RH11-RS03

DATA RELIABILITY
MD-11-DZRSC-E

EP-DZRSC-E-DL-A

FICHE 1 OF 1

NOV 1976
digital
MADE IN USA

.REM %

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZRSC-E-D

PRODUCT NAME: RH11-RS03-RS03/LA-RS04 DATA RELIABILITY DIAGNOSTIC

PROGRAM DATE: AUG 1976

MAINTAINER; DIAGNOSTIC GROUP

CONTENTS

DESCRIPTION

1. ABSTRACT

THIS DIAGNOSTIC WAS DESIGNED TO TEST RS03, RS03/LA AND RS04 DRIVES.

THE DZRSC DISK DATA TEST IS A SERIES OF ADDRESS AND DATA RELIABILITY ROUTINES WHICH VERIFY TO THE USER THAT THE CONTROLLER (RH11) AND THE DISKS (RS03/LA OR RS04) ARE OPERATING CORRECTLY. THIS TEST SHOULD BE USED IN CONJUNCTION WITH THE DZRSB DIAGNOSTIC. IF THERE IS A POWER FAIL WHILE THE DIAGNOSTIC IS RUNNING, THE PROGRAM WILL WAIT FOR APPROXIMATELY 5 MINUTES, TO GIVE ALL THE DRIVES TIME TO COME BACK UP TO SPEED, BEFORE RESTARTING THE TEST SEQUENCE.

NOTE

THIS PROGRAM WILL DESTROY ALL DATA ON THE DISKS. TURN OFF ALL DRIVES THAT YOU DO NOT WANT TO TEST.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP11 STANDARD COMPUTER WITH A MINIMUM OF 8K OF MEMORY, AND AN RH11 CONTROLLER WITH AN RS03, RS03/LA OR AN RS04 DISK.

2.2 PRELIMINARY PROGRAMS

DZRSB

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR ABS TAPES.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE 5. (ALL DOWN FOR WORST CASE TESTING)

4.2 STARTING ADDRESS

PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY USING ABS LOADER.

1. STARTING ADDRESS 200.

A. SET SWITCHES (SEE SEC 5.). ALL DOWN FOR WORST CASE (IF SWITCH-LESS CPV SIMPLY PRESS START)

B. THE DISPLAY ON THE 11/45 WILL SHOW THE ITERATION COUNT IN THE LEFT BYTE AND TEST NUMBER IN THE RIGHT. TO USE, SET THE DATA DISPLAY SWITCH TO THE DISPLAY POSITION.

C. PRESS START.

THE PROGRAM WILL NOW MAP THE DATA BUFFERS IN 4K SEGMENTS ON -A- AND -B- PORTS UP TO 28K. IT WILL THEN TYPE OUT THE PARAMETERS OF THE DATA BUFFERS. THE PROGRAM WILL ONLY DO THIS THE FIRST TIME IT IS STARTED, FOR IT STORES THESE ADDRESSES AND CONTINUES USING THEM. TO HAVE THE PROGRAM REMAP THE SYSTEM, THE PROGRAM MUST BE RELOADED. IF YOU WISH TO GET ABOVE 28K, YOU CAN ENTER CONVERSATION MODE AND PUT THE DATA BUFFERS WHERE YOU WISH. THE SIZE OF THE DATA BUFFERS CAN NOT EXCEED 24K.

DESCRIPTION

5. OPERATIONAL SWITCH SETTINGS

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC.176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED.

(I.E) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1. <CR> — IF NO CHANGES ARE TO BE MADE.

2. 6 DIGITS 0-7 — TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE: LAST DIGIT FOLLOWED BY <CR>.

3. ↑U — TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (I.E.) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

G01


```
                        MAINDEC-11-DZRSC-E  RH11-RS03/LA-RS04  DATA RELIABILITY DIAG    PAGE 6
                        DESCRIPTION


                        SWITCH SETTINGS ARE:

                                SW<15> = 1 ..... HALT ON ERROR
                                SW<14> = 1 ..... LOOP ON FUNCTION
                                SW<13> = 1 ..... INHIBIT PRINTOUT
                                SW<12> = 1 ..... INHIBIT COMPARISON
                                                 WITH THIS SWITCH SET, THE
                                                 PROGRAM WILL NOT COMPARE THE
                                                 DATA IT READ FROM THE DISK WITH
                                                 THE KNOWN GOOD DATA.
                                SW<11> = 1 ..... HALT ON COMPLETION OF TRANSFER
                                SW<10> = 1 ..... ENTER CONVERSATION MODE
                                SW<09> = 1 ..... LOOP ON ERROR
                                SW<08> = 1 ..... DATA RELIABILITY TEST MODE
                                SW<07> = 1 ..... WAIT IN WAIT MODE
                                                 PROGRAM RUNS IN A BACKGROUND TEST
                                                 WHILE WAITING FOR INTERRUPT, WITH
                                                 SW SET PROGRAM WAITS IN A WAIT
                                                 INSTRUCTION.
                                SW<06> = 1 ..... OPTIONAL TYPEOUT OF RETRY ERRORS
                                SW<05> = 1 ..... INHIBIT PASS COUNT
                                SW<04> = 1 ..... ALLOWS 8 ERROR TYPEOUTS IN THE
                                                 COMPARE ROUTINE BEFORE EXECUTING NEXT READ
                                                 COMMAND. WHEN SWITCH IS 0, ONLY 1 ERROR
                                                 TYPEOUT IS RECORDED.
                                SW<03> = 1 ..... TYPEOUT #  OF ERRORS
                                SW<02> = 1 ..... INHIBIT MEMORY MANAGEMENT
                                SW<01> = 1 ..... DATA TEST ONLY
                                SW<00> = 1 ..... DROPS DRIVE AFTER 20 ERRORS
```

5.1 DATA RELIABILITY TEST MODE

WITH SW8 SET, THE PROGRAM WILL SET THE "BAI" BIT IN RHCS2 AND TRANSFER 64K OF DATA AT A TIME FOR ALL PATTERNS EXCEPT RANDOM. RANDOM WILL BE EXECUTED AS USUAL WITH STANDARD BUFFERS. NO COMPARES ARE DONE IN THIS MODE OF OPERATION EXCEPT ON RANDOM PATTERNS. THIS OPTION SHOULD ONLY BE USED IN DATA TEST OR CONVERSATION MODE. WHEN USED IN CONVERSATION MODE IT OVER RIDES THE NON STANDARD WORD COUNT. YOU SHOULD NOT SELECT A DESIRED DISK ADDRESS IN CONVERSATION MODE FOR IT CAN PRODUCE A DISK ADDRESS OVERFLOW ERROR FOR THIS DATA RELIABILITY TEST MODE ONLY DOES 64K WORD TRANSFERS. IF SW8 IS CHANGED, WHILE THE PROGRAM IS RUNNING, THE PROGRAM WILL FINISH ITS PASS BEFORE EXECUTING THE SWITCH CHANGE.

5.2 CONVERSATION MODE FOR PROGRAM PARAMETERS FOR DATA TEST ONLY

IN CONVERSATION MODE THE OPERATOR CAN SPECIFY ANY ONE OR ALL OF THE PROGRAM PARAMETERS.

NOTE

ONCE IN CONVERSATION MODE, THE ONLY WAY TO REMAP THE SYSTEM IS TO RELOAD THE PROGRAM. TO RESTART THE PROGRAM IN CONVERSATION MODE WITHOUT HAVING TO REANSWER THE QUESTIONS, THE STARTING ADDRESS IS 210. RESET SWITCH 10. TO RESTART THE PROGRAM WITHOUT HAVING TO REANSWER THE PORT SIZING QUESTIONS, RESTART AT 220. RESET SWITCH 10.

MAINDEC-11-DZRSC-E RH11-RS03/LA-RS04 DATA RELIABILITY DIAG PAGE 8
DESCRIPTION

THE PROGRAM WILL NOW ASK SEVERAL QUESTIONS, THE TABLE BELOW WILL HELP YOU ANSWER THE QUESTIONS.

TYPE TO	START AT	TYPE TO	START AT
0	000000		
1	020000	20	400000
2	040000	21	420000
3	060000	22	440000
4	100000	23	460000
5	120000	24	500000
6	140000	25	520000
7	160000	26	540000
10	200000	27	560000
11	220000	30	600000
12	240000	31	620000
13	260000	32	640000
14	300000	33	660000
15	320000	34	700000
16	340000	35	720000
17	360000	36	740000

NOTE: TYPE ONLY NUMBERS SHOWN!!!

1. -A- PORT? (Y OR N)

   THIS GIVES YOU THE OPTION TO TEST -A- OR -B- PORT USING THE DATA TEST.

   IF THE ANSWER TO THIS QUESTION IS YES, THE FOLLOWING QUESTIONS WILL BE ASKED. IF THE ANSWER IS NO, -B- PORT WILL BE TESTED AND QUESTIONS 4 AND 5 WILL BE ASKED.

2. 1ST 4K BANK #

   THIS NUMBER THAT IS TYPED WILL DETERMINE WHERE THE BUFFER AREA WILL START ON -A- PORT. USE TABLE ABOVE

   NOTE:

   PROGRAM IS LOCATED IN 1ST 4K BANK. THEREFORE, THIS BANK CAN NOT BE USED AS A BUFFER.

3. # OF 4K BANKS ?

   THIS WILL DETERMINE THE SIZE OF THE -A- PORT DATA BUFFER. THE SIZE OF THE DATA BUFFER CAN NOT EXCEED 24K AND MUST BE IN "OCTAL".

4. 1ST 4K BANK #

NOTE

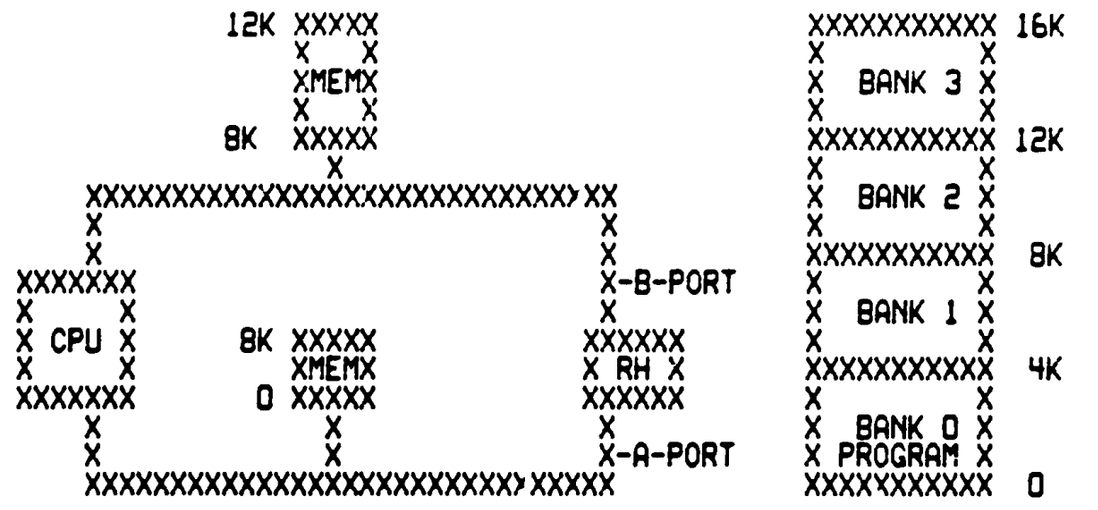
THIS DIAGNOSTIC WILL ONLY TEST -B- PORT IF THE PROCESSOR HAS ACCESS TO THAT MEMORY ON -B- PORT. THIS MEMORY MUST HAVE THE SAME ADDRESS ON ALL PORTS.

THIS NUMBER WILL DETERMINE WHERE THE DATA BUFFER AREA WILL START ON -B- PORT.

5. # OF 4K BANKS?

THIS NUMBER WILL DETERMINE THE SIZE OF THE -B- PORT DATA BUFFER. THE SIZE OF THE DATA BUFFER CAN NOT EXCEED 24K AND MUST BE IN "OCTAL".

EXAMPLE:



THESE ANSWERS GIVEN BELOW WILL TEST THE CONFIGURATION IN THE GIVEN EXAMPLE. ANSWERS:

TO TEST	-A- PORT	-B- PORT
	1) Y	1) N
	2) 1	4) 2
	3) 1	5) 1

DESCRIPTION

PROGRAM CONVERSATION

MULTI DRIVE MODE? (YES-NO)

MULTI DISK MODE IS A MODE IN THE PROGRAM WHICH ALLOWS THE OPERATOR TO EXERCISE ALL THE DISKS ON THE SYSTEM WITHOUT RE-STARTING THE PROGRAM. THE PROGRAM, AFTER EXERCISING ONE DISK WILL REPORT A MESSAGE TELLING THE OPERATOR WHICH DISK WILL BE SELECTED NEXT, AND THEN THE PROGRAM WILL EXERCISE THAT DISK. WHEN A COMPLETE PASS IS ACCOMPLISHED, A PASS COMPLETE WILL BE REPORTED AND THE TEST WILL RECYCLE.

IF THE ANSWER TO THE MULTI DRIVE MODE WAS "NO", THE FOLLOWING QUESTION IS ASKED.

UNIT #

THE OPERATOR CAN NOW SELECT THE UNIT HE WISHES TO TEST BY TYPING THE UNIT NUMBER.

OPTIONAL WORD COUNT (YES-NO)

IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION THE NEXT QUESTION WILL BE DELETED FROM THE CONVERSATION.

WD CT

THE OPERATOR CAN SPECIFY ANY LENGTH TRANSFER FROM 1(8) TO 60000(8) WORDS. THE NORMAL TRANSFER LENGTH IS N(8) WORDS WHERE N IS THE MAXIMUM BUFFER SIZE FOR THE AVAILABLE CORE. IN EITHER CASE, BUFFER WILL NOT EXCEED 24 K.

THIS PROGRAM MAPS THE SYSTEM IN 4K SEGMENTS. IF THERE IS A 1K BLOCK OF MEMORY ON THE SYSTEM THAT YOU WOULD LIKE TO REACH, YOU CAN TYPE IN THAT 4K BANK # AND THEN SPECIFY A WC OF 2000.

IF THE WORD COUNT NUMBER TYPED, IS LARGER THAN THE CORE SIZE GIVEN IN THE SETUP ROUTINE, THE QUESTION WILL BE REPEATED.

OPTIONAL DSK ADDR (YES-NO)

IF THE ANSWER TO THIS QUESTION IS NO, THE WHOLE DISK WILL BE WRITTEN AND THE NEXT QUESTION IS NOT ASKED.

DSK ADDR

THE OPERATOR CAN NOW SPECIFY THE STARTING SECTOR

MAINDEC-11-DZRSC-E RH11-RS03/LA-RS04 DATA RELIABILITY DIAG PAGE 11
DESCRIPTION

PATTERN NO.?

THIS GIVES THE OPERATOR THE OPTION OF SELECTING ALL THE DATA PATTERNS (#22) OR ANY ONE DATA PATTERN, SIMPLY BY TYPING THE DATA PATTERN NUMBER DESIRED.

PATTERN	0	= 000000
"	1	= 177777
"	2	= 031463
"	3	= 066666
"	4	= 100001
"	5	= 107070
"	6	= 070707
"	7	= 052525
"	10	= 125252
"	11	= 177737
"	12	= 146314
"	13	= 136363
"	14	= 063636
"	15	= 000001
"	16	= 100005
"	17	= 155555
"	20	= 133333
"	21	= RANDOM DATA
"	22	= RUN ALL DATA PATTERNS UNDER PROGRAM CONTROL

IN THIS SECTION OF THE PROGRAM PARAMETER CONVERSATION MODE, THE OPERATOR CAN SELECT ANY ONE OR ALL THREE OF THE CONTROL FUNCTIONS TO BE EXECUTED. THE NORMAL SEQUENCE OF DISK FUNCTIONS UNDER PROGRAM CONTROL ARE WRITE, WRITE CHECK, AND THEN READ. BY ENTERING THE CONVERSATION MODE THE OPERATOR HAS GAINED COMPLETE CONTROL OVER THE DISK FUNCTIONS. HE MUST SPECIFY YES OR NO TO ALL OF THE FOLLOWING QUESTIONS.

WRITE? (YES - NO)
READ? (YES - NO)
WRITE CHECK? (YES - NO)

TO PERFORM A WRITE CHECK ONLY, THE OPERATOR MUST FIRST WRITE SOME KNOWN DATA ON THE DISK. THIS COURSE OF ACTION ALSO PREVAILS FOR A READ ONLY OPERATION.
* IF AN ERROR OCCURS IN THE LINE THE OPERATOR IS TYPING, DEPRESS THE RUB-OUT KEY AND RETYPE ANSWER.
ALL ANSWERS SHOULD BE FOLLOWED BY A CARRIAGE-RETURN

M01

5.3 ROUTINE ABSTRACTS

ADDRESS TEST

THIS TEST WRITES EACH SECTOR WITH ITS OWN ADDRESS THEN READS IT BACK AND COMPARES IT FOR THE CORRECT DATA.

RANEX - RANDOM DATA, ADDRESS AND WORD COUNT TEST

THIS ROUTINE TESTS THE ABILITY OF THE SYSTEM TO ACCESS RANDOM ADDRESSES WITH RANDOM DATA. ONE SECTOR OF RANDOM DATA IS WRITTEN AT A STARTING RANDOM ADDRESS ON THE DISK. IT IS THEN WRITE CHECKED AND READ. ALL ERRORS ARE REPORTED. THIS IS REPEATED 1000 TIMES.

DATA RELIABILITY - DATA PATTERN TEST

IN THIS PORTION OF THE TEST, THE RELIABILITY OF THE DISK SURFACE IS TESTED BY WRITE, WRITE CHECK, AND READ FUNCTIONS. THE ROUTINE FIRST WRITES THE COMPLETE SURFACE WITH A SET DATA PATTERN, THEN A WRITE CHECK OF THE COMPLETE SURFACE IS ACCOMPLISHED, THUS REPORTING ALL ERRORS BETWEEN THE DATA WRITTEN AND THE DATA IN MEMORY. THE DISK IS THEN READ. THE DATA READ FROM THE DISK IS COMPARED AGAINST THE KNOWN DATA PATTERN. THIS COMPARE IS TAKING PLACE THE SAME TIME THE DISK IS BEING READ. THE BUFFER IS CLEARED AS IT IS BEING COMPARED. IF THERE ARE DATA BUFFERS ON -A- AND -B- PORTS, THE DATA TEST WILL TRANSFER DATA OVER -A- PORT ON ODD PASSES AND OVER -B- PORT ON EVEN PASSES.

5.4 SUBROUTINE ABSTRACTS

5.4.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUBTEST AS IT IS BEING ENTERED IN LOCATION "LAD". IF A SCOPE LOOP IS REQUESTED, THE CURRENT SUBTEST WILL BE LOOPED UPON. THE CONTENTS OF LAD MAY BE USED TO DETERMINE THE LAST SUBTEST SUCCESSFULLY COMPLETED.

5.4.2 HLT

THIS ROUTINE PRINTS OUT AN ERROR MESSAGE (SEE 6.1). TO INHIBIT TYPEOUTS, PUT SW<13> ON A 1.

5.4.3 TRAPCATCHER

A ".+2" - "HALT" SEQUENCE IS REPEATED FROM 0 - 776 TO CATCH ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR INTERRUPTS WILL HALT AT THE VECTOR + 2.

DESCRIPTION

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

```
ADR    CS1 = ----- CS2 = ----- ER = -----
GOOD       = ----- BAD = -----
```

WHERE:

CS1,CS2,ER ETC.	= RS11 DISK REGISTERS.
GOOD	= EXPECTED DATA.
BAD	= DATA RECEIVED.

TO FIND THE FAILING TEST, LOOK AT THE LISTING ABOVE THE ADDRESS TYPED.

IF SWO IS SET, A DRIVE WILL BE DROPPED FROM THE TEST SEQUENCE AFTER 20 ERRORS. THE PROGRAM WILL STATE WHICH DRIVE WAS DROPPED AND ON WHICH PASS IT WAS DROPPED. IF ALL THE DRIVES HAVE BEEN DROPPED, THE PROGRAM WILL TYPE "TESTING UNIT 0" AND HALT", INDICATING THAT IT COULD NOT FIND ANY MORE DRIVES ON THE SYSTEM TO TEST.

7. RESTRICTIONS

THIS DIAGNOSTIC WILL TEST -B- PORT, ONLY IF THE CPU CAN ACCESS THAT MEMORY ON -B- PORT.

8. MISCELLANEOUS

8.1 EXECUTION TIME

PASS COMPLETE WILL BE TYPED OUT AT END OF PASS. IT WILL TAKE 10 TO 20 MINUTES TO COMPLETE A PASS DEPENDING ON THE TYPE OF DRIVE BEING TESTED AND THE SIZE OF THE SYSTEM.

8.2 STACK POINTER

STACK IS INITIALLY SET TO 500

8.3 POWER FAIL

THE STARTING ADDRESS FOR THE WRITE POWER FAIL TEST IS 244. WHEN ASKED, ENTER UNIT #. THE PROGRAM WILL TELL THE OPERATOR WHEN TO POWER DOWN. WHEN THE SYSTEM IS POWERED UP, ONLY ONE ERROR IS ALLOWED. THE STARTING ADDRESS FOR THE WRITECHECK POWER FAIL TEST IS 250. HERE AS IN THE WRITE POWER FAIL TEST, THE PROGRAM WILL TELL THE OPERATOR WHEN TO POWER DOWN. WHEN THE POWER COMES BACK, NO ERRORS SHOULD OCCUR.

```
        %
.REM    %
```

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZRSC-E-D
PRODUCT NAME:	RH11-RS03-RS03/LA-RS04 DATA RELIABILITY DIAGNOSTIC
PROGRAM DATE:	AUG 1976
MAINTAINER;	DIAGNOSTIC GROUP

```
                                DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY  FOR
                                THE  USE OR RELIABILITY OF ITS SOFTWARE ON EQUIPMENT THAT IS
                                NOT SUPPLIED BY DIGITAL.

                                COPYRIGHT  (C)  1973,1974,1975,1976  BY  DIGITAL   EQUIPMENT
                                CORPORATION
```

TABLE OF CONTENTS

CONTENTS

DESCRIPTION

1. ABSTRACT

THIS DIAGNOSTIC WAS DESIGNED TO TEST RS03, RS03/LA AND RS04 DRIVES.

THE DZRSC DISK DATA TEST IS A SERIES OF ADDRESS AND DATA RELIABILITY ROUTINES WHICH VERIFY TO THE USER THAT THE CONTROLLER (RH11) AND THE DISKS (RS03/LA OR RS04) ARE OPERATING CORRECTLY. THIS TEST SHOULD BE USED IN CONJUNCTION WITH THE DZRSB DIAGNOSTIC. IF THERE IS A POWER FAIL WHILE THE DIAGNOSTIC IS RUNNING, THE PROGRAM WILL WAIT FOR APPROXIMATELY 5 MINUTES, TO GIVE ALL THE DRIVES TIME TO COME BACK UP TO SPEED, BEFORE RESTARTING THE TEST SEQUENCE.

NOTE

THIS PROGRAM WILL DESTROY ALL DATA ON THE DISKS. TURN OFF ALL DRIVES THAT YOU DO NOT WANT TO TEST.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP11 STANDARD COMPUTER WITH A MINIMUM OF 8K OF MEMORY, AND AN RH11 CONTROLLER WITH AN RS03, RS03/LA OR AN RS04 DISK.

2.2 PRELIMINARY PROGRAMS

DZRSB

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR ABS TAPES.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE 5. (ALL DOWN FOR WORST CASE TESTING)

4.2 STARTING ADDRESS

PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY USING ABS LOADER.

1. STARTING ADDRESS 200.

A. SET SWITCHES (SEE SEC 5.). ALL DOWN FOR WORST CASE (IF SWITCH-LESS CPV SIMPLY PRESS START)

B. THE DISPLAY ON THE 11/45 WILL SHOW THE ITERATION COUNT IN THE LEFT BYTE AND TEST NUMBER IN THE RIGHT. TO USE, SET THE DATA DISPLAY SWITCH TO THE DISPLAY POSITION.

C. PRESS START.

THE PROGRAM WILL NOW MAP THE DATA BUFFERS IN 4K SEGMENTS ON -A- AND -B- PORTS UP TO 28K. IT WILL THEN TYPE OUT THE PARAMETERS OF THE DATA BUFFERS. THE PROGRAM WILL ONLY DO THIS THE FIRST TIME IT IS STARTED, FOR IT STORES THESE ADDRESSES AND CONTINUES USING THEM. TO HAVE THE PROGRAM REMAP THE SYSTEM, THE PROGRAM MUST BE RELOADED. IF YOU WISH TO GET ABOVE 28K, YOU CAN ENTER CONVERSATION MODE AND PUT THE DATA BUFFERS WHERE YOU WISH. THE SIZE OF THE DATA BUFFERS CAN NOT EXCEED 24K.

DESCRIPTION

5. OPERATIONAL SWITCH SETTINGS

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC.176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED.

(I.E) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1. <CR> — IF NO CHANGES ARE TO BE MADE.

2. 6 DIGITS 0-7 — TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE: LAST DIGIT FOLLOWED BY <CR>.

3. ↑U — TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (I.E.) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

```
                                MAINDEC-11-DZRSC-E  RH11-RS03/LA-RS04  DATA RELIABILITY DIAG    PAGE 6
                                DESCRIPTION


                                SWITCH SETTINGS ARE:

                                        SW<15> = 1 ..... HALT ON ERROR
                                        SW<14> = 1 ..... LOOP ON FUNCTION
                                        SW<13> = 1 ..... INHIBIT PRINTOUT
                                        SW<12> = 1 ..... INHIBIT COMPARISON
                                                         WITH THIS SWITCH SET, THE
                                                         PROGRAM WILL NOT COMPARE THE
                                                         DATA IT READ FROM THE DISK WITH
                                                         THE KNOWN GOOD DATA.
                                        SW<11> = 1 ..... HALT ON COMPLETION OF TRANSFER
                                        SW<10> = 1 ..... ENTER CONVERSATION MODE
                                        SW<09> = 1 ..... LOOP ON ERROR
                                        SW<08> = 1 ..... DATA RELIABILITY TEST MODE
                                        SW<07> = 1 ..... WAIT IN WAIT MODE
                                                         PROGRAM RUNS IN A BACKGROUND TEST
                                                         WHILE WAITING FOR INTERRUPT, WITH
                                                         SW SET PROGRAM WAITS IN A WAIT
                                                         INSTRUCTION.
                                        SW<06> = 1 ..... OPTIONAL TYPEOUT OF RETRY ERRORS
                                        SW<05> = 1 ..... INHIBIT PASS COUNT
                                        SW<04> = 1 ..... ALLOWS 8 ERROR TYPEOUTS IN THE
                                                         COMPARE ROUTINE BEFORE EXECUTING NEXT READ
                                                         COMMAND. WHEN SWITCH IS 0, ONLY 1 ERROR
                                                         TYPEOUT IS RECORDED.
                                        SW<03> = 1 ..... TYPEOUT # OF ERRORS
                                        SW<02> = 1 ..... INHIBIT MEMORY MANAGEMENT
                                        SW<01> = 1 ..... DATA TEST ONLY
                                        SW<00> = 1 ..... DROPS DRIVE AFTER 20 ERRORS
```

DESCRIPTION

5.1 DATA RELIABILITY TEST MODE

WITH SW8 SET, THE PROGRAM WILL SET THE "BAI" BIT IN RHCS2 AND TRANSFER 64K OF DATA AT A TIME FOR ALL PATTERNS EXCEPT RANDOM. RANDOM WILL BE EXECUTED AS USUAL WITH STANDARD BUFFERS. NO COMPARES ARE DONE IN THIS MODE OF OPERATION EXCEPT ON RANDOM PATTERNS. THIS OPTION SHOULD ONLY BE USED IN DATA TEST OR CONVERSATION MODE. WHEN USED IN CONVERSATION MODE IT OVER RIDES THE NON STANDARD WORD COUNT. YOU SHOULD NOT SELECT A DESIRED DISK ADDRESS IN CONVERSATION MODE FOR IT CAN PRODUCE A DISK ADDRESS OVERFLOW ERROR FOR THIS DATA RELIABILITY TEST MODE ONLY DOES 64K WORD TRANSFERS. IF SW8 IS CHANGED, WHILE THE PROGRAM IS RUNNING, THE PROGRAM WILL FINISH ITS PASS BEFORE EXECUTING THE SWITCH CHANGE.

5.2 CONVERSATION MODE FOR PROGRAM PARAMETERS FOR DATA TEST ONLY

IN CONVERSATION MODE THE OPERATOR CAN SPECIFY ANY ONE OR ALL OF THE PROGRAM PARAMETERS.

NOTE

ONCE IN CONVERSATION MODE, THE ONLY WAY TO REMAP THE SYSTEM IS TO RELOAD THE PROGRAM. TO RESTART THE PROGRAM IN CONVERSATION MODE WITHOUT HAVING TO REANSWER THE QUESTIONS, THE STARTING ADDRESS IS 210. RESET SWITCH 10. TO RESTART THE PROGRAM WITHOUT HAVING TO REANSWER THE PORT SIZING QUESTIONS, RESTART AT 220. RESET SWITCH 10.

DESCRIPTION

THE PROGRAM WILL NOW ASK SEVERAL QUESTIONS, THE TABLE BELOW WILL HELP YOU ANSWER THE QUESTIONS.

TYPE TO	START AT	TYPE TO	START AT
0	000000		
1	020000	20	400000
2	040000	21	420000
3	060000	22	440000
4	100000	23	460000
5	120000	24	500000
6	140000	25	520000
7	160000	26	540000
10	200000	27	560000
11	220000	30	600000
12	240000	31	620000
13	260000	32	640000
14	300000	33	660000
15	320000	34	700000
16	340000	35	720000
17	360000	36	740000

NOTE: TYPE ONLY NUMBERS SHOWN!!!

1. -A- PORT? (Y OR N)

   THIS GIVES YOU THE OPTION TO TEST -A- OR -B- PORT USING THE DATA TEST.

   IF THE ANSWER TO THIS QUESTION IS YES, THE FOLLOWING QUESTIONS WILL BE ASKED. IF THE ANSWER IS NO, -B- PORT WILL BE TESTED AND QUESTIONS 4 AND 5 WILL BE ASKED.

2. 1ST 4K BANK #

   THIS NUMBER THAT IS TYPED WILL DETERMINE WHERE THE BUFFER AREA WILL START ON -A- PORT. USE TABLE ABOVE

   NOTE:

   PROGRAM IS LOCATED IN 1ST 4K BANK. THEREFORE, THIS BANK CAN NOT BE USED AS A BUFFER.

3. # OF 4K BANKS ?

   THIS WILL DETERMINE THE SIZE OF THE -A- PORT DATA BUFFER. THE SIZE OF THE DATA BUFFER CAN NOT EXCEED 24K AND MUST BE IN "OCTAL".

4. 1ST 4K BANK #

NOTE

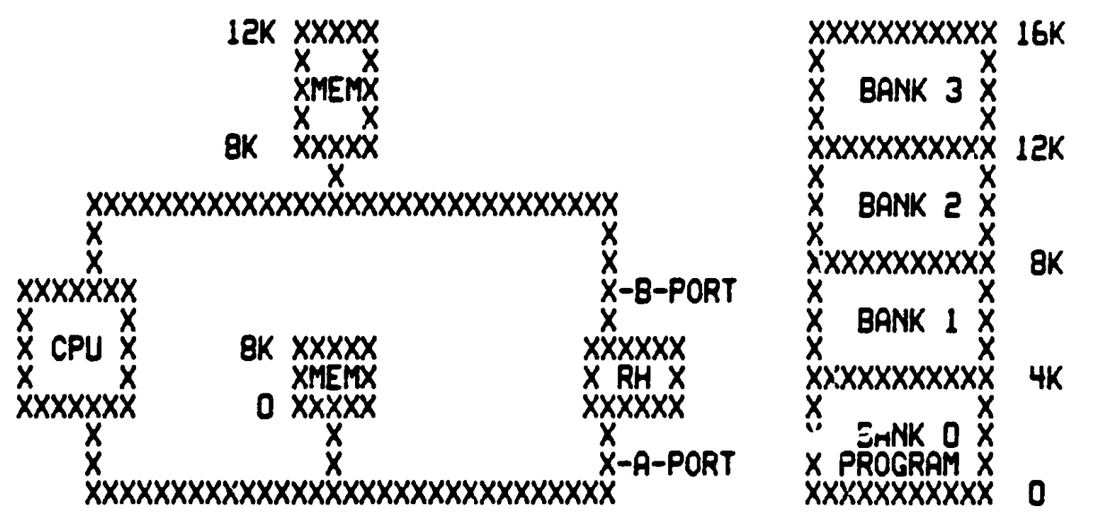
THIS DIAGNOSTIC WILL ONLY TEST -B- PORT IF THE PROCESSOR HAS ACCESS TO THAT MEMORY ON -B- PORT. THIS MEMORY MUST HAVE THE SAME ADDRESS ON ALL PORTS.

THIS NUMBER WILL DETERMINE WHERE THE DATA BUFFER AREA WILL START ON -B- PORT.

5. # OF 4K BANKS?

THIS NUMBER WILL DETERMINE THE SIZE OF THE -B- PORT DATA BUFFER. THE SIZE OF THE DATA BUFFER CAN NOT EXCEED 24K AND MUST BE IN "OCTAL".

EXAMPLE:



THESE ANSWERS GIVEN BELOW WILL TEST THE CONFIGURATION IN THE GIVEN EXAMPLE. ANSWERS:

TO TEST	-A- PORT	-B- PORT
	1) Y	1) N
	2) 1	4) 2
	3) 1	5) 1

DESCRIPTION

PROGRAM CONVERSATION

MULTI DRIVE MODE? (YES-NO)

MULTI DISK MODE IS A MODE IN THE PROGRAM WHICH ALLOWS THE OPERATOR TO EXERCISE ALL THE DISKS ON THE SYSTEM WITHOUT RE-STARTING THE PROGRAM. THE PROGRAM, AFTER EXERCISING ONE DISK WILL REPORT A MESSAGE TELLING THE OPERATOR WHICH DISK WILL BE SELECTED NEXT, AND THEN THE PROGRAM WILL EXERCISE THAT DISK. WHEN A COMPLETE PASS IS ACCOMPLISHED, A PASS COMPLETE WILL BE REPORTED AND THE TEST WILL RECYCLE.

IF THE ANSWER TO THE MULTI DRIVE MODE WAS "NO", THE FOLLOWING QUESTION IS ASKED.

UNIT #

THE OPERATOR CAN NOW SELECT THE UNIT HE WISHES TO TEST BY TYPING THE UNIT NUMBER.

OPTIONAL WORD COUNT (YES-NO)

IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION THE NEXT QUESTION WILL BE DELETED FROM THE CONVERSATION.

WD CT

THE OPERATOR CAN SPECIFY ANY LENGTH TRANSFER FROM 1(8) TO 60000(8) WORDS. THE NORMAL TRANSFER LENGTH IS N(8) WORDS WHERE N IS THE MAXIMUM BUFFER SIZE FOR THE AVAILABLE CORE. IN EITHER CASE, BUFFER WILL NOT EXCEED 24 K.

THIS PROGRAM MAPS THE SYSTEM IN 4K SEGMENTS. IF THERE IS A 1K BLOCK OF MEMORY ON THE SYSTEM THAT YOU WOULD LIKE TO REACH, YOU CAN TYPE IN THAT 4K BANK # AND THEN SPECIFY A WC OF 2000.

IF THE WORD COUNT NUMBER TYPED, IS LARGER THAN THE CORE SIZE GIVEN IN THE SETUP ROUTINE, THE QUESTION WILL BE REPEATED.

OPTIONAL DSK ADDR (YES-NO)

IF THE ANSWER TO THIS QUESTION IS NO, THE WHOLE DISK WILL BE WRITTEN AND THE NEXT QUESTION IS NOT ASKED.

DSK ADDR

THE OPERATOR CAN NOW SPECIFY THE STARTING SECTOR

DESCRIPTION

PATTERN NO.?

THIS GIVES THE OPERATOR THE OPTION OF SELECTING ALL THE DATA PATTERNS (#22) OR ANY ONE DATA PATTERN, SIMPLY BY TYPING THE DATA PATTERN NUMBER DESIRED.

PATTERN	0	= 000000
"	1	= 177777
"	2	= 031463
"	3	= 066666
"	4	= 100001
"	5	= 107070
"	6	= 070707
"	7	= 052525
"	10	= 125252
"	11	= 177737
"	12	= 146314
"	13	= 136363
"	14	= 063636
"	15	= 000001
"	16	= 100005
"	17	= 155555
"	20	= 133333
"	21	= RANDOM DATA
"	22	= RUN ALL DATA PATTERNS UNDER PROGRAM CONTROL

IN THIS SECTION OF THE PROGRAM PARAMETER CONVERSATION MODE, THE OPERATOR CAN SELECT ANY ONE OR ALL THREE OF THE CONTROL FUNCTIONS TO BE EXECUTED. THE NORMAL SEQUENCE OF DISK FUNCTIONS UNDER PROGRAM CONTROL ARE WRITE, WRITE CHECK, AND THEN READ. BY ENTERING THE CONVERSATION MODE THE OPERATOR HAS GAINED COMPLETE CONTROL OVER THE DISK FUNCTIONS. HE MUST SPECIFY YES OR NO TO ALL OF THE FOLLOWING QUESTIONS.

WRITE? (YES - NO)
READ? (YES - NO)
WRITE CHECK? (YES - NO)

TO PERFORM A WRITE CHECK ONLY, THE OPERATOR MUST FIRST WRITE SOME KNOWN DATA ON THE DISK. THIS COURSE OF ACTION ALSO PREVAILS FOR A READ ONLY OPERATION.
* IF AN ERROR OCCURS IN THE LINE THE OPERATOR IS TYPING, DEPRESS THE RUB-OUT KEY AND RETYPE ANSWER.
ALL ANSWERS SHOULD BE FOLLOWED BY A CARRIAGE-RETURN

5.3 ROUTINE ABSTRACTS

ADDRESS TEST

THIS TEST WRITES EACH SECTOR WITH ITS OWN ADDRESS THEN READS IT BACK AND COMPARES IT FOR THE CORRECT DATA.

RANEX - RANDOM DATA, ADDRESS AND WORD COUNT TEST

THIS ROUTINE TESTS THE ABILITY OF THE SYSTEM TO ACCESS RANDOM ADDRESSES WITH RANDOM DATA. ONE SECTOR OF RANDOM DATA IS WRITTEN AT A STARTING RANDOM ADDRESS ON THE DISK. IT IS THEN WRITE CHECKED AND READ. ALL ERRORS ARE REPORTED. THIS IS REPEATED 1000 TIMES

DATA RELIABILITY - DATA PATTERN TEST

IN THIS PORTION OF THE TEST, THE RELIABILITY OF THE DISK SURFACE IS TESTED BY WRITE, WRITE CHECK, AND READ FUNCTIONS. THE ROUTINE FIRST WRITES THE COMPLETE SURFACE WITH A SET DATA PATTERN, THEN A WRITE CHECK OF THE COMPLETE SURFACE IS ACCOMPLISHED, THUS REPORTING ALL ERRORS BETWEEN THE DATA WRITTEN AND THE DATA IN MEMORY. THE DISK IS THEN READ. THE DATA READ FROM THE DISK IS COMPARED AGAINST THE KNOWN DATA PATTERN. THIS COMPARE IS TAKING PLACE THE SAME TIME THE DISK IS BEING READ. THE BUFFER IS CLEARED AS IT IS BEING COMPARED. IF THERE ARE DATA BUFFERS ON -A- AND -B- PORTS, THE DATA TEST WILL TRANSFER DATA OVER -A- PORT ON ODD PASSES AND OVER -B- PORT ON EVEN PASSES.

5.4 SUBROUTINE ABSTRACTS

5.4.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUBTEST AS IT IS BEING ENTERED IN LOCATION "LAD". IF A SCOPE LOOP IS REQUESTED, THE CURRENT SUBTEST WILL BE LOOPED UPON. THE CONTENTS OF LAD MAY BE USED TO DETERMINE THE LAST SUBTEST SUCCESSFULLY COMPLETED.

5.4.2 HLT

THIS ROUTINE PRINTS OUT AN ERROR MESSAGE (SEE 6.1). TO INHIBIT TYPEOUTS, PUT SW<13> ON A 1.

5.4.3 TRAPCATCHER

A ".+2" - "HALT" SEQUENCE IS REPEATED FROM 0 - 776 TO CATCH ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR INTERRUPTS WILL HALT AT THE VECTOR + 2.

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

```
ADR    CS1 = ----- CS2 = ----- ER = -----
GOOD       = ----- BAD = -----
```

WHERE:

CS1,CS2,ER ETC.	= RS11 DISK REGISTERS.
GOOD	= EXPECTED DATA.
BAD	= DATA RECEIVED.

TO FIND THE FAILING TEST, LOOK AT THE LISTING ABOVE THE ADDRESS TYPED.

IF SW0 IS SET, A DRIVE WILL BE DROPPED FROM THE TEST SEQUENCE AFTER 20 ERRORS. THE PROGRAM WILL STATE WHICH DRIVE WAS DROPPED AND ON WHICH PASS IT WAS DROPPED. IF ALL THE DRIVES HAVE BEEN DROPPED, THE PROGRAM WILL TYPE "TESTING UNIT 0" AND HALT". INDICATING THAT IT COULD NOT FIND ANY MORE DRIVES ON THE SYSTEM TO TEST.

7. RESTRICTIONS

THIS DIAGNOSTIC WILL TEST -B- PORT, ONLY IF THE CPU CAN ACCESS THAT MEMORY ON -B- PORT.

8. MISCELLANEOUS

8.1 EXECUTION TIME

PASS COMPLETE WILL BE TYPED OUT AT END OF PASS. IT WILL TAKE 10 TO 20 MINUTES TO COMPLETE A PASS DEPENDING ON THE TYPE OF DRIVE BEING TESTED AND THE SIZE OF THE SYSTEM.

8.2 STACK POINTER

STACK IS INITIALLY SET TO 500

8.3 POWER FAIL

THE STARTING ADDRESS FOR THE WRITE POWER FAIL TEST IS 244. WHEN ASKED, ENTER UNIT #. THE PROGRAM WILL TELL THE OPERATOR WHEN TO POWER DOWN. WHEN THE SYSTEM IS POWERED UP, ONLY ONE ERROR IS ALLOWED. THE STARTING ADDRESS FOR THE WRITECHECK POWER FAIL TEST IS 250. HERE AS IN THE WRITE POWER FAIL TEST, THE PROGRAM WILL TELL THE OPERATOR WHEN TO POWER DOWN. WHEN THE POWER COMES BACK, NO ERRORS SHOULD OCCUR.

%

```
COMMEN      1#
ENDCOM      1#
ESCAPE      1#
GETPRI      1#
GETSWR      1#
MULT        1#
NEWTST      1#
POP         1#
PUSH        1#
REPORT      1#
SETPRI      1#
SETUP       1#
SKIP        1#
SLASH       1#
STARS       1#
SWRSU       1#
TYPBIN      1#
TYPDEC      1#
TYPNAM      1#
TYPNUM      1#
TYPOCS      1#
TYPOCT      1#
TYPTXT      1#
$$ESCA      1#
$$NEWT      1#
$$SKIP      1#
.EQUAT      1#
.HEADE      1#
.KT11       1#
.SETUP      1#
.SWRHI      1#
.$ACTI      1#
.$APTB      1#
.$APTH      1#
.$APTY      1#
.$ASTA      1#
.$CATC      1#
.$CMTA      1#
.$DB2D      1#
.$DB2O      1#
.$DIV       1#
.$EOP       1#
.$ERRO      1#
.$ERRT      1#
.$MULT      1#
.$POWE      1#
.$RAND      1#
.$RDDE      1#
.$RDOC      1#
.$REAO      1#
.$R2AZ      1#
.$SAVE      1#
.$SB2D      1#
.$SB2O      1#
.$SCOP      1#
.$SIZE      1#
```

```
.MAIN.  MACY11 27(732)  03-NOV-76  09:20  PAGE 34
DZRSCE.P11      CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

.ENABL      1
.LIST       1
.MACRO      1
.NLIST      1
.REM        1     604


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *,DZRSCE.SEQ/SOL/CRF/PAGNUM/NL:TOC=SYSMAC.CO,DZRSCE.P11
 RUN-TIME:  22 25  .2 SECONDS
 RUN-TIME RATIO: 104/48=2.1
 CORE USED:  32K  (63 PAGES)
```

G03

Spooler runtime 4 Seconds, 20 KCS, 93 disk reads, 3 disk writes, 31 pages

[illegible] Date 0[illegible]-Nov-7[illegible] 1[illegible] Monitor [illegible]

```
00[illegible]000000000000000000000000000000000000000000000000000000000000000000000000000000000011111111111111111111111111111111110
0[illegible]11111111112222222222333333333[illegible]55555555556666666666777777777788888888889999999999000000000011111111112222222222333312
[illegible]567890123456789012 **
0[illegible]00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000011111111111111111111111111111111110
[illegible]0000111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111111112222222222333312
```