IS NOT DELETED (SW 5=0) THE PROGRAM WILL TRY TO RECOVER ONLY BY REWRITING THE RECORD WITH EXTENDED INTERRECORD GAP. FAILURE TO RECOVER SHOULD RESULT IN A READ ERROR DURING READ PASS.

## 6.3.2 READ ERROR RECOVERY

A READ ERROR CAN OCCUR FOR TWO REASONS: STATUS ERROR OR DATA ERROR. A PROPER COUNT IS TAKEN FOR EACH TYPE OF ERROR. RECOVERY OF A READ ERROR WILL CONSIST OF TRYING TO RE-READ THE RECORD UP TO TWO MORE TIMES (UNLESS SW 4=1 TO DELETE READ RE-TRYS FOR SCOPING PURPOSES). IF THE ERROR PERSISTS IT IS CONSIDERED "NON-RECOVERABLE" AND THE PROGRAM WILL CONTINUE WITH THE NEXT RECORD.

## 7. RESTRICTIONS

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8. MISCELLANEOUS

8.1 TAPE LENGTH

SINCE EACH OF THE TESTS DEPEND ON REACHING THE "EOT" REFLECTOR FOR TERMINATING IT COULD BE ADVANTAGEOUS TO USE A "SHORT" TAPE. THIS WOULD ALLOW FOR LESS TIME TO RUN A SERIES OF TESTS WHILE VARYING THE TEST PARAMETERS (REFERENCE 5.1.3). HOWEVER, THIS IS NOT INTENDED TO IMPLY THAT CONSTANTLY CHANGING THE TEST PARAMETERS CONSTITUTES A MORE DIFFICULT TEST OF DATA RELIABILITY. THE LENGTH OF TIME UNDER TEST IS MORE LIKELY TO SUPPLY THAT. IN ANY EVENT, IF A "SHORT" TAPE IS DESIRED, JUST PLACE AN "EOT" REFLECTIVE STRIP APPROXIMATELY 50 FEET DOWN TAPE FROM THE "BOT" MARKER. SO THAT THE TAPE IS STILL USEFUL AS A "LONG" TAPE ANOTHER "BOT" MARKER COULD BE PLACED A SHORT DISTANCE (APPROXIMATELY 10 FEET) FARTHER DOWN ON TAPE. THIS WOULD EFFECTIVELY GIVE YOU TWO TAPES. CARE MUST BE EXERCISED WHEN MOUNTING THE TAPE TO POSITION IT AT THE PROPER "BOT" MARKER.

8.2 MEMORY AVAILABLE

THE PROGRAM REQUIRES 4K OF MEMORY. IF 8K IS AVAILABLE, STARTING THE PROGRAM AT ADDRESS 200 OR 210 WILL EXPAND THE WRITE AND READ BUFFERS SO THAT THE MINIMUM LENGTH RECORDS WILL BE 8 BYTES AND MAXIMUM LENGTH RECORDS WILL BE 2048 BYTES.

9. PROGRAM DESCRIPTION

9.1 GENERAL DESCRIPTION

THE PROGRAM IS DESIGNED AROUND TWO MAIN SUBROUTINES "WRITE" AND "READ" AND A SERIES OF MINOR SUBROUTINES FOR MANIPULATING UNIT SELECTION, HANDLING ERROR STATISTICS, AND RECORD POSITIONING. IF MORE THAN ONE UNIT IS SELECTED THE UNIT WITH THE LOWEST NUMBER IS SELECTED FIRST AND WHEN THE SEQUENCE IS COMPLETED THEN THE NEXT LOWEST UNIT NUMBER IS SELECTED UNTIL ALL UNITS HAVE BEEN SELECTED. THIS PROCESS IS REPEATED UNTIL ALL UNITS REACH END OF TAPE.

9.2 TEST 0

THIS IS A "WRITE ONLY" TEST. THE PROCEDURE IS TO WRITE 1 RECORD, REPEAT FOR ALL UNITS, CONTINUE UNTIL EOT. WRITE MODE OF NONSTOP (WMO=0) WILL NOT BE AN EFFECTIVE SELECTION FOR THIS TEST BECAUSE THE WRITE ROUTINE IS EXITED AFTER EACH RECORD TO DETERMINE IF ANY OTHER UNITS ARE SELECTED. READ MODE (RMO) HAS NO EFFECT ON THIS TEST.

9.3 TEST 1

THIS IS A "WRITE ONLY" TEST SIMILAR TO TEST 0 EXCEPT A SEQUENCE OF 256 RECORDS IS WRITTEN ON EACH UNIT BEFORE CHANGING TO THE NEXT UNIT. READ MODE (RMO) HAS NO EFFECT ON THIS TEST.

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## 9.4 TEST 2

THIS IS A "WRITE AND READ" TEST. THE PROCEDURE IS TO WRITE 256 RECORDS ON EACH UNIT, THEN BACKSPACE 256 RECORDS ON EACH UNIT, THEN READ 256 RECORDS ON EACH UNIT, AND THEN REPEAT THE SEQUENCE UNTIL ALL UNITS ARE AT EOT.

## 9.5 TEST 3

THIS IS A "WRITE AND READ" TEST. THE PROCEDURE IS TO WRITE 1 RECORD, BACKSPACE, READ 1 RECORD AND REPEAT FOR EACH UNIT, THEN REPEAT THE SEQUENCE UNTIL ALL UNITS ARE AT EOT. WRITE MODE OR READ MODE OF NONSTOP (WMO=0 OR RMO=0) WILL NOT BE EFFECTIVE FOR THIS TEST.

## 9.6 TEST 4

THIS IS A "WRITE AND READ" TEST. IT IS SIMILAR TO TEST 2 EXCEPT UNITS ARE CHANGED BETWEEN EACH RECORD DURING WRITE, BACKSPACE, AND READ. WRITE MODE OR READ MODE OF NONSTOP (WMO=0 OR RMO=0) WILL NOT BE EFFECTIVE FOR THIS TEST.

## 9.7 TEST 5

THIS IS A "READ ONLY" TEST. THE PROCEDURE IS TO READ 1 RECORD, REPEAT FOR ALL UNITS, AND CONTINUE UNTIL ALL UNITS ARE AT EOT. THE MAIN PURPOSE OF THIS TEST IS TO PROVE COMPATIBILITY AMONG TAPE UNITS. A TAPE THAT IS WRITTEN ON ONE UNIT SHOULD BE ABLE TO BE READ ON ANY OTHER UNIT. TEST PARAMETERS THAT SELECT PATTERN AND RECORD LENGTH SEQUENCE MUST BE THE SAME AS THOSE USED TO WRITE THE DATA ON TAPE. ANY OF THE OTHER TESTS (0 THRU 4) CAN BE USED TO GENERATE THE DATA.

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10. LISTING  
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.TITLE TM 11 DATA RELIAB 9TRK  
;COPYRIGHT 1970, 1971, 1972, 1973, 1976 1977 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 017  
;REVISED SEPT 1971, J.RODENHISER  
;REVISED AUGUST 1972, J. LACEY  
;REVISED TO REV.B SEPT., 1973 BY BRUCE BURGESS - DIAGNOSTIC ENGINEERING  
THE FOLLOWING ADDITIONS AND/OR CORRECTIONS MAKE  
UP REV.B :  
(A) CODE TO COVER ACT-11 AND MAGTAPE DDP OPTIONS  
(B) SECTION TO PRINT OUT GOOD AND BAD DATA (EXPECTED AND ACTUAL)  
ON READ STATUS ERRORS CAUSED BY PARITY ERRORS. THIS SECTION  
IS ENABLED BY SETTING SW<03> TO A '1'. SEE SECTION 5.1.1  
OF THE DOCUMENT.  
;REVISED TO REV. D MAR., 1976 BY SAM CARPENTER-DIAGNOSTIC ENGINEERING  
(A) MODIFIED TO SUPPORT SOFTWARE SWITCH REGISTER  
(B) ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER FROM TTY  
BY PRESSING A CNTL G  
(C) PROGRAM WILL ALLOW THE LOADING OF THE SOFTWARE SWITCH REGISTER AT START  
IF NO HARDWARE SWITCH REGISTER IS AVAILABLE OR IF THE  
HARDWARE SWITCH REGISTER CONTAINS ALL 1'S.  
;REVISED DECEMBER 1977, CLEM WALSH

000000  
000001  
000002  
000003  
000004  
000005  
000006  
000007

R0=%0  
R1=%1  
R2=%2  
R3=%3  
R4=%4  
R5=%5  
SP=%6  
PC=%7

000000  
000034 012326

.ENABL ABS, AMA  
=0  
;TRAP CATCHER IN UNUSED LOCATIONS 0-476  
=34  
TRAP34

\*\*\*\*\*  
;SOFTWARE SWITCH REGISTER IS LOCATED AT LOC. 176  
;BEFORE STARTING REFER TO SECTION 5.1 OF DOCUMENT  
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MODIFIED DEC 16 1977  
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ACT11 AND XXDP MODE INDICATORS  
--  
AUTOM: .WORD 0 ; AUTOMATIC MODE INDICATOR  
ACT11M: .BYTE 0 ; ACT11 AUTO MODE INDICATOR  
XXDPM: .BYTE 0 ; XXDP AUTO MODE INDICATOR  
ADUMPM: .BYTE 0 ; ACT11 DUMP MODE INDICATOR  
XDUMPM: .BYTE 0 ; XXDP DUMP MODE INDICATOR  
\*\*\*\*\*

000036 000000  
000040 000  
000041 000  
000042 000  
000043 000



917					
918		000176		.=176	
919	000176	000000		SWREG: .WORD 0	;SOFTWARE SWITCH REGISTER
920		000200		.=200	
921	000200	000137	001354	JMP	AUTOST
922	000204	000137	002066	JMP	MEM4K
923	000210	000137	002112	JMP	MEM6K

924					
925		000500		STACK=500	
926		000500		.=500	
927	000500	172520		MTS: 172520	
928	000502	172522		MTC: 172522	
929	000504	172524		BC: 172524	
930	000506	172526		CA: 172526	
931	000510	177776		CC: 177776	
932	000512	177570		SWR: 177570	
933	000514	177560		TKS: 177560	
934	000516	177562		TKB: 177562	
935	000520	177564		TPS: 177564	
936	000522	177566		TPB: 177566	
937	000524	002000		MAXLEN: 1024.	;MAX RECORD LENGTH
938	000526	000004		MINLEN: 4.	;MIN RECORD LENGTH
939	000530	014074		WBUF: BUFFER	;STARTING ADDRESS OF WRITE BUFFER
940	000532	016074		RBUF: BUFFER+1024.	;STARTING ADDRESS OF READ BUFFER
941	000534	000224		MTV: 224	

942					
943					
944	000536	000000		: TEMPORARY STORAGE AREAS	
945	000540	000000		ATST: 0	
946	000542	000000		DRVSEL: 0	
947	000544	000000		STRLEN: 0	
948	007546	000000		LENGTH: 0	
949	000550	000000		MSBITS: 0	
950	000552	000000		SVRECR: 0	
951	000554	000000		COMAND: 0	
952	000556	000000		CDRVBT: 0	
953	000560	000000		CDRIVE: 0	
954	000562	000000		RDPASS: 0	
955	000564	000000		WRPASS: 0	
956	000566	000000		BLKINC: 0	
957	000570	000000		STATRD: 0	
958	000572	000000		WRCHK: 0	
959	000574	000000			
960	000576	000000			
961	007600	000000			
962	000602	000000			
963	000604	000000			
964	000606	000000			
965					
966	000610	000000		PERMBS: 0	
967	000612	000000		RECORD: 0	
968	000614	000000		WRRECR: 0	
969	000616	000000		LASRCR: 0	
970	000620	000000		RDERRS: 0	
971	000622	000000		DAERRS: 0	
972	000624	000000		NRREAD: 0	

973	000626	000000	WRTLEN: 0			
974	000630	000000	READLN: 0			
975	000632	000000	MODES: 0			
976						
977	000634	000654	DRVADR: DOTAB			
978	000636	000720	D1TAB			
979	000640	000764	D2TAB			
980	000642	001030	D3TAB			
981	000644	001074	D4TAB			
982	000646	001140	D5TAB			
983	000650	001204	D6TAB			
984	000652	001250	D7TAB			
985						
986	000654	000000	DOTAB: 0			
987		000720	=DOTAB+44			
988	000720	000000	D1TAB: 0			
989		000764	=D1TAB+44			
990	000764	000000	D2TAB: 0			
991		001030	=D2TAB+44			
992	001030	000000	D3TAB: 0			
993		001074	=D3TAB+44			
994	001074	000000	D4TAB: 0			
995		001140	=D4TAB+44			
996	001140	000000	D5TAB: 0			
997		001204	=D5TAB+44			
998	001204	000000	D6TAB: 0			
999		001250	=D6TAB+44			
1000	001250	000000	D7TAB: 0			
1001		001314	=D7TAB+44			
1002	001314	000000	CHARIN: 0			
1003	001316	000000	NUMTST: 0			
1004	001320	000000	PARAM: 0			
1005	001322	000000	TSTEX: 0			
1006	001324	000000	TEST: 0			
1007						
1008	001326	000000	TSTTBL: 0			
1009	001330	000000	0			
1010	001332	000000	0			
1011	001334	000000	0			
1012	001336	000000	0			
1013	001340	000000	0			
1014	001342	000000	0			
1015	001344	000000	0			
1016	001346	000000	0			
1017	001350	000000	0			
1018	001352	000000	0			
1019						
1020	001354	012706	000500	AUTOST: MOV #STACK, SP	; SETUP THE SP	
1021	001360	104432		SUSWR	; CHECK FOR HARDWARE SWICH REG	
1022	001362	004737	012404	JSR PC, CKMODE	; CHECK FOR MODE OF OPERATION ++ C.W	
1023	001366	022737	000176	000512	CMP #SWREG, SWR	
1024	001374	001004		BNE 1\$		
1025	001376	004737	012024	JSR PC, CNTLU	; ALLOW SWREG TO BE CHANGED	
1026	001402	004737	012404	JSR PC, CKMODE	; CHECK FOR MODE OF OPERATION	
1027	001406	012737	177777	000536	1\$: MOV #-1, ATST	
1028	001414	012737	036025	001326	MOV #36025, TSTTBL	; SETUP TEST PARAMETERS

```

; CHARACTER JUST INPUT
; NUMBER OF TEST
; TEST PARAMETERS
; POINTS TO TEST PARAMETERS TO BE EXECUTED
; CONTAINS CURRENT TEST NUMBER

; TEST TABLE
; UP TO 10 TESTS CAN BE SELECTED TO
; BE RUN IN CONSECUTIVE ORDER

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1029 001422 012737 040052 001330      MOV      #40052,TSTTBL+2
1030 001430 012737 027052 001332      MOV      #27052,TSTTBL+4
1031 001436 012737 000003 001316      MOV      #3,NUMTST
1032 001444 012737 123456 007374      MOV      #123456,LONUM      ;PRIME RANDOM NUMBER GENERATER
1033 001452 012737 176543 007376      MOV      #176543,HINUM
1034                                     ;DETERMINE THE SIZE OF THE WRITE AND READ BUFFERS.
1035 001460 012737 001474 000004      MOV      #NXMRET,#4      ;SETUP NXM VECTOR
1036 001466 005737 024074      TST      BUFFER+4096.      ;OVER 4K OF MEMORY?
1037 001472 000413      BR      OVER4K      ;BR IF YES
1038 001474 022626      NXMRET: CMP      (SP)+,(SP)+      ;POP THE STACK
1039 001476 012737 000004 000526      MOV      #4,MINLEN
1040 001504 012737 002000 000524      MOV      #1024,MAXLEN
1041 001512 012737 016074 000532      MOV      #BUFFER+1024.,RBUF
1042 001520 000411      BR      TU.SEL      ;GO SELCT DRIVES
1043 001522 012737 000010 000526      OVER4K: MOV      #8,MINLEN
1044 001530 012737 004000 000524      MOV      #2048,MAXLEN
1045 001536 012737 020074 000532      MOV      #BUFFER+2048.,RBUF
1046                                     ;DETERMINE DRIVES TO BE TESTED.
1047                                     ;A DRIVE WILL BE TESTED IF:
1048                                     1. IT CAN BE SELECTED
1049                                     2. IT IS 9 TRACK
1050                                     3. IT IS WRITE ENABLED
1051 001544 012737 000006 000004      TU.SEL: MOV      #6,#4      ;SET TRAP CATCHER
1052 001552 012777 010000 176722      MOV      #10000,#MTC      ;PWR CLR
1053 001560 005037 000540      CLR      DRVSEL      ;CLEAR DRIVE TABLE
1054 001564 005037 000546      CLR      MSBITS
1055 001570 012700 000200      MOV      #200,R0      ;R0=DRIVE 0
1056 001574 105777 176702      TSTB    #MTC
1057 001600 100036      BPL     IDSELF      ;BR IF NO CU RDY
1058 001602 123737 000041 000004      CMPB    #41,4      ;DDP ON MAGTAPE?
1059 001610 001426      BEQ     NO.SEL      ;IF YES - SKIP DRIVE 0
1060 001612 013777 000540 176662      NXT.TU: MOV      DRVSEL,#MTC      ;SELECT A DRIVE
1061 001620 012702 000024      MOV      #20,R2      ;SETUP R2 FOR WAIT LOOP
1062 001624 032777 000100 176646      USSTST: BIT     #100,#MTC      ;DOES DRIVE EXIST?
1063 001632 001003      BNE     USS.OK      ;BR IF YES
1064 001634 005302      DEC     R2      ;KILL SOME TIME
1065 001636 003372      BGT     USSTST
1066 001640 000412      BR      NO.SEL      ;DRIVE IS NON-EXISTENCE
1067 001642 032777 000020 176630      USS.OK: BIT     #20,#MTC      ;IS THIS DRIVE 7 OR 9 CHN?
1068 001650 001006      BNE     NO.SEL      ;BR IF 7 CHN.
1069 001652 032777 000004 176620      BIT     #4,#MTC      ;IS WRITE LOCK ON?
1070 001660 001002      BNE     NO.SEL      ;BR IF YES
1071 001662 050037 000546      BIS     R0,MSBITS      ;PUT DRIVE INTO TABLE
1072 001666 105237 000541      NO.SEL: INCB   DRVSEL+1      ;INC. THE DRIVE NUMBER
1073 001672 006200      ASR     R0      ;HAS ALL DRIVES BEEN TESTED FOR EXISTENCE?
1074 001674 001346      BNE     NXT.TU      ;BR IF NO
1075
1076                                     ;TYPE-OUT NAME OF PROGRAM AND MIN. AND MAX. RECORD LENGTHS.
1077
1078 001676 105737 000040      IDSELF: TSTB   ACT11M      ;ACT11 MODE?
1079 001702 001011      BNE     3$      ;BRANCH - IF YES
1080 001704 012702 013177      MOV     #MSG10A,R2
1081 001710 104404      TOP
1082 001712 013702 000526      MOV     MINLEN,R2
1083 001716 104426      DECPRT
1084 001720 013702 000524      MOV     MAXLEN,R2      ;PRINT MIN. LENGTH
    
```



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1141 002210 104400 SELDRV: WAITKY
1142 002212 122737 000015 001314 CMPB #15,CHARIN ;WAS CHARACTER A CARRIAGE RETURN?
1143 002220 001010 BNE SELD1 ;NO
1144 002222 005737 000546 TST MSBITS ;YES, WERE ANY DRIVES SELECTED
1145 002226 001744 BEQ START1 ;NO
1146 002230 005737 000536 TST ATST ;YES--IS AUTO SWITCH SET?
1147 002234 001454 BEQ SELTST ;NO--GO SELECT TESTS
1148 002236 000137 003056 JMP EXECUT ;YES--GO START TESTING
1149 002242 122737 000070 001314 SELD1: CMPB #70,CHARIN ;IS CHARACTER A VALID NUMBER 0-7?
1150 002250 003404 BLE SELD2 ;NO, PRINT "?"
1151 002252 122737 000060 001314 CMPB #60,CHARIN ;IS CHARACTER A VALID NUMBER 0-7?
1152 002260 003407 BLE VAL1D ;YES
1153 002262 105777 176232 SELD2: TSTB @TPS
1154 002266 100375 BPL .-4
1155 002270 012777 000077 176224 MOV #'?,@TPB ;PRINT '?'
1156 002276 000424 BR VAL4
1157 ;HAVE VALID DRIVE NUMBER
1158 002300 142737 000270 001314 VALID: BICB #270,CHARIN ;MASK OUT NUMBER
1159 002306 105137 001314 COMB CHARIN
1160 002312 012700 000200 MOV #200,R0 ;INITIALIZE BIT POSITION FOR DRIVE 0
1161
1162
1163 002316 105237 001314 VAL1: INCB CHARIN ;+1 TO DRIVE SELECT
1164 002322 001402 BEQ VAL2 ;HAVE DRIVE OF EQUAL TO ZERO
1165 002324 006200 RO ;MOVE BIT POSITION TO NEXT DRIVE
1166 002326 000773 BR VAL1 ;TRY AGAIN
1167 002330 130037 000546 VAL2: BITB RO,MSBITS ;COMPARE DRIVE SELECT WITH PREVIOUS SELECTED
1168 002334 001003 BNE VAL3 ;DRIVE WASN'T PREVIOUSLY SET, SO SET IT NOW.
1169 002336 150037 000546 BISB RO,MSBITS
1170 002342 000402 BR VAL4 ;DRIVE WAS SET, CLEAR IT.
1171 002344 140037 000546 VAL3: BICB RO,MSBITS
1172 002350 105777 176144 VAL4: TSTB @TPS
1173 002354 100375 BPL .-4
1174 002356 012777 000054 176136 MOV #' ,@TPB ;PRINT COMMA
1175 002364 000711 BR SELDRV ;RETURN TO WAIT FOR NEXT KEY
1176 ;HAVE DRIVES SELECTED-NOW GET TEST SELECTION
1177 002366 012702 012636 SELTST: MOV #MSG2,R2
1178 002372 104404 TOP ;PRINT 'SELECT TESTS'
1179 002374 005037 001316 CLR NUMTST ;CLEAR TEST NUMBERS SELECTED
1180 002400 012700 001326 MOV #TSTTABL,R0 ;INITIALIZE TEST TABLE POINTER
1181 002404 104400 SELT1: WAITKY
1182 002406 122737 000015 001314 CMPB #15,CHARIN ;WAS CHARACTER A CARRIAGE RETURN?
1183 002414 001005 BNE SELT2 ;WERE ANY TESTS SELECTED?
1184 002416 005737 001316 TST NUMTST ;NO
1185 002422 001412 BEQ SELT3 ;YES, EXECUTE TESTS
1186 002424 000137 003056 JMP EXECUT ;IS CHARACTER A VALID NUMBER 0-5
1187 002430 122737 000066 001314 SELT2: CMPB #66,CHARIN ;NO
1188 002436 003404 BLE SELT3 ;IS CHARACTER A VALID NUMBER 0-5
1189 002440 122737 000060 001314 CMPB #60,CHARIN ;YES
1190 002446 003404 BLE SELPAT
1191 002450 012702 012610 SELT3: MOV #MSG0,R2
1192 002454 104404 TOP ;RETURN TO WAIT FOR TEST SELECT
1193 002456 000752 BR SELT1 ;ROTATE TEST NUMBER INTO POSITION
1194 002460 013704 001314 SELPAT: MOV CHARIN,R4
1195 002464 000304 SWAB R4
1196 002466 006104 ROL R4

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1197 002470 006104 ROL R4
1198 002472 006104 ROL R4
1199 002474 006104 ROL R4
1200 002476 042704 107777 BIC #107777,R4
1201 002502 104430 SP3
1202 ;TYPE 3 SPACES
1203 ;HAVE VALID TEST SELECTED, NOW GET SELECTED PATTERN
1204 002504 104400 WAITKY
1205 002506 122737 000070 001314 CMPB #70,CHARIN ;IS CHARACTER A VALID NUMBER 0-7
1206 002514 003755 BLE SELT3 ;NO
1207 002516 122737 000057 001314 CMPB #57,CHARIN ;IS CHARACTER A VALID NUMBER 0-7
1208 002524 002351 BGE SELT3 ;NO
1209 002526 000337 001314 SWAB CHARIN ;MOVE PATTERN SELECT INTO POSITION
1210 002532 006137 001314 ROL CHARIN
1211 002536 042737 170777 001314 BIC #170777,CHARIN
1212 002544 053704 001314 BIS CHARIN,R4 ;COMBINE PATTERN WITH TEST
1213 SP3
1214 ;WAIT FOR RECORD LENGTH SEQUENCES SELECTION
1215 002552 104400 SELRLS: WAITKY
1216 002554 122737 000060 001314 CMPB #60,CHARIN ;IS CHARACTER=0
1217 002562 001424 BEQ SELR3 ;YES, RLS=MIN
1218 002564 122737 000061 001314 CMPB #61,CHARIN ;IS CHARACTER=1
1219 002572 001003 BNE SELR1
1220 002574 052704 000020 BIS #20,R4 ;SET RLS=MAX
1221 002600 000415 BR SELR3
1222 002602 122737 000062 001314 SELR1: CMPB #62,CHARIN ;IS CHARACTER=2
1223 002610 001003 BNE SELR2
1224 002612 052704 000040 BIS #40,R4 ;SET RLS=MIN-MAX
1225 002616 000406 BR SELR3
1226 002620 122737 000063 001314 SELR2: CMPB #63,CHARIN ;IS CHARACTER=3
1227 002626 001310 BNE SELT3
1228 002630 052704 000060 BIS #60,R4 ;SET RLS=MAX-MIN
1229 002634 104430 SELR3: SP3
1230 ;WAIT FOR WRITE MODE SELECTION
1231 002636 104400 WAITKY
1232 002640 122737 000060 001314 CMPB #60,CHARIN
1233 002646 001415 BEQ SELW2 ;SET WMO=NONSTOP
1234 002650 122737 000061 001314 CMPB #61,CHARIN
1235 002656 001003 BNE SELW1
1236 002660 052704 000004 BIS #4,R4 ;SET WMO=START-STOP
1237 002664 000406 BR SELW2
1238 002666 122737 000062 001314 SELW1: CMPB #62,CHARIN
1239 002674 001265 BNE SELT3
1240 002676 052704 000010 BIS #10,R4 ;SET WMO=RANDOM
1241 002702 104430 SELW2: SP3
1242 ;WAIT FOR READ MODE SELECTION
1243 002704 104400 WAITKY
1244 002706 122737 000060 001314 CMPB #60,CHARIN
1245 002714 001415 BEQ SELRM2 ;SET RMO=NONSTOP
1246 002716 122737 000061 001314 CMPB #61,CHARIN
1247 002724 001003 BNE SELRM1
1248 002726 052704 000001 BIS #1,R4 ;SET RMO=START-STOP
1249 002732 000406 BR SELRM2
1250 002734 122737 000062 001314 SELRM1: CMPB #62,CHARIN
1251 002742 001242 BNE SELT3
1252 002744 052704 000002 BIS #2,R4 ;SET RMO=RANDOM

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1253 C02750 104430 SELRM2: SP3
1254
1255 ;HAVE ALL PARAMETERS
1256 002752 012702 012713 MOV #MSG6,R2
1257 002756 104404 TOP ;PRINT "OK"
1258 002760 104400 WAITKY ;WAIT FOR CARRIAGE RETURN
1259 002762 122737 000015 001314 CMPB #15,CHARIN
1260 002770 001402 BEQ .+6
1261 002772 000137 002450 JMP SELT3
1262 002776 105777 175516 TSTB @TPS
1263 003002 100375 BPL .-4
1264 003004 012777 000012 175510 MOV #12,@TPB
1265 003012 105777 175502 TSTB @TPS
1266 003016 100375 BPL .-4
1267 003020 012777 000040 175474 MOV #40,@TPB
1268 003026 010420 MOV R4,(0)+
1269 003030 005237 001316 INC NUMTST ;+1 TO TEST COUNT
1270 003034 022737 000012 001316 CMP #10,NUMTST ;EQUAL TO TEN YET
1271 003042 001402 BEQ SELOK1 ;YES
1272 003044 000137 002404 JMP SELT1 ;NO, ACCEPT NEXT SET
1273 003050 012702 012666 SELOK1: MOV #MSG5,R2
1274 003054 104404 TOP
1275
1276 ;EXECUTE SELECTED TEST
1277 003056 005037 000632 EXECUT: CLR MODES ;INITIALIZE MODES
1278 003062 012737 001326 001322 MOV #TSTTBL,TSTEX
1279 003070 017737 176226 001320 EXEC: MOV @TSTEX,PARAM ;GET TEST PARAMETERS
1280 003076 013700 001320 EXEC1: MOV PARAM,R0
1281 003102 042700 007777 BIC #7777,R0
1282 003106 010037 001324 MOV R0,TEST
1283 003112 001475 BEQ TEST0
1284 003114 022700 010000 CMP #10000,R0
1285 003120 001516 BEQ TEST1
1286 003122 022700 020000 CMP #20000,R0
1287 003126 001537 BEQ TEST2
1288 003130 022700 030000 CMP #30000,R0
1289 003134 001002 BNE IS
1290 003136 000137 003544 JMP TEST3
1291 003142 022700 040000 IS: CMP #40000,R0
1292 003146 001402 BEQ .+6
1293 003150 000137 004204 JMP TEST5
1294 003154 000137 003662 JMP TEST4
1295
1296 ;RETURN HERE AFTER COMPLETION OF TEST
1297 003160 104434 DONE: CKSWR ;CHECK FOR CNTL G
1298 003162 012702 014020 MOV #MSG26,R2
1299 003166 104404 TOP
1300 003170 032777 000001 175314 BIT #1,@SWR ;IS SW 0=1 TO REPEAT TEST WITH ALL PATTERNS
1301 003176 001413 BEQ DONE1 ;NO
1302 003200 013700 001320 MOV PARAM,R0
1303 003204 042700 170777 BIC #170777,R0
1304 003210 022700 007000 CMP #7000,R0 ;REACHED PATTERN 7?
1305 003214 001404 BEQ DONE1 ;YES
1306 003216 062737 001000 001320 ADD #1000,PARAM ;NO +1 TO PATTERN
1307 003224 000724 BR EXEC1 ;REPEAT TEST
1308 003232 001021 DONE1: DEC NUMTST
BNE DOAGN

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1309 003234 013701 000042      MOV      J#42,R1
1310 003240 001002      BNE     SENDAD
1311 003242 000000      HALT
1312 003244 104434      CKSWR
1313 003246 004711      SENDAD: JSR     PC,(R1)
1314 003250 000240      NOP
1315 003252 000240      NOP
1316 003254 000240      NOP
1317 003256 105737 000040      TSTB   ACT11M      ;ACT11 MODE? ++ C.W
1318 003262 001405      BEQ    DOAGN       ;BRANCH - IF NO ++ C.W
1319 003264 012702 014025      MOV    #MSG27,R2  ;GET END OF PASS MESSAGE
1320 003270 104404      TOP
1321 003272 000137 001354      JMP    AUTOST      ;TYPE END OF PASS
1322 003276 062737 000002 001322 DOAGN: ADD    #2,TSTEX    ;CONTINUE TEST
1323 003304 000671      BR     EXEC        ;DO NEXT TEST
1324
1325      ;TEST0
1326      ;WRITE ONE RECORD, CHANGE DRIVES, GO TO EOT
1327 003306 052737 000002 000632 TEST0: BIS    #2,MODES ;EXIT WRITE EVERY RECORD, NO READ PASS
1328 003314 104420      CLRALL ;CLEAR ERROR COUNTERS AND REWIND
1329 003316 104416      GENPAT ;GENERATE PATTERN
1330 003320 104410      TO:    RSFDRV      ;RESET DRIVE SELECTION TO LOWEST NUMBER
1331 003322 104414      TOA:   MVCTRS      ;RESTORE DRIVE COUNTERS
1332 003324 032737 000040 000632      BIT    #40,MODES  ;IS THIS DRIVE AT EOT?
1333 003332 001002      BNE    TOB         ;YES, SKIP WRITE
1334 003334 104402      WRITIT ;WRITE
1335 003336 104406      SVCTRS ;SAVE DRIVE COUNTERS
1336
1337 003340 104422      TOB:   CHGDRV      ;ANY MORE DRIVES SELECTED?
1338 003342 000767      BR     TOA         ;YES
1339 003344 004737 004776      JSR    PC,ALLEOT  ;ARE ALL DRIVES AT EOT?
1340 003350 000763      BR     TO         ;NO
1341 003352 000137 003160      JMP    DONE        ;YES, EXIT
1342
1343      ;TEST1
1344      ;WRITE RECORD LENGTH SEQUENCE, GO TO NEXT DRIVE, CONTINUE TO EOT ON ALL DRIVES.
1345 003356 052737 000001 000632 TEST1: BIS    #1,MODES ;EXIT WRITE AFTER RLS, NO READ PASS
1346 003364 104420      CLRALL ;CLEAR ERROR COUNTERS AND REWIND
1347 003366 104416      GENPAT ;GENERATE PATTERN
1348 003370 104410      T1:    RSFDRV      ;RESET DRIVE SELECTION TO LOWEST NUMBER
1349 003372 104414      T1A:   MVCTRS      ;RESTORE DRIVE COUNTERS
1350 003374 032737 000040 000632      BIT    #40,MODES  ;IS THIS DRIVE AT EOT?
1351 003402 001002      BNE    T1B        ;YES, SKIP WRITE
1352 003404 104402      WRITIT ;WRITE
1353 003406 104406      SVCTRS ;SAVE DRIVE COUNTERS
1354 003410 104422      T1B:   CHGDRV      ;ANY MORE DRIVE SELECTED?
1355 003412 000767      BR     T1A        ;YES
1356 003414 004737 004776      JSR    PC,ALLEOT  ;ARE ALL DRIVES AT EOT?
1357 003420 000763      BR     T1         ;NO
1358 003422 000137 003160      JMP    DONE        ;YES EXIT
1359
1360      ;TEST2
1361      ;WRITE A RECORD LENGTH SEQUENCE, CHANGE DRIVES, CHANGE DRIVES, CONTINUE TO EOT ON ALL DRIVES
1362 003426 052737 000005 000632 TEST2: BIS    #5,MODES ;EXIT WRITE AFTER RLS, DO READ PASS
1363 003434 104420      BACKSPACE ;CHANGE DRIVES, READ,
1364 003436 104416      CLRALL ;CLEAR ERROR COUNTERS AND REWIND
1365      GENPAT ;GENERATE PATTERN
    
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1365	003440	104410			T2:	RSFDRV	;; SET DRIVE SELECTION TO LOWEST NUMBER
1366	003442	104414			T2A:	MVCTRS	;; RESTORE DRIVE COUNTERS
1367	003444	032737	000040	000632		#40, MODES	;; IS THIS DRIVE AT EOT?
1368	003452	001002			BIT	T2B	;; YES, SKIP WRITE
1369	003454	104402			BNE	WRITIT	;; WRITE
1370	003456	104406				SVCTRS	;; SAVE DRIVE COUNTERS
1371	003460	104422			T2B:	CHGDRV	;; ANYMORE DRIVES SELECTED?
1372	003462	000767			BR	T2A	;; YES
1373	003464	104414			T2C:	MVCTRS	;; RESTORE DRIVE COUNTERS
1374	003466	032737	000020	000632		#20, MODES	;; IS THIS READ AT EOT?
1375	003474	001003			BIT	T2D	;; YES, SKIP BACKSPACE
1376	003476	004737	011072		BNE	PC, GOBKWD	;; BACKSPACE
1377	003502	104406			JSR	SVCTRS	;; SAVE DRIVE COUNTERS
1378	003504	104422			T2D:	CHGDRV	;; ANY MORE DRIVES SELECTED?
1379	003506	000766			BR	T2C	;; YES
1380	003510	104414			T2E:	MVCTRS	;; RESTORE DRIVE COUNTERS
1381	003512	032737	000020	000632		#20, MODES	;; IS THIS READ AT EOT
1382	003520	001001			BIT	T2F	;; YES, SKIP READ
1383	003522	104424			BNE	READIT	;; READ
1384	003524	104406			T2F:	SVCTRS	;; SAVE DRIVE COUNTERS
1385	003526	104422				CHGDRV	;; ANYMORE DRIVES SELECTED?
1386	003530	000767			BR	T2E	;; YES
1387	003532	004737	004776		JSR	PC, ALLEOT	;; ARE ALL DRIVES AT EOT?
1388	003536	000740			BR	T2	;; NO
1389	003540	000137	003160		JMP	DONE	;; YES EXIT
1390							
1391					;; TEST3		
1392					WRITE	ONE RECORD, CHANGE DRIVES,	BACKSPACE, CHANGE DRIVES, READ, CHANGE DRIVES
1393	003544	052737	000006	000632	TEST3:	BIS	;; EXIT WRITE EVERY RECORD, DO READ PASS
1394	003552	104420				#6, MODES	;; CLEAR ERROR COUNTERS AND REWIND
1395	003554	104416				CLALL	;; GENERATE PATTERN
1396	003556	104410			T3:	RSFDRV	;; SET DRIVE SELECTION TO LOWEST NUMBER
1397	003560	104414			T3A:	MVCTRS	;; RESTORE DRIVE COUNTERS
1398	003562	032737	000040	000632		#40, MODES	;; IS THIS DRIVE AT EOT?
1399	003570	001002			BIT	T3B	;; YES, SKIP WRITE
1400	003572	104402			BNE	WRITIT	;; WRITE
1401	003574	104406				SVCTRS	;; SAVE DRIVE COUNTERS
1402	003576	104422			T3B:	CHGDRV	;; ANY MORE DRIVES SELECTED?
1403	003600	000767			BR	T3A	;; YES
1404							
1405	003602	104414			T3C:	MVCTRS	;; RESTORE DRIVE COUNTERS
1406	003604	032737	000020	000632		#20, MODES	;; IS THIS DRIVE AT EOT
1407	003612	001002			BIT	T3D	;; YES, SKIP BACKSPACE
1408	003614	004737	011072		BNE	PC, GOBKWD	;; BACKSPACE
1409	003620	104406			JSR	SVCTRS	;; SAVE DRIVE COUNTERS
1410	003622	104422			T3D:	CHGDRV	;; ANY MORE DRIVES SELECTED?
1411	003624	000766			BR	T3C	;; GO
1412	003626	104414			T3E:	MVCTRS	;; RESTORE DRIVE COUNTERS
1413	003630	032737	000020	000632		#20, MODES	;; IS THIS DRIVE AT EOT?
1414	003636	001001			BIT	T3F	;; YES, SKIP READ
1415	003640	104424			BNE	READIT	;; READ
1416	003642	104406			T3F:	SVCTRS	;; SAVE DRIVE COUNTERS
1417	003644	104422				CHGDRV	;; ANY MORE DRIVES SELECTED?
1418	003646	000767			BR	T3E	;; YES
1419	003650	004737	004776		JSR	PC, ALLEOT	;; ARE ALL DRIVES AT EOT?
1420	003654	000740			BR	T3	;; NO

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1421 003656 000137 003160          JMP      DONE          ;YES, EXIT
1422
1423
1424          ;TEST4
1425          ;WRITE RECORD, CHANGE DRIVES, REPEAT FOR RECORD LENGTH SEQUENCE
1426          ;READ RECORD, CHANGE DRIVES, REPEAT FOR RLS
1427 003662 052737 000006 000632 TEST4: BIS      #6,MODES      ;EXIT WRITE EVERY RECORD, DO READ PASS
1428 003670 104416          GENPAT          ;GENERATE PATTERN
1429 003672 032777 000014 175422          BIT      #14,@STEX
1430 003700 001006          BNE     T4
1431 003702 042737 000007 000632          BIC     #7,MODES
1432 003710 052737 000005 000632          BIS     #5,MODES      ;EXIT WRITE AFTER RLS, DO READ PASS
1433 003716 104420          T4:          CLEAR          ;CLEAR ERROR COUNTERS AND REWIND
1434 003720 104410          T4A:         RSFDRV          ;SET DRIVE SELECTION TO LOWEST NUMBER
1435 003722 104414          T4B:         MVCTRS          ;RESTORE DRIVE COUNTERS
1436 003724 013737 000612 000614          MOV     RECORD,WRRECR ;SAVE RECORD
1437 003732 104406          SVCTRS          ;SAVE DRIVE COUNTERS
1438 003734 104422          CHGDRV          ;ANYMORE DRIVES SELECTED?
1439 003736 000771          BR      T4B          YES
1440 003740 042737 000010 000632          BIC     #10,MODES     ;CLEAR RLS END
1441 003746 104410          T4C:         RSFDRV          ;SET DRIVE SELECTION TO LOWEST NUMBER
1442 003750 104414          T4D:         MVCTRS          ;RESTORE DRIVE COUNTERS
1443 003752 032737 000040 000632          BIT     #40,MODES     ;IS DRIVE AT EOT
1444 003760 001010          BNE     T4E          YES, SKIP WRITE
1445 003762 013737 000614 000550          MOV     WRRECR,SVRECR ;SAVE START OF RLS
1446 003770 104402          WRITIT          WRITE
1447 003772 013737 000550 000614          MOV     SVRECR,WRRECR ;RESTORE START OF RLS
1448 004000 104406          SVCTRS          ;SAVE DRIVE COUNTERS
1449 004002 104422          T4E:         CHGDRV          ;ANYMORE DRIVES SELECTED?
1450 004004 000761          BR      T4D          YES
1451 004006 032737 000010 000632          BIT     #10,MODES     ;ARE WE AT END OF RLS
1452 004014 001007          BNE     T4F          YES
1453 004016 104414          T4F:         MVCTRS          ;RESTORE DRIVE COUNTERS
1454 004020 032737 000040 000632          BIT     #40,MODES     ;ARE WE AT EOT?
1455 004026 001747          BEQ     T4C          NO
1456 004030 104422          CHGDRV          ;ANYMORE DRIVES SELECTED?
1457 004032 000771          BR      T4F          YES
1458 004034 104410          T4G:         RSFDRV          ;SET DRIVE SELECTION TO LOWEST NUMBER
1459 004036 104414          T4H:         MVCTRS          ;RESTORE DRIVE COUNTERS
1460 004040 032737 000020 000632          BIT     #20,MODES     ;IS THIS DRIVE AT EOT?
1461 004046 001002          BNE     T4J          YES, SKIP BACKSPACE
1462 004050 004737 011072          JSR     PC,GOBKWD     ;BACKSPACE
1463 004054 104406          T4J:         SVCTRS          ;SAVE DRIVE COUNTERS
1464 004056 104422          CHGDRV          ;ANY MORE DRIVES SELECTED?
1465 004060 000766          BR      T4H          YES
1466 004062 104410          T4K:         RSFDRV          ;SET DRIVE SELECTION TO LOWEST NUMBER
1467 004064 104414          T4L:         MVCTRS          ;RESTORE DRIVE COUNTERS
1468 004066 032737 000020 000632          BIT     #20,MODES     ;IS THIS READ AT EOT?
1469 004074 001025          BNE     T4N          YES, SKIP READ
1470 004076 023737 000616 000612          CMP     LASRCR,RECORD ;HAVE WE READ LAST RECORD WRITTEN?
1471 004104 001421          BEQ     T4M          YES
1472 004106 013737 000616 000550          MOV     LASRCR,SVRECR ;SAVE LAST RECORD
1473 004114 032737 000003 001320          BIT     #3,PARAM      ;IS READ MODE NONSTOP?
1474 004122 001405          BEQ     T4M          YES
1475 004124 013737 000612 000616          MOV     RECORD,LASRCR
1476 004132 005237 000616          INC     LASRCR
1476 004136 104424          T4M:         READIT          ;+1 TO LAST RECORD WRITTEN
;READ

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1477	004140	013737	000550	000616		MOV	SVRECR,LASRCR	:RESTORE LAST RECORD WRITTEN
1478	004146	104406					SVCTRS	:SAVE DRIVE COUNTERS
1479	004150	104422			T4N:	CHGDRV		:ANYMORE DRIVES SELECTED?
1480	004152	000744				BR	T4L	:YES
1481	004154	104414			T4P:	MVCTRS		:RESTORE DRIVE COUNTERS
1482	004156	023737	000616	000612		CMP	LASRCR,RECORD	:ARE WE AT END OF RLS?
1483	004164	001336				BNE	T4K	:NO
1484	004166	104422					CHGDRV	:ANYMORE DRIVES SELECTED?
1485	004170	000771				BR	T4P	:YES
1486	004172	004737	004776			JSR	PC,ALLEOT	:ARE ALL DRIVES AT EOT?
1487	004176	000650				BR	T4A	:NO
1488	004200	000137	003160			JMP	DONE	:YES,EXIT
1489								
1490								
1491								
1492								
1493	004204	052737	000002	000632				
1494	004212	104420						
1495	004214	104416						
1496	004216	012737	177777	004464	T5:	MOV	#-1,TSFLAG	:CLEAR ERROR COUNTERS AND REWIND
1497	004224	104402					WRITIT	:GENERATE PATTERN
1498	004226	032737	000010	000632		BIT	#10,MODES	:ENABLE EXIT FROM WRITE ROUTINE
1499	004234	001402				BEQ	T5A	:ENTER WRITE ONLY TO INITIALIZE RECORD SEQUENCE
1500	004236	004737	005616			JSR	PC,TESINC	:ARE WE AT END OF RLS?
1501	004242	013737	000612	004466	T5A:	MOV	RECORD,TSINC	:YES
1502	004250	005037	000612			CLR	RECORD	:SEE IF RECORD LENGTH SHOULD BE CHANGED
1503	004254	052737	000010	000632	T5B:	BIS	#10,MODES	
1504	004262	104410					RSFDRV	:INDICATE AT START OF RLS
1505	004264	104414			T5C:		MVCTRS	:SET DRIVE SELECTION TO LOWEST DRIVE NUMBER
1506	004266	032737	000020	000632		BIT	#20,MODES	:RESTORE DRIVE COUNTERS
1507	004274	001007				BNE	T5D	:IS THIS DRIVE AT EOT
1508	004276	013737	000612	000616		MOV	RECORD,LASRCR	:YES
1509	004304	063737	004466	000616		ADD	TSINC,LASRCR	:CURRENT RECORD + SEQUENCE LENGTH
1510	004312	104406					SVCTRS	:SAVE DRIVE COUNTERS
1511	004314	104422			T5D:		CHGDRV	:ANYMORE DRIVES?
1512	004316	000762				BR	T5C	:YES
1513	004320	104410					RSFDRV	:SET DRIVE SELECTION TO LOWEST NUMBER
1514	004322	104414			T5E:		MVCTRS	:RESTORE DRIVE COUNTERS
1515	004324	032737	000020	000632		BIT	#20,MODES	:IS THIS DRIVE AT EOT?
1516	004332	001021				BNE	T5G	:YES
1517	004334	013737	000616	000550		MOV	LASRCR,SVRECR	:SAVE END OF RLS RECORDS
1518	004342	032737	000003	001320		BIT	#3,PARAM	:IS READ MODE NONSTOP
1519	004350	001405				BEQ	T5F	:YES GO TO END RLS
1520	004352	013737	000612	000616		MOV	RECORD,LASRCR	:NEXT TO BE READ
1521	004360	005237	000616			INC	LASRCR	:+1 EXIT READ AFTER ONE RECORD
1522	004364	104424			T5F:		READIT	:READ
1523	004366	013737	000550	000616		MOV	SVRECR,LASRCR	:RESTORE END RECORD
1524	004374	104406					SVCTRS	:SAVE DRIVE COUNTERS
1525	004376	104422			T5G:		CHGDRV	:ANY MORE DRIVES?
1526	004400	000750				BR	T5E	:YES
1527	004402	004737	004776			JSR	PC,ALLEOT	:ALL AT EOT?
1528	004406	000402				BR	T5H	:NO
1529	004410	000137	003160			JMP	DONE	:YES EXIT
1530	004414	104410			T5H:		RSFDRV	:SET DRIVE SELECTION TO LOWEST NUMBER
1531	004416	104414			T5J:		MVCTRS	:RESTORE DRIVE COUNTERS
1532	004420	023737	000612	000616		CMP	RECORD,LASRCR	:ARE WE AT END OF RLS?

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1533 004426 001003          BNE      TSK          ;NO
1534 004430 042737 000010 000632 BIC      #10,MODES   ;YES
1535 004436 104422          TSK:     CHGDRV      ;ANYMORE DRIVES SELECTED?
1536 004440 000766          BR       T5J         ;YES
1537 004442 032737 000010 000632 BIT      #10,MODES   ;AT END OF RLS?
1538 004450 001324          BNE      T5E         ;NO
1539 004452 004737 004776 JSR      PC,ALLEOT   ;ALL DRIVES AT EOT?
1540 004456 000657          BR       T5          ;NO
1541 004460 000137 003160 JMP      DONE        ;YES, EXIT
1542 004464 000000          TSFLAG: 0
1543 004466 000000          TSINC:  0

;SAVE DRIVE RECORD AND ERROR COUNTERS
1546 004470 004737 004524 SVCTR:  JSR      PC,CTRDEX
1547 004474 012021          SVC1:   MOV      (0)+,(1)+
1548 004476 022700 000634          CMP      #DRVADR,R0
1549 004502 001374          BNE      SVC1
1550 004504 000207          RTS      PC

;RESET DRIVE COUNTERS BACK INTO PROGRAM
1552 004506 004737 004524 MVCTR:  JSR      PC,CTRDEX
1553 004512 012120          MV1:   MOV      (1)+,(0)+
1554 004514 022700 000634          CMP      #DRVADR,R0
1555 004520 001374          BNE      MV1
1556 004522 000207          RTS      PC

;SET UP POINTERS FOR MOVE AND SAVE COUNTERS
1558 004524 012700 000570 CTRDEX: MOV      #WRCHK,R0
1559 004530 012701 000634          MOV      #DRVADR,R1
1560 004534 063701 000556          ADD      CDRIVE,R1
1561 004540 063701 000556          ADD      CDRIVE,R1
1562 004544 011101          MOV      @R1,R1
1563 004546 000207          RTS      PC

;CLEAR ALL DRIVE COUNTERS
1565 004550 104410          CLRAL:  RSFDRV
1566 004552 004737 004740 CLR1:   JSR      PC,REWIND
1567 004556 004737 005104          JSR      PC,CLRTBL
1568 004562 104406          SVCTRS
1569 004564 104422          CHGDRV
1570 004566 000771          CLR1
1571 004570 052737 000010 000632 BR       #10,MODES   ;AT END OF RLS
1572 004576 005037 004464          CLR     TSFLAG
1573 004602 000207          RTS      PC

;RESET DRIVE SELECTION TO LOWEST NUMBER
1575 004604 005037 000556 RSFDR:  CLR      CDRIVE   ;START WITH DRIVE 0
1576 004610 012737 000200 000554          MOV      #200,CDRVBT ;BIT FOR DRIVE 0
1577 004616 033737 000546 000554 RSF1:   BIT      MSBITS,CDRVBT ;IS DRIVE SELECTED?
1578 004624 001006          BNE      RSF2         ;YES
1579 004626 005237 000556          INC      CDRIVE      ;NO + 1 TO DRIVE
1580 004632 000241          CLC
1581 004634 006037 000554          ROR      CDRVBT      ;ROTATE DRIVE BIT
1582 004640 000766          BR       RSF1         ;REPEAT
1583 004642 013737 000556 000552 RSF2:  MOV      CDRIVE,COMAND
1584 004650 000337 000552          SWAB    COMAND
1585 004654 052737 060000 000552          BIS      #6000,COMAND ;800 BPI, 9 TRACK
1586 004662 032777 001000 173622          BIT      #1000,ASWR  ;TEST PARITY SELECTED
1587 004670 001403          BEQ     .+10         ;ODD
1588 004672 052737 004000 000552          BIS      #4000,COMAND ;EVEN
    
```

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1589 004700 000207          RTS      PC
1590
1591          ;SELECT NEXT DRIVE IN SEQUENCE
1592          ;+1 WORD TO EXIT ADDRESS IF LAST DRIVE TESTED
1593 004702 005237 000556  CHGDR:  INC      CDRIVE      ;+1 TO DRIVE NUMBER
1594 004706 000241          CLC
1595 004710 006037 000554  ROR      CDRVBT      ;MOVE MASK BIT OVER 1 PLACE
1596 004714 001004          BNE      CHG1        ;BRANCH IF MORE DRIVES SELECTED
1597 004716 104410          RSFDRV      ;RESET DRIVE SELECT TO LOWEST NUMBER
1598 004720 062716 000002          ADD      #2, DSP      ;+ 2 TO SKIP OVER FIRST EXIT
1599 004724 000207          RTS      PC
1600 004726 033737 000554 000546  CHG1:  BIT      CDRVBT,MSBITS
1601 004734 001762          BEQ      CHGDR
1602 004736 000741          BR       RSF2
1603
1604          ;REWIND DRIVE TO BOT
1605 004740 105777 173536  REWIND: TSTB     @MTC
1606 004744 100375          BPL      -4          ;WAIT FOR CONTROL UNIT
1607 004746 013777 000552 173526  MOV      COMAND,@MTC ;SELECT DRIVE
1608 004754 006077 173520  ROR      @MTC
1609 004760 103375          BCC      -4          ;WAIT FOR TU READY
1610 004762 052777 000016 173512  BIS      #16,@MTC   ;REWIND
1611 004770 004737 005130  JSR      PC,GOWAIT
1612 004774 000207          RTS      PC          ;EXIT
1613
1614          ;ARE ALL DRIVES AT END OF TAPE
1615 004776 104410  ALLEOT:  RSFDRV
1616 005000 104414  ALL1:   MVCTRS
1617 005002 032737 000060 000632  BIT      #60,MODES ;AT EOT?
1618 005010 001403          BEQ      ALLEOS     ;NO
1619 005012 104422          BR       CHGDRV     ;DONE ALL DRIVES?
1620 005014 000771          BR       ALL1        ;NO
1621 005016 000427          BR       ALL3
1622 005020 032777 000400 173464  ALLEOS: BIT      #400,@SWR ;TEST SWITCH 8 TO EXIT AT END OF SEQUENCE
1623 005026 001425          BEQ      ALL2        ;NO, GO TO EOT
1624 005030 032737 000010 000632  BIT      #10,MODES ;AT END OF SEQUENCE
1625 005036 001421          BEQ      ALL2        ;NO, EXIT, DON'T DUMP ERROR COUNTERS
1626          ;DUMP ERROR COUNTERS ON ALL DRIVES
1627 005040 104410  CTRDMP: RSFDRV
1628 005042 104414          MVCTRS
1629 005044 005737 004464          TST      T5FLAG
1630 005050 001006          BNE      CTRD1      ;DUMP READ ONLY
1631 005052 004737 006154          JSR      PC,ENDT1
1632 005056 032737 000004 000632  BIT      #4,MODES   ;READ PASS SELECTED?
1633 005064 001402          BEQ      CDMEND     ;NO
1634 005066 004737 010326  CTRD1:  JSR      PC,RNDTP1
1635 005072 104422  CDMEND: CHGDRV      ;DONE ALL DRIVES
1636 005074 000762          BR       CTRDMP+2   ;NO
1637 005076 062716 000002  ALL3:   ADD      #2,(6) ;INCREMENT RETURN POINT
1638 005102 000207  ALL2:   RTS      PC
1639
1640          ;CLEAR READ AND WRITE TABLES
1641 005104 012700 000570  CLRTBL: MOV      #WRCHK,RO
1642 005110 005020  CLRT1:  CLR      (0)+
1643 005112 020027 000632          CMP      RO,#MODES
1644 005116 001374          BNE      CLRT1
1644 005120 042737 000070 000632  BIC      #70,MODES
    
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1645 005126 000207
1646
1647 005130 012777 000200 173352
1648 005136 012777 005172 173370
1649 005144 012737 000001 005160
1650 005152 052777 000101 173322
1651 005160 000001
1652 005162 012777 000340 173320
1653 005170 000207
1654 005172 012737 000001 005160
1655 005200 000002
1656
1657
1658 005202 005737 000612
1659 005206 001031
1660 005210 013737 000524 000542
1661 005216 012737 177774 000564
1662 005224 032737 000020 001320
1663 005232 001006
1664 005234 013737 000526 000542
1665 005242 012737 000004 000564
1666 005250 013737 000542 000626
1667 005256 032737 000040 001320
1668 005264 001002
1669 005266 005037 000564
1670 005272 013737 000612 000614
1671 005300 005737 004464
1672 005304 001401
1673 005306 000207
1674 005310 005037 000562
1675 005314 013777 000552 173160
1676 005322 105777 173154
1677 005326 100375
1678 005330 006077 173144
1679 005334 103375
1680 005336 013777 000626 173140
1681 005344 005477 173134
1682 005350 013777 000530 173130
1683 005356 052777 000004 173116
1684 005364 004737 005130
1685
1686 005370 017737 173104 000566
1687 005376 005777 173100
1688 005402 100542
1689 005404 005737 000562
1690 005410 001410
1691 005412 013700 000562
1692 005416 006300
1693 005420 062700 000570
1694 005424 005210
1695 005426 005037 000562
1696 005432 032737 000014 001320
1697 005440 001023
1698 005442 005737 000562
1699 005446 001333
1700 005450 004737 005616

; INTERRUPT ENABLE, GO, WAIT FOR INTERRUPT
GOWAIT: MOV #200, @CC ; SET PRIORITY LEVEL -4
; SET INTERRUPT RETURN
MOV #GW1, @MTV
MOV #1, WAIT1
BIS #101, @MTC ; INTERRUPT ENABLE, GO
; WAIT FOR INTERRUPT
WAIT1: WAIT
MOV #340, @CC ; RESTORE PRIORITY LEVEL 7
RTS PC ; EXIT
MOV #1, WAIT1
RTI ; RETURN FROM INTERRUPT

; WRITE RECORD SECTION
WRITI: TST RECORD ; IS THIS THE FIRST RECORD
; NO, SKIP SET UP OF RECORD LENGTH AND BLOCK INCREMENT
BNE NOINCR
MOV MAXLEN, STRLEN
MOV #4, BLKINC
BIT #20, PARAM
BNE W1
MOV MINLEN, STRLEN
MOV #4, BLKINC
W1: MOV STRLEN, WRTLEN
BIT #40, PARAM ; DOES RECORD LENGTH CHANGE?
BNE NOINCR ; YES
CLR BLKINC ; NO
MOV RECORD, WRRECR
TST T5FLAG
BEQ .+4
RTS PC ; EXIT WRITE ROUTINE IF TEST 5
CLR WRPASS
STRTOP: MOV COMAND, @MTC ; SELECT UNIT
TSTB @MTC
BPL .-4 ; WAIT FOR CU READY
ROR @MTC ; WAIT FOR TU READY
BCC .-4
NONSTP: MOV WRTLEN, @BC ; SET BYTE COUNT
NEG @BC
MOV WBUF, @CA ; SET CURRENT ADDRESS
BIS #4, @MTC ; WRITE
JSR PC, GOWAIT ; INTERRUPT ENABLE, GO, WAIT FOR DONE
; RETURN HERE AFTER INTERRUPT
MOV @MTC, STATRD ; SAVE STATUS
TST @MTC
BMI ERROR ; HAVE ERROR FLAG, CHECK FOR EOT
TST WRPASS ; WAS THIS A RECOVERY PASS
BEQ TSTSTP ; NO
MOV WRPASS, RO ; YES
ASL RO
ADD #WRCKEK, RO ; +1 TO APPROPRIATE RECOVERY PASS COUNTER
INC @RO
CLR WRPASS
TSTSTP: BIT #14, PARAM ; IS WRITE MODE NONSTOP?
BNE STOPOP ; NO
TST WRPASS ; YES
BNE NONSTP
JSR PC, TESINC ; CHANGE RECORD LENGTH

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1701 005454 032737 000001 000632 BIT #1,MODES ;EXIT AFTER RLS?
1702 005462 001405 BEQ W10 ;NO
1703 005464 032737 000010 000632 BIT #10,MODES ;YES, ARE WE AT END OF RLS?
1704 005472 001721 BEQ NONSTP ;NO
1705 005474 000207 RTS PC ;YES
1706 005476 032737 000002 000632 W10: BIT #2,MODES ;EXIT EVERY RECORD?
1707 005504 001714 BEQ NONSTP ;NO
1708 005506 000207 RTS PC ;YES
1709 005510 032737 000010 001320 STOPOP: BIT #10,PARAM ;IS WRITE MODE RANDOM?
1710 005516 001414 BEQ W11 ;NO
1711 ;RANDOM STALL DELAY
1712 005520 004737 007222 RANSTP: JSR PC,RANGEN
1713 005524 052737 177400 007372 BIS #177400,RANDOM
1714 005532 012704 177470 RAN1: MOV #-200.,R4 ;DELAY 1 MILLISECOND
1715 005536 005204 INC R4
1716 005540 001376 BNE .-2
1717 005542 005237 007372 INC RANDOM
1718 005546 001371 BNE RAN1
1719 005550 005737 000562 W11: TST WRPASS
1720 005554 001257 BNE STRTOP
1721 005556 004737 005616 JSR PC,TESINC
1722 005562 032737 000001 000632 BIT #1,MODES ;EXIT AFTER RLS?
1723 005570 001405 BEQ W12 ;NO
1724 005572 032737 000010 000632 BIT #10,MODES ;YES, ARE WE AT END OF RLS?
1725 005600 001645 BEQ STRTOP ;NO
1726 005602 000207 RTS PC ;YES
1727 005604 032737 000002 000632 W12: BIT #2,MODES ;EXIT EVERY RECORD?
1728 005612 001640 BEQ STRTOP ;NO
1729 005614 000207 RTS PC ;YES
1730 ;SEE IF RECORD LENGTH SHOULD BE CHANGED
1731 005616 005237 000612 TESINC: INC RECORD ;+1 TO RECORD COUNT
1732 005622 042737 000010 000632 BIC #10,MODES ;NOT END OF RLS UNLESS SET BELOW
1733 005630 005737 000564 TST BLKINC
1734 005634 001416 BEQ TSINC2
1735 005636 063737 000564 000626 ADD BLKINC,WRTLEN
1736 005644 023737 000626 000526 CMP WRTLEN,MINLEN ;RECORD LENGTH TOO SHORT?
1737 005652 002404 BLT RESETL ;YES, RESET
1738 005654 023737 000626 000524 CMP WRTLEN,MAXLEN ;RECORD LENGTH TOO LONG?
1739 005662 003403 BLE TSINC2 ;NO
1740 005664 013737 000542 000626 RESETL: MOV STRLEN,WRTLEN ;YES, RESET
1741 005672 105737 000612 TSINC2: TSTB RECORD ;IS RECORD A MULTIPLE OF 256
1742 005676 001003 BNE TSINC3 ;NO
1743 005700 052737 000010 000632 BIS #10,MODES ;INDICATE AT END OF RLS
1744 005706 000207 TSINC3: RTS PC
1745
1746
1747 ;HAVE AN ERROR FLAG DURING WRITE OPERATION
1748 ;IF ERROR IS CAUSED BY END OF TAPE FLAG DUMP WRITE ERROR COUNTERS
1749 ;FOR ALL OTHER ERRORS: PRINT COMMAND AND STATUS REGISTERS AND RECORD NUMBER
1750 ;IF READ PASS IS SELECTED, TRY TO RECOVER BY WRITING WITH XIRG.
1751 005710 104434 ERROR: CKSWR ;CHECK FOR CNTL G
1752 005712 032737 175600 000566 BIT #175600,STATRD ;AT EOT?
1753 005720 001510 BEQ ENDTAP ;YES
1754 005722 005737 000562 TST WRPASS
1755 005726 001002 BNE ERR1 ;FIRST ERROR?
1756 005730 005237 000570 INC WRCHEK ;YES, + 1 TO WRITE ERROR

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1757 005734 032777 020000 172550 ERR1: BIT #20000,JSWR ;TYPE ALL ERRORS?
1758 005742 001010 BNE TESREC ;NO
1759 005744 012702 012720 MOV #MSG7,R2
1760 005750 104404 TOP ;PRINT ERROR
1761 005752 013737 000626 000544 MOV WRTLEN,LENGTH
1762 005760 004737 011202 JSR PC,PTS ;PRINT STATUS, COMMAND, RECORD, LENGTH
1763 005764 032777 000100 172520 TESREC: BIT #100,JSWR ;RECOVER STATISTICALLY SELECTED?
1764 005772 001410 BEQ TESRC1 ;NO
1765 005774 005237 000562 INC WRPASS ;+1 TO WRITE RECOVER
1766 006000 022737 000010 000562 CMP #8,WRPASS ;HAVE WE TRIED TO WRITE RECOVER 8 TIMES?
1767 006006 001020 BNE STREC1 ;NO
1768 006010 005237 000610 INC PERMBS ;YES, +1 TO PERMANENT BADSPOT?
1769 006014 032737 000004 000632 TESRC1: BIT #4,MODES ;IS READ PASS SELECTED?
1770 006022 001402 BEQ .+6 ;NO
1771 006024 004737 JSR PC,XRGREC
1772 006030 005037 000562 CLR WRPASS
1773 006034 032737 002000 000566 BIT #2000,STATRD
1774 006042 001037 BNE ENDTAP
1775 006044 000137 005550 JMP W11
1776 006050 004737 010250 STREC1: JSR PC,BACK1
1777 006054 004737 010250 JSR PC,BACK1 ;BACKSPACE 2 RECORDS
1778 006060 032777 000040 172412 BIT #40,AMTS
1779 006066 001402 BEQ .+6
1780 006070 000137 005314 JMP STARTOP
1781 006074 012777 177777 172402 MOV #-1,ABC
1782 006102 013777 000552 172372 MOV COMAND,AMTC
1783 006110 052777 000010 172364 BIS #10,AMTC
1784 006116 004737 005130 JSR PC,GOWAIT ;SPACE FORWARD 1 RECORD
1785 006122 042777 000016 172352 BIC #16,AMTC
1786 006130 052777 000004 172344 BIS #4,AMTC ;CHANGE FROM SPACE TO WRITE
1787 006136 000137 005314 JMP STARTOP
1788 ;DRIVE IS AT EOT
1789 006142 005237 000612 ENDTAP: INC RECORD
1790 006146 052737 000040 000632 BIS #40,MODES ;INDICATE DRIVE AT EOT
1791 006154 012702 013710 ENDT1: MOV #MSG24,R2
1792 006160 104404 TOP
1793 006162 012702 012746 MOV #MSG8,R2
1794 006166 104404 TOP
1795 ;DUMP WRITE ERRORS
1796 006170 104434 WRTDMP: CKSWR ;CHECK FOR CNTL G
1797 006172 013737 000552 011356 MOV COMAND,CHAR
1798 006200 000337 011356 SWAB CHAR
1799 006204 142737 000170 011356 BICB #170,CHAR
1800
1801 006212 052737 000260 011356 BIS #260,CHAR
1802 006220 004737 011360 JSR PC,OCTP ;PRINT DRIVE NUMBER
1803 006224 104430 SP3
1804 006226 013737 001320 011356 MOV PARAM,CHAR

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1805 006234 000337 011356

SWAB CHAR

C04

YM 11 DATA RELIAB 9TRK MACY11 30A(1052) 17-JAN-78 11:23 PAGE 41  
CZTMBE.P11 17-JAN-78 11:22

SEQ 0041

1806 006240 006037 011356

ROR CHAR

D04

TM 11 DATA RELIAB 9TRK MACY11 30A(1052) 17-JAN-78 11:23 PAGE 42  
CZTMBE.P11 17-JAN-78 11:22

SEQ 0042

1807	006244	042737	000170	011356
1808	006252	052737	000260	011356
1809	006260	004737	011360	
1810	006264	013737	001320	011356
1811	006272	042737	177763	011356
1812	006300	012702	013441	
1813	006304	022737	000004	011356
1814	006312	001002		
1815	006314	012702	013415	

BIC	#170, CHAR
BIS	#260, CHAR
JSR	PC, OCTP
MOV	PARAM, CHAR
BIC	#177763, CHAR
MOV	#MSG14, R2
CMP	#4, CHAR
BNE	+.6
MOV	#MSG12, R2

;PRINT PATTERN NUMBER

E04

TM 11 DATA RELIAB 9TRK MACY11 30A(1052) 17-JAN-78 11:23 PAGE 43  
CZTMBE.P11 17-JAN-78 11:22

SEQ 0043

1816 006320 022737 000010 011356  
1817 006326 001002

CMP #10, CHAR  
BNE .+6

1818	006330	012702	013427		MOV	#MSG13,R2	
1819	006334	104404			TOP		;PRINT WRITE MODE
1820	006336	013702	000612		MOV	RECORD,R2	
1821	006342	104426			DECPRT		;PRINT RECORD NUMBER
1822	006344	013737	001320	011356	MOV	PARAM,CHAR	
1823	006352	042737	177717	011356	BIC	#177717,CHAR	
1824	006360	012702	013471		MOV	#MSG17,R2	
1825	006364	022737	000020	011356	CMP	#20,CHAR	
1826	006372	001002			BNE	.+6	
1827	006374	012702	013500		MOV	#MSG18,R2	
1828	006400	022737	000040	011356	CMP	#40,CHAR	
1829	006406	001002			BNE	.+6	
1830	006410	012702	013453		MOV	#MSG15,R2	
1831	006414	022737	000060	011356	CMP	#60,CHAR	
1832	006422	001002			BNE	.+6	
1833	006424	012702	013462		MOV	#MSG16,R2	
1834	006430	104404			TOP		;PRINT RECORD LENGTH SEQUENCE
1835	006432	012702	013507		MOV	#MSG19,R2	
1836	006436	104404			TOP		
1837	006440	013702	000570		MOV	WRCHEK,R2	
1838	006444	104426			DECPRT		;PRINT "WRITE ERRORS="
1839	006446	012700	000572		MOV	#WRCHEK+2,R0	
1840	006452	112737	000060	013550	MOVB	#60,MSG20+17	
1841	006460	105237	013550	WRTD1:	INCB	MSG20+17	;PRINT STATISTICAL RECOVERY
1842	006464	005710			JRO		
1843	006466	001405			BEQ	WRTD2	
1844	006470	012702	013531		MOV	#MSG20,R2	
1845	006474	104404			TOP		
1846	006476	011002			MOV	(0),R2	
1847	006500	104426			DECPRT		;RECOVERED AT X
1848	006502	005720		WRTD2:	TST	(0)+	;JUST INCREMENTING
1849	006504	020027	000610		CMP	R0,#WRCHEK+20	
1850	006510	001363			BNE	WRTD1	
1851	006512	005737	000610		TST	PERMBS	
1852	006516	001001			BNE	.+4	;SKIP PRINT IF = 0
1853	006520	000207			RTS	PC	
1854							
1855							
1856	006522	012702	013553		MOV	#MSG20A,R2	
1857	006526	104404			TOP		
1858	006530	013702	000610		MOV	PERMBS,R2	;PRINT "PERMANENT BADSPOT"
1859	006534	104426			DECPRT		
1860	006536	000207			RTS	PC	
1861							
1862	006540	013702	000530				
1863	006544	013737	001320	006652	GENPA: MOV	WBUF,R2	;INITIALIZE BUFFER
1864	006552	042737	170777	006652	MOV	PARAM,GP1	;CHECK PARAMETERS FOR PATTERN SELECTED
1865	006560	001435			BIC	#170777,GP1	
1866	006562	022737	001000	006652	BEQ	PAT0	
1867	006570	001437			CMP	#1000,GP1	
1868	006572	022737	002000	006652	BEQ	PAT1	
1869	006600	001457			CMP	#2000,GP1	
1870	006602	022737	003000	006652	BEQ	PAT2	
					CMP	#3000,GP1	

G04

TM 11 DATA RELIAB 9TRK MACY11 30A(1052) 17-JAN-78 11:23 PAGE 45  
CZTMBE.P11 17-JAN-78 11:22

SEQ 0045

1871	006610	001461			BEQ	PAT3
1872	006612	022737	004000	006652	CMP	#4000,GP1
1873	006620	001501			BEQ	PAT4
1874	006622	022737	005000	006652	CMP	#5000,GP1

H04

TM 11 DATA RELIAB 9TRK MACY11 30A(1052) 17-JAN-78 11:23 PAGE 46  
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SEQ 0046

1875 006630 001510  
1876 006632 022737 006000 006652  
1877 006640 001402

BEQ PAT5  
CMP #6000,GP1  
BEQ .+6

1878	006642	000137	007202
1879	006646	000137	007166
1880	006652	000000	
1881			
1882			
1883	006654	012722	002010
1884	006660	023702	000532
1885	006664	001373	
1886	006666	000207	
1887			
1888			
1889	006670	012700	006716
1890	006674	012022	
1891	006676	023702	000532
1892	006702	001001	
1893	006704	000207	
1894	006706	022700	006740
1895	006712	001370	
1896	006714	000765	
1897	006716	100000	
1898	006720	020100	
1899	006722	004020	
1900	006724	001004	
1901	006726	000001	
1902	006730	040200	
1903	006732	010040	
1904	006734	002010	
1905	006736	000402	
1906			
1907			
1908			
1909	006742	012722	136274
1910	006744	023702	000532
1911	006750	001373	
1912	006752	000207	
1913			
1914			
1915	006754	012700	007002
1916	006760	012022	
1917	006762	023702	000532
1918	006766	001001	
1919	006770	000207	
1920	006772	022700	007024
1921	006776	001370	
1922	007000	000765	
1923	007002	140037	
1924	007004	100476	
1925	007006	001574	
1926	007010	003770	
1927	007012	017760	
1928	007014	037300	
1929	007016	076201	
1930	007020	174003	
1931	007022	170007	
1932			
1933			

```

        JMP      PAT7
        JMP      PAT6
GP1:    0
;PATTERN 0
;HALF FREQUENCY OUTSIDE SKEW
PATO:  MOV      #2010,(2)+      ;(010)(004)
        CMP      RBUF,R2
        BNE     PATO
        RTS     PC
;PATTERN 1
;SLIDING 1 BIT (ISOLATED BIT)
PAT1:  MOV      #P1T,R0
PAT1A: MOV      (0)+,(2)+
        CMP      RBUF,R2
        BNE     +4
        RTS     PC
        CMP      #PAT2,R0
        BNE     PAT1A
        BR      PAT1
P1T:   100000
        20100
        4020
        1004
        1
        40200
        10040
        2010
        402
;PATTERN 2
;HIGH FREQUENCY EVERY OTHER TRACK
PAT2:  MOV      #136274,(2)+    ;(274)(274)
        CMP      RBUF,R2
        BNE     PAT2
        RTS     PC
;PATTERN 3
;THREE 0'S, THREE 1'S, THREE 0'S.
PAT3:  MOV      #P3T,R0
PAT3A: MOV      (0)+,(2)+
        CMP      RBUF,R2
        BNE     +4
        RTS     PC
        CMP      #PAT4,R0
        BNE     PAT3A
        BR      PAT3
P3T:   140037
        100476
        1574
        3770
        17760
        37300
        76201
        174003
        170007
;PATTERN 4
;INCREMENTING PATTERN (0-377)
    
```



```

1934 007024 105037 007050
1935 007030 113722 007050
1936 007034 105237 007050
1937 007040 023702 000532
1938 007044 001371
1939 007046 000207
1940 007050 000000
1941
1942
1943
1944 007052 012700 007100
1945 007056 012022
1946 007060 023702 000532
1947 007064 001001
1948 007066 000207
1949 007070 022700 007166
1950 007074 001370
1951 007076 000765
1952 007100 000000
1953 007102 100000
1954 007104 100200
1955 007106 040100
1956 007110 020100
1957 007112 020040
1958 007114 010020
1959 007116 004020
1960 007120 004010
1961 007122 002004
1962 007124 001004
1963 007126 001002
1964 007130 000401
1965 007132 000001
1966 007134 000000
1967 007136 100200
1968 007140 040200
1969 007142 040100
1970 007144 020040
1971 007146 010040
1972 007150 010020
1973 007152 004010
1974 007154 002010
1975 007156 002004
1976 007160 001002
1977 007162 000402
1978 007164 000401
1979
1980
1981 007166 012722 177777
1982 007172 023702 000532
1983 007176 001373
1984 007200 000207
1985
1986
1987
1988
1989 007202 004737 007222

```

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PAT4: CLRB P4A
P4: MOV P4A,(2)+
INCB P4A
CMP RBUF,R2
BNE P4
RTS PC
P4A: 0

:PATTERN 5
:EACH TRACK 3 BITS
PAT5: MOV #PST,R0
PAT5A: MOV (0)+,(2)+
CMP RBUF,R2
BNE +4
RTS PC
CMP #PAT6,R0
BNE PAT5A
BR PAT5
PST: 0
100000
100200
40100
20100
20040
10020
4020
4010
2004
1004
1002
401
1
0
100200
40200
40100
20040
10040
10020
4010
2010
2004
1002
402
401

:PATTERN 6
:HIGH FREQUENCY ALL TRACKS
PAT6: MOV #-1,(2)+
CMP RBUF,R2
BNE PAT6
RTS PC

:PATTERN 7
:RANDOM
PAT7: JSR PC,RANGEN

```

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1990 007206 013722 007372      MOV      RANDOM,(2)+
1991 007212 023702 000532      CMP      RBUF,R2
1992 007216 001371          BNE      PAT7
1993 007220 000207          RTS      PC
1994
1995          ;RANDOM NUMBER GENERATOR
1996          ;EXIT WITH RANDOM NUMBER IN LOCATION NAMED "RANDOM"
1996 007222 010037 007400  RANGEN: MOV      R0,SV0          ;SAVE REGISTERS
1997 007226 010137 007402      MOV      R1,SV1
1998 007232 010237 007404      MOV      R2,SV2
1999 007236 010337 007406      MOV      R3,SV3
2000 007242 013700 007374      MOV      LONUM,R0          ;SET UP LOW DIGIT
2001 007246 013701 007376      MOV      HINUM,R1          ;SET UP HIGH DIGIT
2002 007252 012703 000007      MOV      #7,R3          ;SET UP SHIFT COUNT
2003 007256 005002          CLR      R2
2004 007260 006300  RANG1: ASL      R0          ;SHIFT R0 LEFT AND
2005 007262 006101          ROL      R1          ;ROTATE CARRY INTO LSB OF R1 AND
2006 007264 006102          ROL      R2          ;ROTATE CARRY OUT OF R1 INTO R2
2007 007266 005303          DEC      R3          ;DECREMENT R3
2008 007270 001373          BNE      RANG1          ;CONTINUE SHIFT LOOP
2009 007272 063700 007374      ADD      LONUM,R0          ;ADD NUMBER TO MAKE X 129
2010 007276 005501          ADC      R1          ;PROPAGATE CARRY
2011 007300 063701 007376      ADD      HINUM,R1          ;ADD NUMBER TO MAKE X 129
2012 007304 005502          ADC      R2          ;PROPAGATE CARRY
2013 007306 062700 001057      ADD      #1057,R0          ;ADD LOW CONSTANT
2014 007312 005501          ADC      R1          ;PROPAGATE CARRY
2015 007314 005502          ADC      R2          ;PROPAGATE CARRY
2016 007316 062701 047401      ADD      #47401,R1          ;ADD HIGH CONSTANT
2017 007322 005502          ADC      R2          ;PROPAGATE CARRY
2018 007324 062702 000006      ADD      #6,R2          ;ADD HIGH CONSTANT
2019 007330 060200          ADD      R2,R0          ;RE-PRIME R0 WITH HIGH DIGIT
2020 007332 005501          ADC      R1          ;PROPAGATE CARRY
2021 007334 010037 007372      MOV      R0,RANDOM          ;SAVE RANDOM NUMBER
2022 007340 010037 007374      MOV      R0,LONUM          ;PUT R0 BACK IN LONUM
2023 007344 010137 007376      MOV      R1,HINUM          ;PUT R1 BACK IN HINUM
2024 007350 013700 007400      MOV      SV0,R0          ;RESTORE REGISTERS
2025 007354 013701 007402      MOV      SV1,R1
2026 007360 013702 007404      MOV      SV2,R2
2027 007364 013703 007406      MOV      SV3,R3
2028 007370 000207          RTS      PC          ;EXIT
2029 007372 000000  RANDOM: 0
2030 007374 000000  LONUM: 0
2031 007376 000000  HINUM: 0
2032 007400 000000  SV0: 0
2033 007402 000000  SV1: 0
2034 007404 000000  SV2: 0
2035 007406 000000  SV3: 0
2036
2037
2038          ;READ RECORD SECTION
2039 007410 005737 000612  READI: TST      RECORD          ;FIRST RECORD?
2040 007414 001003          BNE      $R1          ;NO
2041 007416 013737 000542 000630      MOV      STRLEN,READLN          ;SET INITIAL READ LENGTH
2042 007424 012737 177775 000560  $R1: MOV      #-3,RDPASS          ;INITIALIZE READ PASS COUNTER
2043 007432 013777 000552 171042  RDSTPD: MOV      COMAND,@MTC
2044 007440 105777 171036          TSTB    @MTC
2045 007444 100375          BPL      -.4          ;WAIT FOR CONTROL UNIT READY

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2046 007446 006077 171026 ROR @MTS
2047 007452 103375 BCC .-4 ;WAIT FOR TAPE UNIT READY
2048 007454 013700 000532 READGO: MOV RBUF,RO
2049 007460 013701 000630 MOV READLN,R1
2050 007464 105020 RG1: CLRB (0)+ ;CLEAR READ BUFFER
2051 007466 005301 DEC R1
2052 007470 001375 BNE RG1
2053 007472 013777 000630 171004 MOV READLN,@BC ;SET BYTE COUNT
2054 007500 005477 171000 NEG @BC
2055 007504 013777 000532 170774 MOV RBUF,@CA ;SET CURRENT ADDRESS
2056 007512 013777 000552 170762 MOV COMAND,@MTC
2057 007520 052777 000002 170754 BIS #2,@MTC
2058 007526 004737 005130 JSR PC,GOWAIT
2059 ;RETURN HERE AFTER INTERRUPT
2060 007532 017737 170742 000566 MOV @MTC,STATRD
2061 007540 005777 170736 TST @MTC ;ANY STATUS ERRORS
2062 007544 100504 BMI RDERR0 ;YES
2063 ;CHECK FOR DATA ERRORS
2064 007546 013700 000532 MOV RBUF,RO
2065 007552 013701 000530 MOV WBUF,R1
2066 007556 013702 000630 MOV READLN,R2
2067 007562 022021 SR5: CMP (0)+(1)+ ;CHECK FOR PROPER DATA TRANSFER
2068 007564 001045 BNE DATERR ;HAVE DATA ERROR
2069 007566 162702 000002 SUB #2,R2 ;CHECKED ALL TRANSFERS?
2070 007572 001373 BNE SR5 ;NO
2071 007574 032737 000003 001320 RTSSTP: BIT #3,PARAM
2072 007602 001007 BNE RDSTPC
2073 007604 004737 010200 JSR PC,RDINCR ;INCREMENT FOR NEXT BLOCK
2074 007610 023737 000612 000616 CMP RECORD,LASRCR
2075 007616 001316 BNE READGO
2076 007620 000207 RTS PC ;EXIT READIT
2077 007622 032737 000002 001320 RDSTPC: BIT #2,PARAM ;IS READ MODE RANDOM?
2078 007630 001414 BEQ RDSTP ;NO
2079 007632 004737 007222 RNRDRS: JSR PC,RANGEN
2080 007636 052737 177400 007372 BIS #177400,RANDOM
2081 007644 012704 177470 RNDS1: MOV #-200.,R4 ;DELAY 1 MILLISECOND
2082 007650 005204 INC R4
2083 007652 001376 BNE .-2
2084 007654 005237 007372 INC RANDOM
2085 007660 001371 BNE RNDS1
2086 007662 004737 010200 RDSTP: JSR PC,RDINCR
2087 007666 023737 000612 000616 CMP RECORD,LASRCR ;DONE LAST RECORD?
2088 007674 001256 BNE RDSTPD ;NO
2089 007676 000207 RTS PC ;YES EXIT
2090 ;HAVE DATA ERROR
2091 007700 032777 020000 170604 DATERR: BIT #20000,@SWR ;TYPE ALL READ ERRORS?
2092 007706 001014 BNE DATERR1 ;NO
2093 007710 012702 013070 MOV #MSG9A,R2
2094 007714 104404 TOP
2095 007716 013737 000630 000544 MOV READLN,LENGTH
2096 007724 004737 011202 JSR PC,PRT$
2097 007730 014102 MOV -(1),R2 ;PRINT EXPECTED DATA
2098 007732 104412 OCTPAT
2099 007734 014002 MOV -(0),R2
2100 007736 104412 OCTPAT ;PRINT ACTUAL DATA
2101 007740 022737 177775 000560 DATERR1: CMP #-3,RDPASS

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2102 007746 001002 BNE +6
2103 007750 005237 000622 INC DAERRS ;+1 TO DATA ERRORS
2104 007754 000464 BR RTSR1
2105 :STATUS INDICATES AN ERROR, CHECK FOR EOT
2106 007756 104434 RDERR0: CKSWR ;CHECK FOR CNTL G
2107 007760 032737 175600 000566 BIT #175600,STATRD ;IS ERROR LEGITIMATE OR EOT?
2108 007766 001552 BEQ RNDTAP ;HAVE EOT
2109 007770 032777 020000 170514 BIT #20000,ASWR ;TYPE ALL READ ERRORS?
2110 007776 001044 BNE RTSREC ;NO
2111 010000 012702 013043 MOV #MSG9,R2
2112 010004 104404 TOP ;PRINT ERROR
2113 010006 013737 000630 000544 MOV READLN,LENGTH
2114 010014 004737 011202 JSR PC,PRTS
2115 010020 032777 010000 170452 BIT #10000,AMTS ;STATUS ERROR DUE TO PARITY
2116 :ERROR?
2117 010026 001430 BEQ RTSREC ;BRANCH IF NOT
2118 010030 032777 000010 170454 BIT #10,ASWR ;SEE IF USER WANTS DATA COMPARE!
2119 010036 001424 BEQ RTSREC ;BRANCH IF NOT
2120 010040 013700 000530 MOV WBUF,R0 ;PICK UP STARTING ADDRESS OF
2121 :WRITE BUFFER
2122 010044 013701 000532 MOV RBUF,R1 ;PICK UP STARTING ADDRESS OF
2123 :READ BUFFER
2124 010050 013702 000630 MOV #READLN,R2 ;PICK UP RECORD LENGTH IN BYTES
2125 010054 022021 1$: CMP (R0)+,(R1)+ ;COMPARE WHAT SHOULD HAVE BEEN
2126 :WRITTEN WITH WHAT WAS!!
2127 010056 001004 BNE 2$ ;BRANCH IF NOT THE SAME
2128 010060 162702 000002 SUB #2,R2 ;DROP OFF A WORD FROM RECORD
2129 :LENGTH
2130 010064 001406 BEQ 3$ ;BRANCH IF ALL OF RECORD DATA
2131 :CHECKS
2132 010066 000772 BR 1$ ;GO TO COMPARE NEXT BYTE
2133 010070 014002 2$: MOV -(R0),R2 ;PICK UP THE DATA VALUE THAT
2134 :SHOULD HAVE BEEN WRITTEN
2135 010072 104412 OCTPRT ;PRINT EXPECTED VALUE OF
2136 :WRITTEN DATA
2137 010074 014102 MOV -(R1),R2 ;PICK UP THE DATA VALUE THAT
2138 :WAS WRITTEN
2139 010076 104412 OCTPRT ;PRINT ACTUAL VALUE OF THE
2140 :DATA READ
2141 010100 000403 BR RTSREC ;CONTINUE WITH TESTING
2142 010102 012702 013337 3$: MOV #MSG10D,R2 ;INDICATE RECORD DATA COMPARES
2143 :DESPITE THE PARITY ERROR
2144 :CAUSING THE READ STATUS ERROR
2145 010106 104404 TOP
2146 :+ 1 TO RDERRS IF FIRST ERROR PASS
2147 010110 104434 RTSREC: CKSWR ;CHECK FOR CNTL G
2148 010112 022737 177775 000560 CMP #-3,RDPASS
2149 010120 001002 BNE +6
2150 010122 005237 000620 INC RDERRS ;+1 TO STATUS ERRORS
2151 010126 032777 000020 170356 RTSR1: BIT #20,ASWR ;DELETE READ RETRYS (SW 4)?
2152 010134 001011 BNE RPASS3 ;YES
2153 010136 005237 000560 INC RDPASS ;DONE ALL RE-READS?
2154 010142 001404 BEQ RPASS1 ;YES
2155 010144 004737 010250 JSR PC,BACK1 ;NO, BACKSPACE TAPE
2156 010150 000137 007432 JMP RDSTPD ;GO AGAIN
2157 010154 005237 000624 RPASS1: INC NRREAD ;+1 TO NONRECOVERABLE READ

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2158 010160 012737 177775 000560 RPASS3: MOV #-3, RDPASS
2159 010166 032737 002000 000566 BIT #2000, STATRD ; AT EOT?
2160 010174 001054 BNE RNDTP1 ; YES, TYPE "EOT"
2161 010176 000631 BR RDSTP
2162
2163 ; SET UP POINTERS FOR NEXT RECORD
2164 010200 005237 000612 RDINCR: INC RECORD
2165 010204 005737 000564 TST BLKINC
2166 010210 001416 BEQ RESTR1
2167 ; RECORD LENGTH IS CHANGING, COUNT IT
2168 010212 063737 000564 000630 ADD BLKINC, READLN
2169 010220 023737 000630 000526 CMP READLN, MINLEN ; IS LENGTH LESS THAN MINIMUM
2170 010226 00404 BLT RESTR1 ; NO
2171 010230 023737 000630 000524 CMP READLN, MAXLEN ; IS LENGTH GREATER THAN MAXIMUM?
2172 010236 00003 BLE RESTR1 ; NO
2173 010240 000737 000542 000630 RESTR1: MOV STRLEN, READLN ; RESET INITIAL LENGTH
2174 010246 000207 RESTR1: RTS PC
2175 ; BACKSPACE ONE RECORD
2176 010250 006077 170224 BACK1: ROR #MTS
2177 010254 103375 BCC #-4 ; WAIT FOR TAPE UNIT READY
2178 010256 012777 177777 170220 MOV #-1, #BC ; COUNT 1 RECORD
2179 010264 013777 000552 170210 MOV COMAND, #MTC ; SELECT DRIVE
2180 010272 052777 000012 170202 BIS #12, #MTC ; ISSUE BACKSPACE
2181 010300 004737 005130 JSR PC, #GOWAIT
2182 010304 042777 000016 170170 BIC #16, #MTC
2183 010312 000207 RTS PC
2184 ; DRIVE HAS REACHED EOT IN READ MODE
2185 010314 004737 010200 RNDTAP: JSR PC, RDINCR
2186 010320 052737 000020 000632 BIS #20, #MODES ; INDICATE AT EOT
2187 010326 012702 013754 RNDTP1: MOV #MSG25, R2
2188 010332 104404 TOP
2189 010334 012702 012746 MOV #MSG8, R2
2190 010340 104404 TOP
2191 ; DUMP ERROR COUNTERS
2192 010342 104434 READMP: CKSWR ; CHECK FOR CNTL G
2193 010344 013737 000552 011356 MOV COMAND, CHAR
2194 010352 000337 011356 SWAB CHAR
2195 010356 142737 000170 011356 BICB #170, CHAR
2196 010364 052737 000260 011356 BIS #260, CHAR
2197 010372 004737 011360 JSR PC, #OCTP ; PRINT DRIVE NUMBER
2198 010376 104430 SP3
2199 010400 013737 001320 011356 MOV PARAM, CHAR
2200 010406 000337 011356 SWAB CHAR
2201 010412 006037 011356 ROR CHAR
2202 010416 042737 000170 011356 BIC #170, CHAR
2203 010424 052737 000260 011356 BIS #260, CHAR
2204 010432 004737 011360 JSR PC, #OCTP ; PRINT PATTERN NUMBER
2205
2206 010436 013737 001320 011356 MOV PARAM, CHAR
2207 010444 042737 177774 011356 BIC #177774, CHAR
2208 010452 012702 013441 MOV #MSG14, R2
2209 010456 022737 000001 011356 CMP #1, CHAR
2210 010464 001002 BNE .+6
2211 010466 012702 013415 MOV #MSG12, R2
2212 010472 022737 000002 011356 CMP #2, CHAR
2213 010500 001002 BNE .+6

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2214 010502 012702 013427      MOV      #MSG13,R2
2215 010506 104404                TOP
2216 010510 013702 000612      MOV      RECORD,R2      ;PRINT READ MODE
2217 010514 104426                DECPRT      ;PRINT RECORD NUMBER
2218 010516 013737 001320 011356      MOV      PARAM,CHAR
2219 010524 042737 177717 011356      BIC      #177717,CHAR
2220 010532 012702 013471      MOV      #MSG17,R2
2221 010536 022737 000020 011356      CMP      #20,CHAR
2222 010544 001002                BNE      .+6
2223 010546 012702 013500      MOV      #MSG18,R2
2224 010552 022737 000040 011356      CMP      #40,CHAR
2225 010560 001002                BNE      .+6
2226 010562 012702 013453      MOV      #MSG15,R2
2227 010566 022737 000060 011356      CMP      #60,CHAR
2228 010574 001002                BNE      .+6
2229 010576 012702 013462      MOV      #MSG16,R2
2230 010602 104404                TOP
2231 010604 012702 013603      MOV      #MSG21,R2      ;PRINT RECORD LENGTH SEQUENCE
2232 010610 104404                TOP
2233 010612 013702 000620      MOV      RDERRS,R2
2234 010616 104426                DECPRT
2235 010620 012702 013633      MOV      #MSG22,R2
2236 010624 104404                TOP
2237 010626 013702 000622      MOV      DAERRS,R2
2238 010632 104426                DECPRT
2239 010634 012702 013654      MOV      #MSG23,R2
2240 010640 104404                TOP
2241 010642 013702 000624      MOV      NRREAD,R2
2242 010646 104426                DECPRT
2243 010650 000207                RTS      PC

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2244
2245
2246
2247
2248      ;WRITE RECOVERY UTILIZING EXTENDED INTERRECORD GAP
2249      ;USED AFTER EVERY 7 REWRITES OR AFTER
2250      ;EACH WRITE ERROR IF STATISTICAL RECOVERY NOT SELECTED
2251      ;USED ONLY IF READ PASS SELECTED
2251 010652 104434      XRGREC: CKSWR      ;CHECK FOR CNTL G
2252 010654 012737 177774 000562      MOV      #-4,WRPASS      ;COUNT 4 REWRITES
2253 010662 032777 000040 167622      XRG0:  BIT      #40,JSWR      ;DELETE WRITE XIRG (SW 5)
2254 010670 001036                BNE      XRGACD      ;YES
2255 010672 004737 010250      JSR      PC,BACK1
2256 010676 105777 167600      TSTB     @MTC
2257 010702 100375                BPL      .-4
2258 010704 013777 000552 167570      MOV      COMAND,@MTC
2259 010712 052777 000014 167562      BIS      #14,@MTC      ;WRITE XIRG
2260 010720 013777 000626 167556      MOV      WRTLEN,@BC      ;SET BYTE COUNT
2261 010726 005477 167552      NEG      @BC
2262 010732 013777 000530 167546      MOV      WBUF,@CA      ;SET CURRENT ADDRESS
2263 010740 006077 167534      ROR      @MTC
2264 010744 103375                BCC      .-4      ;WAIT FOR TU READY
2265 010746 004737 005130      JSR      PC,GOWAIT
2266
2267      ;RETURN HERE AFTER INTERRUPT
2268 010752 017737 167522 000566      MOV      @MTC,STATRD      ;SAVE STATUS
2269 010760 005777 167516      TST      @MTC

```

```

2270 010764 100403          BMI          XRG5          ;HAVE ERROR FLAG, CHECK FOR EOT
2271 010766 005037 000562  XRGRCO: CLR      WRPASS
2272 010772 000207          RTS          PC          ;EXIT WRITE XIRG
2273 010774 032737 175600 000566  XRG5:  BIT      #175600,STATRD
2274 011002 001771          BEQ      XRGRCO      ;ONLY EOT, EXIT
2275 011004 005237 000562  INC      WRPASS      ;DONE 4 XIRG
2276 011010 001324          BNE      XRG5
2277          ;PRINT STATUS AFTER 4 XIRG ERRORS
2278 011012 012702 012720  MOV      #MSG7,R2
2279 011016 104404          TOP
2280 011020 013737 000626 000544  MOV      WRTLEN,LENGTH ;PRINT WRITE STATUS ERROR
2281 011026 004737 011202  JSR      PC,PRTS      ;PRINT STATUS, COMMAND, RECORD, LENGTH
2282 011032 012702 013367  MOV      #MSG11,R2
2283 011036 104404          TOP
2284 011040 032737 002000 000566  BIT      #2000,STATRD ;PRINT "XIRG WRITTEN 4 TIMES"
2285 011046 001701          BEQ      XRGRCO
2286 011050 042777 000016 167424  BIC      #16,AMTC
2287 011056 052777 000006 167416  BIS      #6,AMTC      ;WRITE AN EOF
2288 011064 004737 005130  JSR      PC,GOWAIT
2289 011070 000207          RTS          PC
2290
2291          ;GO BACKWARD ON TAPE X RECORDS
2292 011072 013737 000612 000616  GOBKWD: MOV      RECORD,LASRCR
2293 011100 013737 000614 000612  MOV      WRECR,RECORD
2294 011106 001003          BNE      GOB1
2295 011110 004737 004740  JSR      PC,REWIND    ;IS NEW RECORD=0
2296 011114 000207          RTS          PC      ;YES REWIND
2297 011116 013777 000616 167360  GOB1:  MOV      LASRCR,ABC ;EXIT
2298 011124 163777 000614 167352  SUB      WRECR,ABC    ;SET BYTE COUNT TO DIFFERENCE
2299 011132 005477 167346  NEG      ABC          ;BETWEEN LASRCR AND WRECK
2300 011136 013777 000552 167336  MOV      COMAND,AMTC
2301 011144 105777 167332  TSTB    AMTC          ;WAIT FOR CU READY
2302 011150 100375          BPL      -4
2303 011152 006077 167322  ROR      AMTS          ;WAIT FOR TU READY
2304 011156 103375          BCC      -4
2305 011160 042777 000016 167314  BIC      #16,AMTC
2306 011166 052777 000012 167306  BIS      #12,AMTC
2307 011174 004737 005130  JSR      PC,GOWAIT
2308 011200 000207          RTS          PC
2309
2310
2311          ;PRINT COMMAND, STATUS, RECORD NUMBER, LENGTH
2312 011202 012702 013113  PRTS:  MOV      #MSG9B,R2
2313 011206 104404          TOP
2314 011210 017702 167266  MOV      AMTC,R2
2315 011214 104412          OCTPRT
2316 011216 013702 000566  MOV      STATRD,R2
2317 011222 104412          OCTPRT
2318 011224 013702 000612  MOV      RECORD,R2
2319 011230 005202          INC      R2
2320 011232 104426          DECPRT
2321 011234 013702 000544  MOV      LENGTH,R2
2322 011240 104426          DECPRT
2323 011242 000207          RTS          PC
2324 011244 104434          CKSWR          ;CHECK FOR CNTL G
    
```

```

2326          011246 012737 000060 011356 ;PRINT OCTAL VALUE IN REGISTER 2
2327          011254 005702          OCTPR:  MOV  #0,CHAR ;INITIALIZE 1ST NUMBER AS 0
2328          011256 100003          TST  R2 ;IS VALUE POSITIVE
2329          011256 012737          BPL  OCT1 ;YES PRINT 0
2330          011256 012737 000061 011356          MOV  #1,CHAR ;NO PRINT 1
2331          011266 004737 011360          OCT1:  JSR  PC,OCTP
2332          011272 006102          ROL  R2
2333          011274 006102          ROL  R2
2334          011276 012737 177773 011354          MOV  #-5,OCT ;COUNT 5 DIGITS
2335          011304 006102          OCT2:  ROL  R2
2336          011306 006102          ROL  R2
2337          011310 006102          ROL  R2
2338          011312 010237 011356          MOV  R2,CHAR ;SAVE DIGIT
2339          011316 042737 177770 011356          BIC  #177770,CHAR ;CLEAR OTHER BITS
2340          011324 052737 000060 011356          BIS  #60,CHAR ;MAKE ASCII DIGIT
2341          011332 006002          ROR  R2
2342          011334 004737 011360          JSR  PC,OCTP ;PRINT
2343          011340 006102          ROL  R2
2344          011342 005237 011354          INC  OCT ;+1 TO DIGIT COUNT
2345          011346 001356          BNE  OCT2 ;NOT DONE
2346          011350 104430          SP3
2347          011352 000207          RTS  PC ;EXIT
2348          011354 000000          OCT:  0
2349          011356 000000          CHAR: 0
2350          011360 105777 167134          OCTP:  TSTB @TPS
2351          011364 100375          BPL  #-4 ;WAIT FOR READY
2352          011366 013777 011356 167126          MOV  CHAR,@TPB ;PRINT
2353          011374 000207          RTS  PC
2354          011376 012737 177773 011554 ;PRINT DECIMAL VALUE IN REGISTER 2
2355          011404 012737 011562 011560          DECPR: MOV  #-5,DIGCNT
2356          011412 012737 000040 011556          MOV  @DECPNT+2,DECPNT
2357          011420 012737 177777 011552          TYPT1: MOV  #40,ZERO
2358          011426 005237 011552          TYPT2: MOV  #-1,DIGIT
2359          011432 167702 000122          INC  DIGIT
2360          011436 100373          SUB  @DECPNT,R2
2361          011440 067702 000114          BPL  TYPT2
2362          011444 004737 011472          ADD  @DECPNT,R2
2363          011450 005237 011554          JSR  PC,DECOUT
2364          011454 001002          INC  DIGCNT
2365          011456 104430          BNE  TYPT3
2366          011460 000207          SP3
2367          011462 062737 000002 011560          TYPT3: RTS  PC
2368          011470 000753          ADD  #2,DECPNT
2369          011472 005737 011552          DECOUT: BR   TYPT1
2370          011476 001010          TST  DIGIT
2371          011500 022737 177777 011554          BNE  DEC1
2372          011506 001404          CMP  #-1,DIGCNT
2373          011510 013737 011556 011552          BEQ  DEC1
2374          011516 000406          MOV  ZERO,DIGIT
2375          011520 012737 000060 011556          DEC1: BR   DEC2
2376          011526 052737 000060 011552          MOV  #60,ZERO
2377          011534 105777 166760          BIS  #60,DIGIT
2378          011540 100375          DEC2: TSTB @TPS
2379          011542 013777 011552 166752          BPL  #-4
2380          011542 013777 011552 166752          MOV  DIGIT,@TPB
    
```



```

2382 011550 000207
2383 011552 000000
2384 011554 000000
2385 011556 000040
2386 011560 011562
2387 011562 023420
2388 011564 001750
2389 011566 000144
2390 011570 000012
2391 011572 000001
2392
2393 011574 105777 166714
2394 011600 100375
2395 011602 105777 166712
2396 011606 100375
2397 011610 117777 166702 166704
2398 011616 117737 166674 001314
2399 011624 042737 000200 001314
2400 011632 000207
2401
2402 011634 012702 011644
2403 011640 104404
2404 011642 000207
2405 011644 020057 020040 057
2406 011652
2407
2408 011652 142777 000177 166640
2409 011660 112237 011752
2410 011664 121237 011752
2411 011670 001001
2412 011672 000207
2413 011674 121227 000100
2414 011700 001406
2415 011702 105777 166612
2416 011706 100375
2417 011710 112277 166606
2418 011714 000763
2419 011716 105777 166576
2420 011722 100375
2421 011724 112777 000215 166570
2422 011732 105777 166562
2423 011736 100375
2424 011740 112777 000212 166554
2425 011746 005202
2426 011750 000745
2427 011752 000000
2428 011754 022737 000176 000512
2429 011762 001035
2430 011764 105777 166524
2431 011770 100032
2432 011772 017737 166520 001314
2433 012000 042737 177600 001314
2434 012006 022737 000007 001314
2435 012014 001020
2436 012016 012702 014042
2437 012022 104404

RTS PC
DIGIT: 0
DIGCNT: 0
ZERO: 40
DECPNT: .+2
10000.
1000.
100.
10.
1.
;KEYBOARD INPUT
WAITK: TSTB @TKS ;WAIT FOR KEY
BPL -4
TSTB @TPS ;WAIT FOR TELEPRINTER READY
BPL -4
MOV @TKB,@TPB ;ECHO CHARACTER
MOV @TKB,CHARIN ;SAVE IT
BIC #200,CHARIN
RTS PC ;EXIT
;TYPE 3 SPACES
SP3X: MOV #SP3A,R2
TOP
RTS PC
SP3A: .ASCII ;/ /;
.EVEN
;TELETYPE OUTPUT PACKAGE
TO: BICB #177,@TPS ;CLEAR TELETYPE FLAGS
MOV (2)+,EOMK ;SAVE MESSAGE DELIMITER
TOP1: CMPB @R2,EOMK ;IS CHARACTER THE SECOND MESSAGE DELIMITER?
BNE +4 ;NO
RTS PC ;YES, EXIT
CMPB @R2,#'a ;IS CHARACTER AN a WHICH INDICATES A CARRIAGE RET.
BEQ TOP2 ;YES
TSTB @TPS ;NO, WAIT FOR TELETYPE READY
BPL -4
MOV (2)+,@TPB ;PRINT CHARACTER
BR TOP1
TOP2: TSTB @TPS
BPL -4
MOV @215,@TPB ;CR
TSTB @TPS
BPL -4
MOV @212,@TPB ;LF
INC R2
BR TOP1
EOMK: 0
CKSWRR: CMP #SWREG,SWR ;SOFTWARE SWITCH REG PRESENT
OUT ;NO, GET OUT
TSTB @TKS ;YES, WAIT FOR
BPL OUT ;READY, GET CHARACTER
MOV @TKB,CHARIN ;AND STRIP OFF
BIC #177600,CHARIN ;THE GARBAGE
CMP #7,CHARIN ;IS IT A <TG>
BNE OUT
MOV #SCNTG,R2
TOP

```

2438	012024	012702	014050		CNTLU:	MOV	#SMSWR,R2	
2439	012030	104404				TOP		
2440	012032	017702	166454			MOV	2SWR,R2	
2441	012036	104412				OCTPRT		
2442	012040	012702	014060			MOV	#SMNEW,R2	
2443	012044	104404				TOP		
2444	012046	005037	012250			CLR	2#TEMPST	
2445	012052	004737	012060			JSR	PC,\$READ	;GO READ A LINE
2446	012056	000207			OUT:	RTS	PC	;RETURN TO MAIN BODY OF PROGRAM
2447								
2448	012060	005037	012250		\$READ:	CLR	TEMPST	
2449	012064	012737	000007	012252		MOV	#7,COUNT	
2450	012072	104400			1\$:	WAITKY		
2451	012074	042737	177600	001314		BIC	#177600,CHARIN	;STRIP OFF GARBAGE
2452	012102	122737	000025	001314		CMPB	#25,CHARIN	;IS IT A 'U'?
2453	012110	001002				BNE	2\$	;BRANCH IF NOT
2454	012112	005726			3\$:	TST	(SP)+	;POP THE STACK
2455	012114	000743				BR	CNTLU	;START OVER
2456	012116	122737	000015	001314	2\$:	CMPB	#15,CHARIN	;IS IT A <CR>?
2457	012124	001011				BNE	4\$	;BRANCH IF NOT
2458	012126	012702	014070			MOV	#SMCRLF,R2	;DO CRLF
2459	012132	104404				TOP		
2460	012134	022737	000007	012252		CMP	#7,COUNT	;WAS IT FIRST CHARACTER
2461	012142	001036				BNE	7\$	;CHANGE SWR IF NOT FIRST ONE
2462	012144	005726			8\$:	TST	(SP)+	;POP THE STACK
2463	012146	000743				BR	OUT	;GET OUT
2464	012150	122737	000060	001314	4\$:	CMPB	#60,CHARIN	
2465	012156	003004				BGT	5\$	
2466	012160	122737	000067	001314		CMPB	#67,CHARIN	
2467	012166	002004				BGE	6\$	
2468	012170	012702	012610		5\$:	MOV	#MSG0,R2	
2469	012174	104404				TOP		
2470	012176	000745				BR	3\$	;START OVER IF NOT LEGAL CHARACTER
2471	012200	006337	012250		6\$:	ASL	TEMPST	
2472	012204	006337	012250			ASL	TEMPST	
2473	012210	006337	012250			ASL	TEMPST	
2474	012214	142737	000060	001314		BICB	#60,CHARIN	;GET NITTY-GRITTY
2475	012222	153737	001314	012250		BISB	CHARIN,TEMPST	
2476	012230	005337	012252			DEC	COUNT	;ONLY WANT 6 DIGITS
2477	012234	001755				BEQ	5\$	
2478	012236	000715				BR	1\$	
2479	012240	013777	012250	166244	7\$:	MOV	TEMPST,2SWR	;CHANGE SWITCH REGISTER CONTENTS
2480	012246	000736				BR	8\$	
2481								
2482	012250	000000				TEMPST:	0	
2483	012252	000000				COUNT:	0	
2484								
2485	012254	013746	000006		SUSWRR:	MOV	2#6,-(SP)	;SAVE VECTORS
2486	012260	013746	000004			MOV	2#4,-(SP)	
2487	012264	012737	012304	000004		MOV	#1\$,2#4	;SET UP FOR TIMEOUT
2488	012272	022777	177777	166212		CMP	#-1,2SWR	;REFERENCE HARDWARE SWITCH REGISTER
2489	012300	001402				BEQ	2\$	
2490	012302	000404				BR	3\$	
2491	012304	022626			1\$:	CMP	(SP)+,(SP)+	;ADJUST STACK
2492	012306	012737	000176	000512	2\$:	MOV	#SWREG,SWR	;POINT TO SOFTWARE SWITCH REG
2493	012314	012637	000004		3\$:	MOV	(SP)+,2#4	;RESTORE VECTORS

```

2494 012320 012637 000006
2495 012324 000207
2496
2497
2498 012326 011666 000002
2499 012332 162716 000002
2500 012336 013646
2501 012340 062716 105746
2502 012344 013607
2503 012346 011574
2504 012350 005202
2505 012352 011652
2506 012354 004470
2507 012356 004604
2508 012360 011246
2509 012362 004506
2510 012364 006540
2511 012366 004550
2512 012370 004702
2513 012372 007410
2514 012374 011376
2515 012376 011634
2516 012400 012254
2517 012402 011754
2518 104400
2519 104402
2520 104404
2521 104406
2522 104410
2523 104412
2524 104414
2525 104416
2526 104420
2527 104422
2528 104424
2529 104426
2530 104430
2531 104432
2532 104434

```

```

MOV (SP)+, @#6
RTS PC

:TRAP HANDLER
TRAP34: MOV @SP, 2(6)
SUB #2, @SP
MOV @6)+, -(6)
ADD #TABLE-104400, @SP
MOV @6)+, PC

TABLE: WAITK
WRITI
TO
SVCTR
RSFDR
OCTPR
MVCTR
GENPA
CLRAL
CHGDR
READI
DECPR
SP3X
SUSWR
CKSWR

WAITKY=104400
WRITIT=104402
TOP=104404
SVCTRS=104406
RSFDRV=104410
OCTPRT=104412
MVCTRS=104414
GENPAT=104416
CLRALL=104420
CHGDRV=104422
READIT=104424
DECPRT=104426
SP3=104430
SUSWR=104432
CKSWR=104434

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```

; *****
;                               MODIFIED DEC 16 1977
;
; ++
;                               CHECK FOR DUMP MODE OR AUTOMATIC/ACT11-XXDP MODE
; --
;
CKMODE: CLR      AUTOM      ; INIT AUTOMATIC MODE INDICATOR
        CLRB     ACT11M     ; INIT ACT11 AUTO MODE INDICATOR
        CLRB     XXDPM     ; INIT XXDP AUTO MODE INDICATOR
        CLRB     ADUMPM    ; INIT ACT11 DUMP MODE INDICATOR
        CLRB     XDUMPM    ; INIT XXDP DUMP MODE INDICATOR
        TST      @#42      ; AUTO MODE?
        BEQ      2$        ; BRANCH - IF NO
        INC      AUTOM     ; SET AUTO MODE INDICATOR
        BIT      @20000,@#52 ; MANUAL INTERVENTION?
        BEQ      6$        ; BRANCH - IF NO
        JMP      ABORT     ; ABORT THE PROGRAM
        CMP      @#42,@#46 ; ACT11 MODE?
        BEQ      1$        ; BRANCH - IF YES
        INCB     XXDPM     ; INDICATE XXDP AUTO MODE
        BR      5$         ; AND EXIT
        INCB     ACT11M    ; INDICATE ACT11 AUTO MODE
        MOV      @20111,@SWR ; SET SWITCH REGISTER
        BR      5$         ; AND EXIT
        TSTB    @#41      ; MAN/MODE VIA ACT11/PAPER TAPE?
        BNE     3$        ; BRANCH - IF NOT
        INCB     ADUMPM    ; INDICATE MAN/MODE VIA ACT11/PAPER TAPE
        BR      5$         ; AND EXIT
        INCB     XDUMPM    ; INDICATE MANUAL MODE VIA XXDP
        RTS      PC       ; RETURN
; *****

```

```

012404 005037 000036
012410 105037 000040
012414 105037 000041
012420 105037 000042
012424 105037 000043
012430 005737 000042
012434 001425
012436 005237 000036
012442 032737 020000 000052
012450 001402
012452 000137 012532
012456 023737 000042 000046 6$:
012464 001403
012466 105237 000041
012472 000416
012474 105237 000040 1$:
012500 012777 020111 166004
012506 000410
012510 105737 000041 2$:
012514 001003
012516 105237 000042
012522 000402
012524 105237 000043 3$:
012530 000207 5$:

```

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 2577 012532 000005  
 2578 012534 012702 012566  
 2579 012540 004737 104404  
 2580 012544 105737 000041  
 2581 012550 001405  
 2582 012552 013700 000042  
 2583 012556 005037 000042  
 2584 012562 004710  
 2585 012564 000777  
 2586  
 2587  
 2588

```

; *****
;                               MODIFIED DEC 16 1977
;
; ++
;                               DISCONTINUE TESTING FOR ILLEGAL CONDITIONS
; --
ABORT: RESET
MOV      #MSG00,R2           ; CLEAR THE WORLD
JSR      PC, TOP            ; GET ABORT MESSAGE
TSTB    XXDPM               ; PRINT ABORT MESSAGE
BEQ     1$                  ; XXDP AUTO MODE
MOV     @#42,R0              ; BRANCH - IF NOT
CLR     @#42                 ; GET MONITOR EXIT ADDRESS
JSR     PC,(R0)              ; USE AS ABORT FLAG
1$:      BR                  ; EXIT TO XXDP MONITOR
;                               ; AND HANG
; *****

```

```

2589
2590 ;TEXT MESSAGES
2591
2592 012566 040057 051120 043517 MSG00: .ASCII ;/PROGRAM ABORTED/;
2593 012574 040522 020115 041101
2594 012602 051117 042524 027504
2595 012610 037457 020100 057 MSG0: .ASCII ;/? /;
2596 012615 057 051500 046105 MSG1: .ASCII ;/SELECT UNITS /;
2597 012622 041505 020124 047125
2598 012630 052111 020123 027440
2599 012636 040057 051524 020124 MSG2: .ASCII ;/TST PAT RLS WMO RMO /;
2600 012644 040520 020124 046122
2601 012652 020123 046527 020117
2602 012660 046522 040117 027440
2603 012666 046457 054101 052040 MSG5: .ASCII ;/MAX TESTS SELECTED /;
2604 012674 051505 051524 051440
2605 012702 046105 041505 042524
2606 012710 040104 057
2607 012713 057 047440 027513 MSG6: .ASCII ;/ OK /;
2608 012720 040057 051127 052111 MSG7: .ASCII ;/WRITE STATUS ERROR /;
2609 012726 020105 052123 052101
2610 012734 051525 042440 051122
2611 012742 051117 027500
2612 012746 042457 042116 047440 MSG8: .ASCII ;/END OF TAPE*****/;
2613 012754 020106 040524 042520
2614 012762 025052 025052 025052
2615 012770 025052 025052 025052
2616 012776 025052 025052 025052
2617 013004 025052 100
2618 013007 104 053122 050040 .ASCII ;/DRV PAT MODE RECORD LENGTH /;
2619 013014 052101 046440 042117
2620 013022 020105 042522 047503
2621 013030 042122 046040 047105
2622 013036 052107 040110 057
2623 013043 057 051100 040505 MSG9: .ASCII ;/READ STATUS ERROR /;
2624 013050 020104 052123 052101
2625 013056 051525 042440 051122
2626 013064 051117 027500
2627 013070 040057 042522 042101 MSG9A: .ASCII ;/READ DATA ERROR /;
2628 013076 042040 052101 020101
2629 013104 051105 047522 040122
2630 013112 057
2631 013113 057 047503 042115 MSG9B: .ASCII ;/CMD STATUS RECORD LENGTH EXPECTED ACTUAL /;
2632 013120 020040 020040 051440
2633 013126 040524 052524 020123
2634 013134 020040 042522 047503
2635 013142 042122 020040 046040
2636 013150 047105 052107 020110
2637 013156 054105 042520 052103
2638 013164 042105 040440 052103
2639 013172 040525 040114 057
2640 013177 057 055100 020132 MSG10A: .ASCII ;/ZZ - CZTMBE0RECORD LIMITS IN BYTES /;
2641 013204 020055 055103 046524
2642 013212 042502 040060 042522
2643 013220 047503 042122 046040
2644 013226 046511 052111 020123

```

2645	013234	047111	041040	052131		
2646	013242	051505	100			
2647	013245	115	047111	042514	.ASCII	;MINLEN MAXLEN /;
2648	013252	020116	046440	054101		
2649	013260	042514	040116	027440		
2650	013266	040054	054105	051105	MSG10B:	.ASCII /,EXERCISING UNITS,/
2651	013274	044503	044523	043516		
2652	013302	052440	044516	051524		
2653	013310	054				
2654	013311	054	047100	020117	MSG10C:	.ASCII /,NO DRIVES AVAILABLE,/
2655	013316	051104	053111	051505		
2656	013324	040440	040526	046111		
2657	013332	041101	042514	054		
2658	013337	057	020040	042522	MSG10D:	.ASCII ;/ RECORD DATA COMPARES/;
2659	013344	047503	042122	042040		
2660	013352	052101	020101	047503		
2661	013360	050115	051101	051505		
2662	013366	057				
2663	013367	057	044530	043522	MSG11:	.ASCII ;/XIRG WRITTEN 4 TIMES/;
2664	013374	053440	044522	052124		
2665	013402	047105	032040	052040		
2666	013410	046511	051505	057		
2667	013415	057	020040	051440	MSG12:	.ASCII ;/ SSTP /;
2668	013422	052123	020120	057		
2669	013427	057	020040	051040	MSG13:	.ASCII ;/ RNDM /;
2670	013434	042116	020115	057		
2671	013441	057	020040	047040	MSG14:	.ASCII ;/ NSTP /;
2672	013446	052123	020120	057		
2673	013453	057	026515	040515	MSG15:	.ASCII ;/M-MAX/;
2674	013460	027530				
2675	013462	046457	046455	047111	MSG16:	.ASCII ;/M-MIN/;
2676	013470	057				
2677	013471	057	044515	020116	MSG17:	.ASCII ;/MIN /;
2678	013476	027440				
2679	013500	046457	054101	020040	MSG18:	.ASCII ;/MAX /;
2680	013506	057				
2681	013507	057	053500	044522	MSG19:	.ASCII ;/WRITE ERRORS = /;
2682	013514	042524	042440	051122		
2683	013522	051117	020123	020075		
2684	013530	057				
2685	013531	057	051100	041505	MSG20:	.ASCII ;/RECOVERED AT 0 /;
2686	013536	053117	051105	042105		
2687	013544	040440	020124	020060		
2688	013552	057				
2689	013553	057	050100	051105	MSG20A:	.ASCII ;/PERMANENT BADSPOTS = /;
2690	013560	040515	042516	052116		
2691	013566	041040	042101	050123		
2692	013574	052117	020123	020075		
2693	013602	057				
2694	013603	057	051100	040505	MSG21:	.ASCII ;/READ STATUS ERRORS = /;
2695	013610	020104	052123	052101		
2696	013616	051525	042440	051122		
2697	013624	051117	020123	020075		
2698	013632	057				
2699	013633	057	042100	052101	MSG22:	.ASCII ;/DATA ERRORS = /;
2700	013640	020101	051105	047522		

```

2701 013646 051522 036440 027440
2702 013654 040057 047516 026516 MSG23: .ASCII ;/NON-RECOVERABLE ERRORS = /;
2703 013662 042522 047503 042526
2704 013670 040522 046102 020105
2705 013676 051105 047522 051522
2706 013704 036440 027440
2707 013710 040057 025052 025052 MSG24: .ASCII ;/*****WRITE PASS /;
2708 013716 025052 025052 025052
2709 013724 025052 025052 025052
2710 013732 025052 025052 051127
2711 013740 052111 020105 040520
2712 013746 051523 020040 027440
2713 013754 040057 025052 025052 MSG25: .ASCII ;/*****READ PASS /;
2714 013762 025052 025052 025052
2715 013770 025052 025052 025052
2716 013776 025052 025052 042522
2717 014004 042101 050040 051501
2718 014012 020123 020040 027440
2719 014020 040057 040100 057 MSG26: .ASCII ;/??/?;
2720 014025 057 047105 020104 MSG27: .ASCII ;/END OF PASS/;
2721 014032 043117 050040 051501
2722 014040 027523
2723 014042 040057 043536 027500 $CNTG: .ASCII ;/G@/;
2724 014050 040057 053523 036522 $MSWR: .ASCII ;/SWR= /;
2725 014056 027440
2726 014060 020057 042516 036527 $MNEW: .ASCII ;/ NEW= /;
2727 014066 027440
2728 014070 040057 057 $MCRLF: .ASCII ;/ /;
2729 014074 014074 .EVEN
2730
2731 014074 014074 BUFFER: . ;WRITE BUFFER BEGINS HERE
2732
2733 000001 .END

```















F06

TSD	004314	1507	1511#																		
TSE	004322	1514#	1526	1538																	
TSF	004364	1519	1522#																		
TSFLAG	004464	1496*	1542#	1572*	1628	1671															
TSG	004376	1516	1525#																		
TSH	004414	1528	1530#																		
TSINC	004466	1501*	1509	1543#																	
TSJ	004416	1531#	1536																		
TSK	004436	1533	1535#																		
USSTST	001624	1062#	1065																		
USS.OK	001642	1063	1067#																		
VALID	002300	1152	1158#																		
VAL1	002316	1163#	1166																		
VAL2	002330	1164	1167#																		
VAL3	002344	1168	1171#																		
VAL4	002350	1156	1170	1172#																	
WAITK	011574	2393#	2503																		
WAITKY=	104400	1141	1181	1203	1215	1231	1243	1258	2450	2518#											
WAIT1	005160	1649#	1651#	1654*																	
WBUF	000530	939#	1682	1862	2065	2120	2262														
WRCHK	000570	957#	1558	1640	1693	1756*	1837	1839	1849												
WRIT1	005202	1658#	2504																		
WRITIT=	104402	1334	1351	1369	1400	1445	1497	2519#													
WRPASS	000562	954#	1674*	1689	1691	1695*	1698	1719	1754	1765*	1766	1772*	2252*	2271*							
		2275*																			
WRRECR	000614	968#	1435*	1444	1446*	1670*	2293	2298													
WRTDMP	006170	1796#																			
WRTD1	006460	1841#	1850																		
WRTD2	006502	1843	1848#																		
WRTLEN	000626	973#	1666*	1680	1735*	1736	1738	1740*	1761	2260	2280										
W1	005250	1663	1666#																		
W10	005476	1702	1706#																		
W11	005550	1710	1719#	1775																	
W12	005604	1723	1727#																		
XDUMPM	000043	913#	2546*	2564*																	
XGRCD	010766	2254	2271#	2274																	
XGREC	010652	1771	2251#	2285																	
XRGD	010662	2253#	2276																		
XRG5	010774	2270	2273#																		
XXDPM	000041	911#	2544*	2555*	2580																
ZERO	011556	2357*	2374	2376*	2385#																
SCNTG	014042	2436	2723#																		
SENDAD	003246	891	1092	1310	1313#																
SMCLF	014070	2458	2728#																		
SMNEW	014060	2442	2726#																		
SMSWR	014050	2438	2724#																		
SREAD	012060	2445	2448#																		
SR1	007424	2040	2042#																		
SRS	007562	2067#	2070																		
SSVPC =	000036	877#	897																		
SZEROS	002032	1107	1111#																		
.	= 014076	857#	859#	877	878#	882#	886#	890#	893#	897#	918#	920#	926#	987#							
		989#	991#	993#	995#	997#	999#	1001#	1154	1173	1260	1263	1266	1292							
		1587	1606	1609	1672	1677	1679	1716	1770	1779	1814	1817	1826	1829							
		1832	1852	1877	1892	1918	1947	2045	2047	2083	2102	2149	2177	2210							
		2213	2222	2225	2228	2257	2264	2302	2304	2351	2380	2386	2394	2396							

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TM 11 DATA RELIAB 9TRK MACY11 30A(1052) 17-JAN-78 11:23 PAGE 72  
CZTMBE.P11 17-JAN-78 11:22 CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0071

2406# 2411 2416 2420 2423 2585 2729# 2731

. ABS. 014076 000

ERRORS DETECTED: 0

CZTMBE, CZTMBE.SEG/CRF/SOL/NL:TOC=CZTMBE.P11

RUN-TIME: 3 6 .9 SECONDS

RUN-TIME RATIO: 173/10=16.3

CORE USED: 8K (15 PAGES)

DOCUMENT PAGES: 71