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SEQ 0001

.REV *

IDENTIFICATION

PRODUCT CODE: AC-E679M-MC
PRODUCT NAME: CXRPAMO RP11 MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. ABSTRACT:

RPA IS A IOMODX THAT EXERCISES THE RP11 HIGH AND LOW DENSITY DISK DRIVES.

2. REQUIREMENTS:

HARDWARE: A PDP11 INTERFACED WITH A RP11.
STORAGE:: RPA REQUIRES:

1. DECIMAL WORDS: 1237
2. OCTAL WORDS: 02325
3. OCTAL BYTES: 4652

3. PASS DEFINITION:

AN END OF PASS OCCURS WHEN 788,000 WORDS HAVE BEEN TRANSFERRED.
FIRST A WRITE OF 1024 WORDS IS EXECUTED FOLLOWED BY A WRITE CHECK
OF 1024 WORDS, THEN READING 256 WORDS FOLLOWED BY AN IN-CORE
COMPARE. THIS IS DONE ON ALL DRIVES THEN ALL TRACKS.

4. EXECUTION TIME:

AN END OF PASS TAKES APPROXIMATELY ONE MINUTE.

5. CONFIGURATION REQUIREMENTS:

DEFAULT PARAMETERS ARE AS FOLLOWS;
DVA=176710
VCT=254
RR1=5

6. DEVICE/OPTION SETUP:

MAKE SURE THE DRIVE IS POWERED UP WITH WRITE ENABLED AND
THAT THE DRIVE IS READY. ALSO BE SURE THAT THE PACK HAS
BEEN FORMATTED PROPERLY.

7. MODULE OPERATION:

EXECUTES A WRITE, WRITE CHECK, AND A READ ON ALL TRACKS, ALL SECTORS, AND ALL CYLINDERS.
A RETRY IS DONE 3 TIMES BEFORE A MODULE IS DROPPED OR CONTINUES TO A NEW BLOCK DEPENDING ON THE SR1 OPTION BITS.
LOCATION "RTLMT" CAN BE CHANGED TO ALTER THE NUMBER OF ATTEMPTED RETRYS.

8. OPERATING OPTIONS:

SR1 BIT0=0->IF LOW DENSITY
SR1 BIT0=1->IF HIGH DENSITY
SP1 BIT1=0->DROPS MODULE AFTER 3 UNRECOVERABLE ERRORS
SP1 BIT1=1->GOES ON TO NEXT BLOCK AFTER AN UNRECOVERABLE ERROR
SP1 BIT2=0->WILL TIMEOUT DATA LATE ERRORS AND COUNTS THEM IN LOCATION DLTCNT
SP1 BIT2=1->WILL NOT TIMEOUT DATA LATE ERRORS AND KEEPS COUNT OF THEM IN DLTCNT
THERE IS A TABLE AT LOCATION "BADLOC" IN WHICH UP TO 20 CYLINDER-TRACK
COMBINATIONS MAY BE ENTERED. FOR ANY CYL-TRK LISTED THERE NO ERRORS
WILL BE REGISTERED. THIS IS INTENDED FOR USE WITH PACKS WITH KNOWN
BAD SPOTS. REFER TO THE LISTING AT LOCATION BADLOC FOR DIRECTIONS
ON HOW TO ENTER DISC ADDRESSES INTO THE TABLE.
NOTE: ANY ADDRESS ENTERED IN THIS TABLE WILL APPLY TO ALL DISKS
UNDER TEST.

9. NON-STANDARD PRINTOUTS:

ALL PRINTOUTS ARE STANDARD ACCORDING TO DEC/X11 DOCUMENTS.
PRFOR PRINTOUTS OTHER THAN DATA ERRORS AND NOT READY ERRORS
DUMP THE REGISTERS IN THE FOLLOWING ORDER:

DEVICE STATUS
ERROR
CONTROL STATUS
WORD COUNT
BUS ADDRESS
CYLINDER ADDRESS
DISK ADDRESS
SELECTED UNIT CYLINDER ADDRESS

```

* ;RPAM11 EXERCISER
000000 IOMODX <RPAM>176710,17545,0,750,6 INRD,256,1024-
000000 MODULE 150000,RPAM,1771f,254,5,0,750,6 INRD,256,1024.
; .TITLE RPAM DEC/X11 SYSTEM EXERCISER MODULE
; DDXCOM VERSION 6 2-MAY-78
; F13 BIN
***** BEGIN *****
000000 050122 046501 040 MODNAME: ASCII /RPAM /,MODULE NAME
000000 000100 XFLAG: BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
000000 000100 ADDR: 150000+0 ;1ST DEVICE ADDR.
000000 000254 DECOR: 254 ;1ST RR LEVEL.
000000 000120 240 BB1: BYTE PRTY5+0 ;2ND RR LEVEL.
000000 000130 000 BB2: BYTE PRTY6+0
000000 000001 000 DWID1: 6+1 DEVICE INDICATOR 1.
000000 000000 SR1: OPEN SWITCH REGISTER 1.
000000 000000 SS2: OPEN SWITCH REGISTER 2.
000000 000000 SS3: OPEN SWITCH REGISTER 3.
000000 000000 SS4: OPEN SWITCH REGISTER 4.
***** END *****
000000 150000 STAT: 150000 STATUS WORD
000030 000252 INIT: START MODULE START ADDR.
000032 000252 SPOINT: MODSP MODULE STACK POINTER.
000036 000130 PSCNT: 0 PASS COUNTER.
000036 000130 LOCNT: 150. # OF ITERATIONS PER PASS=750.
000036 000080 COUNT: 0 LOC TO SAVE COUNT ITERATIONS
000042 000080 SOFCNT: 0 LOC TO SAVE TOTAL SOFT ERRORS
000044 000000 HRCNT: 0 LOC TO SAVE TOTAL HARD ERRORS
000046 000000 SOFPAS: 0 LOC TO SAVE SOFT ERRORS PER PASS
000050 000000 HRDPAS: 0 LOC TO SAVE HARD ERRORS PER PASS
000052 000000 SYSCNT: 0 # OF SYS ERRORS ACCUMULATED
000056 000000 RANDUM: 0 HOLDS RANDOM J WHEN RAND MACRO IS CALLED
000056 000000 CONIG: 0
000060 000000 RES1: 0 RESERVED FOR MONITOR USE
000062 000000 RES2: 0 RESERVED FOR MONITOR USE
000064 000000 SVR0: OPEN LOC TO SAVE R0.
000066 000000 SVR1: OPEN LOC TO SAVE R1.
000068 000000 SVR2: OPEN LOC TO SAVE R2.
000072 000000 SVR3: OPEN LOC TO SAVE R3.
000074 000000 SVR4: OPEN LOC TO SAVE R4.
000076 000000 SVR5: OPEN LOC TO SAVE R5.
000100 000000 CSRA: OPEN LOC TO SAVE R6.
000102 000000 SBDR: OPEN ADDR OF CURRENT CSR.
000102 000000 ACSPR: OPEN ADDR OF GOOD DATA, OR
000104 000000 WASADP: OPEN ADDR OF BAD DATA, OR
000106 000000 ASR: OPEN STATUS REG CONTENTS.
000106 000000 ERPTIP: TYPE OF ERROR
000110 000000 AWAS: OPEN EXPECTED DATA.
000112 000143 RSTART: RESTRT ACTUAL DATA.
000114 000000 WDTO: OPEN RESTART ADDRESS AFTER END OF PASS
000116 000000 WDPR: OPEN WORDS TO MEMORY PER ITERATION
                                         WORDS FROM MEMORY PER ITERATION

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000120 000000 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
000122 000006 IDNUM: 6 ;MODULE IDENTIFICATION NUMBER-6
000126 000000 RBUFAA: INRD ;READ BUFFER VIRTUAL ADDRESS
000130 000000 RBUFB: OPEN ;READ BUFFER EA BITS
000134 000000 RBUFSZ: 656 ;SIZE OF THE READ BUFFER
000136 000000 RBUFP: OPEN ;WRITE BUFFER PHYSICAL ADDRESS
000140 002000 WRUFRO: 1024 ;WRITE BUFFER REQUESTED
000142 000000 WRUFSZ: OPEN ;WRITE BUFFER SIZE AVAILABLE
000144 000000 CDERCT: OPEN ;CDATA/DATCK ERROR COUNT
000146 000000 CDWDT: OPEN ;CDATA/DATCK WORD COUNT
000150 000040 FREE: OPEN ;RESERVED FOR FUTURE USE
                                     .LIST SPSIZ ;MODULE STACK STARTS HERE.
                                     .WORD 0
                                     .LIST
                                     .ENDR

000252* MODSP ***** BEGIN *****
199 000252 012767 000400 177634 START: MOV #156,,WDTO ;256 WORDS TO MEM FROM RP
200 000256 012767 002000 177630 MOV #124,WDFR ;104 WORDS OFF PER NEXT TO RP
201 000256 012767 000003 177624 MOV #3,INFR ;3 INTERRUPTS PER ITERATION
202 000274 012767 177514 004316 MOV #1,DVCT ;GET NUMBER OF DEVICES
203 000312 012767 004312 004316 MOV DVCT,RDV ;SAVE NUMBER
204 000310 026667 000001 003252 START1: MOV #1,DROP ;SET MODULE DROP POINTER
205 000322 005867 003265 CLR DEFCNT ;CLEAR DATA LATE ERROR COUNTER
206 000322 005867 003265 CLR TSVS
207 000336 005967 004202 CLR SVA
208 000336 005967 004202 LST SVA ;ANY SELECTED?
209 000336 104410 000000 BNE SVA ;YES
210 000340 104410 000000 ENDS,BEGIN ;
211 000344* 004567 001226 STR: JSP R5,SRG ;SET UP REGISTER ADDRESS
212 000350 005367 003254 CLR H6,LT ;CLEAR OUT COUNTERS
213 000354 005367 003252 CLR TXK1
214 000360 005367 003230 CLR BLK1
215 000364 122737 000003 000041 CMPB #3,0#41 ;TEST FOR LOAD MEDIUM
216 000372 001020 000040 BNE RPDNO ;BRANCH IF NOT
217 000374 113700 000040 MOVB #40,R0 ;LOAD DEVICE NUMBER
218 000409 105700 000001 1$: TSTR R0,R1 ;DEVICE MASK
219 000406 001403 MOVB #1,R1 ;HAVE LOAD DEVICE?
220 000410 006301 TSTB R0 ;YES, DROP IT
221 000412 105300 ASL R1 ;NO, SHIFT TO NEXT DEVICE
222 000414 000773 DECB R0
223 000416 040167 004176 2$: BIC R1,DVCT ;CHECK AGAIN
224 000422 004167 004200 BIC R1,RPDV ;CLEAR LOAD DEVICE
225 000430 104410 000000 BNE RPDNO ;GO CALCULATE IT ALL
226 000430 104410 000000 ENDS,BEGIN ;
227 000434* RPDNO: GWRUF$,BEGIN ;GET WRITE BUFFER INFORMATION
228 000440 104414 000000 GETPAS,BEGIN RBUFAA ;GET PHYSICAL ADDRESS FROM 16-BIT RBUFAA
229 000446 012767 177450 003142 MOV RRUFSZ, RDCT
230 000454 005467 003136 NEG RRCT

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235 000460* 016767 177456 004134 MOV WBUFSZ,WRDCT
236 000466* 005467 004130 NEG WRDCT
237 000472* 005467 001360 JSR RS,CLEAR ;CLEAR TRY COUNTERS
238 000505* 016767 003162 JSR RS,RPSEL ;GO DETERMINE A DRIVE
239 000506* 016767 003162 003036 25: MOVR M0617,ACSR ;SET DEVICE NO.
240 000510* 104402 003032 TSTB #CSR ;DEVICE READY?
241 000514* 104402 003032 BMI HNHD ;IF READY HOME HEAD
242 000516* 004567 001606 JSR RS,WAIT

243 ;HOME HEADS ROUTINE
244
245 000522* 032767 000010 004112 HMHD: BTI #10_SWIT ;HAVE HEADS BEEN HOMED?
246 000530* 016767 001935 BNE EXER ;YES
247 000532* 016767 177252 MOV VECTOR,RO ;SET VECTOR
248 000536* 016767 001112 MOV #HHSRV,(R0)+
249 000546* 052777 000115 002772 RTS #115,ACSR ;SET BR LEVEL
250 000554* 104400 000000 EXIT,BEGIN ;HOME HEADS
251 ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
252
253 000560* 005467 004034 RTRN: TST DVCT ;ANY MORE DRIVES?
254 000566* 016767 003017 BTI INC#1
255 000572* 007200 003017 BR RPDMO
256 000574* 052767 000110 004010 1\$: BIS #10_SWIT ;SET HEADS HOMED FLAG
257 000582* 016767 004010 MOV RPDV,DVCT ;RESTORE DEVICE COUNTER
258 000592* 016767 000001 002746 CLR MDCNT
259 000602* 016767 BR #10_DROP ;GO DO STUFF
260 000614* 012767 000001 002746 MOV RPDMO
261 000622* 007040 EXIT,BEGIN

262 ;START DATA TRANSFER
263
264 000624* 005777 002712 EXER: TST #OVS ;TEST FOR UNIT READY
265 000630* 005777 001566 BNE JSR RS,WAIT1 ;GO
266
267 000636* 004567 001976 1\$: JSR RS,BLKNO ;GO DETERMINE BLOCK NO.
268 000642* 004567 001122 JSR RS,TRKNO ;GO DETERMINE TRACK NO.
269 000646* 004567 001144 JSR RS,CALC ;CALCULATE BLOCK CONVERSION
270 000652* 005056 INC#1
271 000656* 005056 CLR DATCK ;CLEAR KNOWN BAD SPOT FLAG
272 000662* 005467 000024 GOA: JSR RS,WRT ;DO A WRITE
273 000662* 005467 000024 RETRY1 ;TRY AGAIN
274 000664* 004567 000056 GOB: JSR RS,WCK ;DO A WRITE CHECK
275 000670* 004556 RETRY2 ;TRY AGAIN
276 000672* 004567 000110 GOC: JSR RS,RDCMD ;DO A READ
277 000676* 004567 000400 JMP RETRY3 ;TRY AGAIN

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SEQ 0007

291 000702* 000167 000500 JMP ALDN ;ALL DONE
292
293 000705* 116777 003720 002632 WRT: MOVB WPTC,ACSR ;SET WRITE COMMAND
294 000712* 016777 000460 002564 BTG #60,ACSR ;CLEAR EA BITS
295 000722* 056777 177210 002616 BITS WBUFEA,ACSR
296 000730* 016777 003666 002612 MOV WRDCT,BDC ;SET WORD COUNT
297 000736* 016777 177172 002606 MOV WRUFPA,BBAD ;SET BUFFER ADDRESS
298 000744* 006437 BR GO1
299
300 000746* 116777 003664 002572 WCK: MOVB WPTCK,ACSR ;SET WRITE CHECK
301 000754* 016777 000060 002564 BTG #60,ACSR ;CLEAR EA BITS
302 000762* 056777 177150 002562 BITS WBUFEA,ACSR
303 000770* 016777 003626 002562 MOV WRDCT,BDC ;SET WORD COUNT
304 000776* 016777 177132 002546 MOV WRUFPA,BBAD
305 001004* 000417 BR GO1
306
307
308 001006* 116777 003622 002532 RDCMD: MOVB READ,ACSR ;SET READ COMMAND
309 001014* 016777 000060 002524 BTG #60,ACSR ;CLEAR EA BITS
310 001022* 056777 177102 002516 BITS BRUFEA,ACSR
311 001030* 016777 177072 002514 MOV WRDCT,BDC ;SET WORD COUNT
312 001036* 016777 002554 002504 MOV RDCT,BDC
313
314 001044* 016700 176740* GO1: MOVB VECTOR,RO+ ;SET VECTOR
315 001054* 116710 176732* MOVB BR1,(R0)+ ;SET BR LEVEL
316 001060* 016777 002526 002470 MOV TPK1,ADSAD ;SET TRACK ADDRESS
317 001066* 016777 003546 002460 MOV CYLCLT,BCVAD ;SET CYLINDER ADDRESS
318 001074* 105067 003544 CLRB HDERF ;CLEAR HARD ERROR FLAG
319 001100* 052777 000101 002440 BIS #101,ACSR ;SET GO + INTERRUPT ENABLE
320 001105* 104400 000000 EXIT,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
321
322 ;HOME HEAD INTERRUPT SERVICE ROUTINE
323
324 001112* HHSRV:
325 001112* 000004 000000* 001120* PIRQS,BEGIN,1\$;QUEUE UP TO CONTINUE AT 1\$ AND RTI
326 001120* 042777 000115 002420 1\$: BIC #115,ACSR ;CLEAR HOME HEADS BITS
327 001126* 000167 177426 JMP RTRN ;RETURN
328
329 ;DATA TRANSFER SERVICE ROUTINE
330
331 001132* RPSUB:
332 001132* 000004 000000* 001140* PIRQS,BEGIN,1\$;QUEUE UP TO CONTINUE AT 1\$ AND RTI
333 001140* 004567 000740 1\$: JSR RS,ERCK ;GO CHECK FOR ERRORS

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SEQ 0008

347 001144* 000205 RTS R5 ;ERRORS
348 001146* 005725 RTS R5+ ;NO ERRORS
349
350
351
352
353 ;RETRY ROUTINES
354
355 001152* 105767 003466 RETRY1: TSTR HDERF ;WAS IT A HARD ERROR?
356 001158* 001152 001510 BNE 1\$;SKIP MSG IF YES
357 001164* 104403 000000 003126* JSR PG,NOW ;PUT INTO MSG CURRENT POSITION
358 MSGNS,BEGIN,MG1,JASCII MESSAGE CALL WITH COMMON HEADER
359 001172* 012767 000001 176706 MOV #1,ERTRYP ;DATA ERROR
360 *****
361 001200* 104406 000000 000000 SOFERS,BEGIN,NULL ;WRITE ERROR
362 001205* 026767 002374 002360 1\$: CMP RTLMT,TRY1 ;LIMIT MET?
363 BEQ COM ;YES
364 INC TRY1 ;RETRY 3 TIMES
365 JMP GOA
366 001215* 005724 002352
367 001222* 001167 177430
368
369 001226* 105767 003412 RETRY2: TSTR HDERF ;WAS IT A HARD ERR?
370 001232* 001013 BNE 1\$;SKIP MSG IF YES
371 001240* 104403 001424* JSR PG,NOW ;PUT INTO MSG CURRENT POSITION
372 MSGNS,BEGIN,MG2,JASCII MESSAGE CALL WITH COMMON HEADER
373 001246* 012767 000001 176632 MOV #1,ERTRYP ;DATA ERROR
374 *****
375 001254* 104406 000000 000000 SOFERS,BEGIN,NULL ;WRITE CHECK ERROR
376 001262* 026767 002320 002306 1\$: CMP RTLMT,TRY2 ;LIMIT MET?
377 BEQ COM
378 INC TRY2 ;RETRY 3 TIMES
379 JMP GOA
380 001275* 005724 002300
381 001276* 001167 177362
382
383 001302* 105767 003336 RETRY3: TSTB HDERF ;WAS IT A HARD ERR?
384 001306* 001013 BNE 1\$;SKIP MSG IF YES
385 001312* 004184 001380* 003145* JSR PG,NOW ;PUT INTO MSG CURRENT POSITION
386 MSGNS,BEGIN,MG3,JASCII MESSAGE CALL WITH COMMON HEADER
387 001322* 012767 000001 176556 MOV #1,ERTRYP ;DATA ERROR
388 *****
389 001330* 104406 000000 000000 SOFERS,BEGIN,NULL ;READ ERROR
390 001336* 026767 002244 002234 1\$: CMP RTLMT,TRY3 ;LIMIT MET?
391 BEQ COM
392 INC TRY3 ;RETRY 3 TIMES
393 JMP GOA
394 001356* 104405 000000* 000000
395 HRDERS,BEGIN,NULL ;TOO MANY RETRIES
396 001364* 104403 000000* 003172* MSGNS,BEGIN,MG8,JASCII MESSAGE CALL WITH COMMON HEADER
397 001400* 001014 000002 176416 BTR R25,R17 ;IS DROP SWITCH ON?
402 BNE R25,RT
403
404
405
406
407
408
409 001406* 005767 003236 ALDN: TST DATCK ;IS THIS A KNOWN BAD TRACK?
410 001412* 001004 BNE 1\$;SKIP THE CHECK DATA IF YES
411 001414* 104412 000000* 000126* CDATAS,BEGIN,RBUFFPA ;REQUEST FOR MONITOR TO CHECK DATA
412 001421* 001424* .+2 ;IF ERROR, CONTINUE
413 001424* 104413 000000* 1\$: ENDITS-BEGIN ;SIGNAL END OF ITERATION.
414 BR RESTR ;MONITOR SHALL TEST END OF PASS
415 001430* 000400
416
417
418
419
420 ;CONTINUE AFTER TRANSFERRING 4 BLOCKS OF DATA
421
422
423
424 001432* 005767 003162 RESTRT: TST DVCT ;TEST FOR MORE DRIVES
425 001436* 001406 BEQ TRCT
426 001440* 105267 002145 INCB MDCNT+1 ;INCREMENT DRIVE COUNT
427 001444* 006367 000023 ASL DROP ;MOVE DROP POINTER
428 001450* 000167 176760 JMP RPDNO ;GO DO ANOTHER DRIVE
429
430 001454* 016767 003146 003136 TRCT: MOV RDV,DVCT ;RESTORE COUNT
431 001462* 005067 003126 NDCNT ;CLEAR MODULE COUNT
432 001466* 012767 000001 002074 CLR #1,DROP ;RESTORE DROP POINTER
433 001474* 122767 000023 002111 CMP #23,TRK1+1 ;ALL TRACK TESTED?
434 001504* 001405 000040 003130 BEQ #20,SWIT ;YES
435 001512* 000167 176716 JMP RPDNO ;NO
436 001516* 005067 002070 BLCT: CLR TRK1 ;CLEAR TRACK COUNTER
437 001530* 001405 000001 176266 BIT #1,SR1 ;TEST FOR HIGH OR LOW DENSITY
438 BEQ 1\$
439
440 ;HIGH DENSITY
441
442
443 001532* 022767 007726 002054 CMP #4054-,BLK1 ;BLOCK LIMIT MET?
444 001540* 003412 BEQ RESTR
445 001542* 000404 BR 2\$;RESTART
446
447 ;LOW DENSITY
448
449
450 001544* 022767 003750 002042 1\$: CMP #2024-,BLK1 ;LOW DENSITY LIMIT MET?
451 001552* 001405 BEQ RESTR ;YES
452 001554* 052767 000020 003060 2\$: BIS #20,SWIT ;NO
453 001556* 000167 176846 JMP RPDNO
454 001562* 000167 176846 RESTR: CLR SWIT
455 001565* 005067 002950 JMP STR
456 001572* 000167 176846

SEQ 0009

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459
460
461 ;REGISTER SET-UP SUBROUTINE
462
463
464 001576* 016700 176204     SRG:   MOV    ADDR,R0      ;MOVE ADDRESS TO R0 AND
465 001602* 010067 001734     MOV    R0,DVS      ;START TO SET UP REGS.
466 001606* 005020             CLR    (R0)*
467 001610* 010067 001730     MOV    R0,ERG      ;SET ERROR REG
468 001614* 005020             CLR    (R0)*
469 001616* 010067 001724     MOV    R0,CSR      ;CONTROL STATUS REG
470 001622* 005020             CLR    (R0)*
471 001626* 010067 001720     MOV    R0,WDC      ;INCREMENT ADDRESS REG
472 001630* 005020             CLR    (R0)*
473 001634* 010067 001714     MOV    R0,BAD      ;WORD COUNT REG.
474 001636* 005020             CLR    (R0)*
475 001640* 010067 001710     MOV    R0,BAD      ;BUS ADDRESS REG.
476 001644* 005020             CLR    (R0)*
477 001648* 010067 001704     MOV    R0,CYAD      ;CYLINDER ADDRESS REG.
478 001649* 005020             CLR    (R0)*
479 001652* 005020             CLR    (R0)*
480 001656* 005020             CLR    (R0)*
481 001659* 005020             CMP    (R0)+,(R0)+*
482 001660* 010067 001766     TST    (R0)
483 001660* 010067 001766     MOV    R0,SUCA      ;DISK ADDRESS REG.
484 001664* 016767 001656 176206     MOV    CSR,CSRA      ;SAVE CSR ADDRESS
485 001672* 000205             RTS    R5
486
487
488 ;DEVICE SELECT SUBROUTINE
489
490
491 001674* 006267 002720     RPSEL:  ASR    DVCT      ;LOOK FOR ACTIVE DEVICE
492 001700* 103405             BCS    1$          1$:
493 001702* 105267 001703     INCB   MDCNT+1
494 001703* 000390             ASL    DPDP
495 001704* 000205             ASL    RSEL
496 001714* 000205             1$:   RTS    R5
497
498
499 ;RESET THE RP
500
501
502 001716* 112777 000001 001622     REST:  MOVB   #1,CSR      ;SET IDLE COMMAND
503 001724* 016777 001660 001614     MOV    MDCNT,CSR
504 001732* 004567 000466             JSR    R5,WAIT1
505 001736* 000205             RTS    R5
506
507
508 ;SET BLOCK NUMBER
509
510
511
512
513
514

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515 001740* 032767 000020 002674     BLKNO: BIT    #20,SWIT      ;NEW BLOCK FLAG SET?
516 001746* 001001             BNE    1$          YES
517 001750* 000205             RTS    R5
518 001756* 022767 000020 002662     1$:   BIC    #20,SWIT      ;CLEAR FLAG.
519 001760* 000205             ADD    R5,TRK1
520 001766* 000205             RTS    R5
521
522
523 ;SET TRACK NUMBER
524
525
526 001770* 032767 000040 002644     TRKNO: BIT    #40,SWIT      ;DO NEW TRACK FLAG SET?
527 001776* 001001             BNE    1$          YES
528 002000* 000205             RTS    R5
529 002002* 042767 000040 002632     1$:   BIC    #40,SWIT      ;CLEAR FLAG
530 002010* 005267 001537             INCB   TRK1+1
531 002014* 000205             RTS    R5
532
533
534 ;CALCULATE CYLINDER AND SECTOR
535
536
537 002016* 005067 002906     CALC:  CLR    CYLCNT      ;CLEAR CYLINDER COUNT
538 002022* 016702 001562     MOV    R1,R1
539 002026* 022702 000011     MOV    BLK1,R2
540 002032* 022702 000011     1$:   CMP    #9,R2
541 002036* 063004             BGE    DIV
542 002040* 060102             ADD    R1,R2
543 002044* 005267 002562     INC    CYLCNT
544 002048* 000205             RTS    R5
545 002054* 000205 001536     DIV:  MOVB   R5,TRK1      ;SET SECTOR ADDRESS
546
547
548
549
550
551
552
553 ;CLEAR ROUTINE
554
555
556
557 002056* 005067 001510     CLEAR: CLR    TRY1
558 002062* 005067 001506     CLR    TRY1
559 002065* 005067 001504     CLR    TRY2
560 002068* 005067 001502     CLR    TRY3
561 002072* 005067 001500     CLR    TRY4
562 002102* 000205             RTS    R5
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SEQ 0012

571 003110* 008773 001436 ERCK: TST BCSR TEST FOR ERROR BIT
573 002112* 005725 1S: TST (R5)+ NO ERROR
575 002114* 000205 RTS RS
576 002116* 032777 000020 001420 2S: BIT #BIT4,QERG TIMING ERROR?
577 002124* 001411 001406 BEQ 3S NO COUNT ERROR
578 002126* 005267 001406 INC DLTCNT COUNT LINES
579 002132* 117767 000002 175746 MOV #45PRTYP *****
580 002140* 104406 000000 000000 S0FFERS,BEGIN,NULL DATA LATE
581 002146* 000426 *****
582 002146* 001446 001400 3S: BR 6S CONT
583 002146* 001446 001400 MOV R5,-(R6) SAVE R1
584 002146* 000501 CLR R1 GET TRACK INFO
585 002148* 006301 R1 MOVE ONLY TRACK BITS
586 002148* 006301 ASI R1 MOVE TRACK BITS OVER 1 PLACE
587 002148* 005770 001366 BIS R1,CUR,R1 OR IN THE CYL BITS
588 002148* 001671 002434 MOV R1,CUR STORE THIS CURRENT ADDR OF DISK
589 002148* 0012701 003054* MOV #ADLOC,R1 GET START OF TABLE OF KNOWN BAD SPOTS
590 002156* 021127 177777 CMP (R1),#177777 END OF TABLE?
591 002156* 021127 177777 BEQ 5S BRANCH IF YES, MUST BE REAL ERROR
592 002156* 021127 177777 OP,(R1)+ IF YES, ADD TO KNOWN BAD SPOT?
593 002156* 001372 BNE 4S IF NO, TRY NEXT TABLE ENTRY
594 002156* 012601 MOV (R6)+,R1 RESTORE R1
595 002156* 005267 002430 INC DATCK SET THE KNOWN BAD SPOT FLAG FOR ALDN
596 002220* 000734 RR 1S RETURN AND DO NOT REPORT THE ERROR
597 002220* 012601 MOV (R6)+,R1 RESTORE R1
598 002220* 012601 MOV #CSB,CSBR SET UP FOR ERROR CALLS
599 002220* 012601 MOV #ADVS,STAT ,DITTO
600 002220* 017767 001276 175636 MOV #40000,BCSR HARD ERROR?
601 002220* 032777 040000 001272 BIT #40000,BCSR
602 002220* 007416 BEQ 7S
603 002256* 004767 000412 JSR PC,NOW PUT INTO MSG CURRENT POSITION
604 002256* 104403 000000 003164* MSGNS,BEGIN,MG7 ,ASCII MESSAGE CALL WITH COMMON HEADER
605 002256* 105612 CL,ERRTYPE UNKNOWN ERROR
606 002270* 005067 175612 *****
607 002274* 104405 000000 003542* H0FFERS,BEGIN,SAVRC *****
608 002302* 105267 002336 INCB HDERF SET HARD ERR FLAG TO GATE LATER MSG
609 002306* 002567 177404 JSP R5,REST RESET AND TRY AGAIN
610 002312* 032777 000002 001224 7S: BIT #2,QERG CHECK FOR OVERFLOW SET
611 002312* 001402 BEQ R5
612 002329* 004562 000172 JSP R5,OVFL0
613 002329* 000205 RS: RTS R5
614 002329* 000205 *****
615 002330* 005067 002270 *****
616 002334* 104407 000000* WAIT: CLR TMCNT
617 002334* 000000* 1S: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...
618 002340* 104407 000000* BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
619 002340* 105777 001176 TSTB BCSR ;CONTROLLER READY?
620 002350* 105424 *****
621 002350* 105424 *****
622 002350* 005067 002174 *****
623 002354* 104407 000000* 1S: INC TMCNT NO
624 002360* 017767 001162 175514 BNE 1S TIME OUT
625 002360* 017767 001162 MOV #CSB,BCSR
626 002366* 001150- 175510- MOV #ADVS,STAT
627 002366* 001150- MSGNS,BEGIN,MG4 ,ASCII MESSAGE CALL WITH COMMON HEADER
628 002366* 001150- BEQ 1S CONTROLLER NOT READY
629 002374* 104403 000000- 003150- *****
630 002374* 012767 000003 175476 *****
631 002402* 012767 000003 175476 *****
632 002402* 012767 000003 175476 *****
633 002410* 104405 000000 000000 H0FFERS,BEGIN,NULL ;CONTROLLER NOT READY
634 002410* 004567 000210 JSP R5,OFFEND
635 002416* 004567 000210 *****
636 002422* 000205 2S: RTS R5
637 002422* 000205 *****
638 002422* 000205 *****
639 002422* 000205 *****
640 002422* 000205 *****
641 002422* 000205 *****
642 002422* 000205 *****
643 002422* 000205 *****
644 002422* 000205 *****
645 002422* 000205 *****
646 002424* 005067 002174 WAIT1: CLR TMCNT
647 002430* 104407 000000* 1S: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR.
648 002430* 000000* BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
649 002440* 005777 001076 TST R0VS
650 002440* 005777 001076 BMI 2S ;UNIT READY?
651 002444* 100424 002152 INC TMCNT
652 002444* 100424 002152 BNE 2S
653 002446* 005267 002152 INC TMCNT
654 002452* 001366 001066 175420 MOV #CSB,BCSR
655 002452* 001366 001066 175420 MOV #ADVS,STAT
656 002452* 001066 175420 MSGNS,BEGIN,MG4 ,ASCII MESSAGE CALL WITH COMMON HEADER
657 002452* 001066 175420 BEQ 2S UNIT NOT READY
658 002476* 104403 000000- 003154- *****
659 002476* 012767 000006 175402 *****
660 002504* 104405 000000 000000 H0FFERS,BEGIN,NULL ;UNIT NOT READY
661 002512* 004567 000114 JSP R5,OFFEND
662 002516* 000205 2S: RTS R5
663 002516* 000205 *****
664 002516* 000205 *****
665 002516* 000205 *****
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668 002516* 000205 *****
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670 002516* 000205 *****
671 002520* 017703 001036 OVFL0: MOV #SUCA,R3
672 002520* 017703 001036 BEQ 1S ;HIGH OR LOW DENSITY?
673 002532* 001404 000525 BEQ 1S
674 002534* 012704 000525 MOV #405,R4
675 002540* 166304 SUB R3,R4
676 002540* 166304 ARB DET
677 002544* 001404 000312 1S: MOV R202,R4
678 002544* 001404 000312 SUB R3,R4
679 002552* 100417 DET: RBT TET
680 002556* 010467 001002 MOV R4,QNT
681 002556* 010467 001002 CLR TET
682 002562* 005067 001000 *****

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SEQ 0013

627 002352* 005267 002246 1S: INC TMCNT NO
628 002356* 001366 002246 BNE 1S TIME OUT
629 002360* 017767 001162 175514 MOV #CSB,BCSR
630 002366* 017767 001162 175514 MOV #ADVS,STAT
631 002366* 001150- 175510- MSGNS,BEGIN,MG4 ,ASCII MESSAGE CALL WITH COMMON HEADER
632 002402* 012767 000003 175476 BEQ 1S CONTROLLER NOT READY
633 002410* 104405 000000 000000 *****
634 002410* 004567 000210 H0FFERS,BEGIN,NULL ;CONTROLLER NOT READY
635 002416* 004567 000210 JSP R5,OFFEND
636 002422* 000205 *****
637 002422* 000205 *****
638 002422* 000205 *****
639 002422* 000205 *****
640 002422* 000205 *****
641 002422* 000205 *****
642 002422* 000205 *****
643 002422* 000205 *****
644 002422* 000205 *****
645 002422* 000205 *****
646 002424* 005067 002174 WAIT1: CLR TMCNT
647 002430* 104407 000000* 1S: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR.
648 002430* 000000* BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
649 002440* 005777 001076 TST R0VS
650 002440* 005777 001076 BMI 2S ;UNIT READY?
651 002444* 100424 002152 INC TMCNT
652 002444* 100424 002152 BNE 2S
653 002446* 005267 002152 INC TMCNT
654 002452* 001366 001066 175420 MOV #CSB,BCSR
655 002452* 001066 175420 MOV #ADVS,STAT
656 002452* 001066 175420 MSGNS,BEGIN,MG4 ,ASCII MESSAGE CALL WITH COMMON HEADER
657 002452* 001066 175420 BEQ 2S UNIT NOT READY
658 002476* 104403 000000- 003154- *****
659 002476* 012767 000006 175402 *****
660 002504* 104405 000000 000000 H0FFERS,BEGIN,NULL ;UNIT NOT READY
661 002512* 004567 000114 JSP R5,OFFEND
662 002516* 000205 2S: RTS R5
663 002516* 000205 *****
664 002516* 000205 *****
665 002516* 000205 *****
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667 002516* 000205 *****
668 002516* 000205 *****
669 002516* 000205 *****
670 002520* 017703 001036 OVFL0: MOV #SUCA,R3
671 002520* 017703 001036 BEQ 1S ;HIGH OR LOW DENSITY?
672 002532* 001404 000525 BEQ 1S
673 002534* 012704 000525 MOV #405,R4
674 002540* 166304 SUB R3,R4
675 002540* 166304 ARB DET
676 002544* 001404 000312 1S: MOV R202,R4
677 002544* 001404 000312 SUB R3,R4
678 002552* 100417 DET: RBT TET
679 002556* 010467 001002 MOV R4,QNT
680 002556* 010467 001002 CLR TET
681 002562* 005067 001000 *****

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SEQ 0014

681 0026565- 062767 005000 000772 1\$: ADD #2560,TET ;FIND SPACE LEFT
682 002600- 01372 000772 BNE OINT
683 002602- 026767 175334 000756 CMP WBUFSZ,TET ;COMPARE SPACE LEFT
684 002610- 101407 TEL: BLOS RET
685 002612- 026266 TST: CMP (R6)+(R6)+ ;RESTORE STACK
686 002614- 005726 RET: TST (R6)+
687 002621- 042767 000010 002016 RLT: JMP #10,SWIT
688 002630- 000205 RET: RTS R5
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698 ;DROP ROUTINE
699 ;-----
700 002632- 046767 000732 001766 OFFEND: BIC TST RPDV ;CLEAR OFFENDING DRIVE
701 002640- 005767 0001762 001766 RNE 3\$
702 002644- 001000 ENDS,REGIN ;
703 002645- 104410 000000-
704 002652- 104403 000000- 003160- 3\$: MSGS,BEGTN,MG6 ;ASCII MESSAGE CALL WITH COMMON HEADER
705 002656- 005767 0001742 001732 MOV RPDV,DVCT ;RESTORE COUNT
706 002660- 005726 TST (R6)+ ;RESTORE STACK
707 002666- 000167 175450 JMP STR
708
709 ;NOW ROUTINE INSTALLS CURRENT ADDRESS INTO MSG
710 ;-----
711 ;
712 002674- 010146 NOW: MOV RI,-(R6) ;SAVE CURRENT RI
713 002676- 017701 000644 MOV QCSR,RI ;GET DEVICE #
714 002702- 000301 SWAB RI ;GET GOOD BITS ON RIGHT SIDE
715 002704- 042767 177770 BIG #177770,R1 ;LEAVE ONLY CORRECT BITS
716 002710- 010167 000132 MOV RI,NUMBA1 ;STORE IT
717 ;*****
718 ;*****
719 ;*****
720 ;*****
721 002714- 104420- 000000- 003046- OTOAS,BEGIN,NUMBA1,DNUM
722 003422- 003040-
723 ;*****
724 002724- 116767 000115 000537 MOVW DNUM+5,NW+4 ;PUT IN MSG
725 002732- 017767 000616 000110 MOVB RCYAD,NUMBA2 ;PUT CYLINDER NUMBA2 FOR MACRO
726 ;*****
727 ;*****
728 ;*****
729 002740- 104420- 000000- 003050- OTOAS,BEGTN,NUMBA2,DNUM
730 002746- 003940-
731 ;*****
732 002750- 116767 000067 000516 MOVB DNUM+3,NW+7. ;PUT CYC# DIGITS
733 002756- 116767 000062 000514 MOVB DNUM+4,NW+8. ;
734 002759- 115727 000295 000504 MOVB DNUM+5,NW+9. ;
735 002772- 000167 008950 MOVB RDSD,R1 ;PUT TRACK# ON STACK
736 002776- 000301 SWAB RI ;GET GOOD BITS ON RIGHT SIDE
737 003000- 042701 177740 BIC #177740,R1 ;LEAVE ONLY TRAVK BITS
738 003004- 010167 000042 MOV RI,NUMBA3 ;SAVE
739
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741
742 ;*****
743 003010- 104420- 000000- 003052- OTOAS,BEGIN,NUMBA3,DNUM
744 003016- 003040-
745 003020- 116767 000020 000453 MOVB DNUM+4,NW+12. ;PUT TRACK# DIGITS
746 003024- 116767 000013 000446 MOVB DNUM+5,NW+13. ;INTO MSG
747 003032- 012601 MOV (P6)+,RI ;RESTORE RI
748 003036- 000207 RTS PC ;GO BACK
749
750
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756 003040- 000003 DNUM: =BLKN 3. ;RESERVE SIX BYTES FOR BTOD MACRO
757 003045- 000000 NUMBA1: =WORD 0
758 003050- 000000 NUMBA2: =WORD 0
759 003052- 000000 NUMBA3: =WORD 0
760
761
762
763 003054- 177777 BADLOC: 177777 ;TABLE FOR ENTRY OF KNOWN BAD
764 003055- 177777 ;TRACK-CYLINDER LOCATIONS
765 003060- 177777 ;FOR ANY TRACK-CYLINDER COMBINATIONS
766 003062- 177777 ;LISTED IN THIS TABLE NO ERRORS WILL
767 003068- 177777 ;BE REGISTERED OR PRINTED.
768 003069- 177777 ;THE FIRST OCCURANCE OF A MINUS ONE,
769 003070- 177777 ;177777 MARKS THE END OF THE TABLE
770 003072- 177777 ;AND ANY ENTRYS PAST IT WILL BE IGNORED.
771
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780 003114- 177777
781 003116- 177777
782 003120- 177777
783 003122- 177777
784 003124- 177777
785
786 ;GOOD THINGS TO SAVE.
787
788
789 003126- 003176- MG1: HE1
790 003139- 003365- NW
791 003132- 177777 177777
792
793 003134- 003222- MG2: HE2
794 003136- 003465- NW

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SEQ 0015

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SEQ 0016

795 003140* 177777
796 003142* 003254*
798 003144* 003465*
799 003146* 177777
800 003150* 003277*
801 003152* 177777
802 003154* 003324*
803 003156* 177777
804 003160* 003347*
805 003162* 177777
806 003164* 003404*
807 003166* 003465*
808 003170* 177777
809 003172* 003435*
810 003174* 177777
811 003176* 020045 047523 052106 HE1: .ASCIZ "% SOFT WRITE ERROR"
812 003204* 053440 044922 052524
813 003216* 053440 051122 051117
814 003226* 000040
815 003227* 020045 047523 052106 HE2: .ASCIZ "% SOFT WRITE CHECK ERROR"
816 003230* 053440 044922 042524
817 003236* 041440 042510 045503
818 003244* 042440 051122 051117
819 003252* 000040
820 003254* 020045 047523 052106 HE3: .ASCIZ "% SOFT READ ERROR"
821 003262* 051105 040565 020104
822 003270* 051105 047522 020122
823 003276* 000
824 003277* 045 042040 052105 DNR: .ASCIZ "% DEVICE NOT READY"
825 003284* 041514 042522 042101
826 003320* 020131 000045 UNR: .ASCIZ "% UNIT NOT READY"
827 003324* 020045 047125 052111
828 003332* 040505 052104 022440
829 003340* 000
830 003346* 000
831 003347* 045 042040 047522 DRD: .ASCIZ "% DROPPED OFFENDING DRIVE"
832 003354* 050120 042105 047440
833 003362* 043106 047105 044504

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SEQ 0017

851 003370* 043516 042040 044522
852 003376* 042526 020040 000045
853 003411* 020045 052110 052122 HRD: .ASCIZ "% HARD ERROR BIT 14 SET"
854 003414* 052440 052110 052122
855 003420* 041040 052111 030440
856 003426* 020064 042523 020124
857 003434* 000
858 003435* 045 052140 052116 SOE: .ASCIZ "% UNRECOVERABLE ERROR"
859 003436* 041121 042514 042440
860 003456* 051122 051117 022440
861 003464* 000
862 003465* 041440 042504 020126 NW: .ASCIZ "DEV C T IN OCTAL"
863 003466* 041440 020040 020040
864 003502* 052114 020040 044440
865 003506* 052114 041517 040524
866 003514* 000114
867 003516* 042045 052101 020101 MES10: .ASCIZ "%DATA LATE ERROR"
868 003524* 040514 042524 022440
869 003532* 051122 051117 000045 .EVEN
870
871
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879 003540* 000000 DLTCNT: 0
880 003542* 000000 SAVRC: 0 ;DEVICE STATUS REG
881 003542* 000000 DWS: 0 ;ERROR REG
882 003542* 000000 ERG: 0 ;ERROR STATUS REG
883 003542* 000000 MDC: 0 ;WORD COUNT REG
884 003550* 000000 WDC: 0 ;BUS ADDRESS REG.
885 003552* 000000 BAD: 0 ;CYLINDER ADDRESS REG.
886 003554* 000000 CVAD: 0 ;DISK ADDRESS REG.
887 003556* 000000 DSAD: 0 ;
888 003560 177777
889 003562* 000000 SUCA: 0 ;SELECTED UNIT CYLINDER ADDRESS
890 003564* 000000 QNT: 0
891 003566* 000000 TET: 0
892 003567* 000000 DROP: 0
893 003568* 000000 TRY: 0
894 003570* 000000 TRY1: 0
895 003572* 000000 TRY2: 0
896 003574* 000000 TRY3: 0
897 003576* 000000 TRY4: 0
898 003578* 000000 TRY5: 0
899 003602* 000000 TRY6: 0
900 003604* 000000 TRY7: 0
901 003606* 000002 RTLNT: 2 ;RETRY LIMIT *****CAN BE CHANGED
902 003610* 000000 NDCNT: 0
903 003612* 000000 TRK1: 0 ;TRACK NO.
904 003614* 000000 BLK1: 0 ;READ WORD COUNT
905 003620* 000400 INRD: 0 ;READ BUFFER
906 003620* 000400 .BLKW 256.

RPAM DEC/X11 SYSTEM EXERCISER MODULE
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SEQ 0018

```

907 004620- 000000 DVCT: 0 ;DEVICE COUNT
908 004621- 000000 WRDCT: 0 ;WORD COUNT FOR WRITE
909 004622- 000000 TMTNT: 0 ;TIME OUT COUNT
910 004623- 000000 RPTNT: 0
911 004630- 000000 CYLCNT: 0
912 004632- 000002 WRITE: 0 ;WRITE COMMAND
913 004633- 000004 READ: 4 ;READ COMMAND
914 004636- 000006 WRTCK: 6 ;WRITE CHECK COMMAND
915 004640- 000000 LR: 0
916 004642- 000000 SWIT: 0 ;FLAG SWITCH
917 ;BIT 3=1->HEADS HAVE BEEN HOMED
918 ;BIT 4=1->NEW BLOCK REQUESTED
919 ;BIT 5=1->CURRENT TRACK COUNT
920 004644- 000000 HDERF: 0 ;HARD ERROR FLAG
921 004646- 000000 CURS: 0
922 004650- 000000 DATCK: 0 ;CURRENT DISK CYL AND TRK ADDR
923
924
925 000001 .END ;FLAG SET BY ERCK WHEN FINDS KNOWN BAD SPOT

```

RPAM DEC/X11 SYSTEM EXERCISER MODULE
XRPAM0.P11 12-OCT-78 12:12

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0019

RPAN DEC/X11 SYSTEM EXERCISER MODULE MACY11 30A(1052) 12-OCT-78 17:01 PAGE 22
 XRPAM0.P11 12-OCT-78 12:12 CROSS REFERENCE TABLE -- USER SYMBOLS SEQ 0020
 DMUM 003040R 721 724 729 732 733 734 742 745 746 755#
 DRD 003347R 808 848# 245# 427* 432* 495* 700 894#
 DROP 003370R 204* 419* 584 735 887#
 DSAD 003556R 318* 203 208 225* 258 263* 424 430* 492* 706* 907#
 DVCT 004620R 207* 203 208 225* 258 263* 424 430* 492* 706* 907#
 DVID1 0000142R 140# 204 207* 600 630 650 655 881#
 DVS 003542R 207* 461* 600 630 650 655 881#
 ENBITS= 1044113 199# 414# 228 703
 ENDRD= 1042104R 346# 511#
 ERCK 0032104R 465* 575 611 882#
 ERG 003544R 173# 360* 374* 388* 578* 605* 632* 657*
 ERRTYP 000106R 249 273#
 ERTR 003524R 169# 254 322
 EXIT= 104400 191#
 FREE 000150R 199# 232
 GETPAS= 1044115 199# 324
 GOA 000656R 248# 305#
 GOF 000659R 288# 305#
 GOI 011044R 599 306 315#
 GWRUF= 104414 199# 231 356 370 384 609* 920#
 GDERF 004644R 320# 356 370 384 609* 920#
 HE1 003176R 789 821#
 HE2 003222R 793 826#
 HE3 003254R 797 832#
 HRSRV 001112R 251 330#
 HBD 003404R 812 853#
 HRDCNT= 000044R 153#
 HRDEPS= 104405 199# 398 607 634 659
 HRDPAS= 000050R 155#
 ICOUNT 000036R 150#
 ICOUNT 000040R 151#
 IDNUM 000040R 180#
 IMODX= 000046 197# 232
 INIT 000030R 147#
 INRD 0000206 198# 906# 201#
 LDR 004640R 915#
 MAP22S= 104416 199#
 MDCNT 003010R 213# 239 260* 264* 426* 431* 494* 505 902#
 MES10 003516R 871#
 MG1 003126R 359 789#
 MG2 003134R 373 729#
 MG3 003124R 691 803#
 MG4 003154R 656 804#
 MG5 003160R 705 808#
 MG6 003174R 624 810#
 MG7 003172R 400 811#
 MODNAM 000000R 134#
 MODSP 000252R 148# 197#
 MSGNS= 1044073 199# 359 373 387 400 604 631 656 705
 MSGSS= 104401 199#
 NOW 002674R 358 372 386 603 713#

RPAN DEC/X11 SYSTEM EXERCISER MODULE MACY11 30A(1052) 12-OCT-78 17:01 PAGE 23
 XRPAM0.P11 12-OCT-78 12:12 CROSS REFERENCE TABLE -- USER SYMBOLS SEQ 0021
 NULL = 000000 199# 362 376 390 398 580 634 659
 NUMBA1 = 003046R 717# 721 729 756#
 NUMBA2 = 003052R 725# 729 757#
 NUMBA3 = 003052R 738# 742 758#
 NW 003465R 724# 732# 733* 734* 745* 746* 790 794 798 813 866#
 OFFEND = 002632R 403 636 661 700# 746* 790 794 798 813 866#
 OPEN = 000000 135 131 142 144 145 147 149 151 153 155 157 159 161 163 165 166 167 168 169#
 OTOAS= 104420 199# 671# 729 742
 OFWFO 002650R 671# 671#
 PASENT 000034R 148#
 PIROS = 000004 199# 332 344
 POPSP = 005726 199#
 POPSP2= 022626 199#
 PRTY 000000 199#
 PRTY0 000000 135# 199#
 PRTY1 000000 199#
 PRTY2 000140 199#
 PRTY3 000140 199#
 PRTY4 000200 199#
 PRTY5 000240 199#
 PRTY6 000300 199#
 PRTY7 000340 199#
 PS 177772 199#
 PSH 005746 199#
 PUSH2 005746 199#
 QNT 003564R 681# 684* 892#
 RAARDS = 104417 199#
 RAHMUH 000054R 157#
 RBUPEA 000130R 183# 311 411
 RBUPPA 000126R 183# 312 411
 RBURSA 000132R 183# 233 232
 RBUPVA 000172R 183# 232 232
 RDAD 003516R 232# 362#
 RREAD 004634R 309# 913# 313 905#
 REST 001716R 504# 610#
 RESTR 001566R 446# 453# 457# 424#
 RESTRT 001432R 176# 402 416# 424#
 RES1 000056R 159#
 RES2 000060R 160#
 RETRY1 001552R 626#
 RETRY2 001552R 626#
 RETRY3 001562R 626#
 RPONO 000434R 231# 230# 261 266* 428 436 456#
 RPDV 004626R 203# 226* 263# 430 700* 701 706 456#
 RPSL 001674R 238# 492#
 RPSUB 001132R 316 342#
 RSTMT 006112R 176#
 RTLMT 003666R 364# 378 392 901#
 RTTR 003560R 259# 355#
 SAVRG 003542R 601 880#
 SBADR 0001C2R 159#

RPM DEC/X11 SYSTEM EXERCISER MODULE MACV11 30A(1052) 12-OCT-78 17:01 PAGE 24
XRPAMO.P11 12-OCT-78 12:12 CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0022

RPM DEC/X11 SYSTEM EXERCISER MODULE XRPAM0.P11 12-OCT-78 12:12 MACY11 30A(1052) 12-OCT-78 17:01 PAGE 25
CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0023

• = 004652R 412 755# 906#

• ABS. 880000 881

```
ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0  
  
XRPAM0 XRPAM0/SOL/CRF/SYM=DDXCOM, XRPAM0  
RUN-TIME: 1 2 : 4 SECONDS  
RUN-TIME RATIO: 25/45=1  
CORE USED: 7K (13 PAGES)
```