

ER M MACRO M1200 02-SEP-82 14:57 PAGE 2  
DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

.REM -

**IDENTIFICATION**  
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PRODUCT CODE: AC-E965G-MC  
PRODUCT NAME: CXRLAGO RL11/RLV11/RLV12/RL01/RL02  
PRODUCT DATE: JUNE 1982  
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. **ABSTRACT**  
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RLA IS AN IOMODX THAT EXERCISES RL01/RL02 DISK DRIVES ON RL11/RLV11/RLV12 CONTROLLERS. IT EXERCISES THE DRIVES BY DOING READ HEADERS, SEEKS, READS, WRITES AND IN-CORE COMPARISONS.

ER M MACRO M1200 02-SEP-82 14:57 PAGE 2-1  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

ALL ERRORS DETECTED ARE REPORTED ON THE CONSOLE DEVICE.

2. REQUIREMENTS

HARDWARE: 1 TO 4 RL01/RL02 DISK DRIVES (WITH SCRATCH PACKS).  
 1 RL11, RLV11, OR RLV12 DISK CONTROLLER.

STORAGE: RLA REQUIRES

1. DECIMAL WORDS: 1445
2. OCTAL WORDS: 2645
3. OCTAL BYTES: 5512

3. PASS DEFINITION

ONE PASS OF THE RLA MODULE CONSISTS OF 20 X 100 CYCLES OF THE BASIC TEST SEQUENCE (READ HEADER, SEEK, READ HEADER, WRITE, WRITE CHECK, READ). THE TEST SEQUENCE WRITES 1024 WORDS, READS BACK THE FIRST 256, AND DATA CHECKS THE SAME.

4. EXECUTION TIME

ONE PASS OF RLA RUNNING ALONE ON A PDP-11/40 TAKES APPROXIMATELY ONE MINUTE.

5. CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:  
 DEVADR: 174400, VECTOR: 160, BR1: 5, DEVCNT: 1

6. DEVICE/OPTION SETUP

INSURE THAT ALL DRIVES UNDER TEST ARE POWERED UP, WRITE ENABLED, AND READY -- AND OF COURSE, SCRATCH PACKS INSTALLED !!!

IF MORE THAN 1 DRIVE, CHANGE DVID1: (LOC 14') ACCORDINGLY.

IF RLV12 CONTROLLER, SET SR1: = 10 (LOC 16', BIT 3).

7. SR1 OPTIONAL SETUP

BIT 0 - DROP DRIVE ON ERROR

BIT 1 - RANDOM SEEKS

BIT 2 - DON'T PRINT SOFT ERRORS

BIT 3 - CONTROLLER IS AN RLV12

8. ERROR REPORTING

ON ERROR ALL REGISTERS ARE PRINTED IN THE FOLLOWING ORDER:

RL11/RLV11 RLCS RLBA RLDA RLMP DRIVE STATUS

RLV12 RLCS RLBA RLDA RLMP RLBAE DRIVE STATUS

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*****
*
*   EDIT:  BY:          DATE:          REASON:
*
*   1      G.PASQUINTONIO  MAY-81      'HNF' ERRORS WERE BEING
*                                     REPORTED AS 'OPI'.
*
*   2      G.PASQUINTONIO  MAY-81      CONTROLLER ERROR ON
*                                     WRITE-CHECK CAUSED A
*                                     TERMINAL TABLE SEARCH
*                                     (ULTIMATELY TRAPPING TO 4).
*
*   3      G.PASQUINTON!O  MAY-81      'DROP ON ERROR' OPTION
*                                     (SR1<0>) NOT IMPLEMENTED
*                                     CORRECTLY.
*
*   4      G.PASQUINTONIO  MAY-81      RLV12 22 BIT UPGRADE.
*
*   5      P. ANASTAS      DEC-81      DATA CHECK ERRORS ON FLAGGED
*                                     BAD SPOTS ABOVE CYL. 177
*                                     24 DECIMAL PATCH LOCATIONS
*                                     ADDED.
*
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ER M MACRO M1200 02-SEP-82 14:57 PAGE 3  
DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

000000 IOMODX <RLAG >,174400,160,5,0,0,20.,146,BUFIN,256.,1024.  
000000 MODULE 150000,RLAG ,174400,160,5,0,0,20.,146,BUFIN,256.,1024.  
; .TITLE RLAG DEC/X11 SYSTEM EXERCISER MODULE  
DDXCOM VERSION 6.4 28-JAN-82  
.LIST BIN

```

000000          122      114      101  BEGIN:
000003          107      040          MODNAM: .ASCII /RLAG / ;MODULE NAME.
000005          000
000006 174400          XFLAG: .BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
000010 000160          ADDR: 174400+0 ;1ST DEVICE ADDR.
000012          240          VECTOR: 160+0 ;1ST DEVICE VECTOR.
000013          000          BR1: .BYTE PRTY5+0 ;1ST BR LEVEL.
000014 000001          BR2: .BYTE PRTY0+0 ;2ND BR LEVEL.
000016 000000          DVID1: 0+1 ;DEVICE INDICATOR 1.
000020 000000          SR1: OPEN ;SWITCH REGISTER 1
000022 000000          SR2: OPEN ;SWITCH REGISTER 2
000024 000000          SR3: OPEN ;SWITCH REGISTER 3
000026 150000          SR4: OPEN ;SWITCH REGISTER 4
000030 000252          STAT: 150000 ;STATUS WORD.
000032 000252          INIT: START ;MODULE START ADDR.
000034 000000          SPOINT: MODSP ;MODULE STACK POINTER.
000036 000024          PASCNT: 0 ;PASS COUNTER.
000040 000000          ICOUNT: 20. ;# OF ITERATIONS PER PASS=20.
000042 000000          SOFCNT: 0 ;LOC TO COUNT ITERATIONS
000044 000000          HRDCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
000046 000000          SOFPAS: 0 ;LOC TO SAVE TOTAL HARD ERRORS
000050 000000          HRDPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
000052 000000          SYSCNT: 0 ;LOC TO SAVE HARD ERRORS PER PASS
000054 000000          RANNUM: 0 ;# OF SYS ERRORS ACCUMULATED
000056 000000          CONFIG: ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
000060 000000          RES1: 0 ;RESERVED FOR MONITOR USE
000062 000000          RES2: 0 ;RESERVED FOR MONITOR USE
000064 000000          SVR0: OPEN ;RESERVED FOR MONITOR USE
000066 000000          SVR1: OPEN ;LOC TO SAVE R0.
000070 000000          SVR2: OPEN ;LOC TO SAVE R1.
000072 000000          SVR3: OPEN ;LOC TO SAVE R2.
000074 000000          SVR4: OPEN ;LOC TO SAVE R3.
000076 000000          SVR5: OPEN ;LOC TO SAVE R4.
000100 000000          SVR6: OPEN ;LOC TO SAVE R5.
000102 000000          CSRA: OPEN ;LOC TO SAVE R6.
000104 000000          SBADR: ;ADDR OF CURRENT CSR.
000106 000000          ACSR: OPEN ;ADDR OF GOOD DATA, OR
000110 000000          WASADR: ;CONTENTS OF CSR.
000112 000424          ASTAT: OPEN ;ADDR OF BAD DATA, OR
000114 000000          ERRTYP: ;STATUS REG CONTENTS.
000116 000000          ASB: OPEN ;TYPE OF ERROR
000120 000000          AWAS: OPEN ;EXPECTED DATA.
000122 000146          RSTRT: RESTRT ;ACTUAL DATA.
000124 003636          WDTO: OPEN ;RESTART ADDRESS AFTER END OF PASS
000126 000000          WDFR: OPEN ;WORDS TO MEMORY PER ITERATION
          INTR: OPEN ;WORDS FROM MEMORY PER ITERATION
          IDNUM: 146 ;# OF INTERRUPTS PER ITERATION
          RBUFVA: BUFIN ;MODULE IDENTIFICATION NUMBER=146
          RBUFPA: OPEN ;READ BUFFER VIRTUAL ADDRESS
          ;READ BUFFER PHYSICAL ADDRESS

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ER M MACRO M1200 02-SEP-82 14:57 PAGE 3-1  
DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

000130 000000  
000132 000400  
000134 000000  
000136 000000  
000140 002000  
000142 000000  
000144 000000  
000146 000000  
000150 000000  
000040

RBUFEA: OPEN ;READ BUFFER EA BITS  
RBUFSZ: 256. ;SIZE OF THE READ BUFFER  
WBUFPA: OPEN ;WRITE BUFFER PHYSICAL ADDRESS  
WBUFEA: OPEN ;WRITE BUFFER EA BITS  
WBUFRO: 1024. ;WRITE BUFFER SIZE REQUESTED  
WBUFSZ: OPEN ;WRITE BUFFER SIZE AVAILABLE  
CDERCT: OPEN ;CDATA/DATCK ERROR COUNT  
CDWDCT: OPEN ;CDATA/DATCK WORD COUNT  
FREE: OPEN ;RESERVED FOR FUTURE USE  
;MODULE STACK STARTS HERE.

.REPT SPSIZ  
.NLIST  
.WORD 0  
.LIST  
.ENDR

000252

MODSP:  
:\*\*\*\*\*

159  
160 000252 012767 002000 177636 START: MOV #1024.,WDFR ;1024. WORDS FROM MEM/ITERATION  
161 000260 012767 000400 177626 MOV #256.,WDTO ;256 WORDS TO MEM/ITERATION  
162 000266 012767 000005 177624 MOV #5,INTR ;5 INTERRUPTS/ITERATION  
163 000274 012767 000057 004424 MOV #57,NUMB  
164 000302 012767 177400 003316 MOV #-400,DRIVE ;SET DRIVE SELECT  
165 000310 012767 000001 003254 MOV #1,DRVMSK ;SETUP DRIVE SELECT MASK  
166 000316 005067 003274 CLR DLTCNT ;CLEAR DATA LATE COUNT  
167 000322 004767 001300 JSR PC,SETUP ;GO SET UP REGISTERS  
168 000326 016767 177462 003274 MOV DVID1,DVICE ;COPY DRIVE SELECTION  
169 000334 122737 000014 000041 3\$: CMPB #14,@#41 ;WAS RL LOAD DEVICE?  
170 000342 001020 BNE 7\$ ;N-BRANCH; Y-SEE IF LOAD UNIT SELECTED  
171 000344 012702 000001 MOV #1,R2 ;SET UP FOR MASK  
172 000350 113701 000040 MOVB @#40,R1 ;GET LOAD UNIT  
173 000354 001403 BEQ 5\$ ;IF ZERO GO MASK OUT UNIT  
174 000356 006302 4\$: ASL R2 ;SHIFT MASK  
175 000360 105301 DECB R1 ;DEC COUNT  
176 000362 001375 BNE 4\$ ;KEEP CHECKING  
177 000364 030267 003240 5\$: BIT R2,DVICE ;WAS THAT DRIVE SELECTED?  
178 000370 001405 BEQ 7\$ ;N-BRANCH; Y-CONTINUE  
179 000372 040267 003232 BIC R2,DVICE ;DELETE UNIT FROM DEVICE MAP  
180 000376 104403 000000' 005474' MSGNS,BEGIN,DROPLD ;ASCII MESSAGE CALL WITH COMMON HEADER  
181 000404 005767 003220 7\$: TST DVICE ;ANY DRIVES SELECTED?  
182 000410 001011 BNE RSTRT1 ;YES, CONTINUE  
183 000412 104403 000000' 005424' MSGNS,BEGIN,ABORT ;ASCII MESSAGE CALL WITH COMMON HEADER  
184 000420 000167 001176 JMP FINI ;MESSAGE, DROP MODULE  
185 000424 005767 003162 RESTRT: TST CNT ;+ / SUPPORT  
186 000430 001001 BNE RSTRT1 ;+ / FOR  
187 000432 000707 BR START ;+ / DT03  
188 000434  
189 000434 104415 000000' 000124' RSTRT1: GETPAS,BEGIN, RBUFVA ;GET PHYSICAL ADDRESS FROM 16-BIT RBUFVA  
190 000442 000421 BR CHKDR1  
191 000444 006367 003122 LOOPL: ASL DRVMSK ;SHIFT MASK FOR NEXT DRIVE  
192 000450 022767 000020 003114 CMP #20,DRVMSK ;DRIVE MASK OVERSHIFT CHECK  
193 000456 001013 BNE CHKDR1 ;BRANCH IF MASK OK  
194 000460 012767 000001 003104 MOV #1,DRVMSK ;RESET DRIVE SELECT MASK  
195 000466 012767 000057 004232 MOV #57,NUMB  
196 000474 012767 177400 003124 MOV #-400,DRIVE ;RESET DRIVE SELECT  
197 000502 000502 CHKDRV: ENDITS,BEGIN ;SIGNAL END OF ITERATION.  
000502 104413 000000' ;MONITOR SHALL TEST END OF PASS

ER M MACRO M1200 02-SEP-82 14:57 PAGE 3-2  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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198 000506
199 000506 062767 000400 003112 CHKDR1:
200 000514 005267 004206 1$: ADD #400,DRIVE ;NEXT DRIVE
201 000520 036767 003046 003102 INC NUMB
202 000526 001746 BIT DRVMSK,DEVICE ;IS THAT DRIVE PRESENT
203 000530 005067 002772 BEQ LOOPL ;NO, GO FOR NEXT ONE
204 000534 005067 003026 CLR RETRY ;CLEAR A FEW LOCATIONS
205 000540 005067 003046 CLR RWER ;READ WRITE ERROR FLAG
206 CLR CNT ;COUNT
207 ;
208 ;WE HAVE A DRIVE, START TESTING
209 000544 004767 000722 JSR PC,WTRDY
210 000550 004567 001430 JSR R5,DRVRTS ;ISSUE DRIVE RESET, CLEAR VOLUME
211 000554 012767 100077 003024 MOV #100077,MASK2
212 000562 012767 077724 003004 MOV #77724,FSTBSC ;SET UP FOR RL01
213 000570 012767 077750 003000 MOV #77750,LSTBSC
214 000576 012767 100177 002774 MOV #100177,MASK
215 000604 012767 077600 002770 MOV #77600,LSTCYL
216 000612 012767 077700 002764 MOV #77700,LSTTRK
217 000620 032767 000200 002730 BIT #200,T.MP ;TEST RL01 OR RL02
218 000626 001422 BEQ 2$ ;RL01 BRANCH
219 000630 042767 100000 002742 BIC #100000,MASK ;FIX FOR RL02
220 000636 052767 100000 002736 BIS #100000,LSTCYL
221 000644 052767 100000 002732 BIS #100000,LSTTRK
222 000652 052767 100000 002716 BIS #100000,LSTBSC
223 000660 042767 100000 002720 BIC #100000,MASK2 ;
224 000666 052767 100000 002700 BIS #100000,FSTBSC
225 000674 012767 000201 002722 2$: MOV #201,DIFWD
226 000702 004567 001256 LOOP: JSR R5,RDHDR ;READ HEADER ON DISK
227 000706 016767 002644 002706 MOV T.MP,HDRWD ;GET HEADER
228 ;
229 ;CHECK TO SEE IF RANDOM SEEK IS REQUESTED, BIT 1 OF SR1
230 ;SET INDICATES A RANDOM SEEK OTHERWISE SEEK IS INCREMENTAL
231 ;
232 000714 032767 000002 177074 TAG: BIT #BIT1,SR1 ;INCREMENTAL OR RANDOM SEEKS?
233 000722 001446 BEQ TAG1 ;INCREMENTAL, TAG1
234 000724 042767 000177 002670 BIC #177,HDRWD ;CLEAR HEAD AND SECTOR BITS
235 000732 104417 000000 RAND$,BEGIN
236 000736 016700 177112 MOV RANUM,RO ;STORE IT AWAY
237 000742 010001 MOV RO,R1 ;SAVE A COPY
238 000744 046700 002630 BIC MASK,RO ;CLEAR HEAD AND SECTOR
239 000750 010067 002650 MOV RC,DIFWD ;LET'S CALCULATE DIFFERENCE WORD
240 000754 166767 002642 002642 SUB HDRWD,DIFWD ;GET DIFFERENCE TO SEEK
241 000762 103003 BCC 1$
242 000764 005467 002634 NEG DIFWD ;MAKE DIFF ABSOLUTE
243 000770 000403 BR 2$
244 000772 052767 000004 002624 1$: BIS #4,DIFWD ;SET DIRECTION BIT
245 001000 052767 000001 002616 2$: BIS #1,DIFWD ;SET MARKER
246 001006 032701 000100 BIT #100,R1 ;TEST HEAD
247 001012 001403 BEQ 3$ ;IF 0, DON'T SET HEAD IN DIFF
248 001014 052767 000020 002602 BIS #20,DIFWD ;SET HEAD
249 001022 010167 002574 3$: MOV R1,HDRWD ;GET EXPECTED HEADER
250 001026 046767 002554 002566 BIC MASK2,HDRWD ;CLEAR SECTOR BITS
251 001034 000167 000134 JMP TAG2
252 ;
253 001040 042767 000177 002554 TAG1: BIC #177,HDRWD ;CLEAR OUT SECTOR BITS & HEAD
254 001046 032767 177600 002546 BIT #177600,HDRWD ;ON TRACK 0?

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ER M MACRO M1200 02-SEP-82 14:57 PAGE 3-3  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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255 001054 001007          BNE      1$          ;NO, GO CHECK FOR LAST CYLINDER
256 001056 012767 000200 002536  MOV     #200,HDRWD  ;SET NEXT ADDRESS=CYL 1
257 001064 012767 000205 002532  MOV     #205,DIFWD  ;DIF WD 1, MARKER, SEEK IN, HS=0
258                                     ;SET CURRENT HD=0, SEEK IN
259 001072 000440          BR       TAG2
260 001074 026767 002502 002520  1$:    CMP     LSTCYL,HDRWD ;CURRENT ADDRESS=LAST TRACK?
261 001102 001012          BNE     2$          ;NO, CONTINUE
262 001104 162767 000200 002510  SUB     #200,HDRWD  ;
263 001112 052767 000100 002502  BIS     #100,HDRWD  ;
264 001120 012767 000221 002476  MOV     #221,DIFWD  ;DIF WD 1, MARKER, SEEK OUT, HS=1
265                                     ;SET CURRENT HD=1, SEEK OUT
266 001126 000422          BR       TAG2
267 001130 032767 000004 002466  2$:    BIT     #4,DIFWD   ;SN SET IN DIF WORD
268 001136 001404          BEQ     3$          ;NO, 3$
269 001140 062767 000200 002454  ADD     #200,HDRWD  ;YES, CYL WILL INCREMENT
270 001146 000403          BR       4$          ;SKIP OVER
271 001150 162767 000200 002444  3$:    SUB     #200,HDRWD  ;NO, CYL WILL DECREMENT
272 001156 032767 000020 002440  4$:    BIT     #20,DIFWD ;HEAD SET?
273 001164 001403          BEQ     TAG2        ;NO, LEAVE EXPECTED ALONE
274 001166 052767 000100 002426  BIS     #100,HDRWD  ;YES, SET HEAD SELECT BIT
275 001174 004567 000740          JSR     R5,SEEK     ;PERFORM SEEK
276 001200 004767 000266          JSR     PC,WTRDY    ;WAIT FOR SEEK TO FINISH
277 001204 004567 000754          JSR     R5,RDHDR    ;READ HEADER VERIFY CORRECT
278                                     ;SEEK
279 001210 016767 002342 003304  MOV     T,MP,CURADR ;READ HEADER
280 001216 042767 000077 003476  BIC     #77,CURADR  ;CLEAR OUT SECTOR BITS
281 001224 026767 003472 002370  CMP     CURADR,HDRWD ;WAS SEEK CORRECT?
282 001232 001425          BEQ     6$          ;YES, CONTINUE
283                                     ;NO REPORT ERROR
284 001234 016767 002272 176636  MOV     RLCS,CSRA
285 001242 017767 002264 176632  MOV     @RLCS,ACSR
286 001250 017767 002256 176626  MOV     @RLCS,ASTAT
287 001256 104403 000000' 005470' MSGN$,BEGIN,BDSEEK ;ASCII MESSAGE CALL WITH COMMON HEADER
288
289 001264 012767 000051 176614  MOV     #51,ERRTP   ;BAD SEEK
290 001272 104405 000000' 005500' ;*****
  HRDR$,BEGIN,TABLE ;SEEK WAS BAD
  ;*****
291
292 001300 016767 003416 002314  MOV     CURADR,HDRWD ;MAKE MISTAKE NEW HDRWD
293
294 001306 026767 002310 002270  6$:    CMP     HDRWD,LSTTRK ;ARE WE ON LAST TRACK
295 001314 001002          BNE     7$          ;NO, CONTINUE
296 001316 000167 177372          JMP     TAG          ;YES, GO GET ANOTHER CAUSE ITS THE BAD SECTOR TRACK
297
298 001322 016767 176604 002304  7$:    MOV     RBUF$Z,WCNT2 ;GET BUFFER SIZE (READ)
299 001330 005467 002300          NEG     WCNT2       ;NEGATE FOR RLMP
300 001334 104414 000000'          GMBUF$, BEGIN     ;GET WRITE BUFFER INFORMATION
301 001340 016767 176576 002264  MOV     WBUF$Z,WCNT1 ;GET BUFFER SIZE (WRITE)
302 001346 005467 002260          NEG     WCNT1       ;NEGATE FOR RLMP
303 001352 004567 000502          JSR     R5,WRITE    ;WRITE DATA
304 001356 005767 002204          TST     RWER        ;CONTROLLER ERROR ??
305 001362 001017          BNE     5$          ;SKIP READS IF SO.
306 001364 004567 000460          JSR     R5,WRCHK    ;
307 001370 005767 002172          TST     RWER        ;ERROR ??
308 001374 001012          BNE     5$          ;SKIP READS IF SO.
309 001376 004567 000506          JSR     R5,READ     ;READ DATA

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RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-5  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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359 001644 005720          TST      (R0)+          ; INCREMENT FOR NEXT
360 001646 010067 001664  MOV      R0,RLDA        ; DISK ADDRESS
361 001652 005720          TST      (R0)+          ; INCREMENT FOR NEXT
362 001654 010067 001660  MOV      R0,RLMP        ; DATA BUFFER
363 001660 032767 000010 176130 BIT      #BIT3,SR1      ; TEST IF AN RLV12 CONTROLLER ; GP-4
364 001666 001411          BEQ      1$            ; BR IF NOT ; GP-4
365 001670 005720          TST      (R0)+          ; INCREMENT FOR NEXT ; GP-4
366 001672 010067 001644  MOV      R0,RLBAE       ; BUS EXTENDED ADDRESS REGISTER ; GP-4
367 001676 012767 003560 003604 MOV      #T.BAE, TABLEY ; FIX ERROR REPORT ; GP-4
368 001704 012767 003562 003600 MOV      #T.STAT, TABLEZ ; FOR RLV12 CONTROLLER ; GP-4
369 001712 016700 176072 1$:      MOV      VECTOR,R0      ; GET VECTOR ADDRESS
370 001716 012720 000252  MOV      #START,(R0)+   ; SET POINTER
371 001722 116710 176064  MOV      BR1,(R0)       ; SET PRIORITY
372 001723 000207          RTS      PC            ; RETURN
373
374          ;
375          ; SUBROUTINE TO SET 18 OR 22 BIT BUS ADDRESS IN CONTROLLER.
376          ; THIS ENTIRE SUBROUTINE IS NEW. ; GP-4
377 001730 016767 176200 000102 SETWBA: MOV      WBUFPA,PA18 ; GET 18 BIT WRITE BUFFER ADDRESS.
378 001736 016767 176174 000076      MOV      WBUFEA,EA18
379 001744 000406          BR      SETCMN
380 001746 016767 176154 000064 SETRBA: MOV      RBUFPA,PA18 ; GET 18 BIT READ BUFFER ADDRESS.
381 001754 016767 176150 000060      MOV      RBUFEA,EA18
382 001762 016777 000052 001544 SETCMN: MOV      PA18,@RLBA ; SET BA<15:0>...
383 001770 042777 000060 001534      BIC      #60,@RLCS
384 001776 056777 000040 001526      BIS      EA18,@RLCS ; ...AND BA<17:16> IN CSR<5:4>.
385 002004 032767 000010 176004      BIT      #BIT3,SR1 ; ARE WE RLV12 ??
386 002012 001411          BEQ      1$            ; BR IF NOT.
387 002014 104416 000000 002040  MAP22$, BEGIN,PA18 ; GET 22-BIT ADDR FROM 18-BIT ADDR
388 002022 016777 000016 001504      MOV      PA22,@RLBA ; LOAD BA<15:0>...
389 002030 016777 000012 001504      MOV      EA22,@RLBAE ; ...AND BA<21:16>.
390 002036 000207 1$:      RTS      PC
391
392 002040 000000          PA18: 0 ; 18 BIT BA<15:0>...
393 002042 000000          EA18: 0 ; ...AND EA<17:16> IN BITS <5:4>.
394 002044 000000          PA22: 0 ; 22 BIT BA<15:0>...
395 002046 000000          EA22: 0 ; ...AND EA<21:16> IN BITS <5:0>.
396
397          ; DRIVERS (INTERRUPT)
398
399 002050 012767 000102 001542 WRCHK: MOV      #102,FUNC ; WRITE-CHECK...
400 002056 000403          403 ; ...OR...
401 002060 012767 000112 001532 WRITE: MOV      #112,FUNC ; ...WRITE FUNCTION.
402 002066 016777 001540 001444      MOV      WCNT1,@RLMP ; WORD COUNT
403 002074 016777 001522 001434      MOV      HDRWD,@RLDA ; DISK ADDRESS
404 002102 004767 177622      JSR      PC,SETWBA ; WRITE BUFFER ADDRESS ; GP-4
405 002106 000444          BR      EXEC
406 002110 012767 000114 001502 READ:  MOV      #114,FUNC ; READ FUNCTION
407 002116 016777 001512 001414      MOV      WCNT2,@RLMP ; WORD COUNT
408 002124 016777 001472 001404      MOV      HDRWD,@RLDA ; DISK ADDRESS
409 002132 004767 177610      JSR      PC,SETRBA ; READ BUFFER ADDRESS ; GP-4
410 002136 000430          BR      EXEC
411 002140 012767 000106 001452 SEEK:  MOV      #106,FUNC ; SEEK FUNCTION
412 002146 016777 001452 001362      MOV      DIFWD,@RLDA ; DIFFERENCE WORD
413 002154 052777 000001 001354      BIS      #1,@RLDA ; SET MARKER BIT
414 002162 000416          BR      EXEC
415 002164 012767 000110 001426 RDHDR: MOV      #110,FUNC ; READ HEADER FUNCTION
    
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RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-6  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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416 002172 000412
417 002174 012777 000003 001334 GSTAT: BR EXEC
418 002202 000403 403 ;GET STATUS...
419 002204 012777 000013 001324 DRVRTS: MOV #13,@RLDA ;...OR...
420 002212 012767 000104 001400 MOV #104,FUNC ;...RESET AND GET STATUS.
421 ;GET STATUS FUNCTION.
422 002220 042777 001416 001304 EXEC: BIC #1416,@RLCS ; CLEAR THE OLD... ;GP-4
423 002226 056777 001374 001276 BIS DRIVE,@RLCS ;...AND INSERT NEW DRIVE... ;GP-4
424 002234 056777 001360 001270 BIS FUNC,@RLCS ;...AND OPCODE BITS. ;GP-4
425 002242 012777 002262 175540 MOV #INTSRV,@VECTOR ;SET UP INTERRUPT VECTOR... ;GP-4
426 002250 042777 000200 001254 BIC #200,@RLCS ;...AND EXECUTE. ;GP-4
427 002256 104400 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
428
429 ; CONTINUE HERE ON RL INTERRUPT.
430
431 002262 INTSRV:
;-----
002262 000004 000000 002270 PIRQ$,BEGIN,1$ ; QUEUE UP TO CONTINUE AT 1$ AND RTI
;-----
432 002270 005067 001266 1$: CLR T.STAT
433 002274 016767 001232 175576 MOV RLCS,CSRA ;LOAD ADDR OF CSR
434 002302 017767 001224 175572 MOV @RLCS,ACSR ;LOAD CONTENTS OF CSR
435 002310 016767 175566 001232 MOV ACSR,T.CS
436 002316 017767 001212 001226 MOV @RLBA,T.BA
437 002324 017767 001206 001222 MOV @RLDA,T.DA
438 002332 017767 001202 001216 MOV @RLMP,T.MP
439 002340 032767 000010 175450 BIT #BIT3,SR1 ;TEST IF RLV12 CONTROLLER ;GP-4
440 002346 001403 BEQ 20$ ;BR IF NOT ;GP-4
441 002350 017767 001166 001202 MOV @RLBAE,T.BAE ;GET EA BITS ;GP-4
442 002356 005767 001166 20$: TST T.CS ;ANY ERRORS
443 002362 100403 BMI 11$ ;YES, CONTINUE TO CHECK
444 002364 005067 001136 CLR RETRY
445 002370 000205 RTS ;NO, RETURN CALL+4 SKIP RETRY
446
447 002372 005267 001170 11$: INC RWER
448 002376 012767 005404 003056 MOV #NULLX,HTYPE ;SETUP FOR NULL PRINT
449 002404 032767 040000 001136 BIT #BIT14,T.CS ;DRIVE ERROR
450 002412 001457 BEQ 2$ ;NO BRANCH
451 002414 012777 000003 001114 MOV #3,@RLDA ;GET STATUS
452 002422 012767 000004 001116 MOV #4,TMP
453 002430 056767 001172 001110 BIS DRIVE,TMP
454 002436 016777 001104 001066 MOV TMP,@RLCS
455 002444 99$: BREAK$,BEGIN ;TEMPORARY RETURN TO MONITOR....
002444 104407 000000 ;THEN CONTINUE AT NEXT INSTRUCTION.
002450 104407 000000
456 002454 032777 000200 001050 BIT #200,@RLCS
457 002462 001770 BEQ 99$
458 002464 017767 001050 001070 MOV @RLMP,T.STAT
459 002472 104403 000000 005454 MSGNS,BEGIN,DRVERR ;ASCII MESSAGE CALL WITH COMMON HEADER
460 002500 012767 000006 175400 MOV #6,ERRTYP ;DRIVE ERROR
461 ;*****
002506 104405 000000 005500 HRDR$,BEGIN,TABLE ;
;*****
462 002514 012777 000013 001014 MOV #13,@RLDA
463 002522 016777 001020 001002 MOV TMP,@RLCS
464 002530 98$: BREAK$,BEGIN ;TEMPORARY RETURN TO MONITOR....
002530 104407 000000
    
```

RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-7  
DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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002574 104407 000000' BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
465 002540 032777 000200 000764 BIT #200,BRLCS
466 002546 001770 BEQ 98$
467 002550 000522 BR NORPT
468 002552 032767 020000 000770 2$: BIT #BIT13,T.CS ;NXM SET
469 002560 001404 BEQ 21$
470 002562 012767 005400' 002672 MOV #NXM,HTYPE
471 002570 000515 BR HRDRPT
472 002572 032767 002000 000750 21$: BIT #BIT10,T.CS ;OPI SET
473 002600 001423 BEQ 4$ ;NO, CHECK DCRC,DCK
474 002602 012767 005353' 002652 MOV #OPI,HTYPE ;INITIAL SET FOR OPI
475 002610 032767 004000 000732 BIT #BIT11,T.CS ;HCRC?
476 002616 001404 BEQ 3$ ;NO, BRANCH
477 002620 012767 005373' 002634 MOV #HCRC,HTYPE ;HCRC ERROR
478 002626 000505 BR FNDBSC ;FIND BAD SECTOR
479 002630 032767 010000 000712 3$: BIT #BIT12,T.CS ;HNF
480 002636 001472 BEQ HRDRPT ; NO, REPORT AS REPORT 'OPI' ;GP-1
481 002640 012767 005367' 002614 MOV #HNF,HTYPE ;HNF ERROR
482 002646 000475 BR FNDBSC ;GO CHECK BAD SECTOR FILE
483 002650 032767 004000 000672 4$: BIT #BIT11,T.CS ;DCK?
484 002656 001406 BEQ 5$ ;NO,MUST BE DLT
485 002660 005367 000670 DEC T.DA ;BACK UP TO SECTOR THAT WAS BAD
486 002664 012767 005363' 002570 MOV #DCK,HTYPE ;DCK ERROR
487 002672 000463 BR FNDBSC ;GO CHECK BAD SECTOR FILE
488 002674 012767 005357' 002560 5$: MOV #DLT,HTYPE ;SETUP DLT ERROR
489
490 002702 032767 000004 175106 RPTERR: BIT #BIT2,SR1 ;PRINTING SOFTERRORS ??
491 002710 001011 BNE 55$ ;NO, SKIP PRINT
492 002712 104403 000000' 005460' MSGNS,BEGIN,SOFT ;ASCII MESSAGE CALL WITH COMMON HEADER
493 002720 012767 000001 175160 MOV #1,ERRTP ;DATA ERROR
494
002726 104406 000000' 005500'
;*****
;SOFERS,BEGIN,TABLE
;*****
495 002734 026767 000566 000566 55$: CMP RETRY,LIMIT ;RETRY EXHAUSTED
496 002742 001405 BEQ 6$ ;YES, NO MORE RETRIES
497 002744 005267 000556 INC RETRY
498 002750 162705 000004 SUB #4,R5 ; ADJUST RETURN PC...
499 002754 000205 RTS R5 ;...AND TRY AGAIN.
500
501 002756 016700 000636 6$: MOV FUNC,R0 ; GET FUNCTION CODE... ;GP-2
502 002762 042700 177761 BIC #*C16,R0 ;...STRIP IT... ;GP-2
503 002766 016067 004730' 002434 MOV FNCLST(R0),EXCEED ;...AND GET APPORPRIATE TEXT. ;GP-2
504 002774 016767 002462 002440 MOV HTYPE,TER1 ;GET ERROR TYPE
505 003002 104403 000000' 005440' MSGNS,BEGIN,HARD ;ASCII MESSAGE CALL WITH COMMON HEADER
506 003010 104403 000000' 005430' MSGNS,BEGIN,EXCEED ;ASCII MESSAGE CALL WITH COMMON HEADER
507 003016 005067 000504 NORPT: CLR RETRY
508 003022 000205 RTS R5
509 003024 016767 002432 002410 HRDRPT: MOV HTYPE,TER1
510 003032 104403 000000' 005440' MSGNS,BEGIN,HARD ;ASCII MESSAGE CALL WITH COMMON HEADER
511 003040 000766 BR NORPT
512
513 ;ERROR WAS HCRC OR HNF OR DCK, POSITION TO LAST TRACK AND RECOVER
514 ;BAD SECTOR FILES. IF DCK/HNF CHECK WHOLE DA, IF HCRC CHECK IF
515 ;WE WERE DOING A RDHDR IF READ HDR THEN CHECK ONLY TRACK AND
516 ;CYLINDER.
517
518 003042 016701 000534 FNDBSC: MOV LSTCYL,R1 ;LAST TRACK

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RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-8  
 DEC/X11 SYSTEM EXERCISER MACRO DEFINITION MODULE

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519 003046 016700 000550      MOV      HDRWD,RO      ;PRESENT POSITION
520 003052 042700 000100      BIC      #100,RO      ;CLEAR OUT HEAD
521 003056 160001                SUB      RO,R1        ;CALC SEEK DIFFERENCE
522 003060 010177 000452      MOV      R1,@RLDA     ;LOAD SEEK DIFFERENCE
523 003064 052777 000025 000444  BIS      #25,@RLDA    ;SET HEAD 1, SEEK IN
524 003072 016767 000530 000464  MOV      DRIVE,MFLG   ;SELECT DRIVE. (MFLG UESD)
525 003100 052767 000006 000456  BIS      #6,MFLG      ;SET UP SEEK
526 003106 016777 000452 000416  MOV      MFLG,@RLCS   ;SEEK
527 003114 004767 176352      JSR      PC,WTRDY     ;WAIT FOR SEEK TO FINISH
528
529                                ;NOW SITTING ON LAST TRACK, RECOVER BAD SECTOR FILES AND COMPARE
530
531 003120 016700 000460      MOV      LSTTRK,RO    ;STARTING SECTOR 0
532 003124 005067 000434      CLR      MFLG         ;SWITCH TO TELL US MANUF OR FIELD FILE
533 003130 005067 000434      CLR      FND          ;FLAG TO INDICATE HEADER FOUND IN LIST
534 003134 010077 000376 2$:    MOV      RO,@RLDA     ;LOAD SECTOR TO READ
535 003140 012777 177400 000372  MOV      #-256,@RLMP  ;TWO SECTOR READ
536 003146 012777 000215 000356  MOV      #215,@RLCS  ; READ COMMAND ;GP-4
537 003154 004767 176566      JSR      PC,SETRBA    ; BUFFER ADDRESS. ;GP-4
538 003160 056777 000442 000344  BIS      DRIVE,@RLCS ; INSERT DRIVE ;GP-4
539 003166 042777 000200 000336  BIC      #200,@RLCS  ; EXECUTE IT.
540 003174 004767 176272      JSR      PC,WTRDY    ;WAIT FOR DRIVE
541 003200 005777 000326      TST      @RLCS       ;READ SUCCESSFUL??
542 003204 100023      BPL      4$          ;YES, GO CHECK FOR SECTOR
543
544 003206 062700 000004      ADD      #4,RO        ;NO, NEXT SECTOR
545 003212 005767 000346      TST      MFLG        ;WHICH WE READING, MANUF OR FIELD
546 003216 001012      BNE      3$          ;FIELD COMPARE AGAINST 77750
547 003220 026700 000350      CMP      FSTBSC,RO   ;MANUFACTURING, AT END
548 003224 001343      BNE      2$          ;NO, GO BACK AND READ NEXT
549
550 003226 104403 000000' 005450' 99$:    MSGNS$,BEGIN,NOSEC  ;ASCII MESSAGE CALL WITH COMMON HEADER
551 003234 004567 176332      JSR      R5,DROP     ;
552 003240 000167 175200      JMP      LOOPL       ;
553
554 003244 026700 000326 3$:    CMP      LSTBSC,RO   ;AT END OF FIELD BAD
555 003250 001331      BNE      2$          ;NO, GO BACK
556 003252 000765      BR      99$         ;YES GO DROP DRIVE
557
558 003254 016701 174644 4$:    MOV      RBUFVA,R1   ;GET WHERE WE READ
559 003260 062701 000010      ADD      #10,R1      ;SKIP PAST I.D. ETC.....
560 003264 012702 000176      MOV      #126.,R2    ;ONLY 126 ENTRIES
561 003270 012103 44$:    MOV      (R1)+,R3    ;GET CYLINDER
562 003272 100440      BMI      88$        ;MINUS WE'RE DONE
563 003274 012104      MOV      (R1)+,R4    ;GET TRACK AND SECTOR
564 003276 000303      SWAB      R3        ;ALIGN PROPERLY
565 003300 106003      RORB      R3
566                                ;PA005
567 003302 006003      ASR      R3
568 003304 150403      ROR      R3
569 003306 032704 000400      BISB     R4,R3
570 003312 001402      BIT      #400,R4
571 003314 052703 000100      BEQ      5$
572 003320 022767 005373' 002134 5$:    BIS      #100,R3
573 003326 001012      CMP      #HCRC,HTYPE ;IS ERROR HCRC?
574 003330 022767 000110 000262      BNE      6$          ;NO, GO LOOK FOR BAD SECTOR
574 003330 022767 000110 000262      CMP      #110,FUNC   ;WE'RE WE DOING READ HEADER

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DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-9  
DEC/X11 SYSTEM EXERCISER MACRO DEFINITION MODULE

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575 003336 001006          BNE      6$          ;NO, GO LOOK FOR BAD SECTOR
576 003340 042703 000077  BIC      #77,P3      ;YES, CLEAR SCETOR BITS
577 003344 020367 000252  CMP      R3,HDRWD    ;BAD SECTOR
578 003350 001404          BEQ      7$
579 003352 000406          BR       8$
580 003354 020367 000174  6$:    CMP      R3,T.DA    ;IS THIS ONE IT??????
581 003360 001003          BNE      8$          ;NO
582 003362 005267 000202  7$:    INC      FND
583 003366 000412          BR       9$
584 003370 005302          8$:    DEC      R2          ;CHECKED WHOLE FILE
585 003372 001336          BNE      44$         ;NO
586 003374 005767 000164  88$:   TST      MFLG      ;WHICH WE DOING
587 003400 001005          BNE      9$          ;FIELD WE'RE DONE
588 003402 005267 000156  INC      MFLG        ;MANUFACT. THEN SET UP FIELD
589 003406 016700 000162  MOV      FSTBSC,R0
590 003412 000650          BR       2$
591
592 003414 016700 000202  9$:    MOV      HDRWD,R0
593 003420 016701 000156  MOV      LSTCYL,R1
594 003424 042700 000100  BIC      #100,R0
595 003430 160001          SUB      R0,R1
596 003432 010177 000100  MOV      R1,ARLDA
597 003436 052777 000001 000072  BIS      #1,ARLDA
598 003444 032767 000100 000150  BIT      #100,HDRWD
599 003452 001403          BEQ      10$
600 003454 052777 000020 000054  BIS      #20,ARLDA
601 003462 016767 000140 000074  10$:   MOV      DRIVE,MFLG
602 003470 052767 000006 000066  BIS      #6,MFLG
603 003476 016777 000062 000026  MOV      MFLG,ARLCS
604 003504 004767 175762          JSR      PC,WTRDY
605 003510 005767 000054          TST      FND
606 003514 001002          BNE      11$
607 003516 000167 177160          JMP      RPTERR
608 003522 000167 177270  11$:   JMP      NORPT

```

LOCATIONS USED BY MODULE

```

609
610
611
612 003526 000000  RETRY:   .WORD  0
613 003530 000003  LIMIT:   .WORD  3
614 003532 000000  RLCS:    .WORD  0
615 003534 000000  RLBA:    .WORD  0
616 003536 000000  RLDA:    .WORD  0
617 003540 000000  RLMP:    .WORD  0
618 003542 177777  RLBAE:   .WORD  177777 ; RLV12 BAE ;GP-4
619 003544 177777  .WORD  177777 ; TERMINATOR.
620 003546 000000  TMP:     .WORD  0
621 003550 000000  T.CS:    .WORD  0
622 003552 000000  T.BA:    .WORD  0
623 003554 000000  T.DA:    .WORD  0
624 003556 000000  T.MP:    .WORD  0
625 003560 000000  T.BAE:   .WORD  0 ; RLV12 BAE ;GP-4
626 003562 000000  T.STAT:  .WORD  0
627 003564 000000  MFLG:    .WORD  0
628 003566 000000  RWER:    .WORD  0
629 003570 000000  FND:     .WORD  0
630 003572 000000  DRVMSK:  .WORD  0
631 003574 000000  FSTBSC:  .WORD  0

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RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-10  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

632	003576	000000			LSTBSC: .WORD	0		
633	003600	000000			MASK: .WORD	0		
634	003602	000000			LSTCYL: .WORD	0		
635	003604	000000			LSTTRK: .WORD	0		
636	003606	000000			MASK2: .WORD	0		
637	003610	000000			CLK: .WORD	0		
638	003612	000000			CNT: .WORD	0		
639	003614	000000			MULDRV: .WORD	0		
640	003616	000000			DLTCNT: .WORD	0		:NUMBER OF DATA LATE ERRORS
641	003620	000000			FUNC: .WORD	0		:FUNCTION TO BE PERFORMED
642	003622	000000			HDRWD: .WORD	0		:HEADER WORD (RDHDR, R/W)
643	003624	000000			DIFWD: .WORD	0		:DIFFERENCE WORD (SEEK)
644	003626	000000			DRIVE: .WORD	0		:DRIVE UNDER TEST (BITS 8,9)
645	003630	000000			DVICE: .WORD	0		:WORKING 'DVID1'
646	003632	000000			WCNT1: .WORD	0		:WORD COUNT (WRITE)
647	003634	000000			WCNT2: .WORD	0		:WORD COUNT (READ)
648	003636				BUF IN: .BLKW	256.		
649	004636				BSECBF: .BLKW	25.		:BAD SECTOR LIST
650	004720	000000			CURMSG: .WORD	0		
651	004722	000000			CURADR: .WORD	0		
652	004724	000000			NXTADR: .WORD	0		
653	004726	000000			NUMB: .WORD	0		
654	004730	005404'			FNCLST: NULLX			: OPCODE 0 UNUSED. :GP-2
655	004732	005073'			MES8A			: 1 = WRT CHK. :GP-2
656	004734	005107'			MES9			: 2 = RESET OR GET STATUS.
657	004736	005053'			MES6			: 3 = SEEK.
658	004740	005037'			MES5			: 4 = READ HEADER.
659	004742	005065'			MES8			: 5 = WRITE.
660	004744	005060'			MES7			: 6 = READ.
661	004746	005404'			NULLX			: 7 = READ NO-HEADER (UNUSED). :GP-2
662								
663	004750	116	117	040	MES1: .ASCIZ	'NO DRIVES PRESENT %'		
	004753	104	122	111				
	004756	126	105	123				
	004761	040	120	122				
	004764	105	123	105				
	004767	116	124	040				
	004772	045	000					
664	004774	116	117	040	MES2: .ASCIZ	'NO DRIVES LEFT %'		
	004777	104	122	111				
	005002	126	105	123				
	005005	040	114	105				
	005010	106	124	040				
	005013	045	000					
665	005015	104	122	111	MES3: .ASCIZ	'DRIVE '		
	005020	126	105	040				
	005023	000						
666	005024	040	104	122	MES4: .ASCIZ	' DROPPED %'		
	005027	117	120	120				
	005032	105	104	040				
	005035	045	000					
667	005037	122	105	101	MES5: .ASCIZ	'READ HEADER'		
	005042	104	040	110				
	005045	105	101	104				
	005050	105	122	000				
668	005053	123	105	105	MES6: .ASCIZ	'SEEK'		
	005056	113	000					

RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-11  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

669	005060	122	105	101	MES7:	.ASCIZ	'READ'	
	005063	104	000					
670	005065	127	122	111	MES8:	.ASCIZ	'WRITE'	
	005070	124	105	000				
671	005073	127	122	111	MES8A:	.ASCIZ	'WRITE-CHECK'	:GP-2
	005076	124	105	055				
	005101	103	110	105				
	005104	103	113	000				
672	005107	104	122	111	MES9:	.ASCIZ	'DRIVE RESET'	
	005112	126	105	040				
	005115	122	105	123				
	005120	105	124	000				
673	005123	040	122	105	MES10:	.ASCIZ	'RETRY LIMIT EXCEEDEDX'	
	005126	124	122	131				
	005131	040	114	111				
	005134	115	111	124				
	005137	040	105	130				
	005142	103	105	105				
	005145	104	105	104				
	005150	045	000					
674	005152	045	123	105	MES11:	.ASCIZ	'%SEEK TO WRONG CYLINDERX'	
	005155	105	113	040				
	005160	124	117	040				
	005163	127	122	117				
	005166	116	107	040				
	005171	103	131	114				
	005174	111	116	104				
	005177	105	122	045				
	005202	000						
675	005203	104	101	124	MES12:	.ASCIZ	'DATA LATEX'	
	005206	101	040	114				
	005211	101	124	105				
	005214	045	000					
676	005216	104	122	111	MES13:	.ASCIZ	'DRIVE ERRORX'	
	005221	126	105	040				
	005224	105	122	122				
	005227	117	122	045				
	005232	000						
677	005233	123	117	106	MES14:	.ASCIZ	'SOFT ERROR '	
	005236	124	040	105				
	005241	122	122	117				
	005244	122	040	040				
	005247	040	000					
678	005251	122	114	130	MES15:	.ASCIZ	'RLX LOAD UNIT DROPPED'	
	005254	040	114	117				
	005257	101	104	040				
	005262	125	116	111				
	005265	124	040	104				
	005270	122	117	120				
	005273	120	105	104				
	005276	000						
679	005277	110	101	122	MES16:	.ASCIZ	'HARD ERROR '	
	005302	104	040	105				
	005305	122	122	117				
	005310	122	040	040				
	005313	040	000					
680	005315	103	101	116	NBDSC:	.ASCIZ	'CANT RECOVER BAD SECTOR FILEX'	

RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-12  
 DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

	005320	124	040	122			
	005323	105	103	117			
	005326	126	105	122			
	005331	040	102	101			
	005334	104	040	123			
	005337	105	103	124			
	005342	117	122	040			
	005345	106	111	114			
	005350	105	045	000			
681	005353	117	120	111	OPI:	.ASCIZ	'OPI'
	005356	000					
682	005357	104	114	124	DLT:	.ASCIZ	'DLT'
	005362	000					
683	005363	104	103	113	DCK:	.ASCIZ	'DCK'
	005366	000					
684	005367	110	116	106	HNF:	.ASCIZ	'HNF'
	005372	000					
685	005373	110	103	122	HCRC:	.ASCIZ	'HCRC'
	005376	103	000				
686	005400	116	130	115	NXM:	.ASCIZ	'NXM'
	005403	000					
687	005404	040	000		NULLX:	.ASCIZ	' '
688	005406	045	000		CR:	.ASCIZ	'X'
689						.EVEN	
690							
691	005410	005015'			DROPMS:	MES3	
692	005412	004726'				NUMB	
693	005414	005024'				MES4	
694	005416	177777				177777	
695							
696	005420	004774'			NOLEFT:	MES2	
697	005422	177777				177777	
698							
699	005424	004750'			ABORT:	MES1	
700	005426	177777				177777	
701							
702	005430	000000			EXCEED:	.WORD	0
703	005432	005123'				MES10	
704	005434	005406'				CR	
705	005436	177777				177777	
706							
707	005440	005277'			HARD:	MES16	
708	005442	000000			TER1:	.WORD	0
709	005444	005406'				CR	
710	005446	177777				177777	
711							
712	005450	005315'			NOSEC:	NBDSC	
713	005452	177777				177777	
714							
715	005454	005216'			DRVERR:	MES13	
716	005456	177777				177777	
717							
718	005460	005233'			SOFT:	MES14	
719	005462	000000			HTYPE:	.WORD	0
720	005464	005406'				CR	
721	005466	177777				177777	
722							



RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-13  
DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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723 005470 005152'      BDSEEK: MES11
724 005472 177777      177777
725
726 005474 005251'      DROPLD: MES15
727 005476 177777      177777
728
729                      ;REGISTERS OF RL11
730
731 005500 003550'      TABLE: .WORD  T.CS          ;CONTROL AND STATUS REGISTER
732 005502 003552'      .WORD  T.BA          ;BUS ADDRESS REGISTER
733 005504 003554'      .WORD  T.DA          ;DISK ADDRESS REGISTER
734 005506 003556'      .WORD  T.MP          ;DISK DATA BUFFER ADDRFS
735 005510 003562'      TABLEY: .WORD T.STAT   ;T.BAE ;HAS STATUS ON DRIVE ERROR ;GP-4
736 005512 177777      TABLEZ: .WORD 177777  ;T.STAT ;TERMINATOR           ;GP-4
737 005514 177777      .WORD 177777      ;TERMINATOR
738
739 005516 000030      PATCH: .REPT 24.      ;24 DECIMAL PATCH LOCATIONS ;PA005
740                      .NLIST
741                      .WORD 0
742                      .LIST
743                      .ENDR
744                      .END
000001

```

RLAG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-14  
 SYMBOL TABLE

ABORT	005424R	DIFWD	003624R	LOOPL	000444R	PDP44	= 100000	SETWBA	001730R
ACSR	000102R	DLT	005357R	LSTBSC	003576R	PDP60	= 004000	SOFCNT	000042R
ADDR	000006R	DLTCNT	003616R	LSTCYL	003602R	PDP70	= 010000	SOFERS=	104406
ADDR22=	001000	DRIVE	003626R	LSTTRK	003604R	PIR0\$	= 000004	SOFPAS	000046R
APTPRE=	000200	DROP	001572R	MAP22\$=	104416	POPSP	= 005726	SOFT	005460R
ASB	000106R	DROPLD	005474R	MASK	003600R	POPSP2=	022626	SPOINT	000032R
ASTAT	000104R	DROPMS	005410R	MASK2	003606R	PRHMS\$=	000002	SPSIZ	= 000040
AUTO	= 000010	DRVERR	005454R	MES1	004750R	PRTY	= 000000	SR1	000016R
AWAS	000110R	DRVMSK	003572R	MES10	005123R	PRTY0	= 000000	SR2	000020R
BDSEEK	005470R	DRVRTS	002204R	MES11	005152R	PRTY1	= 000040	SR3	000022R
BEGIN	000000R	DVICE	003630R	MES12	005203R	PRTY2	= 000100	SR4	000024R
BIT0	= 000001	DVID1	000014R	MES13	005216R	PRTY3	= 000140	START	000252R
BIT1	= 000002	EA18	002042R	MES14	005233R	PRTY4	= 000200	STAT	000026R
BIT10	= 002000	EA22	002046R	MES15	005251R	PRTY5	= 000240	SVR0	000062R
BIT11	= 004000	ECCMEM=	000100	MES16	005277R	PRTY6	= 000300	SVR1	000064R
BIT12	= 010000	ENDITS=	104413	MES2	004774R	PRTY7	= 000340	SVR2	000066R
BIT13	= 020000	END\$	= 104410	MES3	005015R	PS	= 177776	SVR3	000070R
BIT14	= 040000	ERRTYP	000106R	MES4	005024R	PSW	= 177776	SVR4	000072R
BIT15	= 100000	EXCEED	005430R	MES5	005037R	PUSH	= 005746	SVR5	000074R
BIT2	= 000004	EXEC	002220R	MES6	005053R	PUSH2	= 024646	SVR6	000076R
BIT3	= 000010	EXITS	= 104400	MES7	005060R	PWRFLG=	000002	SYSCNT	000052R
BIT4	= 000020	FINI	001622R	MES8	005065R	QMON22=	000010	TABLE	005500R
BIT5	= 000040	FNCLST	004730R	MES8A	005073R	RAND\$	= 104417	TABLEY	005510R
BIT6	= 000100	FND	003570R	MES9	005107R	RANMUM	000054R	TABLEZ	005512R
BIT7	= 000200	FNDBSC	003042R	MFLG	003564R	RBUFEA	000130R	TAG	000714R
BIT8	= 000400	FREE	000150R	MODNAM	000000R	RBUFPA	000126R	TAG1	001040R
BIT9	= 001000	FSTBSC	003574R	MODSP	000252R	RBUFSZ	000132R	TAG2	001174R
BREAK\$=	104407	FUNC	003620R	MSGNS	= 104403	RBUFVA	000124R	TER1	005442R
BR1	000012R	GETPAS=	104415	MSGSS	= 104402	RDHDR	002164R	TMP	003546R
BR2	000013R	GSTAT	002174R	MSG\$	= 104401	READ	002110R	TRPDFD=	000023
BSECBF	004636R	GWBUFF\$=	104414	MULDRV	003614R	RESTR	000424R	T.BA	003552R
BTOD\$	= 104421	HARD	005440R	NBDSC	005315R	RES1	000056R	T.BAE	003560R
BUFIN	003636R	HCRC	005373R	NCPUOP=	000020	RES2	000060R	T.CS	003550R
CAPRES=	000004	HDRWD	003622R	NOPTY=	000002	RETRY	003526R	T.DA	003554R
CDATAS=	104412	HNF	005367R	NOLEFT	005420R	RH70	= 001000	T.MP	003556R
CDERCT	000144R	HRDCNT	000044R	NORPT	003016R	RLBA	003534R	T.STAT	003562R
CDWDCT	000146R	HRDERS=	104405	NOSEC	005450R	RLBAE	003542R	USTACK=	000001
CHKDRV	000502R	HRDPAS	000050R	NULL	= 000000	RLCS	003532R	VECTOR	000010R
CHKDR1	000506R	HRDRPT	003024R	NULLX	005404R	RLDA	003536R	WASADR	000104R
CKHNG\$=	000001	HTYPE	005462R	NUMB	004726R	RLMP	003540R	WBUFEA	000136R
CLK	003610R	ICONT	000036R	NXM	005400R	RPTERR	002702R	WBUFPA	000134R
CLKPRE=	000001	ICOUNT	000040R	NXTADR	004724R	RSTR	000112R	WBUFRQ	000140R
CLKSP\$=	104422	IDNUM	000122R	OPEN	= 000000	RSTR1	000434R	WBUFSZ	000142R
CNT	003612R	IMODX.=	000000	OPI	005353R	RWER	003566R	WCNT1	003632R
CONFIG	000056R	INDPAR=	000040	OTOAS	= 104420	R6	= 0000006	WCNT2	003634R
CR	005406R	INIT	000030R	PARPRE=	002000	R7	= 0000007	WDFR	000116R
CSRA	000100R	INTR	000120R	PASCNT	000034R	SBADR	000102R	WDTO	000114R
CURADR	004722R	INTSRV	002262R	PATCH	005516R	SEEK	002140R	WRCHK	002050R
CURMSG	004720R	KTPRES=	000400	PA18	002040R	SETCMN	001762R	WRITE	002060R
DATCK\$=	104411	KTXTND=	040000	PA22	002044R	SETRBA	001746R	WTRDY	001472R
DATERS=	104404	LIMIT	003530R	PDF11=	000002	SETUP	001626R	XFLAG	000005R
DCK	005363R	LOOP	000702R	PDPLSI=	020000				

. ABS. 000000 000  
 005576 001  
 ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 13181 WORDS ( 52 PAGES)

RLOG DEC/X11 SYSTEM EXERCISER M MACRO M1200 02-SEP-82 14:57 PAGE 3-15  
SYMBOL TABLE

DYNAMIC MEMORY: 19748 WORDS ( 75 PAGES)  
ELAPSED TIME: 00:00:34  
XRLAGO,XRLAGO/CR/-SP=DDXCOM,XRLAGO



XRLAGO CREATED BY MACRO ON 2-SEP-82 AT 14:57

PAGE 2  
CREF V01

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
DATCK\$	=	104411	#3-158
DATERS	=	104404	#3-158
DCK		005363 R	3-486 #3-683
DIFWD		003624 R	*3-225 *3-239 *3-240 *3-242 *3-244 *3-245 *3-248 *3-257 *3-264
			3-267 *3-272 3-412 #3-643
DLT		005357 R	3-488 #3-682
DLTCNT		003616 R	*3-166 #3-640
DRIVE		003626 R	*3-164 *3-196 *3-199 3-329 3-423 3-453 3-524 3-538 3-601
			#3-644
DROP		001572 R	3-316 3-339 #3-345 3-551
DROPLD		005474 RR	3-180 #3-726
DROPMS		005410 RR	3-345 #3-691
DRVERR		005454 RR	3-459 #3-715
DRVMSK		003572 RR	*3-165 *3-191 3-192 *3-194 3-201 3-346 #3-630
DRVRTS		002204 RR	3-210 #3-419
DVICE		003630 RR	*3-168 3-177 *3-179 3-181 3-201 *3-346 #3-645
DVID1		000014 RR	#3-158 3-168
EA18		002042 RR	*3-378 *3-381 3-384 #3-393
EA22		002046 R	3-389 #3-395
ECCMEM	=	000100	#3-158
ENDITS	=	104413	#3-158 3-197
ENDS	=	104410	#3-158 3-351
ERRTYP		000106 R	#3-158 *3-289 *3-337 *3-460 *3-493
EXCEED		005430 RR	*3-503 *3-506 #3-702
EXEC		002220 R	3-405 3-410 3-414
EXITS	=	104400	#3-158 3-427
FINI		001622 RR	3-184 #3-351
FNCLST		004730 RR	3-503 #3-654
FND		003570 RR	*3-533 *3-582 3-605 #3-629
FNDBSC		003042 RR	3-478 3-482 3-487 #3-518
FREE		000150 RR	#3-158
FSTBSC		003574 RR	*3-212 *3-224 3-547 3-589 #3-631
FUNC		003620 R	*3-399 *3-401 *3-406 *3-411 *3-415 *3-420 3-424 3-501 3-574
			#3-641
GETPAS	=	104415	#3-158 3-189
GSTAT		002174 R	#3-417
GWBUFS	=	104414	#3-158 3-300
HARD		005440 R	3-505 #3-707
HCRC		005373 RR	3-477 #3-685
HDRWD		003622 R	*3-227 *3-234 3-240 *3-249 *3-250 *3-253 3-254 *3-256 3-260
			*3-262 *3-263 *3-269 *3-271 *3-274 3-281 *3-292 *3-294 3-403
			3-408 3-519 3-577 3-592 3-598 #3-642
HNF		005367 R	3-481 #3-684
HRDCNT		000044 R	#3-158
HRDERS	=	104405	#3-158 3-290 3-338 3-461
HRDPAS		000050 R	#3-158
HRDRPT		003024 RR	3-471 3-480 #3-509
HTYPE		005462 R	*3-448 *3-470 *3-474 *3-477 *3-481 *3-486 *3-488 3-504 3-509
			3-572 #3-719
ICONT		000036 R	#3-158
ICOUNT		000040 R	#3-158
IDNUM		000122 R	#3-158



XRLAGO CREATED BY MACRO ON 2-SEP-82 AT 14:57

PAGE 4  
CREF V01

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES								
NXTADR		004724 R	#3-652								
OPEN		= 000000	3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158
			3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158
			3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158
			3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158	3-158
			#3-158								
			#3-681								
OPI		005353 R	3-474								
OTOAS		= 104420	#3-158								
PARPRE		= 002000	#3-158								
PASCNT		000034 R	#3-158								
PATCH		005516 R	#3-739								
PA18		002040 R	*3-377	*3-380	3-382	3-387	#3-392				
PA22		002044 R	3-388	#3-394							
PDPF11		= 000002	#3-158								
PDPLSI		= 020000	#3-158								
PDP44		= 100000	#3-158								
PDP60		= 004000	#3-158								
PDP70		= 010000	#3-158								
PIRQS		= 000004	#3-158	3-431							
POPSP		= 005726	#3-158								
POPSP2		= 022626	#3-158								
PRHMS\$		= 000002	#3-158								
PRTY		= 000000	#3-158								
PRTY0		= 000000	3-158	#3-158							
PRTY1		= 000040	#3-158								
PRTY2		= 000100	#3-158								
PRTY3		= 000140	#3-158								
PRTY4		= 000200	#3-158								
PRTY5		= 000240	3-158	#3-158							
PRTY6		= 000300	#3-158								
PRTY7		= 000340	#3-158								
PS		= 177776	#3-158								
PSW		= 177776	#3-158								
PUSH		= 005746	#3-158								
PUSH2		= 024646	#3-158								
PWRFLG		= 000002	#3-158								
QMON22		= 000010	#3-158								
RAND\$		= 104417	#3-158	3-235							
RANUM		000054 R	#3-158	3-236							
RBUFEA		000130 R	#3-158	3-381							
RBUFPA		000126 R	#3-158	3-312	3-380						
RBUFSZ		000132 R	#3-158	3-298							
RBUFVA		000124 R	#3-158	3-189	3-558						
RDHDR		002164 R	3-226	3-277	#3-415						
READ		002110 R	3-309	#3-406							
RESTR		000424 R	3-158	#3-185							
RES1		000056 R	#3-158								
RES2		000060 R	#3-158								
RETRY		003526 R	*3-203	*3-444	3-495	*3-497	*3-507	#3-612			
RH70		= 001000	#3-158								
RLBA		003534 R	*3-358	3-382	3-388	3-436	#3-615				
RLBAE		003542 R	*3-366	3-389	3-441	#3-618					
RLCS		003532 R	3-284	3-285	3-286	3-328	3-329	3-331	3-338	*3-356	3-383





XRLAGO CREATED BY MACRO ON 2-SEP-82 AT 14:57

PAGE 6  
CREF V01

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES							
T.BA		003552 R	*3-436	#3-622	3-732					
T.BAE		003560 R	3-367	*3-441	#3-625					
T.CS		003550 R	*3-435	3-442	3-449	3-468	3-472	3-475	3-479	3-483 #3-621
			3-731							
T.DA		003554 R	*3-437	*3-485	3-580	#3-623	3-733			
T.MP		003556 R	3-217	3-227	3-279	*3-438	#3-624	3-734		
T.STAT		003562 R	3-368	*3-432	*3-458	#3-626	3-735			
USTACK	=	000001	#3-158							
VECTOR		000010 R	#3-158	3-369	3-425					
WASADR		000104 R	#3-158							
WBUF EA		000136 R	#3-158	3-378						
WBUF PA		000134 R	#3-158	3-377						
WBUF RQ		000140 R	#3-158							
WBUF SZ		000142 R	#3-158	3-301						
WCNT1		003632 R	*3-301	*3-302	3-402	#3-646				
WCNT2		003634 R	*3-298	*3-299	3-407	#3-647				
WDFR		000116 R	#3-158	*3-160						
WDTO		000114 R	#3-158	*3-161						
WRCHK		002050 R	3-306	#3-399						
WRITE		002060 R	3-303	#3-401						
WTRDY		001472 R	3-209	3-276	#3-328	3-527	3-540	3-604		
XFLAG		000005 R	#3-158							

