

TMA,B-11

TM11 DATA RELIAB 9TRK
CZTMBFO

AH-9399F-MC

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IDENTIFICATION

PRODUCT CODE: AC-9398F-MC
PRODUCT NAME: CZTMBF0 TM 11 DATA RELIAB 9TRK
PROGRAM DATE: 21 MARCH 1976
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: JOHN RODENHISER
REVISED: JIM LACEY/B. BURGESS/S. CARPENTER/CLEM WALSH

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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*

SWR=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)

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210 - " " " " (" 8k " ")

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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 OTHERWISE
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

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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.

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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	010 004 010 004 ETC.	001 400 001 400 ETC.
1	SLIDING '1'	000 200 100 040 020 010 004 002 001 ETC.	040 004 010 020 100 001 400 002 200 ETC.
2	HIGH FREQUENCY, ALTERNATING CHANNELS	274 274 ETC.	525 525 ETC.
3	THREE 0'S, THRU 1'S, THRU 0'S	037 037 037 300 300 300 076 076 076 201 201 201 174 174 174 003 003 003 370 370 370 007 007 007 360 360 360	703 703 703 054 054 054 523 523 523 244 244 244 531 531 531 242 242 242 135 135 135 602 602 602 174 174 174

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ETC. ETC.

273				
274				
275	4	INCREMENTING PATTERN	000	040
276			001	200
277			002	002
278			003	202
279			:	:
280			:	:
281			377	777
282			ETC.	ETC.
283				
284				
285	5	EACH CHANNEL 3 BITS	000	040
286			000	040
287			000	040
288			200	004
289			200	004
290			200	004
291			100	010
292			100	010
293			100	010
294			040	020
295			040	020
296			040	020
297			020	100
298			020	100
299				
300				
301		PATTERN DESCRIPTION	DATA	CHANNELS
302			020	100
303			010	001
304			010	001
305			010	001
306			004	400
307			004	400
308			004	400
309			002	002
310			002	002
311			002	002
312			001	200
313			001	200
314			001	200
315			ETC.	ETC.
316				
317				
318	6	HIGH FREQUENCY ALL CHANNELS	377	777
319			377	777
320			ETC.	ETC.
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322	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)
					(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
4	0	2	2	2
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, CR 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
(0001000)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

NONE

726
727
728 8. MISCELLANEOUS
729
730 8.1 TAPE LENGTH
731
732 SINCE EACH OF THE TESTS DEPEND ON REACHING THE 'EOT' REFLECTOR
733 FOR TERMINATING IT COULD BE ADVANTAGEOUS TO USE A 'SHORT' TAPE.
734 THIS WOULD ALLOW FOR LESS TIME TO RUN A SERIES OF TESTS WHILE
735 VARYING THE TEST PARAMETERS (REFERENCE 5.1.3). HOWEVER, THIS
736 IS NOT INTENDED TO IMPLY THAT CONSTANTLY CHANGING THE TEST
737 PARAMETERS CONSTITUTES A MORE DIFFICULT TEST OF DATA RELIABILITY.
738 THE LENGTH OF TIME UNDER TEST IS MORE LIKELY TO SUPPLY THAT.
739 IN ANY EVENT, IF A 'SHORT' TAPE IS DESIRED, JUST PLACE AN 'EOT'
740 REFLECTIVE STRIP APPROXIMATELY 50 FEET DOWN TAPE FROM THE 'BOT'
741 MARKER. SO THAT THE TAPE IS STILL USEFUL AS A 'LONG' TAPE
742 ANOTHER 'BOT' MARKER COULD BE PLACED A SHORT DISTANCE (APPROX-
743 IMATELY 10 FEET) FARTHER DOWN ON TAPE. THIS WOULD EFFECTIVELY
744 GIVE YOU TWO TAPES. CARE MUST BE EXERCISED WHEN MOUNTING THE TAPE
745 TO POSITION IT AT THE PROPER 'BOT' MARKER.
746
747 8.2 MEMORY AVAILABLE
748
749 THE PROGRAM REQUIRES 4K OF MEMORY. IF 8K IS AVAILABLE, STARTING
750 THE PROGRAM AT ADDRESS 200 OR 210 WILL EXPAND THE WRITE AND READ BUFFERS
751 SO THAT THE MINIMUM LENGTH RECORDS WILL BE 8 BYTES AND MAXIMUM
752 LENGTH RECORDS WILL BE 2048 BYTES.
753
754 9. PROGRAM DESCRIPTION
755
756 9.1 GENERAL DESCRIPTION
757
758 THE PROGRAM IS DESIGNED AROUND TWO MAIN SUBROUTINES 'WRITE' AND
759 'READ' AND A SERIES OF MINOR SUBROUTINES FOR MANIPULATING UNIT
760 SELECTION, HANDLING ERROR STATISTICS, AND RECORD POSITIONING.
761 IF MORE THAN ONE UNIT IS SELECTED THE UNIT WITH THE LOWEST
762 NUMBER IS SELECTED FIRST AND WHEN THE SEQUENCE IS COMPLETED
763 THEN THE NEXT LOWEST UNIT NUMBER IS SELECTED UNTIL ALL UNITS HAVE
764 BEEN SELECTED. THIS PROCESS IS REPEATED UNTIL ALL UNITS REACH
765 END OF TAPE.
766
767 9.2 TEST 0
768
769 THIS IS A 'WRITE ONLY' TEST. THE PROCEDURE IS TO WRITE 1 RECORD,
770 REPEAT FOR ALL UNITS, CONTINUE UNTIL EOT. WRITE MODE OF NONSTOP
771 (WMO=0) WILL NOT BE AN EFFECTIVE SELECTION FOR THIS TEST BECAUSE
772 THE WRITE ROUTINE IS EXITED AFTER EACH RECORD TO DETERMINE IF
773 ANY OTHER UNITS ARE SELECTED. READ MODE (RMO) HAS NO EFFECT ON
774 THIS TEST.
775
776 9.3 TEST 1
777
778 THIS IS A 'WRITE ONLY' TEST SIMILAR TO TEST 0 EXCEPT A SEQUENCE
779 OF 256 RECORDS IS WRITTEN ON EACH UNIT BEFORE CHANGING TO THE
780 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
```

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

```
.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  
:*****
```

```
000000  
000001  
000002  
000003  
000004  
000005  
000006  
000007  
  
000000  
000034 012326
```

```
869
870      : *****
871      :                               *****
872      :                               MODIFIED DEC 16 1977
873      :
874      : ++
875      :                               ACT11 AND XXDP HOOKS
876      : --
877      :                               $SVPC=.      ;SAVE PC
878      :                               . =40
879      :                               DRIVE: .BYTE 0      ;DRIVE # FOR XXDP LOAD MEDIUM
880      :                               ;ASSEMBLE AS A 0
881
882      :                               . =41
883      :                               MEDIUM: .BYTE 0      ;XXDP LOAD MEDIUM
884      :                               ;ASSEMBLE AS A 0
885
886      :                               . =42
887      :                               .WORD 0      ;AUTO/MAN MODE INDICATOR
888      :                               ;ASSEMBLE AS A 0
889
890      :                               . =46
891      :                               .WORD $ENDAD ;SET TO $ENDAD IN .SEOP
892
893      :                               . =52
894      :                               .WORD 0      ;CHARACTERISTICS OF PROGRAM
895      :                               ;SET TO 0
896
897      :                               .=$SVPC      ;RESTORE PC
898
899      : *****
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000400

. =400

```
: *****  
:                                     MODIFIED DEC 16 1977  
:                                       
: ++  
:                                     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  
: *****
```

921					
922		000176		.=176	
923	000176	000000		SWREG: .WORD 0	; SOFTWARE SWITCH REGISTER
924		000200		.=200	
925	000200	000137	001354	JMP	AUTOST
926	000204	000137	002066	JMP	MEM4K
927	000210	000137	002112	JMP	MEM8K
928					
929		000500		STACK=500	
930		000500		.=500	
931	000500	172520		MTS:	172520
932	000502	172522		MTC:	172522
933	000504	172524		BC:	172524
934	000506	172526		CA:	172526
935	000510	177776		CC:	177776
936	000512	177570		SWR:	177570
937	000514	177560		TKS:	177560
938	000516	177562		TKB:	177562
939	000520	177564		TPS:	177564
940	000522	177566		TPB:	177566
941	000524	002000		MAXLEN: 1024.	; MAX RECORD LENGTH
942	000526	000004		MINLEN: 4.	; MIN RECORD LENGTH
943	000530	014074		WBUF: BUFFER	; STARTING ADDRESS OF WRITE BUFFER
944	000532	016074		RBUF: BUFFER+1024.	; STARTING ADDRESS OF READ BUFFER
945	000534	000224		MTV: 224	
946					
947				; TEMPORARY STORAGE AREAS	
948	000536	000000		ATST: 0	
949	000540	000000		DRVSEL: 0	
950	000542	000000		STRLEN: 0	
951	000544	000000		LENGTH: 0	
952	000546	000000		MSBITS: 0	
953	000550	000000		SVRECR: 0	
954	000552	000000		COMAND: 0	
955	000554	000000		CDRVBT: 0	
956	000556	000000		CDRIVE: 0	
957	000560	000000		RDPASS: 0	
958	000562	000000		WRPASS: 0	
959	000564	000000		BLKINC: 0	
960	000566	000000		STATRD: 0	
961	000570	000000		WRCHEK: 0	
962	000572	000000		0	
963	000574	000000		0	
964	000576	000000		0	
965	000600	000000		0	
966	000602	000000		0	
967	000604	000000		0	
968	000606	000000		0	
969					
970	000610	000000		PERMBS: 0	
971	000612	000000		RECORD: 0	
972	000614	000000		WRRRCR: 0	
973	000616	000000		LASRCR: 0	
974	000620	000000		RDERRS: 0	
975	000622	000000		DAERRS: 0	
976	000624	000000		NRREAD: 0	

977 000626 000000
978 000630 000000
979 000632 000000
980
981 000634 000654
982 000636 000720
983 000640 000764
984 000642 001030
985 000644 001074
986 000646 001140
987 000650 001204
988 000652 001250
989
990 000654 000000
991 000720 000720
992 000720 000000
993 000764 000764
994 000764 000000
995 001030 001030
996 001030 000000
997 001074 001074
998 001074 000000
999 001140 001140
1000 001140 000000
1001 001204 001204
1002 001204 000000
1003 001250 001250
1004 001250 000000
1005 001314 001314
1006 001314 000000
1007 001316 000000
1008 001320 000000
1009 001322 000000
1010 001324 000000
1011
1012 001326 000000
1013 001330 000000
1014 001332 000000
1015 001334 000000
1016 001336 000000
1017 001340 000000
1018 001342 000000
1019 001344 000000
1020 001346 000000
1021 001350 000000
1022 001352 000000
1023
1024 001354 012706 000500
1025 001360 104432
1026 001362 004737 012404
1027 001366 022737 000176 000512
1028 001374 001004
1029 001376 004737 012024
1030 001402 004737 012404
1031 001406 012737 177777 000536 1\$:
1032 001414 012737 036025 001326

WRTLEN: 0
READLN: 0
MODES: 0

DRVADR: D0TAB
D1TAB
D2TAB
D3TAB
D4TAB
D5TAB
D6TAB
D7TAB

D0TAB: 0
D1TAB: 0
D2TAB: 0
D3TAB: 0
D4TAB: 0
D5TAB: 0
D6TAB: 0
D7TAB: 0

CHARIN: 0
NUMTST: 0
PARAM: 0
TSTEX: 0
TEST: 0

TSTTBL: 0
0
0
0
0
0
0
0
0
0
0
0
0

: 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

: SETUP THE SP
: CHECK FOR HARDWARE SWICH REG
: CHECK FOR MODE OF OPERATION ++ C.W

: ALLOW SWREG TO BE CHANGED
: CHECK FOR MODE OF OPERATION

: SETUP TEST PARAMETERS

AUTOST: MOV #STACK, SP
SUSWR
JSR PC, CKMODE
CMP #SWREG, SWR
BNE 1\$
JSR PC, CNTLU
JSR PC, CKMODE
MOV #-1, ATST
MOV #36025, TSTTBL

```

1033 001422 012737 040052 001330      MOV      #40052,TSTTBL+2
1034 001430 012737 027052 001332      MOV      #27052,TSTTBL+4
1035 001436 012737 000003 001316      MOV      #3,NUMTST
1036 001444 012737 123456 007374      MOV      #123456,LONUM      ;PRIME RANDOM NUMBER GENERATER
1037 001452 012737 176543 007376      MOV      #176543,HINUM
1038                                     ;DETERMINE THE SIZE OF THE WRITE AND READ BUFFERS.
1039 001460 012737 001474 000004      MOV      #NXMRET,@#4      ;SETUP NXM VECTOR
1040 001466 005737 024074      TST      BUFFER+4096.      ;OVER 4K OF MEMORY?
1041 001472 000413      BR      OVER4K      ;BR IF YES
1042 001474 022626      NXMRET: CMP      (SP)+,(SP)+      ;POP THE STACK
1043 001476 012737 000004 000526      MOV      #4,MINLEN
1044 001504 012737 002000 000524      MOV      #1024.,MAXLEN
1045 001512 012737 016074 000532      MOV      #BUFFER+1024.,RBUF
1046 001520 000411      BR      TU.SEL      ;GO SELCT DRIVES
1047 001522 012737 000010 000526      OVER4K: MOV      #8.,MINLEN
1048 001530 012737 004000 000524      MOV      #2048.,MAXLEN
1049 001536 012737 020074 000532      MOV      #BUFFER+2048.,RBUF
1050                                     ;DETERMINE DRIVES TO BE TESTED.
1051                                     ;A DRIVE WILL BE TESTED IF:
1052                                     :
1053                                     : 1. IT CAN BE SELECTED
1054                                     : 2. IT IS 9 TRACK
1055                                     : 3. IT IS WRITE ENABLED
1055 001544 012737 000006 000004      TU.SEL: MOV      #6,@#4      ;SET TRAP CATCHER
1056 001552 012777 010000 176722      MOV      #10000,@MTC      ;PWR CLR
1057 001560 005037 000540      CLR      DRVSEL      ;CLEAR DRIVE TABLE
1058 001564 005037 000546      CLR      MSBITS
1059 001570 012700 000200      MOV      #200,R0      ;R0=DRIVE 0
1060 001574 105777 176702      TSTB    @MTC
1061 001600 100036      BPL      IDSELF      ;BR IF NO CU RDY
1062 001602 123737 000041 000004      CMPB    @#41,4      ;DDP ON MAGTAPE?
1063 001610 001426      BEQ      NO.SEL      ;IF YES - SKIP DRIVE 0
1064 001612 013777 000540 176662      NXT.TU: MOV      DRVSEL,@MTC      ;SELECT A DRIVE
1065 001620 012702 000024      MOV      #20.,R2      ;SETUP R2 FOR WAIT LOOP
1066 001624 032777 000100 176646      USSTST: BIT      #100,@MTC      ;DOES DRIVE EXIST?
1067 001632 001003      BNE      USS.OK      ;BR IF YES
1068 001634 005302      DEC      R2      ;KILL SOME TIME
1069 001636 003372      BGT      USSTST
1070 001640 000412      BR      NO.SEL
1071 001642 032777 000020 176630      USS.OK: BIT      #20,@MTC      ;DRIVE IS NON-EXISTENCE
1072 001650 001006      BNE      NO.SEL      ;IS THIS DRIVE 7 OR 9 CHN?
1073 001652 032777 000004 176620      BIT      #4,@MTC      ;BR IF 7 CHN.
1074 001660 001002      BNE      NO.SEL      ;IS WRITE LOCK ON?
1075 001662 050037 000546      BIS      R0,MSBITS      ;BR IF YES
1076 001666 105237 000541      NO.SEL: INCB    DRVSEL+1      ;PUT DRIVE INTO TABLE
1077 001672 006200      ASR      R0      ;INC. THE DRIVE NUMBER
1078 001674 001346      BNE      NXT.TU      ;HAS ALL DRIVES BEEN TESTED FOR EXISTENCE?
1079                                     ;BR IF NO
1080                                     ;TYPE-OUT NAME OF PROGRAM AND MIN. AND MAX. RECORD LENGTHS.
1081
1082 001676 105737 000402      IDSELF: TSTB    ACT11M      ;ACT11 MODE?
1083 001702 001011      BNE      3$      ;BRANCH - IF YES
1084 001704 012702 013177      MOV      #MSG10A,R2
1085 001710 104404      TOP
1086 001712 013702 000526      MOV      MINLEN,R2
1087 001716 104426      DECPRT
1088 001720 013702 000524      MOV      MAXLEN,R2      ;PRINT MIN. LENGTH

```



```

1089 001724 104426
1090 001726 005737 000546
1091 001732 001012
1092 001734 013701 000042
1093 001740 001405
1094 001742 012702 013311
1095 001746 104404
1096 001750 000137 003246
1097 001754 000137 002140
1098
1099
1100 001760 012702 013266
1101 001764 104404
1102 001766 105037 014074
1103 001772 012701 014074
1104 001776 005000
1105 002000 012702 000200
1106
1107
1108 002004 105021
1109 002006 112721 000040
1110 002012 030237 000546
1111 002016 001405
1112 002020 110011
1113 002022 152721 000060
1114 002026 112721 000054
1115 002032 000241
1116 002034 006002
1117 002036 005200
1118 002040 020027 000007
1119 002044 003762
1120 002046 105011
1121 002050 112741 000100
1122 002054 012702 014074
1123 002060 104404
1124 002062 000137 003056
1125
1126 002066 012737 000004 000526
1127 002074 012737 002000 000524
1128 002102 012737 016074 000532
1129 002110 000411
1130
1131 002112 012737 000010 000526
1132 002120 012737 004000 000524
1133 002126 012737 020074 000532
1134 002134 005037 000536
1135 002140 012706 000500
1136 002144 104432
1137 002146 022737 000176 000512
1138 002154 001002
1139 002156 004737 012024
1140 002162 012737 123456 007374
1141 002170 012737 176543 007376
1142 002176 012702 012615
1143 002202 104404
1144 002204 005037 000546

DECPRT
3$: TST MSBITS ;PRINT MAX. LENGTH
    BNE 2$ ;WAS ANY DRIVES SELECTED?
    MOV @#42,R1 ;BR IF YES
    BEQ 1$ ;IS THERE A MONITOR?
    MOV #MSG10C,R2 ;BRANCH IF NO
    TOP ;INDICATE THAT NO DRIVES ARE
    JMP @#$ENDAD ;AVAILABLE!!
1$: JMP START1 ;RETURN TO THE MONITOR
    ;NO--GO HAVE OPERATOR SELECT DRIVES

;TYPE-OUT THE DRIVE/S TO BE TESTED
2$: MOV #MSG10B,R2
    TOP
    CLRB BUFFER
    MOV #BUFFER,R1
    CLR R0 ;SET R0 TO DRIVE 0
    MOV #200,R2 ;SET R2 TO DRIVE 0

;FORM AND SAVE DRIVE NUMBER FOR TYPE-OUT
    CLRB (R1)+ ;SET EOM
    MOVB #' ,(R1)+ ;SPACE
LOOPER: BIT R2,MSBITS ;DID THIS DRIVE NUMBER EXIST?
    BEQ $ZEROS$ ;BR IF NO
    MOVB R0,(R1) ;YES--SAVE THE NUMBER
    BISB #'0,(R1)+ ;MAKE IT ASCII
    MOVB #' ,(R1)+ ;COMMA
$ZEROS$: CLC ;POSITION DRIVE BIT
    ROR R2
    INC R0 ;UPDATE DRIVE NUMBER
    CMP R0,#7 ;LAST
    BLE LOOPER ;BR IF NO
    CLRB (R1) ;SET EOM
    MOVB #'@,-(R1) ;CR & LF
    MOV #BUFFER,R2 ;TYPE THE DRIVE/S SELECTED
    TOP
    JMP EXECUT ;GO START TESTING

;MODIFY RECORD LENGTHS AND BUFFER AREAS FOR 4K OF MEMORY
MEM4K: MOV #4.,MINLEN
    MOV #1024.,MAXLEN
    MOV #BUFFER+1024.,RBUF
    BR START

;MODIFY RECORD LENGTHS AND BUFFER AREAS FOR 8K OF MEMORY
MEM8K: MOV #8.,MINLEN
    MOV #2048.,MAXLEN
    MOV #BUFFER+2048.,RBUF

START: CLR ATST ;NOT AUTO START
START1: MOV #STACK,SP ;INITIALIZE STACK
    SUSWR ;CHECK FOR HARDWARE SWITCH REGISTER
    CMP #SWREG,SWR
    BNE 1$
    JSR PC,CNTLU
1$: MOV #123456,LONUM ;PRIME RANDOM
    MOV #176543,HINUM ;NUMBER GENERATOR
    MOV #MSG1,R2
    TOP ;PRINT 'SELECT DRIVES'
    CLR MSBITS ;CLEAR SELECTED DRIVE INDICATOR
    
```



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1145 002210 104400 SELDRV: WAITKY
1146 002212 122737 000015 001314 CMPB #15,CHARIN ;WAS CHARACTER A CARRIAGE RETURN?
1147 002220 001010 BNE SELD1 ;NO
1148 002222 005737 000546 TST MSBITS ;YES, WERE ANY DRIVES SELECTED
1149 002226 001744 BEQ START1 ;NO
1150 002230 005737 000536 TST ATST ;YES--IS AUTO SWITCH SET?
1151 002234 001454 BEQ SELTST ;NO--GO SELECT TESTS
1152 002236 000137 003056 JMP EXECUT ;YES--GO START TESTING
1153 002242 122737 000070 001314 SELD1: CMPB #70,CHARIN ;IS CHARACTER A VALID NUMBER 0-7?
1154 002250 003404 BLE SELD2 ;NO, PRINT '?'
1155 002252 122737 000060 001314 CMPB #60,CHARIN ;IS CHARACTER A VALID NUMBER 0-7?
1156 002260 003407 BLE VALID ;YES
1157 002262 105777 176232 SELD2: TSTB @TPS
1158 002266 100375 BPL -4
1159 002270 012777 000077 176224 MOV #'?,@TPB ;PRINT '?'
1160 002276 000424 BR VAL4
1161 ;HAVE VALID DRIVE NUMBER
1162 002300 142737 000270 001314 VALID: BICB #270,CHARIN ;MASK OUT NUMBER
1163 002306 105137 001314 COMB CHARIN
1164 002312 012700 000200 MOV #200,R0 ;INITIALIZE BIT POSITION FOR DRIVE 0
1165
1166
1167 002316 105237 001314 VAL1: INCB CHARIN ;+1 TO DRIVE SELECT
1168 002322 001402 BEQ VAL2 ;HAVE DRIVE OF EQUAL TO ZERO
1169 002324 006200 ASR R0 ;MOVE BIT POSITION TO NEXT DRIVE
1170 002326 000773 BR VAL1 ;TRY AGAIN
1171 002330 130037 000546 VAL2: BITB R0,MSBITS ;COMPARE DRIVE SELECT WITH PREVIOUS SELECTED
1172 002334 001003 BNE VAL3
1173 002336 150037 000546 BISB R0,MSBITS ;DRIVE WASN'T PREVIOUSLY SET, SO SET IT NOW.
1174 002342 000402 BR VAL4
1175 002344 140037 000546 VAL3: BICB R0,MSBITS ;DRIVE WAS SET, CLEAR IT.
1176 002350 105777 176144 VAL4: TSTB @TPS
1177 002354 100375 BPL -4
1178 002356 012777 000054 176136 MOV #'',@TPB ;PRINT COMMA
1179 002364 000711 BR SELDRV ;RETURN TO WAIT FOR NEXT KEY
1180 ;HAVE DRIVES SELECTED-NOW GET TEST SELECTION
1181 002366 012702 012636 SELTST: MOV #MSG2,R2
1182 002372 104404 TOP ;PRINT 'SELECT TESTS'
1183 002374 005037 001316 CLR NUMTST ;CLEAR TEST NUMBERS SELECTED
1184 002400 012700 001326 MOV #TSTTBL,R0 ;INITIALIZE TEST TABLE POINTER
1185 002404 104400 SELT1: WAITKY
1186 002406 122737 000015 001314 CMPB #15,CHARIN ;WAS CHARACTER A CARRIAGE RETURN?
1187 002414 001005 BNE SELT2
1188 002416 005737 001316 TST NUMTST ;WERE ANY TESTS SELECTED?
1189 002422 001412 BEQ SELT3 ;NO
1190 002424 000137 003056 JMP EXECUT ;YES, EXECUTE TESTS
1191 002430 122737 000066 001314 SELT2: CMPB #66,CHARIN ;IS CHARACTER A VALID NUMBER 0-5
1192 002436 003404 BLE SELT3 ;NO
1193 002440 122737 000060 001314 CMPB #60,CHARIN ;IS CHARACTER A VALID NUMBER 0-5
1194 002446 003404 BLE SELPAT ;YES
1195 002450 012702 012610 SELT3: MOV #MSG0,R2
1196 002454 104404 TOP
1197 002456 000752 BR SELT1 ;RETURN TO WAIT FOR TEST SELECT
1198 002460 013704 001314 SELPAT: MOV CHARIN,R4
1199 002464 000304 R4 ;ROTATE TEST NUMBER INTO POSITION
1200 002466 006104 ROL R4
  
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1201	002470	006104			ROL	R4	
1202	002472	006104			ROL	R4	
1203	002474	006104			ROL	R4	
1204	002476	042704	107777		BIC	#107777,R4	
1205	002502	104430			SP3		:TYPE 3 SPACES
1206							:HAVE VALID TEST SELECTED, NOW GET SELECTED PATTERN
1207	002504	104400			WAITKY		
1208	002506	122737	000070	001314	CMPB	#70,CHARIN	:IS CHARACTER A VALID NUMBER 0-7
1209	002514	003755			BLE	SEL3	:NO
1210	002516	122737	000057	001314	CMPB	#57,CHARIN	:IS CHARACTER A VALID NUMBER 0-7
1211	002524	002351			BGE	SEL3	:NO
1212	002526	000337	001314		SWAB	CHARIN	:MOVE PATTERN SELECT INTO POSITION
1213	002532	006137	001314		ROL	CHARIN	
1214	002536	042737	170777	001314	BIC	#170777,CHARIN	
1215	002544	053704	001314		BIS	CHARIN,R4	:COMBINE PATTERN WITH TEST
1216	002550	104430			SP3		
1217							
1218							:WAIT FOR RECORD LENGTH SEQUENCES SELECTION
1219	002552	104400			SELRLS:	WAITKY	
1220	002554	122737	000060	001314	CMPB	#60,CHARIN	:IS CHARACTER=0
1221	002562	001424			BEQ	SEL3	:YES, RLS=MIN
1222	002564	122737	000061	001314	CMPB	#61,CHARIN	:IS CHARACTER=1
1223	002572	001003			BNE	SEL1	
1224	002574	052704	000020		BIS	#20,R4	:SET RLS=MAX
1225	002600	000415			BR	SEL3	
1226	002602	122737	000062	001314	SELR1: CMPB	#62,CHARIN	:IS CHARACTER=2
1227	002610	001003			BNE	SEL2	
1228	002612	052704	000040		BIS	#40,R4	:SET RLS=MIN-MAX
1229	002616	000406			BR	SEL3	
1230	002620	122737	000063	001314	SELR2: CMPB	#63,CHARIN	:IS CHARACTER=3
1231	002626	001310			BNE	SEL3	
1232	002630	052704	000060		BIS	#60,R4	:SET RLS=MAX-MIN
1233	002634	104430			SELR3: SP3		
1234							:WAIT FOR WRITE MODE SELECTION
1235	002636	104400			WAITKY		
1236	002640	122737	000060	001314	CMPB	#60,CHARIN	
1237	002646	001415			BEQ	SELW2	:SET WMO=NONSTOP
1238	002650	122737	000061	001314	CMPB	#61,CHARIN	
1239	002656	001003			BNE	SELW1	
1240	002660	052704	000004		BIS	#4,R4	:SET WMO=START-STOP
1241	002664	000406			BR	SELW2	
1242	002666	122737	000062	001314	SELW1: CMPB	#62,CHARIN	
1243	002674	001265			BNE	SEL3	
1244	002676	052704	000010		BIS	#10,R4	:SET WMO=RANDOM
1245	002702	104430			SELW2: SP3		
1246							:WAIT FOR READ MODE SELECTION
1247	002704	104400			WAITKY		
1248	002706	122737	000060	001314	CMPB	#60,CHARIN	
1249	002714	001415			BEQ	SELRM2	:SET RMO=NONSTOP
1250	002716	122737	000061	001314	CMPB	#61,CHARIN	
1251	002724	001003			BNE	SELRM1	
1252	002726	052704	000001		BIS	#1,R4	:SET RMO=START-STOP
1253	002732	000406			BR	SELRM2	
1254	002734	122737	000062	001314	SELRM1: CMPB	#62,CHARIN	
1255	002742	001242			BNE	SEL3	
1256	002744	052704	000002		BIS	#2,R4	:SET RMO=RANDOM

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1257 002750 104430 SELRM2: SP3
1258
1259 ;HAVE ALL PARAMETERS
1260 002752 012702 012713 MOV #MSG6,R2
1261 002756 104404 TOP ;PRINT 'OK'
1262 002760 104400 WAITKY ;WAIT FOR CARRIAGE RETURN
1263 002762 122737 000015 001314 CMPB #15,CHARIN
1264 002770 001402 BEQ .+6
1265 002772 000137 002450 JMP SELT3
1266 002776 105777 175516 TSTB @TPS
1267 003002 100375 BPL .-4
1268 003004 012777 000012 175510 MOV #12,@TPB
1269 003012 105777 175502 TSTB @TPS
1270 003016 100375 BPL .-4
1271 003020 012777 000040 175474 MOV #40,@TPB
1272 003026 010420 MOV R4,(0)+
1273 003030 005237 001316 INC NUMTST ;+1 TO TEST COUNT
1274 003034 022737 000012 001316 CMP #10,NUMTST ;EQUAL TO TEN YET
1275 003042 001402 BEQ SELOK1 ;YES
1276 003044 000137 002404 JMP SELT1 ;NO, ACCEPT NEXT SET
1277 003050 012702 012666 SELOK1: MOV #MSG5,R2
1278 003054 104404 TOP
1279
1280 ;EXECUTE SELECTED TEST
1281 003056 005037 000632 EXECUT: CLR MODES ;INITIALIZE MODES
1282 003062 012737 001326 001322 MOV #TSTTBL,TSTEX
1283 003070 017737 176226 001320 EXEC: MOV @TSTEX,PARAM ;GET TEST PARAMETERS
1284 003076 013700 001320 EXEC1: MOV PARAM,R0
1285 003102 042700 007777 BIC #7777,R0
1286 003106 010037 001324 MOV R0,TEST
1287 003112 001475 BEQ TEST0
1288 003114 022700 010000 CMP #10000,R0
1289 003120 001516 BEQ TEST1
1290 003122 022700 020000 CMP #20000,R0
1291 003126 001537 BEQ TEST2
1292 003130 022700 030000 CMP #30000,R0
1293 003134 001002 BNE 1$
1294 003136 000137 003544 JMP TEST3
1295 003142 022700 040000 1$: CMP #40000,R0
1296 003146 001402 BEQ .+6
1297 003150 000137 004204 JMP TEST5
1298 003154 000137 003662 JMP TEST4
1299 ;RETURN HERE AFTER COMPLETION OF TEST
1300 003160 104434 DONE: CKSWR ;CHECK FOR CNTL G
1301 003162 012702 014020 MOV #MSG26,R2
1302 003166 104404 TOP
1303 003170 032777 000001 175314 BIT #1,@SWR ;IS SW 0=1 TO REPEAT TEST WITH ALL PATTERNS
1304 003176 001413 BEQ DONE1 ;NO
1305 003200 013700 001320 MOV PARAM,R0
1306 003204 042700 170777 BIC #170777,R0
1307 003210 022700 007000 CMP #7000,R0 ;REACHED PATTERN ??
1308 003214 001404 BEQ DONE1 ;YES
1309 003216 062737 001000 001320 ADD #1000,PAPAM ;NO, +1 TO PATTERN
1310 003224 000724 BR EXEC1 ;REPEAT TEST
1311 003226 005337 001316 DONE1: DEC NUMTST
1312 003232 001021 BNE DOAGN

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1313 003234 013701 000042      MOV    @#42,R1
1314 003240 001002      BNE    $ENDAD
1315 003242 000000      HALT
1316 003244 104434      CKSWR
1317 003246 004711      $ENDAD: JSR    PC,(R1)
1318 003250 000240      NOP
1319 003252 000240      NOP
1320 003254 000240      NOP
1321 003256 105737 000402      TSTB   ACT11M      ;ACT11 MODE? ++ C.W
1322 003262 001405      BEQ    DOAGN       ;BRANCH - IF NO ++ C.W
1323 003264 012702 014025      MOV    #MSG27,R2  ;GET END OF PASS MESSAGE
1324 003270 104404      TOP
1325 003272 000137 001354      JMP    AUTOST      ;TYPE END OF PASS
1326 003276 062737 000002 001322  DOAGN: ADD    #2,TSTEX  ;CONTINUE TEST
1327 003304 000671      BR     EXEC        ;DO NEXT TEST
1328
1329      ;TEST0
1330      ;WRITE ONE RECORD, CHANGE DRIVES, GO TO EOT
1331 003306 052737 000002 000632  TEST0: BIS    #2,MODES ;EXIT WRITE EVERY RECORD, NO READ PASS
1332 003314 104420      CLRALL           ;CLEAR ERROR COUNTERS AND REWIND
1333 003316 104416      GENPAT          ;GENERATE PATTERN
1334 003320 104410      TO:    RSFDRV    ;RESET DRIVE SELECTION TO LOWEST NUMBER
1335 003322 104414      TOA:   MVCTRS   ;RESTORE DRIVE COUNTERS
1336 003324 032737 000040 000632  BIT    #40,MODES ;IS THIS DRIVE AT EOT?
1337 003332 001002      BNE    TOB       ;YES, SKIP WRITE
1338 003334 104402      WRITIT         ;WRITE
1339 003336 104406      SVCTRS        ;SAVE DRIVE COUNTERS
1340
1341      TOB:   CHGDRV  ;ANY MORE DRIVES SELECTED?
1342 003342 000767      BR     TOA       ;YES
1343 003344 004737 004776      JSR    PC,ALLEOT ;ARE ALL DRIVES AT EOT?
1344 003350 000763      BR     TO        ;NO
1345 003352 000137 003160      JMP    DONE      ;YES, EXIT
1346
1347      ;TEST1
1348 003356 052737 000001 000632  ;WRITE RECORD LENGTH SEQUENCE, GO TO NEXT DRIVE, CONTINUE TO EOT ON ALL DRIVES.
1349 003364 104420      TEST1: BIS    #1,MODES ;EXIT WRITE AFTER RLS, NO READ PASS
1350 003366 104416      CLRALL           ;CLEAR ERROR COUNTERS AND REWIND
1351 003370 104410      T1:    RSFDRV    ;RESET DRIVE SELECTION TO LOWEST NUMBER
1352 003372 104414      T1A:   MVCTRS   ;RESTORE DRIVE COUNTERS
1353 003374 032737 000040 000632  BIT    #40,MODES ;IS THIS DRIVE AT EOT?
1354 003402 001002      BNE    T1B       ;YES, SKIP WRITE
1355 003404 104402      WRITIT         ;WRITE
1356 003406 104406      SVCTRS        ;SAVE DRIVE COUNTERS
1357 003410 104422      T1B:   CHGDRV  ;ANY MORE DRIVE SELECTED?
1358 003412 000767      BR     T1A       ;YES
1359 003414 004737 004776      JSR    PC,ALLEOT ;ARE ALL DRIVES AT EOT?
1360 003420 000763      BR     T1        ;NO
1361 003422 000137 003160      JMP    DONE      ;YES EXIT
1362
1363      ;TEST2
1364      ;WRITE A RECORD LENGTH SEQUENCE, CHANGE DRIVES
1365      ;BACKSPACE, CHANGE DRIVES, READ, CHANGE DRIVES. CONTINUE TO EOT ON ALL DRIVES
1366 003426 052737 000005 000632  TEST2: BIS    #5,MODES ;EXIT WRITE AFTER RLS, DO READ PASS
1367 003434 104420      CLRALL           ;CLEAR ERROR COUNTERS AND REWIND
1368 003436 104416      GENPAT          ;GENERATE PATTERN
  
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1369	003440	104410			T2:	RSFDRV	:SET DRIVE SELECTION TO LOWEST NUMBER
1370	003442	104414			T2A:	MVCTRS	:RESTORE DRIVE COUNTERS
1371	003444	032737	000040	000632		BIT	#40,MODES
1372	003452	001002				BNE	T2B
1373	003454	104402					:IS THIS DRIVE AT EOT?
1374	003456	104406					:YES, SKIP WRITE
1375	003460	104422			T2B:	WRITIT	:WRITE
1376	003462	000767				SVCTRS	:SAVE DRIVE COUNTERS
1377	003464	104414				CHGDRV	:ANYMORE DRIVERS SELECTED?
1378	003466	032737	000020	000632	T2C:	T2A	:YES
1379	003474	001003				MVCTRS	:RESTORE DRIVE COUNTERS
1380	003476	004737	011072			#20,MODES	:IS THIS READ AT EOT?
1381	003502	104406				T2D	:YES, SKIP BACKSPACE
1382	003504	104422			T2D:	PC,GOBKWD	:BACKSPACE
1383	003506	000766				SVCTRS	:SAVE DRIVE COUNTERS
1384	003510	104414				CHGDRV	:ANY MORE DRIVES SELECTED?
1385	003512	032737	000020	000632	T2E:	T2C	:YES
1386	003520	001001				MVCTRS	:RESTORE DRIVE COUNTERS
1387	003522	104424				#20,MODES	:IS THIS READ AT EOT
1388	003524	104406				T2F	:YES, SKIP READ
1389	003526	104422				READIT	:READ
1390	003530	000767				SVCTRS	:SAVE DRIVE COUNTERS
1391	003532	004737	004776			CHGDRV	:ANYMORE DRIVES SELECTED?
1392	003536	000740				T2E	:YES
1393	003540	000137	003160			PC,ALLEOT	:ARE ALL DRIVES AT EOT?
1394						T2	:NO
1395						JMP	:YES EXIT
1396							
1397	003544	052737	000006	000632			:TEST3
1398	003552	104420					:WRITE ONE RECORD, CHANGE DRIVES, BACKSPACE, CHANGE DRIVES, READ, CHANGE DRIVES
1399	003554	104416			TEST3:	BIS	#6,MODES
1400	003556	104410					:EXIT WRITE EVERY RECORD, DO READ PASS
1401	003560	104414				CLRALL	:CLEAR ERROR COUNTERS AND REWIND
1402	003562	032737	000040	000632	T3:	GENPAT	:GENERATE PATTERN
1403	003570	001002			T3A:	RSFDRV	:SET DRIVE SELECTION TO LOWEST NUMBER
1404	003572	104402				MVCTRS	:RESTORE DRIVE COUNTERS
1405	003574	104406				#40,MODES	:IS THIS DRIVE AT EOT?
1406	003576	104422				T3B	:YES, SKIP WRITE
1407	003600	000767				BNE	:WRITE
1408						WRITIT	:WRITE
1409	003602	104414				SVCTRS	:SAVE DRIVE COUNTERS
1410	003604	032737	000020	000632	T3B:	CHGDRV	:ANY MORE DRIVES SELECTED
1411	003612	001002				T3A	:YES
1412	003614	004737	011072			MVCTRS	:RESTORE DRIVE COUNTERS
1413	003620	104406				#20,MODES	:IS THIS DRIVE AT EOT
1414	003622	104422				T3D	:YES, SKIP BACKSPACE
1415	003624	000766				PC,GOBKWD	:BACKSPACE
1416	003626	104414				SVCTRS	:SAVE DRIVE COUNTERS
1417	003630	032737	000020	000632	T3E:	CHGDRV	:ANY MORE DRIVES SELECTED?
1418	003636	001001				T3C	:GO
1419	003640	104424				MVCTRS	:RESTORE DRIVE COUNTERS
1420	003642	104406				#20,MODES	:IS THIS DRIVE AT EOT?
1421	003644	104422				T3F	:YES, SKIP READ
1422	003646	000767				READIT	:READ
1423	003650	004737	004776			SVCTRS	:SAVE DRIVE COUNTERS
1424	003654	000740				CHGDRV	:ANY MORE DRIVES SELECTED
						T3E	:YES
						PC,ALLEOT	:ARE ALL DRIVES AT EOT?
						T3	:NO


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1425 003656 000137 003160          JMP      DONE          ;YES, EXIT
1426
1427                                ;TEST4
1428                                ;WRITE RECORD, CHANGE DRIVES, REPEAT FOR RECORD LENGTH SEQUENCE
1429                                ;READ RECORD, CHANGE DRIVES, REPEAT FOR RLS
1430 003662 052737 000006 000632 TEST4: BIS      #6,MODES      ;EXIT WRITE EVERY RECORD, DO READ PASS
1431 003670 104416                                GENPAT      ;GENERATE PATTERN
1432 003672 032777 000014 175422          BIT      #14,@STEX
1433 003700 001006                                BNE      T4
1434 003702 042737 000007 000632          BIC      #7,MODES
1435 003710 052737 000005 000632          BIS      #5,MODES      ;EXIT WRITE AFTER RLS, DO READ PASS
1436 003716 104420                                CLRALL      ;CLEAR ERROR COUNTERS AND REWIND
1437 003720 104410                                RSFDRV      ;SET DRIVE SELECTION TO LOWEST NUMBER
1438 003722 104414                                MVCTRS      ;RESTORE DRIVE COUNTERS
1439 003724 013737 000612 000614          MOV      RECORD,WRRECR ;SAVE RECORD
1440 003732 104406                                SVCTRS      ;SAVE DRIVE COUNTERS
1441 003734 104422                                CHGDRV      ;ANYMORE DRIVES SELCTED?
1442 003736 000771                                BR        T4B      ;YES
1443 003740 042737 000010 000632          BIC      #10,MODES     ;CLEAR RLS END
1444 003746 104410                                RSFDRV      ;SET DRIVE SELECTION TO LOWEST NUMBER
1445 003750 104414                                MVCTRS      ;RESTORE DRIVE COUNTERS
1446 003752 032737 000040 000632          BIT      #40,MODES     ;IS DRIVE AT EOT
1447 003760 001010                                BNE      T4E      ;YES, SKIP WRITE
1448 003762 013737 000614 000550          MOV      WRRECR,SVRECR ;SAVE START OF RLS
1449 003770 104402                                WRITIT      ;WRITE
1450 003772 013737 000550 000614          MOV      SVRECR,WRRECR ;RESTORE START OF RLS
1451 004000 104406                                SVCTRS      ;SAVE DRIVE COUNTERS
1452 004002 104422                                CHGDRV      ;ANYMORE DRIVES SELECTED?
1453 004004 000761                                BR        T4D      ;YES
1454 004006 032737 000010 000632          BIT      #10,MODES     ;ARE WE AT END OF RLS
1455 004014 001007                                BNE      T4G      ;YES
1456 004016 104414                                MVCTRS      ;RESTORE DRIVE COUNTERS
1457 004020 032737 000040 000632          BIT      #40,MODES     ;ARE WE AT EOT?
1458 004026 001747                                BEQ      T4C      ;NO
1459 004030 104422                                CHGDRV      ;ANYMORE DRIVES SELECTED?
1460 004032 000771                                BR        T4F      ;YES
1461 004034 104410                                RSFDRV      ;SET DRIVE SELECTION TO LOWEST NUMBER
1462 004036 104414                                MVCTRS      ;RESTORE DRIVE COUNTERS
1463 004040 032737 000020 000632          BIT      #20,MODES     ;IS THIS DRIVE AT EOT?
1464 004046 001002                                BNE      T4J      ;YES, SKIP BACKSPACE
1465 004050 004737 011072                                JSR      PC,GOBKWD    ;BACKSPACE
1466 004054 104406                                SVCTRS      ;SAVE DRIVE COUNTERS
1467 004056 104422                                CHGDRV      ;ANY MORE DRIVES SELECTED?
1468 004060 000766                                BR        T4H      ;YES
1469 004062 104410                                RSFDRV      ;SET DRIVE SELECTION TO LOWEST NUMBER
1470 004064 104414                                MVCTRS      ;RESTORE DRIVE COUNTERS
1471 004066 032737 000020 000632          BIT      #20,MODES     ;IS THIS READ AT EOT?
1472 004074 001025                                BNE      T4N      ;YES, SKIP READ
1473 004076 023737 000616 000612          CMP      LASRCR,RECORD ;HAVE WE READ LAST RECORD WRITTEN?
1474 004104 001421                                BEQ      T4M      ;YES
1475 004106 013737 000616 000550          MOV      LASRCR,SVRECR ;SAVE LAST RECORD
1476 004114 032737 000003 001320          BIT      #3,PARAM      ;IS READ MODE NONSTOP?
1477 004122 001405                                BEQ      T4M      ;YES
1478 004124 013737 000612 000616          MOV      RECORD,LASRCR
1479 004132 005237 000616                                INC      LASRCR      ;+1 TO LAST RECORD WRITTEN
1480 004136 104424                                READIT      ;READ
T4M:
T4N:
T4O:
T4P:
T4Q:
T4R:
T4S:
T4T:
T4U:
T4V:
T4W:
T4X:
T4Y:
T4Z:
T4A:
T4B:
T4C:
T4D:
T4E:
T4F:
T4G:
T4H:
T4I:
T4J:
T4K:
T4L:
T4M:

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1481	004140	013737	000550	000616		MOV	SVRECR,LASRCR	:RESTORE LAST RECORD WRITTEN
1482	004146	104406					SVCTRS	:SAVE DRIVE COUNTERS
1483	004150	104422			T4N:		CHGDRV	:ANYMORE DRIVES SELECTED?
1484	004152	000744				BR	T4L	:YES
1485	004154	104414			T4P:		MVCTRS	:RESTORE DRIVE COUNTERS
1486	004156	023737	000616	000612		CMP	LASRCR,RECORD	:ARE WE AT END OF RLS?
1487	004164	001336				BNE	T4K	:NO
1488	004166	104422					CHGDRV	:ANYMORE DRIVES SELECTED?
1489	004170	000771				BR	T4P	:YES
1490	004172	004737	004776			JSR	PC,ALLEOT	:ARE ALL DRIVES AT EOT?
1491	004176	000650				BR	T4A	:NO
1492	004200	000137	003160			JMP	DONE	:YES,EXIT
1493								
1494								:TEST5
1495								:READ ONLY
1496								:RANDOM PATTERN INVALID EXCEPT FOR SPECIFIC CASES
1497	004204	052737	000002	000632	TEST5:	BIS	#2,MODES	
1498	004212	104420					CLRALL	:CLEAR ERROR COUNTERS AND REWIND
1499	004214	104416					GENPAT	:GENERATE PATTERN
1500	004216	012737	177777	004464	T5:	MOV	#-1,T5FLAG	:ENABLE EXIT FROM WRITE ROUTINE
1501	004224	104402					WRITIT	:ENTER WRITE ONLY TO INITIALIZE RECORD SEQUENCE
1502	004226	032737	000010	000632		BIT	#10,MODES	:ARE WE AT END OF RLS?
1503	004234	001402				BEQ	T5A	:YES
1504	004236	004737	005616			JSR	PC,TESINC	:SEE IF RECORD LENGTH SHOULD BE CHANGED
1505	004242	013737	000612	004466	T5A:	MOV	RECORD,T5INC	
1506	004250	005037	000612			CLR	RECORD	
1507	004254	052737	000010	000632	T5B:	BIS	#10,MODES	:INDICATE AT START OF RLS
1508	004262	104410					RSFDRV	:SET DRIVE SELECTION TO LOWEST DRIVE NUMBER
1509	004264	104414			T5C:		MVCTRS	:RESTORE DRIVE COUNTERS
1510	004266	032737	000020	000632		BIT	#20,MODES	:IS THIS DRIVE AT EOT
1511	004274	001007				BNE	T5D	:YES
1512	004276	013737	000612	000616		MOV	RECORD,LASRCR	
1513	004304	063737	004466	000616		ADD	T5INC,LASRCR	:CURRENT RECORD + SEQUENCE LENGTH
1514	004312	104406					SVCTRS	:SAVE DRIVE COUNTERS
1515	004314	104422			T5D:		CHGDRV	:ANYMORE DRIVES?
1516	004316	000762				BR	T5C	:YES
1517	004320	104410					RSFDRV	:SET DRIVE SELECTION TO LOWEST NUMBER
1518	004322	104414			T5E:		MVCTRS	:RESTORE DRIVE COUNTERS
1519	004324	032737	000020	000632		BIT	#20,MODES	:IS THIS DRIVE AT EOT?
1520	004332	001021				BNE	T5G	:YES
1521	004334	013737	000616	000550		MOV	LASRCR,SVRECR	:SAVE END OF RLS RECORDS
1522	004342	032737	000003	001320		BIT	#3,PARAM	:IS READ MODE NONSTOP
1523	004350	001405				BEQ	T5F	:YES GO TO END RLS
1524	004352	013737	000612	000616		MOV	RECORD,LASRCR	:NEXT TO BE READ
1525	004360	005237	000616			INC	LASRCR	:+1 EXIT READ AFTER ONE RECORD
1526	004364	104424			T5F:		READIT	:READ
1527	004366	013737	000550	000616		MOV	SVRECR,LASRCR	:RESTORE END RECORD
1528	004374	104406					SVCTRS	:SAVE DRIVE COUNTERS
1529	004376	104422			T5G:		CHGDRV	:ANY MORE DRIVES?
1530	004400	000750				BR	T5E	:YES
1531	004402	004737	004776			JSR	PC,ALLEOT	:ALL AT EOT?
1532	004406	000402				BR	T5H	:NO
1533	004410	000137	003160			JMP	DONE	:YES EXIT
1534	004414	104410			T5H:		RSFDRV	:SET DRIVE SELECTION TO LOWEST NUMBER
1535	004416	104414			T5J:		MVCTRS	:RESTORE DRIVE COUNTERS
1536	004420	023737	000612	000616		CMP	RECORD,LASRCR	:ARE WE AT END OF RLS?


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1537 004426 001003
1538 004430 042737 000010 000632
1539 004436 104422
1540 004440 000756
1541 004442 032737 000010 000632
1542 004450 001324
1543 004452 004737 004776
1544 004456 000657
1545 004460 000137 003160
1546 004464 000000
1547 004466 000000
1548
1549
1550 004470 004737 004524
1551 004474 012021
1552 004476 022700 000634
1553 004502 001374
1554 004504 000207
1555
1556 004506 004737 004524
1557 004512 012120
1558 004514 022700 000634
1559 004520 001374
1560 004522 000207
1561
1562 004524 012700 000570
1563 004530 012701 000634
1564 004534 063701 000556
1565 004540 063701 000556
1566 004544 011101
1567 004546 000207
1568
1569 004550 104410
1570 004552 004737 004740
1571 004556 004737 005104
1572 004562 104406
1573 004564 104422
1574 004566 000771
1575 004570 052737 000010 000632
1576 004576 005037 004464
1577 004602 000207
1578
1579 004604 005037 000556
1580 004610 012737 000200 000554
1581 004616 033737 000546 000554
1582 004624 001006
1583 004626 005237 000556
1584 004632 000241
1585 004634 006037 000554
1586 004640 000766
1587 004642 013737 000556 000552
1588 004650 000337 000552
1589 004654 052737 060000 000552
1590 004662 032777 001000 173622
1591 004670 001403
1592 004672 052737 004000 000552

                                BNE      T5K
                                BIC      #10,MODES
T5K:                               CHGDRV
                                BR       T5J
                                BIT      #10,MODES
                                BNE      T5E
                                JSR      PC,ALLEOT
                                BR       T5
                                JMP      DONE
                                T5FLAG: 0
                                T5INC: 0

;SAVE DRIVE RECORD AND ERROR COUNTERS
SVCTR: JSR      PC,CTRDEX
SVC1:  MOV      (0)+,(1)+
        CMP      #DRVADR,R0
        BNE     SVC1
        RTS     PC
;RESET DRIVE COUNTERS BACK INTO PROGRAM
MVCTR: JSR      PC,CTRDEX
MV1:   MOV      (1)+,(0)+
        CMP      #DRVADR,R0
        BNE     MV1
        RTS     PC
;SET UP POINTERS FOR MOVE AND SAVE COUNTERS
CTRDEX: MOV     #WRCHK,R0
        MOV     #DRVADR,R1
        ADD     CDRIVE,R1
        ADD     CDRIVE,R1
        MOV     @R1,R1
        RTS     PC
;CLEAR ALL DRIVE COUNTERS
CLR1:  JSR      RSFDRV
        JSR      PC,REWIND
        JSR      PC,CLRTBL
        SVCTRS
        CHGDRV
        CLR1
        BR      CLR1
        BIS     #10,MODES
        CLR     T5FLAG
        RTS     PC
;RESET DRIVE SELECTION TO LOWEST NUMBER
RSFDR: CLR     CDRIVE
        MOV     #200,CDRVBT
        BIT     MSBITS,CDRVBT
        BNE     RSF2
        INC     CDRIVE
        CLC
        ROR     CDRVBT
        BR      RSF1
        MOV     CDRIVE,COMAND
        SWAB
        BIS     #60000,COMAND
        BIT     #1000,@SWR
        BEQ     .+10
        BIS     #4000,COMAND

;AT END OF RLS
;START WITH DRIVE 0
;BIT FOR DRIVE 0
;IS DRIVE SELECTED?
;YES
;NO + 1 TO DRIVE
;ROTATE DRIVE BIT
;REPEAT
;800 BPI, 9 TRACK
;TEST PARITY SELECTED
;ODD
;EVEN
    
```

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1593 004700 000207          RTS      PC
1594
1595          ;SELECT NEXT DRIVE IN SEQUENCE
1596          ;+1 WORD TO EXIT ADDRESS IF LAST DRIVE TESTED
1597 004702 005237 000556    CHGDR:  INC      CDRIVE          ;+1 TO DRIVE NUMBER
1598 004706 000241
1599 004710 006037 000554    ROR      CDRVBT          ;MOVE MASK BIT OVER 1 PLACE
1600 004714 001004          BNE      CHG1            ;BRANCH IF MORE DRIVES SELECTED
1601 004716 104410          RSFDRV          ;RESET DRIVE SELECT TO LOWEST NUMBER
1602 004720 062716 000002    ADD      #2,@SP        ;+ 2 TO SKIP OVER FIRST EXIT
1603 004724 000207
1604 004726 033737 000554 000546  CHG1:  BIT      CDRVBT,MSBITS
1605 004734 001762          BEQ      CHGDR
1606 004736 000741          BR       RSF2
1607
1608          ;REWIND DRIVE TO BOT
1609 004740 105777 173536    REWIND:  TSTB     @MTC
1610 004744 100375          BPL      .-4
1611 004746 013777 000552 173526    MOV      COMAND,@MTC    ;WAIT FOR CONTROL UNIT
1612 004754 006077 173520          ROR      @MTS          ;SELECT DRIVE
1613 004760 103375          BCC      .-4
1614 004762 052777 000016 173512    BIS      #16,@MTC      ;WAIT FOR TU READY
1615 004770 004737 005130          JSR      PC,GOWAIT     ;REWIND
1616 004774 000207          RTS      PC          ;EXIT
1617
1618 004776 104410          ;ARE ALL DRIVES AT END OF TAPE
1619 005000 104414          ALLEOT:  RSFDRV
1620 005002 032737 000060 000632    ALL1:    MVCTRS
1621 005010 001403          BIT      #60,MODES     ;AT EOT?
1622 005012 104422          BEQ      ALLEOS        ;NO
1623 005014 000771          BR       CHGDRV        ;DONE ALL DRIVES?
1624 005016 000427          BR       ALL1          ;NO
1625 005020 032777 000400 173464    ALLEOS:  BIT      #400,@SWR ;TEST SWITCH 8 TO EXIT AT END OF SEQUENCE
1626 005026 001425          BEQ      ALL2          ;NO, GO TO EOT
1627 005030 032737 000010 000632    BIT      #10,MODES     ;AT END OF SEQUENCE
1628 005036 001421          BEQ      ALL2          ;NO, EXIT, DON'T DUMP ERROR COUNTERS
1629
1630 005040 104410          ;DUMP ERROR COUNTERS ON ALL DRIVES
1631 005042 104414          CTRDMP:  RSFDRV
1632 005044 005737 004464          MVCTRS
1633 005050 001006          TST      T5FLAG
1634 005052 004737 006154          BNE      CTRD1          ;DUMP READ ONLY
1635 005056 032737 000004 000632    JSR      PC,ENDT1
1636 005064 001402          BIT      #4,MODES     ;READ PASS SELECTED?
1637 005066 004737 010326    BEQ      CDMEND        ;NO
1638 005072 104422          CTRD1:  JSR      PC,RNDTP1
1639 005074 000762          CDMEND:  CHGDRV
1640 005076 062716 000002    BR       CTRDMP+2      ;DONE ALL DRIVES
1641 005102 000207          ALL3:    ADD      #2,(6) ;NO
1642          ALL2:    RTS      PC          ;INCREMENT RETURN POINT
1643
1644 005104 012700 000570          ;CLEAR READ AND WRITE TABLES
1645 005110 005020          CLRTBL:  MOV      #WRCHK,R0
1646 005112 020027 000632    CLRT1:  CLR      (0)+
1647 005116 001374          CMP      R0,#MODES
1648 005120 042737 000070 000632    BNE      CLRT1
1648          BIC      #70,MODES
    
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1649 005126 000207          RTS      PC
1650          :INTERRUPT ENABLE, GO, WAIT FOR INTERRUPT
1651 005130 012777 000200 173352 GOWAIT: MOV      #200,@CC      ;SET PRIORITY LEVEL 4
1652 005136 012777 005172 173370      MOV      #GW1,@MTV      ;SET INTERRUPT RETURN
1653 005144 012737 000001 005160      MOV      #1,WAIT1
1654 005152 052777 000101 173322      BIS      #101,@MTC      ;INTERRUPT ENABLE, GO
1655 005160 000001          WAIT1: WAIT          ;WAIT FOR INTERRUPT
1656 005162 012777 000340 173320      MOV      #340,@CC      ;RESTORE PRIORITY LEVEL 7
1657 005170 000207          RTS      PC      ;EXIT
1658 005172 012737 000001 005160 GW1:  MOV      #1,WAIT1
1659 005200 000002          RTI          ;RETURN FROM INTERRUPT
1660
1661          ;WRITE RECORD SECTION
1662 005202 005737 000612          WRITI: TST      RECORD      ;IS THIS THE FIRST RECORD
1663 005206 001031          BNE      NOINCR      ;NO, SKIP SET UP OF RECORD LENGTH AND BLOCK INCREMENT
1664 005210 013737 000524 000542      MOV      MAXLEN,STRLEN
1665 005216 012737 177774 000564      MOV      #-4, BLKINC
1666 005224 032737 000020 001320      BIT      #20,PARAM
1667 005232 001006          BNE      W1
1668 005234 013737 000526 000542      MOV      MINLEN,STRLEN
1669 005242 012737 000004 000564      MOV      #4, BLKINC
1670 005250 013737 000542 000626 W1:  MOV      STRLEN,WRTLEN
1671 005256 032737 000040 001320      BIT      #40,PARAM      ;DOES RECORD LENGTH CHANGE?
1672 005264 001002          BNE      NOINCR      ;YES
1673 005266 005037 000564          CLR      BLKINC      ;NO
1674 005272 013737 000612 000614 NOINCR: MOV      RECORD,WRRECR
1675 005300 005737 004464          TST      T5FLAG
1676 005304 001401          BEQ      .+4
1677 005306 000207          RTS      PC      ;EXIT WRITE ROUTINE IF TEST 5
1678 005310 005037 000562          CLR      WRPASS
1679 005314 013777 000552 173160 STRTOP: MOV      COMAND,@MTC      ;SELECT UNIT
1680 005322 105777 173154          TSTB     @MTC
1681 005326 100375          BPL      .-4      ;WAIT FOR CU READY
1682 005330 006077 173144          ROR      @MTS      ;WAIT FOR TU READY
1683 005334 103375          BCC      .-4
1684 005336 013777 000626 173140 NONSTP: MOV      WRTLEN,@BC      ;SET BYTE COUNT
1685 005344 005477 173134          NEG      @BC
1686 005350 013777 000530 173130      MOV      WBUF,@CA      ;SET CURRENT ADDRESS
1687 005356 052777 000004 173116      BIS      #4,@MTC      ;WRITE
1688 005364 004737 005130          JSR      PC,GOWAIT      ;INTERRUPT ENABLE, GO, WAIT FOR DONE
1689          ;RETURN HERE AFTER INTERRUPT
1690 005370 017737 173104 000566      MOV      @MTS,STATRD      ;SAVE STATUS
1691 005376 005777 173100          TST      @MTC
1692 005402 100542          BMI      ERROR      ;HAVE ERROR FLAG, CHECK FOR EOT
1693 005404 005737 000562          TST      WRPASS      ;WAS THIS A RECOVERY PASS
1694 005410 001410          BEQ      TSTSTP      ;NO
1695 005412 013700 000562          MOV      WRPASS,RO      ;YES
1696 005416 006300          ASL      RO
1697 005420 062700 000570          ADD      #WRCHEK,RO
1698 005424 005210          INC      @RO      ;+1 TO APPROPRIATE RECOVERY PASS COUNTER
1699 005426 005037 000562          CLR      WRPASS
1700 005432 032737 000014 001320 TSTSTP: BIT      #14,PARAM      ;IS WRITE MODE NONSTOP?
1701 005440 001023          BNE      STOPOP      ;NO
1702 005442 005737 000562          TST      WRPASS      ;YES
1703 005446 001333          BNE      NONSTP
1704 005450 004737 005616          JSR      PC,TESINC      ;CHANGE RECORD LENGTH
    
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1705 005454 032737 000001 000632      BIT      #1,MODES      ;EXIT AFTER RLS?
1706 005462 001405                      BEQ      W10          ;NO
1707 005464 032737 000010 000632      BIT      #10,MODES   ;YES, ARE WE AT END OF RLS?
1708 005472 001721                      BEQ      NONSTP      ;NO
1709 005474 000207                      RTS      PC          ;YES
1710 005476 032737 000002 000632  W10:    BIT      #2,MODES   ;EXIT EVERY RECORD?
1711 005504 001714                      BEQ      NONSTP      ;NO
1712 005506 000207                      RTS      PC          ;YES
1713 005510 032737 000010 001320  STOPOP: BIT      #10,PARAM ;IS WRITE MODE RANDOM?
1714 005516 001414                      BEQ      W11          ;NO
1715                                     ;RANDOM STALL DELAY
1716 005520 004737 007222                      JSR      PC,RANGEN
1717 005524 052737 177400 007372  RANSTP: BIS      #177400,RANDOM
1718 005532 012704 177470  RAN1:  MOV      #-200.,R4      ;DELAY 1 MILLISECOND
1719 005536 005204                      INC      R4
1720 005540 001376                      BNE     .-2
1721 005542 005237 007372                      INC     RANDOM
1722 005546 001371                      BNE     RAN1
1723 005550 005737 000562  W11:    TST      WRPASS
1724 005554 001257                      BNE     STRTOP
1725 005556 004737 005616                      JSR     PC,TESINC
1726 005562 032737 000001 000632      BIT      #1,MODES   ;EXIT AFTER RLS?
1727 005570 001405                      BEQ     W12          ;NO
1728 005572 032737 000010 000632      BIT      #10,MODES  ;YES, ARE WE AT END OF RLS?
1729 005600 001645                      BEQ     STRTOP      ;NO
1730 005602 000207                      RTS     PC          ;YES
1731 005604 032737 000002 000632  W12:    BIT      #2,MODES   ;EXIT EVERY RECORD?
1732 005612 001640                      BEQ     STRTOP      ;NO
1733 005614 000207                      RTS     PC          ;YES
1734                                     ;SEE IF RECORD LENGTH SHOULD BE CHANGED
1735 005616 005237 000612  TESINC: INC     RECORD      ;+1 TO RECORD COUNT
1736 005622 042737 000010 000632      BIC     #10,MODES   ;NOT END OF RLS UNLESS SET BELOW
1737 005630 005737 000564                      TST     BLKINC
1738 005634 001416                      BEQ     TSINC2
1739 005636 063737 000564 000626      ADD     BLKINC,WRTLEN
1740 005644 023737 000626 000526      CMP     WRTLEN,MINLEN ;RECORD LENGTH TOO SHORT?
1741 005652 002404                      BLT     RESETL      ;YES, RESET
1742 005654 023737 000626 000524      CMP     WRTLEN,MAXLEN ;RECORD LENGTH TOO LONG?
1743 005662 003403                      BLE     TSINC2      ;NO
1744 005664 013737 000542 000626  RESETL: MOV     STRLEN,WRTLEN ;YES, RESET
1745 005672 105737 000612  TSINC2: TSTB    RECORD      ;IS RECORD A MULTIPLE OF 256
1746 005676 001003                      BNE     TSINC3      ;NO
1747 005700 052737 000010 000632      BIS     #10,MODES   ;INDICATE AT END OF RLS
1748 005706 000207  TSINC3: RTS     PC
1749
1750
1751                                     ;HAVE AN ERROR FLAG DURING WRITE OPERATION
1752                                     ;IF ERROR IS CAUSED BY END OF TAPE FLAG DUMP WRITE ERROR COUNTERS
1753                                     ;FOR ALL OTHER ERRORS: PRINT COMMAND AND STATUS REGISTERS AND RECORD NUMBER
1754                                     ;IF READ PASS IS SELECTED, TRY TO RECOVER BY WRITING WITH XIRG.
1755 005710 104434  ERROR:  CKSWR      ;CHECK FOR CNTL G
1756 005712 032737 175600 000566      BIT     #175600,STATRD ;AT EOT?
1757 005720 001510                      BEQ     ENDTAP      ;YES
1758 005722 005737 000562                      TST     WRPASS
1759 005726 001002                      BNE     ERR1        ;FIRST ERROR?
1760 005730 005237 000570                      INC     WRCHK       ;YES, + 1 TO WRITE ERROR
  
```


1761	005734	032777	020000	172550	ERR1:	BIT	#20000,@SWR	:TYPE ALL ERRORS?
1762	005742	001010				BNE	TESREC	:NO
1763	005744	012702	012720			MOV	#MSG7,R2	
1764	005750	104404					TOP	:PRINT ERROR
1765	005752	013737	000626	000544		MOV	WRTLEN,LENGTH	
1766	005760	004737	011202			JSR	PC,PRTS	:PRINT STATUS, COMMAND, RECORD, LENGTH
1767	005764	032777	000100	172520	TESREC:	BIT	#100,@SWR	:RECOVER STATISTICALLY SELECTED?
1768	005772	001410				BEQ	TESRC1	:NO
1769	005774	005237	000562			INC	WRPASS	:+1 TO WRITE RECOVER
1770	006000	022737	000010	000562		CMP	#8,WRPASS	:HAVE WE TRIED TO WRITE RECOVER 8 TIMES?
1771	006006	001020				BNE	STREC1	:NO
1772	006010	005237	000610			INC	PERMBS	:YES, +1 TO PERMANENT BADSPOT?
1773	006014	032737	000004	000632	TESRC1:	BIT	#4,MODES	:IS READ PASS SELECTED?
1774	006022	001402				BEQ	.+6	:NO
1775	006024	004737	010652			JSR	PC,XRGREC	
1776	006030	005037	000562			CLR	WRPASS	
1777	006034	032737	002000	000566		BIT	#2000,STATRD	
1778	006042	001037				BNE	ENDTAP	
1779	006044	000137	005550			JMP	W11	
1780	006050	004737	010250		STREC1:	JSR	PC,BACK1	
1781	006054	004737	010250			JSR	PC,BACK1	:BACKSPACE 2 RECORDS
1782	006060	032777	000040	172412		BIT	#40,@MTS	
1783	006066	001402				BEQ	.+6	
1784	006070	000137	005314			JMP	STRTOP	
1785	006074	012777	177777	172402		MOV	#-1,@BC	
1786	006102	013777	000552	172372		MOV	COMAND,@MTC	
1787	006110	052777	000010	172364		BIS	#10,@MTC	
1788	006116	004737	005130			JSR	PC,GOWAIT	:SPACE FORWARD 1 RECORD
1789	006122	042777	000016	172352		BIC	#16,@MTC	
1790	006130	052777	000004	172344		BIS	#4,@MTC	:CHANGE FROM SPACE TO WRITE
1791	006136	000137	005314			JMP	STRTOP	
1792							:DRIVE IS AT EOT	
1793	006142	005237	000612		ENDTAP:	INC	RECORD	
1794	006146	052737	000040	000632		BIS	#40,MODES	:INDICATE DRIVE AT EOT
1795	006154	012702	013710		ENDT1:	MOV	#MSG24,R2	
1796	006160	104404					TOP	
1797	006162	012702	012746			MOV	#MSG8,R2	
1798	006166	104404					TOP	
1799							:DUMP WRITE ERRORS	
1800	006170	104434			WRDMP:	CKSWR		:CHECK FOR CNTL G
1801	006172	013737	000552	011356		MOV	COMAND,CHAR	
1802	006200	000337	011356			SWAB	CHAR	
1803	006204	142737	000170	011356		BICB	#170,CHAR	
1804								
1805	006212	052737	000260	011356		BIS	#260,CHAR	
1806	006220	004737	011360			JSR	PC,OCTP	:PRINT DRIVE NUMBER
1807	006224	104430				SP3		
1808	006226	013737	001320	011356		MOV	PARAM,CHAR	

1809 006234 000337 011356

SWAB CHAR

1810 006240 006037 011356

ROR CHAR

1811	006244	042737	000170	011356	BIC	#170,CHAR	
1812	006252	052737	000260	011356	BIS	#260,CHAR	
1813	006260	004737	011360		JSR	PC,OCTP	;PRINT PATTERN NUMBER
1814	006264	013737	001320	011356	MOV	PARAM,CHAR	
1815	006272	042737	177763	011356	BIC	#177763,CHAR	
1816	006300	012702	013441		MOV	#MSG14,R2	
1817	006304	022737	000004	011356	CMP	#4,CHAR	
1818	006312	001002			BNE	.+6	
1819	006314	012702	013415		MOV	#MSG12,R2	

1820	006320	022737	000010	011356	CMP	#10,CHAR
1821	006326	001002			BNE	.+6

```

1822 006330 012702 013427      MOV      #MSG13,R2
1823 006334 104404              TOP          ;PRINT WRITE MODE
1824 006336 013702 000612      MOV      RECORD,R2
1825 006342 104426              DECPRT       ;PRINT RECORD NUMBER
1826 006344 013737 001320 011356  MOV      PARAM,CHAR
1827 006352 042737 177717 011356  BIC      #177717,CHAR
1828 006360 012702 013471      MOV      #MSG17,R2
1829 006364 022737 000020 011356  CMP      #20,CHAR
1830 006372 001002              BNE      .+6
1831 006374 012702 013500      MOV      #MSG18,R2
1832 006400 022737 000040 011356  CMP      #40,CHAR
1833 006406 001002              BNE      .+6
1834 006410 012702 013453      MOV      #MSG15,R2
1835 006414 022737 000060 011356  CMP      #60,CHAR
1836 006422 001002              BNE      .+6
1837 006424 012702 013462      MOV      #MSG16,R2
1838 006430 104404              TOP          ;PRINT RECORD LENGTH SEQUENCE
1839 006432 012702 013507      MOV      #MSG19,R2
1840 006436 104404              TOP
1841 006440 013702 000570      MOV      WRCHK,R2
1842 006444 104426              DECPRT       ;PRINT 'WRITE ERRORS='
1843 006446 012700 000572      MOV      #WRCHK+2,R0
1844 006452 112737 000060 013550  MOVVB   #60,MSG20+17
1845 006460 105237 013550      WRTD1: INCB   MSG20+17      ;PRINT STATISTICAL RECOVERY
1846 006464 005710              TST      @R0
1847 006466 001405              BEQ      WRTD2
1848 006470 012702 013531      MOV      #MSG20,R2
1849 006474 104404              TOP
1850 006476 011002              MOV      (0),R2
1851 006500 104426              DECPRT       ;RECOVERED AT X
1852 006502 005720      WRTD2: TST      (0)+      ;JUST INCREMENTING
1853 006504 020027 000610      CMP      R0,#WRCHK+20
1854 006510 001363              BNE      WRTD1
1855 006512 005737 000610      TST      PERMBS
1856 006516 001001              BNE      .+4      ;SKIP PRINT IF = 0
1857 006520 000207      RTS      PC
1858
1859
1860 006522 012702 013553      MOV      #MSG20A,R2
1861 006526 104404              TOP
1862 006530 013702 000610      MOV      PERMBS,R2      ;PRINT 'PERMANENT BADSPOT'
1863 006534 104426              DECPRT
1864 006536 000207      RTS      PC
1865      ;GENERATE DATA PATTERN
1866 006540 013702 000530      GENPA: MOV      WBUF,R2 ;INITIALIZE BUFFER
1867 006544 013737 001320 006652  MOV      PARAM,GP1      ;CHECK PARAMETERS FOR PATTERN SELECTED
1868 006552 042737 170777 006652  BIC      #170777,GP1
1869 006560 001435              BEQ      PAT0
1870 006562 022737 001000 006652  CMP      #1000,GP1
1871 006570 001437              BEQ      PAT1
1872 006572 022737 002000 006652  CMP      #2000,GP1
1873 006600 001457              BEQ      PAT2
1874 006602 022737 003000 006652  CMP      #3000,GP1
  
```


1875	006610	001461			BEQ	PAT3
1876	006612	022737	004000	006652	CMP	#4000.GP1
1877	006620	001501			BEQ	PAT4
1878	006622	022737	005000	006652	CMP	#5000.GP1

1879	006630	001510			BEQ	PAT5
1880	006632	022737	006000	006652	CMP	#6000.GP1
1881	006640	001402			BEQ	.+6

1882	006642	000137	007202
1883	006646	000137	007166
1884	006652	000000	
1885			
1886			
1887	006654	012722	002010
1888	006660	023702	000532
1889	006664	001373	
1890	006666	000207	
1891			
1892			
1893	006670	012700	006716
1894	006674	012022	
1895	006676	023702	000532
1896	006702	001001	
1897	006704	000207	
1898	006706	022700	006740
1899	006712	001370	
1900	006714	000765	
1901	006716	100000	
1902	006720	020100	
1903	006722	004020	
1904	006724	001004	
1905	006726	000001	
1906	006730	040200	
1907	006732	010040	
1908	006734	002010	
1909	006736	000402	
1910			
1911			
1912			
1913	006740	012722	136274
1914	006744	023702	000532
1915	006750	001373	
1916	006752	000207	
1917			
1918			
1919	006754	012700	007002
1920	006760	012022	
1921	006762	023702	000532
1922	006766	001001	
1923	006770	000207	
1924	006772	022700	007024
1925	006776	001370	
1926	007000	000765	
1927	007002	140037	
1928	007004	100476	
1929	007006	001574	
1930	007010	003770	
1931	007012	017760	
1932	007014	037300	
1933	007016	076201	
1934	007020	174003	
1935	007022	170007	
1936			
1937			

```

      JMP      PAT7
      JMP      PAT6
GP1:   0
:PATTERN 0
:HALF FREQUENCY OUTSIDE SKEW
PAT0:  MOV     #2010,(2)+      ;(010)(004)
      CMP     RBUF,R2
      BNE     PAT0
      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)
  
```

1938 007024 105037 007050
 1939 007030 113722 007050
 1940 007034 105237 007050
 1941 007040 023702 000532
 1942 007044 001371
 1943 007046 000207
 1944 007050 000000

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

1945
 1946
 1947
 1948 007052 012700 007100
 1949 007056 012022
 1950 007060 023702 000532
 1951 007064 001001
 1952 007066 000207
 1953 007070 022700 007166
 1954 007074 001370
 1955 007076 000765
 1956 007100 000000
 1957 007102 100000
 1958 007104 100200
 1959 007106 040100
 1960 007110 020100
 1961 007112 020040
 1962 007114 010020
 1963 007116 004020
 1964 007120 004010
 1965 007122 002004
 1966 007124 001004
 1967 007126 001002
 1968 007130 000401
 1969 007132 000001
 1970 007134 000000
 1971 007136 100200
 1972 007140 040200
 1973 007142 040100
 1974 007144 020040
 1975 007146 010040
 1976 007150 010020
 1977 007152 004010
 1978 007154 002010
 1979 007156 002004
 1980 007160 001002
 1981 007162 000402
 1982 007164 000401

:PATTERN 5
 :EACH TRACK 3 BITS
 PAT5: MOV #P5T,R0
 PAT5A: MOV (0)+,(2)+
 CMP RBUF,R2
 BNE .+4
 RTS PC
 CMP #PAT6,R0
 BNE PAT5A
 BR PAT5

P5T: 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

1983
 1984
 1985 007166 012722 177777
 1986 007172 023702 000532
 1987 007176 001373
 1988 007200 000207
 1989
 1990
 1991
 1992
 1993 007202 004737 007222

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

:PATTERN 7
 :RANDOM
 PAT7: JSR PC,RANGEN


```

1994 007206 013722 007372      MOV      RANDOM,(2)+
1995 007212 023702 000532      CMP      RBUF,R2
1996 007216 001371              BNE      PAT7
1997 007220 000207              RTS      PC
1998
1999      ;RANDOM NUMBER GENERATOR
      ;EXIT WITH RANDOM NUMBER IN LOCATION NAMED 'RANDOM'
2000 007222 010037 007400  RANGEN: MOV      R0,SV0      ;SAVE REGISTERS
2001 007226 010137 007402      MOV      R1,SV1
2002 007232 010237 007404      MOV      R2,SV2
2003 007236 010337 007406      MOV      R3,SV3
2004 007242 013700 007374      MOV      LONUM,R0      ;SET UP LOW DIGIT
2005 007246 013701 007376      MOV      HINUM,R1      ;SET UP HIGH DIGIT
2006 007252 012703 000007      MOV      #7,R3      ;SET UP SHIFT COUNT
2007 007256 005002              CLR      R2
2008 007260 006300  RANG1: ASL      R0      ;SHIFT R0 LEFT AND
2009 007262 006101              ROL      R1      ;ROTATE CARRY INTO LSB OF R1 AND
2010 007264 006102              ROL      R2      ;ROTATE CARRY OUT OF R1 INTO R2
2011 007266 005303              DEC      R3      ;DECREMENT R3
2012 007270 001373              BNE      RANG1      ;CONTINUE SHIFT LOOP
2013 007272 063700 007374      ADD      LONUM,R0      ;ADD NUMBER TO MAKE X 129
2014 007276 005501              ADC      R1      ;PROPAGATE CARRY
2015 007300 063701 007376      ADD      HINUM,R1      ;ADD NUMBER TO MAKE X 129
2016 007304 005502              ADC      R2      ;PROPAGATE CARRY
2017 007306 062700 001057      ADD      #1057,R0      ;ADD LOW CONSTANT
2018 007312 005501              ADC      R1      ;PROPAGATE CARRY
2019 007314 005502              ADC      R2      ;PROPAGATE CARRY
2020 007316 062701 047401      ADD      #47401,R1      ;ADD HIGH CONSTANT
2021 007322 005502              ADC      R2      ;PROPAGATE CARRY
2022 007324 062702 000006      ADD      #6,R2      ;ADD HIGH CONSTANT
2023 007330 060200              ADD      R2,R0      ;RE-PRIME R0 WITH HIGH DIGIT
2024 007332 005501              ADC      R1      ;PROPAGATE CARRY
2025 007334 010037 007372      MOV      R0,RANDOM      ;SAVE RANDOM NUMBER
2026 007340 010037 007374      MOV      R0,LONUM      ;PUT R0 BACK IN LONUM
2027 007344 010137 007376      MOV      R1,HINUM      ;PUT R1 BACK IN HINUM
2028 007350 013700 007400      MOV      SV0,R0      ;RESTORE REGISTERS
2029 007354 013701 007402      MOV      SV1,R1
2030 007360 013702 007404      MOV      SV2,R2
2031 007364 013703 007406      MOV      SV3,R3
2032 007370 000207              RTS      PC      ;EXIT
2033 007372 000000  RANDOM: 0
2034 007374 000000  LONUM: 0
2035 007376 000000  HINUM: 0
2036 007400 000000  SV0: 0
2037 007402 000000  SV1: 0
2038 007404 000000  SV2: 0
2039 007406 000000  SV3: 0
2040
2041
2042      ;READ RECORD SECTION
2043 007410 005737 000612  READI: TST      RECORD      ;FIRST RECORD?
2044 007414 001003              BNE      $R1      ;NO
2045 007416 013737 000542 000630      MOV      STRLEN,READLN      ;SET INITIAL READ LENGTH
2046 007424 012737 177775 000560  $R1:  MOV      #-3,CPASS      ;INITIALIZE READ PASS COUNTER
2047 007432 013777 000552 171042  RDSTPD: MOV      COMAND,@MTC
2048 007440 105777 171036              TSTB     @MTC
2049 007444 100375              BPL      .-4      ;WAIT FOR CONTROL UNIT READY
    
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2050 007446 006077 171026          ROR      @MTS
2051 007452 103375          BCC      .-4          ;WAIT FOR TAPE UNIT READY
2052 007454 013700 000532  READGO: MOV      RBUF,R0
2053 007460 013701 000630          MOV      READLN,R1
2054 007464 105020          RG1:    CLRB     (0)+          ;CLEAR READ BUFFER
2055 007466 005301          DEC      R1
2056 007470 001375          BNE     RG1
2057 007472 013777 000630 171004  MOV     READLN,@BC          ;SET BYTE COUNT
2058 007500 005477 171000          NEG     @BC
2059 007504 013777 000532 170774  MOV     RBUF,@CA          ;SET CURRENT ADDRESS
2060 007512 013777 000552 170762  MOV     COMAND,@MTC
2061 007520 052777 000002 170754  BIS     #2,@MTC
2062 007526 004737 005130          JSR     PC,GOWAIT
2063          ;RETURN HERE AFTER INTERRUPT
2064 007532 017737 170742 000566  MOV     @MTS,STATRD
2065 007540 005777 170736          TST     @MTC          ;ANY STATUS ERRORS
2066 007544 100504          BMI     RDERRO          ;YES
2067          ;CHECK FOR DATA ERRORS
2068 007546 013700 000532          MOV     RBUF,R0
2069 007552 013701 000530          MOV     WBUF,R1
2070 007556 013702 000630          MOV     READLN,R2
2071 007562 022021          $R5:   CMP     (0)+,(1)+          ;CHECK FOR PROPER DATA TRANSFER
2072 007564 001045          BNE     DATERR          ;HAVE DATA ERROR
2073 007566 162702 000002          SUB     #2,R2          ;CHECKED ALL TRANSFERS?
2074 007572 001373          BNE     $R5          ;NO
2075 007574 032737 000003 001320  RTSSTP: BIT     #3,PARAM
2076 007602 001007          BNE     RDSTPC
2077 007604 004737 010200          JSR     PC,RDINCR          ;INCREMENT FOR NEXT BLOCK
2078 007610 023737 000612 000616  CMP     RECORD,LASRCR
2079 007616 001316          BNE     READGO
2080 007620 000207          RTS     PC          ;EXIT READIT
2081 007622 032737 000002 001320  RDSTPC: BIT     #2,PARAM          ;IS READ MODE RANDOM?
2082 007630 001414          BEQ     RDSTP          ;NO
2083 007632 004737 007222          RNRDRS: JSR     PC,RANGEN
2084 007636 052737 177400 007372  BIS     #177400,RANDOM
2085 007644 012704 177470          RNDS1: MOV     #-200.,R4          ;DELAY 1 MILLISECOND
2086 007650 005204          INC     R4
2087 007652 001376          BNE     .-2
2088 007654 005237 007372          INC     RANDOM
2089 007660 001371          BNE     RNDS1
2090 007662 004737 010200          RDSTP: JSR     PC,RDINCR
2091 007666 023737 000612 000616  CMP     RECORD,LASRCR          ;DONE LAST RECORD?
2092 007674 001256          BNE     RDSTPD          ;NO
2093 007676 000207          RTS     PC          ;YES EXIT
2094          ;HAVE DATA ERROR
2095 007700 032777 020000 170604  DATERR: BIT     #20000,@SWR          ;TYPE ALL READ ERRORS?
2096 007706 001014          BNE     DATERR1          ;NO
2097 007710 012702 013070          MOV     #MSG9A,R2
2098 007714 104404          TOP
2099 007716 013737 000630 000544  MOV     READLN,LENGTH
2100 007724 004737 011202          JSR     PC,PRTS
2101 007730 014102          MOV     -(1),R2          ;PRINT EXPECTED DATA
2102 007732 104412          OCTPRT
2103 007734 014002          MOV     -(0),R2
2104 007736 104412          OCTPRT          ;PRINT ACTUAL DATA
2105 007740 022737 177775 000560  DATERR1: CMP     #-3,RDPASS
    
```



```

2106 007746 001002          BNE      .+6
2107 007750 005237 000622  INC      DAERRS          ;+1 TO DATA ERRORS
2108 007754 000464          BR       RTSR1
2109          ;STATUS INDICATES AN ERROR, CHECK FOR EOT
2110 007756 104434          ;RDERR0: CKSWR          ;CHECK FOR CNTL G
2111 007760 032737 175600 000566 BIT      #175600,STATRD ;IS ERROR LEGITIMATE OR EOT?
2112 007766 001552          BEQ      RNDTAP          ;HAVE EOT
2113 007770 032777 020000 170514 BIT      #20000,@SWR    ;TYPE ALL READ ERRORS?
2114 007776 001044          BNE      RTSREC          ;NO
2115 010000 012702 013043  MOV      #MSG9,R2
2116 010004 104404          TOP
2117 010006 013737 000630 000544 MOV      READLN,LENGTH ;PRINT ERROR
2118 010014 004737 011202  JSR      PC,PRTS
2119 010020 032777 010000 170452 BIT      #10000,@MTS    ;STATUS ERROR DUE TO PARITY
2120          ;ERROR?
2121 010026 001430          BEQ      RTSREC          ;BRANCH IF NOT
2122 010030 032777 000010 170454 BIT      #10,@SWR      ;SEE IF USER WANTS DATA COMPARE!
2123 010036 001424          BEQ      RTSREC          ;BRANCH IF NOT
2124 010040 013700 000530  MOV      WBUF,R0        ;PICK UP STARTING ADDRESS OF
2125          ;WRITE BUFFER
2126 010044 013701 000532  MOV      RBUF,R1        ;PICK UP STARTING ADDRESS OF
2127          ;READ BUFFER
2128 010050 013702 000630  MOV      @#READLN,R2    ;PICK UP RECORD LENGTH IN BYTES
2129 010054 022021          1$: CMP      (R0)+,(R1)+  ;COMPARE WHAT SHOULD HAVE BEEN
2130          ;WRITTEN WITH WHAT WAS!!
2131 010056 001004          BNE      2$
2132 010060 162702 000002  SUB      #2,R2          ;BRANCH IF NOT THE SAME
2133          ;DROP OFF A WORD FROM RECORD
2134 010064 001406          BEQ      3$
2135          ;LENGTH
2136 010066 000772          BR       1$
2137 010070 014002          2$: MOV      -(R0),R2    ;BRANCH IF ALL OF RECORD DATA
2138          ;CHECKS
2139 010072 104412          OCTPRT ;GO TO COMPARE NEXT BYTE
2140          ;PICK UP THE DATA VALUE THAT
2141 010074 014102          MOV      -(R1),R2    ;SHOULD HAVE BEEN WRITTEN
2142          ;PRINT EXPECTED VALUE OF
2143 010076 104412          OCTPRT ;WRITTEN DATA
2144          ;PICK UP THE DATA VALUE THAT
2145 010100 000403          BR       RTSREC        ;WAS WRITTEN
2146 010102 012702 013337  3$: MOV      #MSG10D,R2 ;PRINT ACTUAL VALUE OF THE
2147          ;DATA READ
2148          ;CONTINUE WITH TESTING
2149 010106 104404          TOP
2150          ;+ 1 TO RDERRS IF FIRST ERROR PASS
2151 010110 104434          ;RTSREC: CKSWR          ;CHECK FOR CNTL G
2152 010112 022737 177775 000560 CMP      #-3,RDPASS
2153 010120 001002          BNE      .+6
2154 010122 005237 000620  INC      RDERRS          ;+1 TO STATUS ERRORS
2155 010126 032777 000020 170356 RTSR1: BIT      #20,@SWR    ;DELETE READ RETRYS (SW 4)?
2156 010134 001011          BNE      RPASS3          ;YES
2157 010136 005237 000560  INC      RDPASS          ;DONE ALL RE-READS?
2158 010142 001404          BEQ      RPASS1          ;YES
2159 010144 004737 010250  JSR      PC,BACK1       ;NO, BACKSPACE TAPE
2160 010150 000137 007432  JMP      RDSTPD         ;GO AGAIN
2161 010154 005237 000624  RPASS1: INC      NRREAD  ;+1 TO NONRECOVERABLE READ
    
```

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2162 010160 012737 177775 000560 RPASS3: MOV #-3,RDPASS
2163 010166 032737 002000 000566 BIT #2000,STATRD ;AT EOT?
2164 010174 001054 BNE RNDTP1 ;YES, TYPE 'EOT'
2165 010176 000631 BR RDSTP
2166
2167 ;SET UP POINTERS FOR NEXT RECORD
2168 010200 005237 000612 RDINCR: INC RECORD
2169 010204 005737 000564 TST BLKINC
2170 010210 001416 BEQ RESTR1
2171 ;RECORD LENGTH IS CHANGING, COUNT IT
2172 010212 063737 000564 000630 ADD BLKINC,READLN
2173 010220 023737 000630 000526 CMP READLN,MINLEN ;IS LENGTH LESS THAN MINIMUM
2174 010226 002404 BLT RESTR1 ;NO
2175 010230 023737 000630 000524 CMP READLN,MAXLEN ;IS LENGTH GREATER THAN MAXIMUM?
2176 010236 003403 BLE RESTR1 ;NO
2177 010240 013737 000542 000630 RESTR1: MOV STRLEN,READLN ;RESET INITIAL LENGTH
2178 010246 000207 RESTR1: RTS PC
2179 ;BACKSPACE ONE RECORD
2180 010250 006077 170224 BACK1: ROR @MTS
2181 010254 103375 BCC #-4 ;WAIT FOR TAPE UNIT READY
2182 010256 012777 177777 170220 MOV #-1,@BC ;COUNT 1 RECORD
2183 010264 013777 000552 170210 MOV COMAND,@MTC ;SELECT DRIVE
2184 010272 052777 000012 170202 BIS #12,@MTC ;ISSUE BACKSPACE
2185 010300 004737 005130 JSR PC,GOWAIT
2186 010304 042777 000016 170170 BIC #16,@MTC
2187 010312 000207 RTS PC
2188 ;DRIVE HAS REACHED EOT IN READ MODE
2189 010314 004737 010200 RNDTAP: JSR PC,RDINCR
2190 010320 052737 000020 000632 BIS #20,MODES ;INDICATE AT EOT
2191 010326 012702 013754 RNDTP1: MOV #MSG25,R2
2192 010332 104404 TOP
2193 010334 012702 012746 MOV #MSG8,R2
2194 010340 104404 TOP
2195 ;DUMP ERROR COUNTERS
2196 010342 104434 READMP: CKSWR ;CHECK FOR CNTL G
2197 010344 013737 000552 011356 MOV COMAND,CHAR
2198 010352 000337 011356 SWAB CHAR
2199 010356 142737 000170 011356 BICB #170,CHAR
2200 010364 052737 000260 011356 BIS #260,CHAR
2201 010372 004737 011360 JSR PC,OCTP ;PRINT DRIVE NUMBER
2202 010376 104430 SP3
2203 010400 013737 001320 011356 MOV PARAM,CHAR
2204 010406 000337 011356 SWAB CHAR
2205 010412 006037 011356 ROR CHAR
2206 010416 042737 000170 011356 BIC #170,CHAR
2207 010424 052737 000260 011356 BIS #260,CHAR
2208 010432 004737 011360 JSR PC,OCTP ;PRINT PATTERN NUMBER
2209
2210 010436 013737 001320 011356 MOV PARAM,CHAR
2211 010444 042737 177774 011356 BIC #177774,CHAR
2212 010452 012702 013441 MOV #MSG14,R2
2213 010456 022737 000001 011356 CMP #1,CHAR
2214 010464 001002 BNE .+6
2215 010466 012702 013415 MOV #MSG12,R2
2216 010472 022737 000002 011356 CMP #2,CHAR
2217 010500 001002 BNE .+6
    
```



```

2218 010502 012702 013427      MOV      #MSG13,R2
2219 010506 104404              TOP          ;PRINT READ MODE
2220 010510 013702 000612      MOV      RECORD,R2
2221 010514 104426              DECPRT      ;PRINT RECORD NUMBER
2222 010516 013737 001320 011356  MOV      PARAM,CHAR
2223 010524 042737 177717 011356  BIC      #177717,CHAR
2224 010532 012702 013471      MOV      #MSG17,R2
2225 010536 022737 000020 011356  CMP      #20,CHAR
2226 010544 001002              BNE      .+6
2227 010546 012702 013500      MOV      #MSG18,R2
2228 010552 022737 000040 011356  CMP      #40,CHAR
2229 010560 001002              BNE      .+6
2230 010562 012702 013453      MOV      #MSG15,R2
2231 010566 022737 000060 011356  CMP      #60,CHAR
2232 010574 001002              BNE      .+6
2233 010576 012702 013462      MOV      #MSG16,R2
2234 010602 104404              TOP          ;PRINT RECORD LENGTH SEQUENCE
2235 010604 012702 013603      MOV      #MSG21,R2
2236 010610 104404              TOP
2237 010612 013702 000620      MOV      RDERRS,R2
2238 010616 104426              DECPRT
2239 010620 012702 013633      MOV      #MSG22,R2
2240 010624 104404              TOP
2241 010626 013702 000622      MOV      DAERRS,R2
2242 010632 104426              DECPRT
2243 010634 012702 013654      MOV      #MSG23,R2
2244 010640 104404              TOP
2245 010642 013702 000624      MOV      NRREAD,R2
2246 010646 104426              DECPRT
2247 010650 000207              RTS      PC
    
```

```

2248
2249
2250
2251      ;WRITE RECOVERY UTILIZING EXTENDED INTERRECORD GAP
2252      ;USED AFTER EVERY 7 REWRITES OR AFTER
2253      ;EACH WRITE ERROR IF STATISTICAL RECOVERY NOT SELECTED
2254      ;USED ONLY IF READ PASS SELECTED
2255 010652 104434      XRGREC: CKSWR      ;CHECK FOR CNTL G
2256 010654 012737 177774 000562      MOV      #-4,WRPASS ;COUNT 4 REWRITES
2257 010662 032777 000040 167622      XRGO: BIT      #40,@SWR ;DELETE WRITE XIRG (SW 5)
2258 010670 001036              BNE      XRGRCD      ;YES
2259 010672 004737 010250      JSR      PC,BACK1
2260 010676 105777 167600      TSTB     @MTC
2261 010702 100375              BPL      .-4
2262 010704 013777 000552 167570      MOV      COMAND,@MTC
2263 010712 052777 000014 167562      BIS      #14,@MTC      ;WRITE XIRG
2264 010720 013777 000626 167556      MOV      WRTLEN,@BC   ;SET BYTE COUNT
2265 010726 005477 167552              NEG      @BC
2266 010732 013777 000530 167546      MOV      WBUF,@CA      ;SET CURRENT ADDRESS
2267 010740 006077 167534      ROR      @MTS          ;WAIT FOR TU READY
2268 010744 103375              BCC      .-4
2269 010746 004737 005130      JSR      PC,GOWAIT
2270
2271      ;RETURN HERE AFTER INTERRUPT
2272 010752 017737 167522 000566      MOV      @MTS,STATRD  ;SAVE STATUS
2273 010760 005777 167516      TST      @MTC
    
```

TM
CZ
MS
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MV
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MV
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NO
NO
NR
NU
NX
OC
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OC
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OU
OV
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PA


```

2274 010764 100403          BMI      XRG5          ;HAVE ERROR FLAG, CHECK FOR EOT
2275 010766 005037 000562  XRGRC: CLR      WRPASS
2276 010772 000207          RTS      PC          ;EXIT WRITE XIRG
2277 010774 032737 175600 000566  XRG5: BIT      #175600,STATRD
2278 011002 001771          BEQ      XRGRC      ;ONLY EOT, EXIT
2279 011004 005237 000562          INC      WRPASS    ;DONE 4 XIRG
2280 011010 001324          BNE      XRG0
2281          ;PRINT STATUS AFTER 4 XIRG ERRORS
2282 011012 012702 012720          MOV      #MSG7,R2
2283 011016 104404          TOP
2284 011020 013737 000626 000544          MOV      WRTLEN,LENGTH ;PRINT WRITE STATUS ERROR
2285 011026 004737 011202          JSR      PC,PRTS    ;PRINT STATUS, COMMAND, RECORD, LENGTH
2286 011032 012702 013367          MOV      #MSG11,R2
2287 011036 104404          TOP
2288 011040 032737 002000 000566          BIT      #2000,STATRD ;PRINT 'XIRG WRITTEN 4 TIMES'
2289 011046 001701          BEQ      XRGREC
2290 011050 042777 000016 167424          BIC      #16,@MTC
2291 011056 052777 000006 167416          BIS      #6,@MTC     ;WRITE AN EOF
2292 011064 004737 005130          JSR      PC,GOWAIT
2293 011070 000207          RTS      PC
2294
2295          ;GO BACKWARD ON TAPE X RECORDS
2296 011072 013737 000612 000616  GOBKWD: MOV      RECORD,LASRCR
2297 011100 013737 000614 000612          MOV      WRRECR,RECORD
2298 011106 001003          BNE      GOB1
2299 011110 004737 004740          JSR      PC,REWIND  ;IS NEW RECORD=0
2300 011114 000207          RTS      PC          ;YES,REWIND
2301 011116 013777 000616 167360  GOB1: MOV      LASRCR,@BC ;EXIT
2302 011124 163777 000614 167352          SUB      WRRECR,@BC ;SET BYTE COUNT TO DIFFERENCE
2303 011132 005477 167346          NEG      @BC        ;BETWEEN LASRCR AND WRRECK
2304 011136 013777 000552 167336          MOV      COMAND,@MTC
2305 011144 105777 167332          TSTB    @MTC        ;WAIT FOR CU READY
2306 011150 100375          BPL     .-4
2307 011152 006077 167322          ROR     @MTC        ;WAIT FOR TU READY
2308 011156 103375          BCC     .-4
2309 011160 042777 000016 167314          BIC      #16,@MTC
2310 011166 052777 000012 167306          BIS      #12,@MTC
2311 011174 004737 005130          JSR      PC,GOWAIT
2312 011200 000207          RTS      PC
2313
2314
2315
2316          ;PRINT COMMAND, STATUS, RECORD NUMBER, LENGTH
2317 011202 012702 013113          PRTS: MOV      #MSG9B,R2
2318 011206 104404          TOP
2319 011210 017702 167266          MOV      @MTC,R2
2320 011214 104412          OCTPRT
2321 011216 013702 000566          MOV      STATRD,R2
2322 011222 104412          OCTPRT
2323 011224 013702 000612          MOV      RECORD,R2
2324 011230 005202          INC     R2
2325 011232 104426          DECPRT
2326 011234 013702 000544          MOV      LENGTH,R2
2327 011240 104426          DECPRT
2328 011242 000207          RTS      PC
2329 011244 104434          CKSWR          ;CHECK FOR CNTL G
    
```



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2330      ;PRINT OCTAL VALUE IN REGISTER 2
2331 011246 012737 000060 011356 OCTPR: MOV #'0,CHAR ;INITIALIZE 1ST NUMBER AS 0
2332 011254 005702          TST R2 ;IS VALUE POSITIVE
2333 011256 100003          BPL OCT1 ;YES PRINT 0
2334 011260 012737 000061 011356 MOV #'1,CHAR ;NO PRINT 1
2335 011266 004737 011360 OCT1: JSR PC,OCTP
2336 011272 006102          ROL R2
2337 011274 006102          ROL R2
2338 011276 012737 177773 011354 MOV #-5,OCT ;COUNT 5 DIGITS
2339 011304 006102          OCT2: ROL R2
2340 011306 006102          ROL R2
2341 011310 006102          ROL R2
2342 011312 010237 011356 MOV R2,CHAR ;SAVE DIGIT
2343 011316 042737 177770 011356 BIC #177770,CHAR ;CLEAR OTHER BITS
2344 011324 052737 000060 011356 BIS #60,CHAR ;MAKE ASCII DIGIT
2345 011332 006002          ROR R2
2346 011334 004737 011360 JSR PC,OCTP ;PRINT
2347 011340 006102          ROL R2
2348 011342 005237 011354 INC OCT ;+1 TO DIGIT COUNT
2349 011346 001356          BNE OCT2 ;NOT DONE
2350 011350 104430          SP3
2351 011352 000207          RTS PC ;EXIT
2352 011354 000000          OCT: 0
2353 011356 000000          CHAR: 0
2354 011360 105777 167134 OCTP: TSTB @TPS
2355 011364 100375          BPL .-4 ;WAIT FOR READY
2356 011366 013777 011356 167126 MOV CHAR,@TPB ;PRINT
2357 011374 000207          RTS PC
2358
2359      ;PRINT DECIMAL VALUE IN REGISTER 2
2360 011376 012737 177773 011554 DECPR: MOV #-5,DIGCNT
2361 011404 012737 011562 011560 MOV #DECPNT+2,DECPNT
2362 011412 012737 000040 011556 MOV #40,ZERO
2363 011420 012737 177777 011552 TYPT1: MOV #-1,DIGIT
2364 011426 005237 011552 TYPT2: INC DIGIT
2365 011432 167702 000122          SUB @DECPNT,R2
2366 011436 100373          BPL TYPT2
2367 011440 067702 000114          ADD @DECPNT,R2
2368 011444 004737 011472          JSR PC,DECOUT
2369 011450 005237 011554          INC DIGCNT
2370 011454 001002          BNE TYPT3
2371 011456 104430          SP3
2372 011460 000207          RTS PC
2373 011462 062737 000002 011560 TYPT3: ADD #2,DECPNT
2374 011470 000753          BR TYPT1
2375 011472 005737 011552          DECOUT: TST DIGIT
2376 011476 001010          BNE DEC1
2377 011500 022737 177777 011554          CMP #-1,DIGCNT
2378 011510 001404          BEQ DEC1
2379 011516 013737 011556 011552          MOV ZERO,DIGIT
2380 011520 012737 000060 011556          DEC1: BR DEC2
2381 011526 052737 000060 011552          MOV #60,ZERO
2382          BIS #60,DIGIT
2383 011534 105777 166760          DEC2: TSTB @TPS
2384 011540 100375          BPL .-4
2385 011542 013777 011552 166752          MOV DIGIT,@TPB
    
```

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2386 011550 000207          RTS      PC
2387 011552 000000          DIGIT:  0
2388 011554 000000          DIGCNT: 0
2389 011556 000040          ZERO:   40
2390 011560 011562          DECPNT: .+2
2391 011562 023420          10000.
2392 011564 001750          1000.
2393 011566 000144          100.
2394 011570 000012          10.
2395 011572 000001          1.
2396
2397 011574 105777 166714      ;KEYBOARD INPUT
2398 011600 100375          WAITK:  TSTB   @TKS      ;WAIT FOR KEY
2399 011602 105777 166712      BPL     .-4
2400 011606 100375          TSTB   @TPS      ;WAIT FOR TELEPRINTER READY
2401 011610 117777 166702 166704      BPL     .-4
2402 011616 117737 166674 001314      MOVB   @TKB,@TPB  ;ECHO CHARACTER
2403 011624 042737 000200 001314      MOVB   @TKB,CHARIN ;SAVE IT
2404 011632 000207          BIC    #200,CHARIN
2405          RTS      PC      ;EXIT
2406 011634 012702 011644      ;TYPE 3 SPACES
2407 011640 104404          SP3X:  MOV     #SP3A,R2
2408 011642 000207          TOP
2409 011644 020057 020040 057  SP3A:  RTS      PC
2410          .ASCII  :/  /;
2411          .EVEN
2412 011652 142777 000177 166640      ;TELETYPE OUTPUT PACKAGE
2413 011660 112237 011752          TO:    BICB   #177,@TPS  ;CLEAR TELETYPE FLAGS
2414 011664 121237 011752          MOVB   (2)+,EOMK    ;SAVE MESSAGE DELIMITER
2415 011670 001001          TOP1:  CMPB   @R2,EOMK    ;IS CHARACTER THE SECOND MESSAGE DELIMITER?
2416 011672 000207          BNE    .+4          ;NO
2417 011674 121227 000100          RTS    PC          ;YES, EXIT
2418 011700 001406          CMPB   @R2,#'a     ;IS CHARACTER AN @ WHICH INDICATES A CARRIAGE RET.
2419 011702 105777 166612          BEQ    TOP2        ;YES
2420 011706 100375          TSTB   @TPS      ;NO, WAIT FOR TELETYPE READY
2421 011710 112277 166606          BPL     .-4
2422 011714 000763          MOVB   (2)+,@TPB  ;PRINT CHARACTER
2423 011716 105777 166576          BR     TOP1
2424 011722 100375          TOP2:  TSTB   @TPS
2425 011724 112777 000215 166570      BPL     .-4
2426 011732 105777 166562          MOVB   #215,@TPB  ;CR
2427 011736 100375          TSTB   @TPS
2428 011740 112777 000212 166554      BPL     .-4
2429 011746 005202          MOVB   #212,@TPB  ;LF
2430 011750 000745          INC    R2
2431 011752 000000          BR     TOP1
2432 011754 022737 000176 000512      EOMK:  0
2433 011762 001035          CKSWRR: CMP    #SWREG,SWR  ;SOFTWARE SWITCH REG PRESENT
2434 011764 105777 166524          BNE    OUT        ;NO, GET OUT
2435 011770 100032          TSTB   @TKS      ;YES, WAIT FOR
2436 011772 017737 166520 001314      BPL    OUT        ;READY, GET CHARACTER
2437 012000 042737 177600 001314      MOV    @TKB,CHARIN ;AND STRIP OFF
2438 012006 022737 000007 001314      BIC    #177600,CHARIN ;THE GARBAGE
2439 012014 001020          CMP    #7,CHARIN  ;IS IT A <^G>
2440 012016 012702 014042          BNE    OUT
2441 012022 104404          MOV    #SCNTG,R2
          TOP
  
```



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2442 012024 012702 014050      CNTLU: MOV    #SMSWR,R2
2443 012030 104404              TOP
2444 012032 017702 166454      MOV    @SWR,R2
2445 012036 104412              OCTPRT
2446 012040 012702 014060      MOV    #SMNEW,R2
2447 012044 104404              TOP
2448 012046 005037 012250      CLR    @#TEMPST
2449 012052 004737 012060      JSR    PC,$READ
2450 012056 000207              OUT:   RTS    PC
2451
2452 012060 005037 012250      $READ: CLR    TEMPST
2453 012064 012737 000007 012252  MOV    #7,COUNT
2454 012072 104400      1$:   WAITKY
2455 012074 042737 177600 001314  BIC    #177600,CHARIN ;STRIP OFF GARBAGE
2456 012102 122737 000025 001314  CMPB   #25,CHARIN      ;IS IT A ^U?
2457 012110 001002              BNE    2$              ;BRANCH IF NOT
2458 012112 005726              3$:   TST    (SP)+      ;POP THE STACK
2459 012114 000743              BR     CNTLU          ;START OVER
2460 012116 122737 000015 001314  2$:   CMPB   #15,CHARIN      ;IS IT A <CR>?
2461 012124 001011              BNE    4$              ;BRANCH IF NOT
2462 012126 012702 014070      MOV    #SMCRLF,R2     ;DO CRLF
2463 012132 104404              TOP
2464 012134 022737 000007 012252  CMP    #7,COUNT       ;WAS IT FIRST CHARACTER
2465 012142 001036              BNE    7$              ;CHANGE SWR IF NOT FIRST ONE
2466 012144 005726              8$:   TST    (SP)+      ;POP THE STACK
2467 012146 000743              BR     OUT            ;GET OUT
2468 012150 122737 000060 001314  4$:   CMPB   #60,CHARIN
2469 012156 003004              BGT    5$
2470 012160 122737 000067 001314  CMPB   #67,CHARIN
2471 012166 002004              BGE    6$
2472 012170 012702 012610      5$:   MOV    #MSG0,R2
2473 012174 104404              TOP
2474 012176 000745              BR     3$
2475 012200 006337 012250      6$:   ASL    TEMPST
2476 012204 006337 012250      ASL    TEMPST
2477 012210 006337 012250      ASL    TEMPST
2478 012214 142737 000060 001314  BICB   #60,CHARIN      ;GET NITTY-GRITTY
2479 012222 153737 001314 012250  BISB   CHARIN,TEMPST
2480 012230 005337 012252      DEC    COUNT          ;ONLY WANT 6 DIGITS
2481 012234 001755              BEQ    5$
2482 012236 000715              BR     1$
2483 012240 013777 012250 166244  7$:   MOV    TEMPST,@SWR   ;CHANGE SWITCH REGISTER CONTENTS
2484 012246 000736              BR     8$
2485
2486 012250 000000      TEMPST: 0
2487 012252 000000      COUNT:  0
2488
2489 012254 013746 000006      SUSWRR: MOV    @#6,-(SP)    ;SAVE VECTORS
2490 012260 013746 000004      MOV    @#4,-(SP)
2491 012264 012737 012304 000004  MOV    #1$,@#4        ;SET UP FOR TIMEOUT
2492 012272 022777 177777 166212  CMP    #-1,@SWR      ;REFERENCE HARDWARE SWITCH REGISTER
2493 012300 001402              BEQ    2$
2494 012302 000404              BR     3$
2495 012304 022626              1$:   CMP    (SP)+,(SP)+   ;ADJUST STACK
2496 012306 012737 000176 000512  2$:   MOV    #SWREG,SWR   ;POINT TO SOFTWARE SWITCH REG
2497 012314 012637 000004      3$:   MOV    (SP)+,@#4    ;RESTORE VECTORS

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2498	012320	012637	000006	MOV	(SP)+, @#6
2499	012324	000207		RTS	PC
2500					
2501				: TRAP HANDLER	
2502	012326	011666	000002	TRAP34: MOV	@SP, 2(6)
2503	012332	162716	000002	SUB	#2, @SP
2504	012336	013646		MOV	@(6)+, -(6)
2505	012340	062716	105746	ADD	#TABLE-104400, @SP
2506	012344	013607		MOV	@(6)+, PC
2507	012346	011574		TABLE: WAITK	
2508	012350	005202		WRITI	
2509	012352	011652		TO	
2510	012354	004470		SVCTR	
2511	012356	004604		RSFDR	
2512	012360	011246		OCTPR	
2513	012362	004506		MVCTR	
2514	012364	006540		GENPA	
2515	012366	004550		CLRAL	
2516	012370	004702		CHGDR	
2517	012372	007410		READI	
2518	012374	011376		DECPR	
2519	012376	011634		SP3X	
2520	012400	012254		SUSWRR	
2521	012402	011754		CKSWRR	
2522		104400		WAITKY=104400	
2523		104402		WRITIT=104402	
2524		104404		TOP=104404	
2525		104406		SVCTRS=104406	
2526		104410		RSFDRV=104410	
2527		104412		OCTPRT=104412	
2528		104414		MVCTRS=104414	
2529		104416		GENPAT=104416	
2530		104420		CLRALL=104420	
2531		104422		CHGDRV=104422	
2532		104424		READIT=104424	
2533		104426		DECPRT=104426	
2534		104430		SP3=104430	
2535		104432		SUSWR=104432	
2536		104434		CKSWR=104434	
2537					


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2538
2539 : *****
2540 :                               MODIFIED DEC 16 1977
2541 :
2542 :                               ++
2543 :                               --
2544 :                               CHECK FOR DUMP MODE OR AUTOMATIC/ACT11-XXDP MODE
2545 :
2546 012404 005037 000400 CKMODE: CLR AUTOM ;INIT AUTOMATIC MODE INDICATOR
2547 012410 105037 000402 CLRB ACT11M ;INIT ACT11 AUTO MODE INDICATOR
2548 012414 105037 000403 CLRB XXDPM ;INIT XXDP AUTO MODE INDICATOR
2549 012420 105037 000404 CLRB ADUMPM ;INIT ACT11 DUMP MODE INDICATOR
2550 012424 105037 000405 CLRB XDUMPM ;INIT XXDP DUMP MODE INDICATOR
2551 012430 005737 000042 TST @#42 ;AUTO MODE?
2552 012434 001425 BEQ 2$ ;BRANCH - IF NO
2553 012436 005237 000400 INC AUTOM ;SET AUTO MODE INDICATOR
2554 012442 032737 020000 000052 BIT #20000,@#52 ;MANUAL INTERVENTION?
2555 012450 001402 BEQ 6$ ;BRANCH - IF NO
2556 012452 000137 012532 JMP ABORT ;ABORT THE PROGRAM
2557 012456 023737 000042 000046 6$: CMP @#42,@#46 ;ACT11 MODE?
2558 012464 001403 BEQ 1$ ;BRANCH - IF YES
2559 012466 105237 000403 INCB XXDPM ;INDICATE XXDP AUTO MODE
2560 012472 000416 BR 5$ ;AND EXIT
2561 012474 105237 000402 1$: INCB ACT11M ;INDICATE ACT11 AUTO MODE
2562 012500 012777 020111 166004 MOV #20111,@SWR ;SET SWITCH REGISTER
2563 012506 000410 BR 5$ ;AND EXIT
2564 012510 105737 000041 2$: TSTB @#41 ;MAN/MODE VIA ACT11/PAPER TAPE?
2565 012514 001003 BNE 3$ ;BRANCH - IF NOT
2566 012516 105237 000404 INCB ADUMPM ;INDICATE MAN/MODE VIA ACT11/PAPER TAPE
2567 012522 000402 BR 5$ ;AND EXIT
2568 012524 105237 000405 3$: INCB XDUMPM ;INDICATE MANUAL MODE VIA XXDP
2569 012530 000207 5$: RTS PC ;RETURN
2570
2571 : *****
2572

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



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2593
2594 ;TEXT MESSAGES
2595
2596 012566 040057 051120 043517 MSG00: .ASCII ;/PROGRAM ABORTED/;
2597 012574 040522 020115 041101
2598 012602 051117 042524 027504
2599 012610 037457 020100 057 MSG0: .ASCII ;/?@ /;
2600 012615 057 051500 046105 MSG1: .ASCII ;/SELECT UNITS /;
2601 012622 041505 020124 047125
2602 012630 052111 020123 027440
2603 012636 040057 051524 020124 MSG2: .ASCII ;/TST PAT RLS WMO RMO@ /;
2604 012644 040520 020124 046122
2605 012652 020123 046527 020117
2606 012660 046522 040117 027440
2607 012666 046457 054101 052040 MSG5: .ASCII ;/MAX TESTS SELECTED@/;
2608 012674 051505 051524 051440
2609 012702 046105 041505 042524
2610 012710 040104 057
2611 012713 057 047440 027513 MSG6: .ASCII ;/ OK/;
2612 012720 040057 051127 052111 MSG7: .ASCII ;/WRITE STATUS ERROR@/;
2613 012726 020105 052123 052101
2614 012734 051525 042440 051122
2615 012742 051117 027500
2616 012746 042457 042116 047440 MSG8: .ASCII ;/END OF TAPE*****@;
2617 012754 020106 040524 042520
2618 012762 025052 025052 025052
2619 012770 025052 025052 025052
2620 012776 025052 025052 025052
2621 013004 025052 100
2622 013007 104 053122 050040 .ASCII ;DRV PAT MODE RECORD LENGTH@/;
2623 013014 052101 046440 042117
2624 013022 020105 042522 047503
2625 013030 042122 046040 047105
2626 013036 052107 040110 057
2627 013043 057 051100 040505 MSG9: .ASCII ;/READ STATUS ERROR@/;
2628 013050 020104 052123 052101
2629 013056 051525 042440 051122
2630 013064 051117 027500
2631 013070 040057 042522 042101 MSG9A: .ASCII ;/READ DATA ERROR@/;
2632 013076 042040 052101 020101
2633 013104 051105 047522 040122
2634 013112 057
2635 013113 057 047503 042115 MSG9B: .ASCII ;/COMD STATUS RECORD LENGTH EXPECTED ACTUAL@/;
2636 013120 020040 020040 051440
2637 013126 040524 052524 020123
2638 013134 020040 042522 047503
2639 013142 042122 020040 046040
2640 013150 047105 052107 020110
2641 013156 054105 042520 052103
2642 013164 042105 040440 052103
2643 013172 040525 040114 057
2644 013177 057 055100 020132 MSG10A: .ASCII ;/ZZ - CZTMBF@RECORD LIMITS IN BYTES@;
2645 013204 020055 055103 046524
2646 013212 043102 040060 042522
2647 013220 047503 042122 046040
2648 013226 046511 052111 020123
    
```

2649	013234	047111	041040	052131			
2650	013242	051505	100				
2651	013245	115	047111	042514	.ASCII	;MINLEN	MAXLENA /;
2652	013252	020116	046440	054101			
2653	013260	042514	040116	027440			
2654	013266	040054	054105	051105	MSG10B:	.ASCII	/,@EXERCISING UNITS, /
2655	013274	044503	044523	043516			
2656	013302	052440	044516	051524			
2657	013310	054					
2658	013311	054	047100	020117	MSG10C:	.ASCII	/,@NO DRIVES AVAILABLE, /
2659	013316	051104	053111	051505			
2660	013324	040440	040526	046111			
2661	013332	041101	042514	054			
2662	013337	057	020040	042522	MSG10D:	.ASCII	;/ RECORD DATA COMPARES/;
2663	013344	047503	042122	042040			
2664	013352	052101	020101	047503			
2665	013360	050115	051101	051505			
2666	013366	057					
2667	013367	057	044530	043522	MSG11:	.ASCII	;/XIRG WRITTEN 4 TIMES/;
2668	013374	053440	044522	052124			
2669	013402	047105	032040	052040			
2670	013410	046511	051505	057			
2671	013415	057	020040	051440	MSG12:	.ASCII	;/ SSTP /;
2672	013422	052123	020120	057			
2673	013427	057	020040	051040	MSG13:	.ASCII	;/ RNDM /;
2674	013434	042116	020115	057			
2675	013441	057	020040	047040	MSG14:	.ASCII	;/ NSTP /;
2676	013446	052123	020120	057			
2677	013453	057	026515	040515	MSG15:	.ASCII	;/M-MAX/;
2678	013460	027530					
2679	013462	046457	046455	047111	MSG16:	.ASCII	;/M-MIN/;
2680	013470	057					
2681	013471	057	044515	020116	MSG17:	.ASCII	;/MIN /;
2682	013476	027440					
2683	013500	046457	054101	020040	MSG18:	.ASCII	;/MAX /;
2684	013506	057					
2685	013507	057	053500	044522	MSG19:	.ASCII	;/@WRITE ERRORS = /;
2686	013514	042524	042440	051122			
2687	013522	051117	020123	020075			
2688	013530	057					
2689	013531	057	051100	041505	MSG20:	.ASCII	;/@RECOVERED AT 0 /;
2690	013536	053117	051105	042105			
2691	013544	040440	020124	020060			
2692	013552	057					
2693	013553	057	050100	051105	MSG20A:	.ASCII	;/@PERMANENT BADSPOTS = /;
2694	013560	040515	042516	052116			
2695	013566	041040	042101	050123			
2696	013574	052117	020123	020075			
2697	013602	057					
2698	013603	057	051100	040505	MSG21:	.ASCII	;/@READ STATUS ERRORS = /;
2699	013610	020104	052123	052101			
2700	013616	051525	042440	051122			
2701	013624	051117	020123	020075			
2702	013632	057					
2703	013633	057	042100	052101	MSG22:	.ASCII	;/@DATA ERRORS = /;
2704	013640	020101	051105	047522			

2705	013646	051522	036440	027440			
2706	013654	040057	047516	026516	MSG23:	.ASCII	;/@NON-RECOVERABLE ERRORS = /;
2707	013662	042522	047503	042526			
2708	013670	040522	046102	020105			
2709	013676	051105	047522	051522			
2710	013704	036440	027440				
2711	013710	040057	025052	025052	MSG24:	.ASCII	;/@*****WRITE PASS /;
2712	013716	025052	025052	025052			
2713	013724	025052	025052	025052			
2714	013732	025052	025052	051127			
2715	013740	052111	020105	040520			
2716	013746	051523	020040	027440			
2717	013754	040057	025052	025052	MSG25:	.ASCII	;/@*****READ PASS /;
2718	013762	025052	025052	025052			
2719	013770	025052	025052	025052			
2720	013776	025052	025052	042522			
2721	014004	042101	050040	051501			
2722	014012	020123	020040	027440			
2723	014020	040057	040100	057	MSG26:	.ASCII	;/@@@/;
2724	014025	057	047105	020104	MSG27:	.ASCII	;/END OF PASS/;
2725	014032	043117	050040	051501			
2726	014040	027523					
2727	014042	040057	043536	027500	\$CNTG:	.ASCII	;/@^G@/;
2728	014050	040057	053523	036522	\$MSWR:	.ASCII	;/@SWR= /;
2729	014056	027440					
2730	014060	020057	042516	036527	\$MNEW:	.ASCII	;/ NEW= /;
2731	014066	027440					
2732	014070	040057	057		\$MCRLF:	.ASCII	;/@/;
2733		014074				.EVEN	
2734							
2735	014074	014074			BUFFER:.		;/WRITE BUFFER BEGINS HERE
2736							
2737		000001				.END	

SELD2	002262	1154	1157#																		
SELOK1	003050	1275	1277#																		
SELPAT	002460	1194	1198#																		
SELRLS	002552	1219#																			
SELRM1	002734	1251	1254#																		
SELRM2	002750	1249	1253	1257#																	
SELR1	002602	1223	1226#																		
SELR2	002620	1227	1230#																		
SELR3	002634	1221	1225	1229	1233#																
SELTST	002366	1151	1181#																		
SELT1	002404	1185#	1197	1276																	
SELT2	002430	1187	1191#																		
SELT3	002450	1189	1192	1195#	1209	1211	1231	1243	1255	1265											
SELW1	002666	1239	1242#																		
SELW2	002702	1237	1241	1245#																	
SP3 =	104430	1205	1216	1233	1245	1257	1807	2202	2350	2370	2534#										
SP3A	011644	2406	2409#																		
SP3X	011634	2406#	2519																		
STACK =	000500	929#	1024	1135																	
START	002134	1129	1134#																		
START1	002140	1097	1135#	1149																	
STATRD	000566	960#	1690*	1756	1777	2064*	2111	2163	2272*	2277	2288	2321									
STOPOP	005510	1701	1713#																		
STREC1	006050	1771	1780#																		
STRLEN	000542	950#	1664*	1668*	1670	1744	2045	2177													
STRTOP	005314	1679#	1724	1729	1732	1784	1791														
SUSWR =	104432	1025	1136	2535#																	
SUSWRR	012254	2489#	2520																		
SVCTR	004470	1550#	2510																		
SVCTRS=	104406	1339	1356	1374	1381	1388	1405	1413	1420	1440	1451	1466	1482	1514							
		1528	1572	2525#																	
SVC1	004474	1551#	1553																		
SVRECR	000550	953#	1448*	1450	1475*	1481	1521*	1527													
SV0	007400	2000*	2028	2036#																	
SV1	007402	2001*	2029	2037#																	
SV2	007404	2002*	2030	2038#																	
SV3	007406	2003*	2031	2039#																	
SWR	000512	936#	1027	1137	1303	1590	1625	1761	1767	2095	2113	2122	2155	2257							
		2432	2444	2483*	2492	2496*	2562*														
SWREG	000176	923#	1027	1137	2432	2496															
TABLE	012346	2505	2507#																		
TEMPST	012250	2448*	2452*	2475*	2476*	2477*	2479*	2483	2486#												
TESINC	005616	1504	1704	1725	1735#																
TESRC1	006014	1768	1773#																		
TESREC	005764	1762	1767#																		
TEST	001324	1010#	1286*																		
TEST0	003306	1287	1331#																		
TEST1	003356	1289	1348#																		
TEST2	003426	1291	1366#																		
TEST3	003544	1294	1397#																		
TEST4	003662	1298	1430#																		
TEST5	004204	1297	1497#																		
TKB	000516	938#	2401	2402	2436																
TKS	000514	937#	2397	2434																	
TO	011652	2412#	2509																		
TOP =	104404	1085	1095	1101	1123	1143	1182	1196	1261	1278	1302	1324	1764	1796							

T5D	004314	1511	1515#																	
T5E	004322	1518#	1530	1542																
T5F	004364	1523	1526#																	
T5FLAG	004464	1500*	1546#	1576*	1632	1675														
T5G	004376	1520	1529#																	
T5H	004414	1532	1534#																	
T5INC	004466	1505*	1513	1547#																
T5J	004416	1535#	1540																	
T5K	004436	1537	1539#																	
USSTST	001624	1066#	1069																	
USS.OK	001642	1067	1071#																	
VALID	002300	1156	1162#																	
VAL1	002316	1167#	1170																	
VAL2	002330	1168	1171#																	
VAL3	002344	1172	1175#																	
VAL4	002350	1160	1174	1176#																
WAITK	011574	2397#	2507																	
WAITKY=	104400	1145	1185	1207	1219	1235	1247	1262	2454	2522#										
WAIT1	005160	1653*	1655#	1658*																
WBUF	000530	943#	1686	1866	2069	2124	2266													
WRCHK	000570	961#	1562	1644	1697	1760*	1841	1843	1853											
WRIT!	005202	1662#	2508																	
WRITIT=	104402	1338	1355	1373	1404	1449	1501	2523#												
WRPASS	000562	958#	1678*	1693	1695	1699*	1702	1723	1758	1769*	1770	1776*	2256*	2275*						
		2279*																		
WRRECR	000614	972#	1439*	1448	1450*	1674*	2297	2302												
WRTDMP	006170	1800#																		
WRTD1	006460	1845#	1854																	
WRTD2	006502	1847	1852#																	
WRTLEN	000626	977#	1670*	1684	1739*	1740	1742	1744*	1765	2264	2284									
W1	005250	1667	1670#																	
W10	005476	1706	1710#																	
W11	005550	1714	1723#	1779																
W12	005604	1727	1731#																	
XDUMPM	000405	917#	2550*	2568*																
XRGRC	010766	2258	2275#	2278																
XRGREC	010652	1775	2255#	2289																
XRGQ	010662	2257#	2280																	
XRG5	010774	2274	2277#																	
XXDPM	000403	915#	2548*	2559*	2584															
ZERO	011556	2361*	2378	2380*	2389#															
\$CNTG	014042	2440	2727#																	
\$ENDAD	003246	891	1096	1314	1317#															
\$MCRLF	014070	2462	2732#																	
\$MNEW	014060	2446	2730#																	
\$MSWR	014050	2442	2728#																	
\$READ	012060	2449	2452#																	
\$R1	007424	2044	2046#																	
\$R5	007562	2071#	2074																	
\$SVPC =	000036	877#	897																	
\$ZEROS	002032	1111	1115#																	
.	= 014076	857#	859#	877	878#	882#	886#	890#	893#	897#	904#	922#	924#	930#						
		991#	993#	995#	997#	999#	1001#	1003#	1005#	1158	1177	1264	1267	1270						
		1296	1591	1610	1613	1676	1681	1683	1720	1774	1783	1818	1821	1830						
		1833	1836	1856	1881	1896	1922	1951	2049	2051	2087	2106	2153	2181						
		2214	2217	2226	2229	2232	2261	2268	2306	2308	2355	2384	2390	2398						

TM 11 DATA RELIAB 9TRK MACY11 30A(1052) 04-APR-79 10:39 PAGE 72
CZTMBF.P11 04-APR-79 10:28 CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0071

2400 2410# 2415 2420 2424 2427 2589 2733# 2735

. ABS. 014076 000

ERRORS DETECTED: 0

DSKZ:CZTMBF,DSKZ:CZTMBF.SEG/CRF/SOL=CZTMBF.P11
RUN-TIME: 8 16 2 SECONDS
RUN-TIME RATIO: 276/27=10.0
CORE USED: 8K (15 PAGES)