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.REM -

IDENTIFICATION

PRODUCT CODE: AC-E965C-WC
PRODUCT NAME: CXRLACO RL11/RL01 MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. ABSTRACT

RLA IS AN IOMODX THAT EXERCISES RL01 DISK DRIVES ON AN RL11 CONTROLLER. IT EXERCISES THE DRIVES BY DOING READ HEADERS, SEEKS, READS, WRITES AND IN-CORE COMPARISONS. ALL ERRORS DETECTED ARE REPORTED ON THE CONSOLE DEVICE.

2. REQUIREMENTS

HARDWARE: 1 TO 4 RL DISK DRIVES WITH AN RL11 CONTROLLER.
STORAGE: RLA REQUIRES:

1. DECIMAL WORDS: 1327
2. OCTAL WORDS: 02457
3. OCTAL BYTES: 5136

3. PASS DEFINITION

ONE PASS OF THE RLA MODULE CONSISTS OF 1024 CYCLES OF THE BASIC TEST SEQUENCE. (READ HEADER, SEEK, READ HEADER, WRITE, WRITE CHECK, READ). THE TEST SEQUENCE WRITES 1024 WORDS, READS 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:
DEVADP: 174400, VECTOR: 160, BR1: 5, DEVCNT: 1
REQUIRED PARAMETERS:
NONE

6. DEVICE/OPTION SETUP

MAKE CERTAIN THAT ALL DRIVES ARE POWERED UP, WRITE ENABLED AND READY.

7. SE1 OPTIONAL SETUP

BIT 0 - DROP DRIVE ON ERROR
BIT 1 - RANDOM SEEKS

RLAC DEC/Y11 SYSTEM EXERCISER MODULE
XRLAC0.P11 12-OCT-78 12:08

MACV11 30A(1052) 12-OCT-78 16:59 PAGE 4

SEQ 0003

103
104
105
106

BIT 2 - DON'T PRINT SOFT ERRORS

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107 000200- IOMODX <RLAC > 174400,160,5,0,0,5,146, RUFIN,256,,1024.
108 000000- MODULE 150000,RLAC,174400,160,5,0,0,5,146, RUFIN,256,,1024.
109 000000- ; RLAC DEC/X11 SYSTEM EXERCISER MODULE
110 ; DDICOM VERSION 6 23-NOV-78
111 ; LIST BIN
112 ;*****
113 ;*****
114 ;*****
115 000000- 046122 041501 040 ;*****
116 000000- ;*****
117 000000- ;*****
118 000010- ;*****
119 000012- ;*****
120 000013- ;*****
121 000014- ;*****
122 000014- ;*****
123 000020- ;*****
124 000022- ;*****
125 000024- ;*****
126 ;*****
127 000026- 150000 ;*****
128 000030- 000252 ;*****
129 000032- 000252 ;*****
130 000034- 000000 ;*****
131 000036- 000005 ;*****
132 000038- 000000 ;*****
133 000040- 000000 ;*****
134 000042- 000000 ;*****
135 000045- 000000 ;*****
136 000050- 000000 ;*****
137 000052- 000000 ;*****
138 000054- 000000 ;*****
139 000056- 000000 ;*****
140 000058- 000000 ;*****
141 000060- 000000 ;*****
142 000062- 000000 ;*****
143 000064- 000000 ;*****
144 000066- 000000 ;*****
145 000070- 000000 ;*****
146 000072- 000000 ;*****
147 000074- 000000 ;*****
148 000076- 000000 ;*****
149 000100- 000000 ;*****
150 000102- 000000 ;*****
151 000104- 000000 ;*****
152 000106- 000000 ;*****
153 000108- 000000 ;*****
154 000110- 000000 ;*****
155 000112- 000000 ;*****
156 000114- 000000 ;*****
157 000116- 000000 ;*****
158 000118- 000000 ;*****
159 000120- 000000 ;*****
160 000122- 000146 ;*****
161 000124- 000146 ;*****
162 000124- 000146 ;*****

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163 000126- 000000 RBUFFA: OPEN ;READ BUFFER PHYSICAL ADDRESS
164 000130- 000000 RBUFEA: OPEN ;READ BUFFER EA BITS
165 000132- 000000 RBUFSZ: 256 ;SIZE OF THE READ BUFFER
166 000134- 000000 WBUFFA: OPEN ;WRITE BUFFER PHYSICAL ADDRESS
167 000136- 000000 WBUFEA: OPEN ;WRITE BUFFER EA BITS
168 000140- 002000 WBUFRQ: 1024. ;WRITE BUFFER SIZE REQUESTED
169 000142- 000000 WBUFSZ: OPEN ;WRITE BUFFER SIZE AVAILABLE
170 000144- 000000 CDEPCT: OPEN ;CDATA/DATCK ERROR COUNT
171 000146- 000000 CWDICT: OPEN ;CWDI/DATCK WORD COUNT
172 000150- 000000 FREE: OPEN ;RESERVED FOR FUTURE USE
173 000152- 000040 ;*****
174 ;*****
175 ;*****
176 ;*****
177 ;*****
178 000252- ;*****
179 ;*****
180 ;*****
181 000252- 012767 002000 177636 START: MOV #1024, WDFR ;1024 WORDS FROM MEM/ITERATION
182 000254- 012767 002000 177626 MOV #256, WDFD ;256 WORDS TO MEM/ITERATION
183 000256- 012767 000005 177624 MOV #5, INTR ;5 INTERRUPTS/ITERATION
184 000274- 005067 002754 CLR DLTENT ;CLEAR DATA LATE COUNT
185 000300- 004767 001144 JSP PCSETUP ;GO SET UP REGISTERS
186 000308- 015767 177504 002756 MOV DV1, DVICE ;COPY DRIVE SELECTION
187 000310- 015767 000014 000041 CMPR #14, @#41 ;WAS RL LOAD DEVICE?
188 000320- 001020 BNE ;N-BRANCH; Y-SEE IF LOAD UNIT SELECTED
189 000322- 012702 000001 MOV #1, R2 ;SET UP FOR MASK
190 000324- 013767 000040 MOVB @R4, R1 ;GET LOAD UNIT
191 000326- 001403 BIC #40, R1 ;IF ZERO GO MASK OUT UNIT
192 000334- 006302 4S: ASL R2 ;SHIFT MASK
193 000336- 105301 DECR R1 ;DEC COUNT
194 000340- 001376 BNE R2, DVICE ;KEEP CHECKING
195 000346- 001405 5S: BIC #2, DVICE ;WAS THAT DRIVE SELECTED?
196 000350- 002714 7S: BIC #75, DVICE ;DELETE UNIT FROM DEVICE MAP
197 000354- 104403 MSGNS, REGIN, DRPLD ;ASC MESSAGE CALL WITH COMMON HEADER
198 000356- 005767 002702 TST DVICE ;ANY DRIVES SELECTED?
199 000366- 001005 BNE RS ;YES, CONTINUE
200 000370- 104403 MSGNS, REGIN, ARORT ;ASCIT MESSAGE CALL WITH COMMON HEADER
201 000376- 001167 000714 JMP FINT ;MESSAGE DROP MODULE
202 000404- 005767 002640 9S: BR RSTRT1 ;+ SUPPORT - DT03
203 000410- 001001 RSTRT1: TST CMT ;+ / SUPPORT
204 000412- 000717 BR RSTRT1 ;+ / FOR
205 ;+ / DT03
206 ;*****
207 ;*****
208 000414- 104415 000000 000124- GETPAS, REGIN, RUFVA ;GET PHYSICAL ADDRESS FROM 16-BIT RBUFFA
209 000422- 005067 002624 CLR MULTDRV ;CLEAR MULTIPLE DRIVE INDICATOR
210 000424- 012767 000657 003732 MOV #57, NUMB ;SET DRIVE SELECT
211 000426- 012767 177493 002640 MOV #40, DRVSE ;SETUP DRIVE SELECT MASK
212 000442- 012767 000001 002874 MOV #1, DRVMSK ;SETUP DRIVE SELECT MASK
213 000450- 000402 BR CKDRV ;SHIFT MASK FOR NEXT DRIVE
214 000452- 006367 002566 LOOP1: ASL DRVMSK ;SHIFT MASK FOR NEXT DRIVE
215 000454- 000456 CHKDRV: ;*****
216 000456- 104413 000000- ENDITS, REGIN ;SIGNAL END OF ITERATION.
217 ;*****
218 ;*****

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219 000462 062767 000400 002576 1S: ADD #400,DRIVE ;NEXT DRIVE
220 000470 005267 003672 002566 INC NUMR ;
221 000474 036767 002544 002566 BIT DRMSK,DVICE ;IS THAT DRIVE PRESENT
222 000562 001763 000000 002566 BFO LOOP ;NO GO FOR NEXT ONE
223 000564 005067 002474 002566 CLR RETP ;CLEAR A FEW LOCATIONS
224 000510 005067 002574 002566 CLR RWEP ;READ WRITE ERROR FLAG
225 000514 005067 002530 002566 CLR CNT ;COUNT
226
227 ;
228 ;
229 ;
230 ;
231 ;
232 ;
233 000520 004767 000576 002526 JSR PC,WTRDY ;ISSUE DRIVE RESET, CLEAR VOLUME
234 000530 012767 000201 002526 MOV R5,DRVRTS ;
235 000536 004567 001112 002526 LOOP: JSP R5,RDHRD ;READ HEADER ON DISK
236 000542 016767 002464 002512 MOV T,MP,HDRWD ;GET HEADER
237
238 ;
239 ;CHECK TO SEE IF RANDOM SEEK IS REQUESTED, BIT 1 OF SR1
240 ;SET INDICATES A RANDOM SEEK OTHERWISE SEEK IS INCREMENTAL
241 ;
242
243 000550 032767 000002 177240 TAG: BIT #BIT1,SR1 ;INCREMENTAL OR RANDOM SEEKS?
244 000556 001446 000177 002474 REO TAG1 ;INCREMENTAL, TAG1
245 000560 042767 000177 002474 BIC #177,HDRWD ;CLEAR HEAD AND SECTOR BITS
246 000572 016700 177256 PANDS,BEGIN ;
247 000576 010001 100177 002474 MOV ANNUM,RC ;STORE IT AWAY
248 000600 042700 000177 002474 RC,R1 ;SAVE A COPY
249 000604 010001 002454 002474 BIC #100177,RO ;CLEAR BIT 15, HEAD AND SECTOR
250 000610 166767 002446 002446 SUB HDRWD,DIFWD ;LET'S CALCULATE DIFFERENCE WORD
251 000616 100003 002446 002446 BPL 1S ;GET DIFFERENCE TO SEEK
252 000620 005467 002440 002440 NEG DIFWD ;MAKE DIFF ABSOLUTE
253 000624 000000 002430 002430 1S: BIS #4,DIFWD ;SET DIRECTION BIT
254 000634 052767 000001 002422 2S: BIS #1,DIFWD ;SET MARKER
255 000642 032701 000100 002422 BIT #100,P1 ;TEST HEAD
256 000650 052767 000020 002406 3S: BIS #20,DIFWD ;SET HEAD
257 000656 016767 002400 002372 MOV P1,HDRWD ;GET EXPECTED HEADER
258 000662 042767 000777 002372 JMC #10077,HDRWD ;CLEAR SECTOR BITS
259 000670 000167 000126 002360 TAG1: BIC #177,HDRWD ;CLEAR OUT SECTOR BITS & HEAD
260 000674 042767 000177 002352 BIT #77600,HDRWD ;ON TRACK?
261 000678 032767 007760 002352 BNE 1S ;NO, GO CHECK FOR CYLINDER 77600
262 000712 012767 000200 002342 MOV #200,HDRWD ;SET NEXT ADDRESS=CYL 1
263 000720 012767 000205 002336 MOV #205,DIFWD ;DIF WD 1, MARKER, SEEK IN, HS=0
264 ;SET CURRENT HD=0, SEEK IN
265
266 000726 000435 000170 002324 1S: BP TAG2 ;CURRENT ADDRESS=LAST TRACK?
267 000730 022767 007760 002324 CMP #77600,HDRWD ;NO, CONTINUE
268 000736 001007 007750 002314 BNE #77500,HDRWD ;NEXT ADDRESS=LAST CYL HS=1
269 000740 012767 000221 002314 MOV #221,DIFWD ;DIF WD 1, MARKER, SEEK OUT, HS=1
270 000746 012767 000221 002314 ;SET CURRENT HD=1, SEEK OUT
271
272
273
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275 000754 000422 000004 002300 2S: BR TAG2 ;SN SET IN DIF WORD
276 000756 032767 001404 002266 BIT 3S ;NO, 3
277 000764 001404 000200 002266 ADD #200,HDRWD ;YES, CYL WILL INCREMENT
278 000766 062767 000000 002266 BR 4S ;SKIP OVER
279 000774 000403 000200 002256 3S: SUB #200,HDRWD ;NO, CYL WILL DECREMENT
280 000776 162767 000200 002252 4S: BIT #205,DIFWD ;HEAD SET?
281 001004 032767 000020 002240 TAG2: BFO TAG2 ;NO, LEAVE EXPECTED ALONE
282 001012 010001 000100 002240 BIS #100,HDRWD ;YES, LEAVE HEAD SELECT BIT
283 001014 032767 000100 002240 JSR R5,SEEK ;PERFORM SEEK
284 001022 004567 000002 002240 JSR PC,WTRDY ;WAIT FOR SEEK TO FINISH
285 001026 004767 000270 002240 JSR R5,RDHRD ;READ HEADER VERIFY CORRECT
286 001032 004567 000616 002240 ;SEEK
287 ;READ HEADER
288 001036 016767 002170 003316 MOV T,MP,CURADR ;CLEAR OUT SECTOR BITS
289 001044 042767 000077 003310 RIC #77,CURADR ;WAS SEEK CORRECT?
290 001052 027667 003304 002202 CMP CURADR,HDRWD ;NO REPORT ERROR
291 001060 061425 000000 005112 REO 6S ;
292
293 MOV RLCS,CSRA ;
294 001062 016767 002122 177000 MOV #RLCS,ACSR ;
295 001070 017767 002106 177000 MOV #RLCS,ASTAT ;
296 001104 104403 000000 005112 MSCNS,BEGIN,BDSEK ;ASCII MESSAGE CALL WITH COMMON HEADER
297
298 001112 012767 000051 176766 MOV #51,ERRTPP ;BAD SEEK
299 *****
300 001120 104405 000000 000000 HDRDS,BEGIN,NULL ;SEEK WAS BAD
301 *****
302
303 001126 016767 003230 002126 MOV CURADR,HDRWD ;MAKE MISTAKE NEW HDRWD
304
305 001134 026727 002122 077700 6S: CMP HDRWD,#77700 ;ARE WE ON LAST TRACK
306 001142 000167 177400 077700 BNE 7S ;NO, CONTINUE
307 001144 000167 177400 JMP TAG ;YES, GO GET ANOTHER CAUSE ITS THE BAD SECTOR TRACK
308
309 001150 016767 176756 002116 7S: MOV #RBUFSZ,WCNT2 ;GET BUFFER SIZE (READ)
310 001156 005467 002112 002116 NEG WCNT2 ;NEGATE FOR RIMP
311 001162 104414 000000 002116 CWRHFS,BEGIN ;GET WRITE BUFFER INFORMATION
312 001166 016767 176750 002076 MOV #RBUFSZ,WCNT1 ;GET BUFFER SIZE (WRITE)
313 001174 005467 002072 002076 NEG WCNT1 ;NEGATE FOR RLMP
314
315 001200 004567 000324 JSR R5,WRITE ;WRITE DATA
316 001204 005767 002030 TST RWFR ;ERROR???
317 001210 000000 002030 BNE 5S ;YES, SKIP READ
318 001212 004567 000302 JSR R5,WRCHK ;
319 001216 005767 002016 TST RWEP ;
320 001222 001011 000340 BNE 5S ;
321 001224 004567 000340 JSR R5,READ ;READ DATA
322
323 001230 005767 002004 TST RWEP ;
324 001234 001304 000000 000126 RNE 5S ;
325 001236 104412 000000 000126 CDATAS,BEGIN,RBUFPA ;REQUEST FOR MONITOR TO CHECK DATA
326 001244 001246 000000 000126 *2 ;IF ERROR, CONTINUE
327
328 001246 005067 001766 5S: CLR RWEP ;
329 001252 005267 001772 INC CNT ;

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31 001256 022767 002000 001764      CMP      #1024,CNT
32 001264 001002 000000 000000      RNE      IS
33 001266 000167 177160 000000      JMP      LOOP
34 001272 000167 177240 000000      1S:     JMP      LOOP
35
36
37 001276 032767 000001 176512      CKDROP: BIT      #BIT0,SR1
38 001304 001407 000000 000000      BRB      IS
39 001306 004964 000102 000000      JSR      RS,DROP
40 001312 000167 177134 000000      1S:     JMP      LOOP
41
42
43
44
45 001316 000000 000000 000000      FINI:   ENDS,BEGIN      ;DROP THE MODULE
46 001316 104410 000000 000000      ;WAIT FOR DRIVE READY
47
48
49
50
51 001322 042777 001400 001660      WTRDY: BIC      #1400,ARLCS
52 001330 056777 001732 001652      BIC      DRIVE,ARLCS
53 001336 012767 000000 001702      MOV      #7777,CLK
54 001344 032777 000001 001636      1S:     BIT      #1,ARLCS      ;SET UP TIMEOUT
55 001354 000000 000000 000000      BRB      IS      ;DRIVE READY?
56 001360 104407 000000 000000      BREAKS,BEGIN      ;YES - EXIT
57 001364 005367 001656 000000      BREAKS,BEGIN      ;TEMPORARY RETURN TO MONITOR....
58 001370 001365 000000 000000      DEC      CLK      ;THEN CONTINUE AT NEXT INSTRUCTION.
59 001372 012767 000006 176506      BNE      IS      ;CHECK TIMEOUT
60 001400 104405 000000 003210      MOV      #6,ERRTPV ;DRIVE NOT READY
61 001406 004567 000002 000000      HDRS,BEGIN,ARLCS ;*****
62 001412 000207 000000 000000      JSR      RS,DROP ;DRIVE NOT READY
63 001412 000207 000000 000000      2S:     RTS      PC ;*****
64 001412 000207 000000 000000      ;DROP THE DRIVE ;CLEAR THAT DRIVE FROM LIST
65
66
67
68
69
70
71
72 001414 104403 000000 005032      DROP:   MSGNS,BEGIN,DROPMS ;ASCII MESSAGE CALL WITH COMMON HEADER
73 001414 104403 000000 005032      BIC      DRVMSK,DVCE ;CLEAR THAT DRIVE
74 001430 001006 000000 000000      BNE      IS      ;ANY LEFT, YES IS
75
76
77 001432 104403 000000 005042      MSGNS,BEGIN,NOLEFT ;ASCII MESSAGE CALL WITH COMMON HEADER
78 001440 006167 177650 000000      MOV      (SP),R5
79 001442 006167 177650 000000      JMP      FINI      ;DROP THE MODULE
80
81 001446 000205 000000 000000      1S:     RTS      R5      ;EXIT
82
83
84
85
86
;ROUTINE TO SET UP PL11 REGISTERS, VECTOR AND BR LEVEL
;

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387 001450 016700 176332 000000      SETUP:  MOV      ADDR,R0      ;GET BASE ADDRESS
388 001460 005026 001530 000000      TST      (R0),ARLCS ;COMPARE REGISTER
389 001462 010067 001524 000000      MOV      R0,RLRA      ;INCREMENT FOR NEXT
390 001466 005720 001520 000000      TST      (R0)+        ;BUS ADDRESS
391 001470 000920 001520 000000      MOV      R0,RLDA      ;INCREMENT FOR NEXT
392 001474 010067 001514 000000      TST      (R0)+        ;DISK ADDRESS
393 001478 010067 001514 000000      MOV      R0,RLMP      ;INCREMENT FOR NEXT
394 001482 010067 001514 000000      MOV      VECTOR,R0    ;DATA BUFFER
395 001486 010067 001514 000000      MOV      VECTOR,R0    ;GET VECTOR ADDRESS
396 001490 012767 176302 000000      MOV      R1,(R0)+    ;SET POINTER
397 001494 012767 176274 000000      MOV      R1,(R0)+    ;SET PRIORITY
398 001516 000207 000000 000000      RTS      PC          ;RETURN
399
400
401 001520 012767 000102 001530      ;DRIVERS (INTERRUPT)
402 001526 000403 000000 000000      WRCHK:  MOV      #102,FUNC
403
404
405 001530 012767 000112 001520      WRITE:  MOV      WCNT1,ARLMP ;WRITE FUNCTION
406 001536 012777 001530 001452      WRCON:  MOV      HDRWD,ARLDA ;WORD COUNT
407 001544 016777 001512 001442      MOV      WBUFP,ARLBA ;DISK ADDRESS
408 001550 016777 176356 001432      MOV      WBUFEA,XMEM ;BUFFER ADDRESS
409 001560 000457 176352 001472      MOV      WBUFEA,XMEM ;EXT. MEM. BITS
410
411
412 001570 012767 000114 001460      READ:   BR      EXEC      ;READ FUNCTION
413 001576 016777 001472 001412      MOV      WCNT2,ARLMP ;WORD COUNT
414 001604 016777 001452 001402      MOV      HDRWD,ARLDA ;DISK ADDRESS
415 001610 016777 176310 001372      MOV      RBUFP,ARLBA ;BUFFER ADDRESS
416 001620 016767 176304 001432      MOV      RBUFEA,XMEM ;EXT. MEM. BITS
417
418 001626 000433 000106 001420      BR      EXEC      ;SEEK FUNCTION
419 001630 012767 000122 001350      MOV      DIFWD,ARLDA ;DIFFERENCE WORD
420 001636 012777 000001 001342      BIC      #1,ARLDA    ;SET MARKER BIT
421 001644 000433 000110 001374      BR      EXEC      ;SET MARKER BIT
422
423 001654 000433 000110 001374      RDHDR:  BR      EXEC      ;READ HEADER FUNCTION
424 001662 000433 000003 001322      BR      EXEC      ;SET MARKER BIT
425 001666 012767 000104 001322      GSTAT:  MOV      #3,ARLDA    ;GET STATUS, MARKER
426 001672 012767 000104 001356      MOV      #104,FUNC   ;GET STATUS FUNCTION
427
428
429 001700 000433 000013 001304      BR      EXEC      ;RESET, GET STATUS, MARKER
430 001710 012767 000164 001340      DRVRTS: MOV      #13,ARLDA  ;GET STATUS
431 001716 0056767 001336 001332      MOV      #104,FUNC   ;GET STATUS
432 001724 0056767 001324 001324      EXEC:   BIC      XMEM,FUNC  ;SET EA BITS
433 001732 0056767 001324 176350      BIC      DRIVE,FUNC  ;SELECT DRIVE
434 001740 016777 001312 001242      MOV      INTSRV,VECTOR ;SET UP INTERRUPT VECTOR
435 001746 104400 000000 000000      MOV      FUNC,ARLCS  ;ISSUE FUNCTION
436
437
438
439 001752 000000 000000 001760      INTSRV: ;-----
440 001752 000004 000000 001760      ;PIRQS,BEGIN,1S      ; QUEUE UP TO CONTINUE AT 1S AND RTI
441
442
443
444 001760 005037 001250 001220      1S:     CLP      T,STAT      ;LOAD ADDR OF CSR
445 001764 016767 001220 176106      MOV      RLC5,CSR    ;LOAD CONTENTS OF CSR
446 001772 012767 001220 176102      MOV      ACSR,ACS    ;LOAD ADDR OF CSR
447 001780 016767 176076 001212      MOV      ACSR,ACS    ;LOAD CONTENTS OF CSR
448 002006 017767 001200 001212      MOV      ARLBA,T.BA

```

```
443 002014 017767 001174 001206 MOV RRLDA,T,DA
444 002030 005767 001170 001202 MOV RRLMP,T,MP
446 002034 100403 TS CS
447 002036 005067 001142 RMI IIS ;ANY ERRORS
448 002038 000205 CLR RETRY ;YES, CONTINUE TO CHECK
449 002044 005267 001170 11S: INC RWER ;NO, RETURN CALL+4 SKIP RETRY
450 002050 012767 005025 003026 MOV #NULLX,HTYPE ;SETUP FOR NULL SKIP
451 002054 032767 040000 001140 BIT #PITI4,T,CS ;DRIVE ERROR
452 002058 001457 ZS ;NO,BRANCH
453 002066 012777 000003 001120 MOV #3,RRLDA ;GET STATUS
454 002074 012767 000004 001120 MOV #4,TMP
455 002100 056767 001160 001112 BIS DRIVE,TMP
456 002110 016777 001106 001072 MOV TMP,@RLCS
458 002116 104407 000000 99S: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR....
459 002122 104407 000000 ;THEN CONTINUE AT NEXT INSTRUCTION.
460 002126 032777 000200 001054 BIT #200,@RLCS
461 002134 001770 BEQ 08S
462 002136 017767 001054 001070 MOV @RLMP,T,STAT
463 002144 104403 000000 005076 MSGNS,BEGIN,DRVER ;ASCII MESSAGE CALL WITH COMMON HEADER
464 002152 012767 000006 175726 MOV #6,ERRVLP ;DRIVE ERROR
465 *****
466 002160 104405 000000 005122 HDRS,BEGIN,TABLE ;
467 *****
468 002166 012777 000013 001020 MOV #13,RRLDA
469 002174 016777 001022 001006 MOV TMP,@RLCS
470 *****
471 002202 104407 000000 98S: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR....
472 002210 032777 000200 ;THEN CONTINUE AT NEXT INSTRUCTION.
473 002216 032777 000200 000770 BIT #200,@RLCS
474 002220 001776 BEQ 08S
475 002222 000530 BP NORPT
476 002224 000200 000772 2S: BIT #PITI3,T,CS ;NXM SET
477 002226 001404 BEQ 21S
478 002234 012767 005021 002642 MOV #NXM,HTYPE
479 002242 000444 BR RPTERR
480 002244 002000 000752 21S: BIT #PITI10,T,CS
481 002250 001423 BEQ 4S
482 002252 012767 004774 002622 MOV #OPI,HTYPE ;OPI SET
483 002262 032767 004000 000734 BIT #PITI1,T,CS ;INITIAL SET FOR OPI
484 002270 003404 DEC #1,BRANCH ;HRCRC?
485 002274 001404 MOV #1,HTYPE ;HRCRC ERROR
486 002300 000504 BR #NDRSC ;FIND BAD SECTOR
487 002302 032767 010000 000714 3S: BIT #PITI2,T,CS ;HNF
488 002310 001423 BEQ #HNF,HTYPE ;NO, IT'S OPI GO REPORT
489 002316 001000 000510 002564 MOV #HNF,HTYPE ;HNF ERROR
490 002320 000474 BR #NDRSC ;GO CHECK BAD SECTOR FILE
491 002322 032767 004000 000674 4S: BIT #PITI1,T,CS ;DCK?
492 002330 001404 BEQ 5S ;NO,MUST BE DLT
493 002336 001276 DEC T,DA ;TRACK UP TO SECTOR THAT WAS BAD
494 002338 012767 005004 002540 MOV #DCK,HTYPE ;DCK ERROR
495 002344 000462 BR #NDRSC ;GO CHECK BAD SECTOR FILE
496 002346 012767 005000 002530 5S: MOV #DLT,HTYPE ;SETUP DLT ERROR
498 002354 032767 000004 175434 RPTERR: BIT #PITI2,SPI ;PRINTING SOFTERRORS
```

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499 002362 001011 RNE 55S ;NO, SKIP PRINT
500 *****
501 002364 104403 000000 005102 MSGNS,BEGIN,SOFT ;ASCII MESSAGE CALL WITH COMMON HEADER
502 002372 012767 000001 175506 MOV #1,ERRVLP ;DATA ERROR
503 *****
504 002400 104406 000000 005122 HDRS,BEGIN,TABLE ;
505 *****
506 *****
507 002406 026767 000572 000572 55S: CMP RETRY,LIMIT ;RETRY EXHAUSTED
508 002414 001405 BEQ 6S ;YES, NO MORE RETRIES
509 002416 000562 INC RETRY
510 002418 000004 SUB #RS,RS
511 002426 000205 RTS
512 *****
513 002430 012700 004370 6S: MOV #FNCLST,R0 ;SET LIST TO GET FUNCTION
514 002434 016701 000616 MOV #FUNC,R1
515 002440 006201 ASP R1 ;SHIFT FUNCTION OVER
516 002442 042701 177770 BIC #177770,R1 ;LEAVE ONLY FUNCTION
517 *****
518 002450 002520 7S: DEC (R0)+ ;RUMP POINTER
519 002452 005301 DEC R1
520 002454 001375 BNE 7S ;STAY IN LOOP TIL FOUND
521 *****
522 002456 011067 002370 MOV (R0),EXCEED ;GET FUNCTION MESSAGE
523 002462 016767 002416 MOV #TYPE,TERI ;GET ERROR TYPE
524 002470 104403 000000 005062 MSGNS,BEGIN,HARD ;ASCII MESSAGE CALL WITH COMMON HEADER
525 002476 104403 000000 005052 MSGNS,BEGIN,EXCEED ;ASCII MESSAGE CALL WITH COMMON HEADER
526 *****
527 002510 000205 NORPT: CLR RETRY
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;ERROR WAS HRCRC OP HNF OR DCK POSITION TO LAST TRACK AND RECOVER
;BAD SECTOR FILES. IF DCK/HNF CHECK WHOLE DLT. IF HRCRC CHECK IF
;WE WERE DOING A PDHDR IF READ HDR THEN CHECK ONLY TRACK AND
;CYLINDER.
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555 002632 056777 000430 002350 RFS DRIVE,ARLCS ;BIT SET IN DRIVE, SELECT
557 002646 042777 000200 000334 BFC #200,ARLCS ;#000000 BIT IF NEEDED
558 002654 004767 176442 JSR PC,WTRDY ;WAIT FO DRIVE
559 002666 005777 004324 TST ARLCS ;READ SUCCESSFUL??
560 002664 100023 BPL 4S ;YES, GO CHECK FOR SECTOR
561 002666 062700 000004 ADD #4,R0 ;NO, NEXT SECTOR
563 002672 005767 000340 TST WFLG ;WHICH WE READING, MAUF OR FIELD
564 002676 003388 077724 BNE 3S ;FIELD COMPARE AGAINST 77750
565 002700 005777 077724 CMP #77724,R0 ;MANUFACTURING AT END
566 002704 005337 BNE 4S ;NO, GO BACK AND READ NEXT
567 002706 005777 000000 JSR #0 ;ASCII MESSAGE CALL WITH COMMON HEADER
568 002708 104403 000000 005072 99S: MSGNS,BEGIN,NOSEC ;ASCII MESSAGE CALL WITH COMMON HEADER
569 002712 005777 176474 JSR R5,DROP ;ASCII MESSAGE CALL WITH COMMON HEADER
570 002714 004567 176474 JMP OLP5K ;ASCII MESSAGE CALL WITH COMMON HEADER
571 002720 000167 175532 ;ASCII MESSAGE CALL WITH COMMON HEADER
572 002724 022700 077750 3S: CMP #77750,R0 ;AT END OF FIEL BAD
573 002730 001325 BNE 2S ;NO, GO BACK
574 002732 000765 BR 99S ;YES GO DROP DRIVE
575 002734 016701 175164 4S: MOV R0UFVA,R1 ;GET WHERE WE READ
576 002740 062701 000010 ADD #10,R1 ;SKIP PAST I.D. ETC.....
577 002744 012702 000176 MOV #126,R2 ;ONLY 126 ENTRIES
578 002748 002103 000176 MOV #R1+,R3 ;GET CYLINDER
579 002750 004337 BNE 44S ;GET CYLINDER
580 002754 012104 MOV (R1),R4 ;GET TRACK AND SECTOR
581 002758 002303 SWAB R3 ;ALIGN PROPERLY
582 002762 150403 ASWB R4,R3
583 002764 032704 000400 BIT #400,R4
584 002770 001403 BEQ 4S
585 002772 052703 BJS #100,R3
586 002776 005014 002100 5S: CMP #CRC,HCTYPE ;IS ERROR HCRC?
587 002778 001012 BNE 6S ;NO, GO LOOK FOR BAD SECTOR
588 002782 022767 000110 000242 CMP #110,FUNC ;WE'RE WE DOING READ HEADER
589 002786 001005 BNE 6S ;NO, GO LOOK FOR BAD SECTOR
590 002790 004767 000077 BFC #7,R3 ;YES, CLEAR SECTOR BITS
591 002794 0020367 CMP R3,HDRWD ;RAD SECTOR
592 002798 001404 BEQ 7S
593 002802 0020367 BJS #3,T.DA ;IS THIS ONE IT????????
594 002806 001003 BNE R3 ;NO
595 002810 001003 INC R3
596 002814 001003 DEC R2
597 002818 001337 BNE 44S ;CHECKED WHOLE FILE
598 002822 005767 000160 88S: TST WFLG ;WHICH WE DOING
599 002826 001005 BNE 6S ;FIELD WE'RE DONE
600 002830 0017724, R0 TIL ;MANUFACT. THEN SET UP FIELD
601 002834 0017724, R0 MOV #77724,R0
602 002838 000645 BR 2S
603 002842 016700 006164 9S: MOV HDRWD,R0
604 002846 012701 077600 MOV #77600,R1

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611 003102 042700 000100 BIC #100,R0
612 003108 160001 000100 SUB R0,R1
613 003114 042777 000001 000072 MOV #1,ARLDA
614 003118 032767 000100 000132 RFS #1,ARLDA
615 003122 032767 000100 000132 BIT #100,HDRWD
616 003126 014003 BEQ 10S
617 003130 017777 BJS #9,ARLDA
618 003134 015767 000122 000070 MOV DRIVE,WFLG
619 003138 052767 000066 000062 BFC #6,WFLG
620 003142 016777 000056 MOV WFLG,ARLCS
621 003146 004767 000050 JSR PC,WTRDY
622 003150 005777 001002 BNE 11S
623 003154 000167 177154 JMP RPTERR
624 003200 000167 177300 JMP NORPT

```

LOCATIONS USED BY MODULE

```

RETRY: .WORD 0
LIMIT: .WORD 0
RLCS: .WORD 0
RLBA: .WORD 0
RLDA: .WORD 0
RLMP: .WORD 0
TWP: .WORD 17777
T.CS: .WORD 0
T.BA: .WORD 0
T.DA: .WORD 0
T.DP: .WORD 0
T.STAT: .WORD 0
WFLG: .WORD 0
RME: .WORD 0
FND: .WORD 0
DRVWSK: .WORD 0
CLK: .WORD 0
CNT: .WORD 0
HLDVR: .WORD 0
DLTCNT: .WORD 0
FUNC: .WORD 0
XMEM: .WORD 0
HDRWD: .WORD 0
DIFWD: .WORD 0
DRIVE: .WORD 0
DVICE: .WORD 0
WNT1: .WORD 0
WNT2: .WORD 0
RUFIN: .RLKW 256
RSECF: .RLKW 256
CURMSC: .WORD 0
CURADR: .WORD 0
NXTADR: .WORD 0
NUMR: .WORD 0
FNCLST: .WORD 0

```

NUMBER OF DATA LATE ERRORS
FUNCTION TO BE PERFORMED
#A BITS FOR R/W
HEADER WORD (RDHDR, R/W)
DIFFERENCE WORD (SEK)
DRIVE UNDER TEST (BITS 8,9)
WORKING "VIDE"
WORD COUNT (WRITE)
WORD COUNT (READ)
RAD SECTOR LIST

667	004372	004527				MES9	
668	004374	004507				MES6	
669	004376	004473				MES5	
670	004400	004527				MES8	
671	004402	004514				MES7	
672							
673							
674	004404	047516	042040	044522	MES1:	.ASCIZ	"NO DRIVES PRESENT %"
675	004405	047522	020040	051124			
676	004420	051505	047105	020124			
677	004426	000045					
678	004432	042522	042040	044522	MES2:	.ASCIZ	"NO DRIVES LEFT %"
679	004432	042522	020123	042524			
680	004444	052106	022440	000			
681	004452	000	044522	042526	MES3:	.ASCIZ	"DRIVE "
682	004458	000040					
683	004460	042040	047522	050120	MES4:	.ASCIZ	" DROPPED %"
684	004466	042105	022440	000			
685	004473	122	040505	020104	MES5:	.ASCIZ	"READ HEADER"
686	004480	042510	042101	051105			
687	004508	000					
688	004507	123	042505	000113	MES6:	.ASCIZ	"SEEK"
689	004514	042522	042101	000	MES7:	.ASCIZ	"READ"
690	004522	000	044522	042524	MES8:	.ASCIZ	"WRITE"
691	004522	000					
692	004527	104	044522	042526	MES9:	.ASCIZ	"DRIVE RESET"
693	004534	051040	051505	052105			
694	004543	000					
695	004543	040	042522	051124	MES10:	.ASCIZ	" RETRY LIMIT EXCEEDED%"
696	004550	020131	044514	044515			
697	004556	020124	054105	042503			
698	004562	042105	042105	000045			
699	004562	051105	042505	020113	MES11:	.ASCIZ	"*SEEK TO WRONG CYLINDER*"
700	004600	047524	053440	047522			
701	004606	043516	041440	046131			
702	004613	047100	042504	022522			
703	004623	000					
704	004623	104	052101	020101	MES12:	.ASCIZ	"DATA LATE%"
705	004630	040514	042524	000045			
706	004634	042105	042105	042105	MES13:	.ASCIZ	"DRIVE ERROR%"
707	004634	051105	047522	022522			
708	004652	000					
709	004652	123	043117	020124	MES14:	.ASCIZ	"SOFT ERROR "
710	004669	051105	047522	020122			
711	004671	020040	000				
712	004671	122	030114	020061	MES15:	.ASCIZ	"RLO1 LOAD UNIT DROPPED"
713	004676	047514	042101	052440			
714	004703	044719	042524	051104			
715	004703	044719	042524	000104			
716	004720	040510	042122	042440	MES16:	.ASCIZ	"HARD ERROR "
717	004726	051122	051117	020040			
718	004738	000503					
719	004738	000503	052116	051040	NBDS:	.ASCIZ	"CANT RECOVER BAD SECTOR FILE*"
720	004744	041505	053117	051105			
721	004752	041040	042101	051440			
722	004760	041505	047524	020122			

723	004766	044506	042514	000045			
724	004774	050117	000111				
725	005000	046104	000124		OPI:	.ASCIZ	"OPI"
726	005000	046104	000124		DLT:	.ASCIZ	"DLT"
727	005010	049110	000162		DCK:	.ASCIZ	"DCK"
728	005014	041510	041522		HNF:	.ASCIZ	"HNF"
729	005021	116	046530	000	HCR:	.ASCIZ	"HCR"
730	005021	040	000		NWM:	.ASCIZ	"NWM"
731	005027	045	000		NULLX:	.ASCIZ	"NULLX"
732			000		CR:	.ASCIZ	"CR"
733		005032					
734					.EVEN		
735	005032	004451			DROPMS:	MES3	
736	005034	004366			NUMR		
737	005036	004460			MES4		
738	005046	177777			177777		
739							
740	005042	004430			NOLEFT:	MES2	
741	005044	177777			177777		
742							
743	005046	004404			ARORT:	MES1	
744	005048	177777			177777		
745							
746							
747							
748	005052	000000			EXCEED:	.WORD	0
749	005054	004543			MES10		
750	005056	005077			CR		
751	005080	177777			177777		
752							
753	005062	004720			HARD:	MES16	
754	005064	005064			TERI:	.WORD	0
755	005064	005064			CR		
756	005070	177777			177777		
757							
758	005072	004736			NOSEC:	NBDS	
759	005074	177777			177777		
760							
761	005076	004636			DRVPR:	MES13	
762	005100	177777			177777		
763							
764	005102	004653			SOFT:	MES14	
765	005104	000000			HTVPE:	.WORD	0
766	005106	005077			CR		
767	005110	177777			177777		
768							
769	005112	004572			RDSPEK:	MES11	
770	005114	177777			177777		
771							
772	005116	004671			DROPLD:	MES15	
773	005120	177777			177777		
774							
775							
776					.REGISTERS OF RL11		
777	005122				.EVEN		
778					TABLE:		

