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IDENTIFICATION

PRODUCT CODE: AC-E974B-MC
PRODUCT NAME: CXLPHR0 LPA11-XX MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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ABSTRACT

LPH IS AN IOMOD THAT EXERCISES THE LPA11-CODE WHEN THE LPA11-CODE IS LOADED IN THE SYSTEM. OPTION WE EXERCISE WHEN ALL DEVICES ON THE LPA-11'S I/O BUS. WHEN DEDICATED USER MICRO-CODE IS LOADED IN THE LPA11'S ONLY A/D'S ARE PRESENT. A 150 KHZ SAMPLE RATE IS USED. ALSO PRESENT AT THIS RATE IS TAKING IS ENABLED IF TWO A/D'S ARE PRESENT. A 150 KHZ SAMPLE RATE IS USED. SAMPLES IN OTHER DEVICES MAY PRODUCE DATA LATENCY PROBLEMS IN THE PDP-11 SYSTEM. IF THERE IS A NUMBER OF NPR DEVICES ON THE PDP-11 SYSTEM. THE VALUE OF "SR2" DETERMINE THE SAMPLE RATE USED FOR THE A/D.

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REQUIREMENTS

HARDWARE: ONE LPA-11XX KMC-11; 1 M8200-YC; 1 M8254
INCLUDES: 1 CLOCK

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STORAGE: LPH REQUIRES:

- 1. DECIMAL WORDS: 5630
- 2. OCTAL WORDS: 12776
- 3. OCTAL BYTES: 25774

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PASS DEFINITION

APPROXIMATELY 20K OF NPR DATA TRANSFERS FOR A SUCCESSFULL PASS.

EXECUTION TIME

ONE PASS OF LPH TAKES APPROXIMATELY 60 SECONDS.

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5.0 CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:

DEVADR: 170460, VECTOR: 300, BR1:6

DEVcnt: N/A, SR1: 0, SR2: 0

REQUIRED PARAMETERS

SR1 MUST BE SET UP TO REFLECT THE TRUE LPA11-KX
SYSTEM CONFIGURATION (SEE OPERATIONS OPTIONS)
NOTE: THIS MODULE WILL ERROR UNLESS A CLOCK HAS
BEEN SPECIFIED IN SR1.
ON LARGER SYSTEMS, SR2 MAY BE CHANGED TO LOWER THE
A/D TRANSFER RATE.

6.0 DEVICE/OUTPUT SET-UP

ALL DEVICES CONNECTED TO THE DR11K OUTPUTS SHOULD BE
REMOVED.

7.0 MODULE OPERATION

1. LPH LOADS AND VERIFIES EITHER DEDICATED OR MULTI-USER
MICRO-CODE INTO THE KMC-11 AS INDICATED BY BIT 6 OF "SR1".
2. TESTS THAT THE MICRO-CODE CAN BE STARTED.
3. BUILDS A DEVICE ADDRESS TABLE BASED ON THE INFORMATION
THE OPERATOR FURNISHED IN SR1. AFTER BUILDING THE
TABLE, IT GIVES IT TO THE LPA-11 FOR VERIFICATION.
4. IF DEDICATED CODE IS RUN, AND THERE ARE TWO A/D'S
ON THE SYSTEM, A/D SAMPLES ARE TAKEN AT A RATE
CONTROLLED BY THE VALUE IN SR2.
IF MULTI-USER MICRO-CODE IS RUN, ALL DEVICES ON THE
I/O BUS ARE EXERCISED.

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1.0 ABSTRACT

LPH IS AN IOMOD THAT EXERCISES THE LPA11-XX OPTION. WHEN MULTIPLE MICRO-CODE IS LOADED IN THE SYSTEM, WE EXERCISE ALL MICRO-CODE ON THE LPA-11'S I/O BUS. WHEN DEDICATED USER MICRO-CODE IS LOADED IN THE LPA11, ONLY A/D'S ON THE LPA11'S I/O BUS ARE EXERCISED. ALSO HIGH-SPEED SAMPLE TAKING IS ENABLED IF TWO A/D'S ARE PRESENT. A 150 KILOHERTZ SAMPLE RATE IS USED. SAMPLING AT THIS RATE MAY PRODUCE DATA LATERCY PROBLEMS IN OTHER PDP-11 SYSTEMS. IF THERE IS A NUMBER OF NPR DEVICES ON THE PDP-11 SYSTEM, THE VALUE OF "SR2" DETERMINE THE SAMPLE RATE USED FOR THE A/D.

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INCLUDES: 1 CLOCK

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DEVcnt: N/A, SR1: 0, SR2: 0

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SYSTEM CONFIGURATION (SEE OPERATIONS OPTIONS)
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BEEN SPECIFIED IN SR1.
ON LARGER SYSTEMS, SR2 MAY BE CHANGED TO LOWER THE
A/D TRANSFER RATE.

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REMOVED.

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1. LPH LOADS AND VERIFIES EITHER DEDICATED OR MULTI-USER
MICRO-CODE INTO THE KMC-11 AS INDICATED BY BIT 6 OF "SR1".
2. TESTS THAT THE MICRO-CODE CAN BE STARTED.
3. BUILDS A DEVICE ADDRESS TABLE BASED ON THE INFORMATION
THE OPERATOR FURNISHED IN SR1. AFTER BUILDING THE
TABLE, IT GIVES IT TO THE LPA-11 FOR VERIFICATION.
4. IF DEDICATED CODE IS RUN, AND THERE ARE TWO A/D'S
ON THE SYSTEM, A/D SAMPLES ARE TAKEN AT A RATE
CONTROLLED BY THE VALUE IN SR2.
IF MULTI-USER MICRO-CODE IS RUN, ALL DEVICES ON THE
I/O BUS ARE EXERCISED.

8.0 OPERATIONS OPTIONS

SR1: INFORMS THIS DIAGNOSTIC AS TO WHAT DEVICES ARE ON THE I/O BUS AND THE MODE THE LPA-11 WILL BE RUNNING. YOU MUST CHANGE THIS LOCATION TO REFLECT THE ACTUAL SYSTEM CONFIGURATION.

WORD	RIT=1	OCTAL	DEVICE
0		000001	1ST AD11K
1		000002	1ST KW11K
2		000004	1ST DR11K
3		000010	1ST AD11K#2
4		000020	2ND DR11K
5		000040	DEDICATED USER MICRO-CODE SELECTED
6		000100	3RD DR11K
7		000400	4TH DR11K
8		001000	5TH DR11K
9		002000	AR11K
10		004000	LPS-11 (LPS A/D) TIME CLOCK)
11		010000	LPSAD (LPS REAL)
12		020000	LPSKW (LPS D/A)
13		040000	LPSVC (LPS DIGITAL I/O)
14		040000	
15		100000	

NOTE: BEFORE RUNNING THIS MODULE, ALL DEVICES CONNECTED TO THE DR11K OUTPUTS SHOULD BE REMOVED. IF NOT, IT IS UNPREDICTABLE WHAT THAT DEVICE WILL DO DURING THE COURSE OF THE TESTS, RANDOM DATA IS SENT TO THE DR11K'S.

SR2: INFORMS THE MODULE AS TO THE A/D DATA TRANSFER RATE

OCTAL VALUE	RATE (KILO-HERTZ)
0	150K
1	134K
2	118K
3	100K
4	80K
5	60K
6	40K
7	20K

9.0 NON-STANDARD PRINTOUTS

ALL PRINTOUTS HAVE THE STANDARD FORMATS DESCRIBED IN THE DEC/X11 DOCUMENT.

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175 000000
176 000000
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181 000000
182 000000 050114 041110 040
183 000005 000
184 000006 170460
185 000010 000300
186 000012 300
187 000013 000
188 000014 000001
189 000016 000000
190 000020 000000
191 000022 000000
192 000024 000000
193
194 000030 140000
195 000032 000550
196 000032 000224
197 000034 000000
198 000036 000001
199 000040 000000
200 000042 000000
201 000044 000000
202 000046 000000
203 000050 000000
204 000052 000000
205 000054 000000
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207 000056 000000
208 000060 000000
209 000062 000000
210 000064 000000
211 000066 000000
212 000070 000000
213 000072 000000
214 000074 000000
215 000076 000000
216 000100 000000
217 000102 000000
218 000104 000000
219 000104 000000
220 000106 000000
221 000106 000000
222 000106 000000
223 000110 000000
224 000112 000000
225 000114 000000
226 000116 000000
227 000120 000000
228 000122 000000
229 000224 000000

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%
IOMOD <LPHR> 170460,300,6,0,0,1,0
MODULE 140000,LPHR,170460,300,6,0,0,1,0
-TITLE LPHR DEC/X11 SYSTEM EXERCISER MODULE
-DDXCOM VERSION 6 23-MAY-78
-LIST BIN
;*****
BEGIN:
MODNAM: .ASCII /LPHR / ;MODULE NAME.
XFLAG: .BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
ADDR: 170460+0 ;1ST DEVICE ADDR.
VECTOR: 300+0 ;1ST DEVICE VECTOR.
BR1: .BYTE PRTV6+0 ;1ST RR LEVEL.
BR2: .BYTE PRTV0+0 ;2ND RR LEVEL.
DVID1: 0+1 ;DEVICE INDICATOR 1.
SR1: OPEN ;SWITCH REGISTER 1
SR2: OPEN ;SWITCH REGISTER 2
SR3: OPEN ;SWITCH REGISTER 3
SR4: OPEN ;SWITCH REGISTER 4
;*****
STAT: 140000 ;STATUS WORD.
INIT: START ;MODULE START ADDR.
SPOINT: WODSP ;MODULE STACK POINTER.
PASCNT: 0 ;PASS COUNTER.
ICOUNT: 1 ;# OF ITERATIONS PER PASS=1
ICOUNT: 0 ;LOC TO COUNT ITERATIONS
SOFCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
HRDCNT: 0 ;LOC TO SAVE TOTAL HARD ERRORS
SOPPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
PANNUM: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
CONFIG: 0 ;RESERVED FOR MONITOR USE
RES1: 0 ;RESERVED FOR MONITOR USE
RES2: 0 ;RESERVED FOR MONITOR USE
SVR0: OPEN ;LOC TO SAVE R0.
SVR1: OPEN ;LOC TO SAVE R1.
SVR2: OPEN ;LOC TO SAVE R2.
SVR3: OPEN ;LOC TO SAVE R3.
SVR4: OPEN ;LOC TO SAVE R4.
SVR5: OPEN ;LOC TO SAVE R5.
SVR6: OPEN ;LOC TO SAVE R6.
CSRA: OPEN ;ADDR OF CURRENT CSR.
SBADR: ;ADDR OF GOOD DATA, OR
ACSR: OPEN ;CONTENTS OF CSR.
MSADR: ;ADDR OF RAD DATA, OR
ASTAT: OPEN ;STATUS REG CONTENTS.
ERRTYP: ;TYPE OF ERROR
ASB: OPEN ;EXPECTED DATA.
AWAS: OPEN ;ACTUAL DATA.
RSTRT: RSTRT ;RESTART ADDRESS AFTER END OF PASS
WOTO: ;WORDS TO MEMORY PER ITERATION
WDFR: OPEN ;WORDS FROM MEMORY PER ITERATION
INTR: OPEN ;# OF INTERRUPTS PER ITERATION
IDNUM: 0 ;MODULE IDENTIFICATION NUMBER=0
MODSP:

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230
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232 000224 177763
233 000226
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242 000226 170460
243 000226 170460
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245 000230 170461
246 000232 170462
247 000234 170463
248 000236 170464
249 000240 170465
250 000242 170466
251 000244 170467
252 00246 000004
253 00250 000000
254 00252 000020
255
256 000312 170400
257 000314 170404
258 000316 167770
259 000320 170416
260 000322 170440
261 000324 167760
262 000326 167750
263 000330 167740
264 000332 167730
265 000334 170400
266 000336 170400

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;*****
SR2VAL: -13. ;CLOCK PRESET VALUE FOR SR2 RATE CODE
KMC5R:
;
; ADDRESS OF KMC-11 OF LPA-11 THE ADDR FOR KMAD0 MAY BE
; CHANGED BY THE USER TO REFLECT
; A DIFFERENT KMC-11 ADDR. THE
; REST OF THE ADDRESSES WILL
; BE CHANGED BY THE PROGRAM.
;
LPCI:
KMAD0: .WORD 170460 ;BASE KMC ADDR. MAY BE PATCHED BY USER.
LPMR:
KMAD1: .WORD 170460+1 ;>>DO NOT <<KMC-CSR ADDR
LPC0: .WORD 170460+2 ;>>PATCH <<
LPS0: .WORD 170460+3 ;>>THIS AREA <<
KMAD3: .WORD 170460+4 ;
LPADL: .WORD 170460+5 ;>>DO NOT <<
KMAD4: .WORD 170460+6 ;>>PATCH <<
LPM51: .WORD 170460+7 ;>>THIS AREA <<
KMAD7: .WORD 170460+7 ;>>THIS AREA <<
VERSN: .WORD 4 ;CURRENT VERSION NUMBER OF MICROCODE.
-DVLS: .WORD 0 ;/DEVICE LIST OF I/O ADDR. DEFINED
.BLRW 16. ;/BY INIT.
AD11K: .WORD 170400 ;AD11K ADDRESS.
KW11K: .WORD 170404 ;KW11K ADDRESS.
DR11K1: .WORD 167770 ;DR11K #1 ADDR.
AR11K1: .WORD 170416 ;AR11K ADDRESS.
AD11K2: .WORD 170440 ;AD11K #2 ADDRESS.
DR11K2: .WORD 167760 ;DR11K #2 ADDRESS.
DR11K3: .WORD 167750 ;DR11K #3 ADDRESS.
DR11K4: .WORD 167740 ;DR11K #4 ADDRESS.
DR11K5: .WORD 167730 ;DR11K #5 ADDRESS.
AR11K: .WORD 170400 ;AR11K ADDRESS.
LPS11: .WORD 170400 ;LPS11 BASE ADDRESS.

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389 000672 104410 000000 ENDS,BEGIN
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397 000676 032757 000100 177112 TST1: BIT #R16,SRI ;TEST MICRO-CODE TYPE INDICATOR
398 000704 001010 ; ;ABORT THIS MODULE SINCE WE HAVE NOT
399 000706 012700 0,5764 ; ;BEEN INFORMED WHICH DEVICES ARE ON
400 000712 010067 177424 ; ;THE I/O BUS VIA SRI
401 000716 012767 000115 177414 ;
402 000724 000407 ;
403 000726 012700 021770 7S: MOV #DMAST,RO ;GET ADDRESS OF DEDICATED USER
404 000732 010067 177404 ;SAVE STATING ADDRESS
405 000736 012767 000104 177374 ;LOAD TYPE OF UCODE
406
407 000744 005077 177256 10S: CLR @KMA0 ;CLEAR CSR
408 000750 005077 177262 CLR @KMA4 ;CLEAR SCRAM ADDRESS
409 000754 052777 002000 177244 1S: BIS #2000,@KMA0 ;SELECT CRAM
410 000762 012077 177254 MOV (0)+@KMA6 ;WRITE DATA
411 000766 052777 020000 177232 BIS #2000,@KMA0 ;SET CRAM WRITE
412 000774 005077 177236 CLP @KMA0 ;DISABLE CRAM
413 001000 005277 177232 INC @KMA4 ;UPDATE CRAM ADDRESS
414 001004 021027 177777 CMP (0),#-1 ;ALL DONE
415 001010 001361 BNE 1S ;NO-LOOP
416 001016 005077 177220 CLR @KMA4 ;CLEAR CRAM ADDRESS
417 001018 016700 177320 UC0DES,RO ;GET MICRO-CODE ADDRESS
418
419 001022 052777 002000 177176 2S: BIS #2000,@KMA0 ;SELECT CRAM
420 001030 022077 177206 CMP (0)+@KMA6 ;DATA-OK?
421 001034 001010 ;NO-REPORT ERROR
422 001036 021027 177777 CMP (0),#-1 ;ALL DONE
423 001042 001426 BEQ TST2 ;EXIT
424 001044 005077 177156 CLP @KMA0 ;NO DESELECT CRAM
425 001050 005277 177162 INC @KMA4 ;UPDATE CRAM ADDRESS
426 001054 000762 BR 2S
427
428 ;SETUP CODE FOR ERROR REPORTING
429
430 001056 016767 177160 177016 3S: MOV @KMA6,ACSR ;STORE ADDRESS OF KMC-11
431 001064 017767 177146 177012 MOV @KMA4,WASADR ;ADDRESS LOCATION OF FAILING
432 ; MICRO-CODE
433 001072 017767 177144 177010 MOV @KMA6,AWAS ;ACTUAL MICRO-CODE LOADED INTO
434 ; THE KMC
435 001100 014067 177002 MOV -(0),ASR ;EXPECTED MICRO-CODE
436 001104 010067 176772 RO,SBADR ;ADDRESS OF EXPECTED MICRO-CODE
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439 001110 104404 000000
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447 ;**SADR** CONTAINS THE ADDRESS OF WHAT THE MICRO-CODE
448 ;**SHOULD HAVE BEEN
449 ;**WAS ADR** CONTAINS THE ADDRESS OF THE MICRO-CODE THAT WAS
450 ;**IN ERROR
451 ;**AWAS** CONTAINS THE MICRO-CODE IN ERROR
452 ;**CSR** CONTAINS WHAT THE MICRO-CODE SHOULD HAVE BEEN.
453 ;**DUE TO THE NATURE OF THIS ERROR, YOU CANNOT
454 ;**RUN "DXLPH"
455 ;**IT IS SUGGESTED THAT YOU RUN "MD-11-DRLPA".
456 ;**GOOD LUCK!
457
458 001114 104410 000000
459
460 ENDS,BEGIN
461
462 ;TEST #2
463
464 ;IN THIS TEST WE WILL TRY TO START
465 ;THE USER MICRO-CODE PREVIOUSLY LOAD BY
466 ;EITHER DXLPE OR DXLPG.
467
468 001120 052777 040000 177100 TST2:
469 001120 012701 000040 12S: MOV #R14,@KMA0 ;SET INIT.
470 001132 104407 000000 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...
471 001136 104407 000000 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
472 001142 005301 DEC R1
473 001146 012777 104000 177052 BNE 1S ;BIT 15 OF THE KMC CSR SHOULD BE
474 ;SET AT THIS TIME.
475 001154 012701 000500 MOV #320,R1
476
477 001160 032777 000200 177040 1S: BIT #R17,@LPCI ;BIT 7 OF CONTROL IN REG. (READY IN)
478 001166 001024 BNE 2S ;SHOULD BE SET AT INIT.
479 001174 104407 000000 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...
480 001178 104407 000000 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
481 001200 005301 DEC R1
482 001202 001366 BNE 1S
483 001204 016767 177022 176666 MOV @LPC0,CSRA ;ADDR. OF CONTROL OUT REG.
484 ;NOTE STATUS OUT IN HIGH BYTE.
485 001212 017767 177014 176662 MOV @LPC0,ACSR ;CONTENTS OF CSR REG.
486 001220 017767 177002 176656 MOV @LPC1,ASTAT ;CONTENTS OF CONTROL IN REG.
487
488 001226 104405 000000 000000 HRDERS,BEGIN,NULL ;LPA-11 ERROR - READY IN NOT SET AT INIT.
489
490 001234 104410 000000
491
492 ENDS,BEGIN
493
494 001240 032777 000200 176764 2S: BIT #R17,@LPC0 ;CHECK READY OUT, IT SHOULD
495 001246 001416 BE CLEAR AT INIT.
496 001250 016767 176756 176622 MOV @LPC0,CSRA ;ADDR. OF CONTROL OUT REG.
497 ;NOTE STATUS OUT IN HIGH BYTE.
498 001256 017767 176750 176616 MOV @LPC0,ACSR ;CONTENTS OF CSR REG.
499 001264 017767 176736 176612 MOV @LPC1,ASTAT ;CONTENTS OF CONTROL IN REG.
500 001272 104405 000000 000000 HRDERS,BEGIN,NULL ;LPA-11 ERROR - READY OUT SET AT INIT.

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501 001300 104410 000000 ENDS,BEGIN ;
502 ;
503 001304 3S: ;TEST #3
504 ;
505 ;INIT TEST IN THIS TEST WE MAKE SURE THE KMC MICRO-
506 ;CODE CAN FIND ALL ADDRESSES OF DEVICES TO BE TESTED.
507 ;
508 ;
509 ;
510 001304 012700 000112 TST3: MOV #10,R0
511 001310 012701 007076 MOV #DEVLST,R1 ;CLEAR DEVICE LIST AREA
512 001314 005021 CLR (1)+
513 001318 005063 BR #1,(1)+
514 001320 012721 000001 1S: MOV #1,(1)+ ;PUT A 1 INTO ALL POSITIONS OF
515 ;DEVICE LIST SO THAT LPA WON'T RETURN
516 ;ADDR ERROR UNLESS BAD ADDR.
517 ;OTHERWISE IT WOULD RETURN ADDR. ERROR
518 ;CODE ON ADDR. ZERO.
519 ;
520 001324 005300 DEC R0
521 001326 001374 BNE 1S
522 001330 012701 007100 MOV #DEVLST+2,R1
523 001334 032767 000002 176454 BIT #RIT1,SR1 ;KW11K CLOCK??
524 001342 001403 BEQ 1S ;NO
525 001344 016721 176744 MOV #R11K,(1)+ ;YES FIX ADDR.
526 001350 000427 BR 20S
527 001352 032767 002000 176436 10S: BIT #RIT10,SR1 ;AR11 CLOCK??
528 001360 001405 BEQ 1S ;NO
529 001362 016711 176746 MOV #R11K,(1) ;YES FIX AR11 CLOCK ADDR.
530 001366 000418 ADD #4,(1)+
531 001374 032767 020000 176414 11S: BIT #RIT13,SR1 ;LPS CLOCK?
532 001402 001405 BEQ 1S ;NO-ERROR!!!
533 001404 016711 176726 MOV #LPS11,(1) ;YES FIX LPS11 CLOCK ADDR.
534 001410 062721 000004 ADD #4,(1)+
535 001416 000405 BR 20S
536 ;
537 001416 104405 000000 000000 12S: *****
538 HRDERS,BEGIN,NULL ;NO CLOCK SELECTED FOR TEST...
539 *****
540 ;CAN NOT DO ANY MORE TESTS WITHOUT
541 ;CLOCK PRESENT!
542 ;YOU MUST SELECT A CLOCK.
543 ;
544 ENDS,BEGIN
545 ;
546 001430 012721 000001 20S: MOV #1,(1)+
547 001434 032767 000001 176354 BIT #RIT0,SR1 ;AD11K FOR TEST??
548 001442 001403 BEQ 1S
549 001444 016721 176642 MOV #AD11K,(1)+ ;YES FIX AD11K ADDR.
550 001450 000420 BR 30S
551 001452 032767 002000 176336 21S: BIT #RIT10,SR1 ;AR11 A/D?
552 001460 001403 BEQ 22S
553 001466 000411 MOV #R11K,(1)+
554 001470 032767 010000 176320 22S: BIT #RIT12,SR1 ;LPS A/D?
555 001476 001403 BEQ 23S
556 001500 016721 176632 MOV #LPS11,(1)+

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557 001504 000402 23S: BR 30S
558 001506 012721 000001 MOV #1,(1)+
559 ;
560 001512 032767 000020 176276 30S: BIT #RIT4,SR1 ;2ND AD11K?
561 001520 001403 BEQ 31S
562 001522 016721 176574 MOV #AD11K2,(1)+
563 001530 012721 000001 31S: BR 32S
564 001532 012721 000001 MOV #1,(1)+
565 ;
566 001534 032767 000010 176254 32S: BIT #RIT3,SR1 ;AA11K?
567 001542 001403 BEQ 33S
568 001544 016721 176550 MOV #AA11K,(1)+
569 001550 000424 BR 40S
570 001552 032767 002000 176236 33S: BIT #RIT10,SR1 ;AR11?
571 001560 001405 BEQ 34S
572 001562 016711 176546 MOV #R11K,(1)
573 001566 062721 000016 ADD #16,(1)+
574 001572 000413 BR 40S
575 001574 032767 040000 176214 34S: BIT #RIT14,SR1 ;LPS D/A?
576 001602 001405 BEQ 35S
577 001604 016711 176526 MOV #LPS11,(1)
578 001610 062721 000016 ADD #16,(1)+
579 001614 000403 BR 40S
580 001616 012721 000001 35S: MOV #1,(1)+
581 ;
582 001622 032767 000004 176166 40S: BIT #RIT2,SR1 ;DR11K?
583 001630 001403 BEQ 41S
584 001632 016721 176460 MOV #DR11K1,(1)+
585 001636 000413 BR 50S
586 001640 032767 100000 176150 41S: BIT #RIT15,SR1 ;LPS I/O?
587 001646 001405 BEQ 42S
588 001650 016711 176462 MOV #LPS11,(1)
589 001654 062721 000010 ADD #10,(1)+ ;FIX LPS11 I/O ADDR.
590 001660 000402 BR 50S
591 001662 012721 000001 42S: MOV #1,(1)+
592 ;
593 001666 032767 000040 176122 50S: BIT #RIT5,SR1 ;DR11K #2 ?
594 001674 001403 BEQ 51S
595 001676 016721 176422 MOV #DR11K2,(1)+
596 001702 000402 BR 52S
597 001704 012721 000001 51S: MOV #1,(1)+
598 001710 032767 000200 176100 52S: BIT #RIT7,SR1 ;DR11K #3 ?
599 001716 001403 BEQ 53S
600 001720 016721 176402 MOV #DP11K3,(1)+
601 001724 000402 BR 54S
602 001726 012721 000001 53S: MOV #1,(1)+
603 001740 001403 176056 54S: BIT #RIT8,SR1 ;DR11K #4 ?
604 001742 016721 176362 BEQ 55S
605 001746 000402 BR 56S
606 001750 012721 000001 55S: MOV #1,(1)+
607 001754 032767 001000 176034 56S: BIT #RIT9,SR1 ;DR11K #5 ?
608 001762 001403 BEQ 57S
609 001764 016721 176342 MOV #DP11K5,(1)+
610 001770 000402 BR 60S
611 001772 012711 000001 57S: MOV #1,(1)

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613 001776* 60S:
614
615 001776* 116767 176244 005073 MOV# VERSN,DEVST+1
616
617 002004* 012701 007076* 4S: MOV #DEVST,R1 ;SET TO GET PA
618 002010* 010167 176334 MOV R1,GETADR ;MOV ADRS SO WE CAN GET THE PA
619 002011* 014415 000000* GETPAS,BEGIN,GETADR ;GET PHYSICAL ADDRESS FROM 16-BIT GETADR
620 002012* 016701 176324 MOV GETPAS,R1 ;RETURN PHYSICAL ADRS.
621 002013* 010177 176204 MOV R1,@LPADL ;SET INIT POINTER
622 002014* 008267 176315 ASR GETEAB ;SHIFT EA BITS INTO BITS 2 AND 3
623 002015* 008267 176315 ASR GETEAB ;SHIFT EA BITS INTO BITS 2 AND 3
624 002016* 156777 176306 BISR GETEAB,@LPCI ;SET EA BITS
625 002017* 052777 000001 176156 BIS #BIT0,@LPCI ;SET GO1
626 002018* 005000 CLP R0
627
628 002060* 5S:
629 002060* 104407 000000* BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR.
630 002061* 104407 000000* BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
631 002070* 132777 000200 176130 BITB #BIT7,@LPCI ;DONE?
632 002070* 001020 BNE 6S ;YES1
633 002070* 105200 INCB R0 ;NO-WAIT
634 002102* 001366 BNE 5S ;BUT NOT TOO LONG..
635 002104* 016767 176122 175766 MOV LPCO,CSRA ;ADDR. OF CONTROL OUT REG.
636 002112* 017767 176114 175762 MOV @LPCO,ACSR ;NOTE STATUS OUT IN HIGH BYTE.
637 002120* 017767 176102 175756 MOV @LPCI,ASTAT ;CONTENTS OF CSR REG.
638 ;CONTENTS OF CONTROL IN REG.
639
640 002126* 104405 000000* 000000
641 ;*****
642 HRDRS,BEGIN,NULL ;LPA FAILED TO FINISH INIT.
643 ;*****
644 ENDS,BEGIN ;
645 6S:
646 RPL @LPCO ;DID CONTROL OUT SET WITH ERROR??
647 TST4
648
649 002146* 016767 176060 175724 MOV LPCO,CSRA ;ADDR. OF CONTROL OUT REG.
650 002154* 017767 176057 175720 MOV @LPCO,ACSR ;NOTE STATUS OUT IN HIGH BYTE.
651 002176* 122777 176048 175714 MOV @LPCI,ASTAT ;CONTENTS OF CSR REG.
652 002176* 001405 000326 176036 CMPR #326,@LPSO ;DEVICE ADDR ERROR?
653 BEQ 7S
654 ;*****
655 HRDRS,BEGIN,NULL ;ERROR KNOWN CHECK RETURNED ERROR
656 ;*****
657 ENDS,BEGIN ;CODE AGAINST DOCUMENTATION.
658
659 7S:
660 ;*****
661 HRDRS,BEGIN,NULL ;RAD DEVICE ADDRESS
662 ;*****
663 ;*****
664 HRDRS,BEGIN,NULL ;DEVICE DOES NOT EXIST? SOMETHINGS
665 ;*****
666 ENDS,BEGIN ;
667
668 TST4:
669 MOV #BUFFER,GETADR ;SET UP TO GET ALL PA'S
670 GETPAS,BEGIN,GETADR ;GET PHYSICAL ADDRESS FROM 16-BIT GETADR
671 GETPAS,BEGIN,MBUFF0 ;GET PHYSICAL ADDRESS FROM 16-BIT MBUFF0
672 GETPAS,BEGIN,MBUFF1 ;GET PHYSICAL ADDRESS FROM 16-BIT MBUFF1

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673 002254* 104415 000000* 000374* GETPAS,BEGIN,MBUFF2 ;GET PHYSICAL ADDRESS FROM 16-BIT MBUFF2
674 002254* 104415 000000* 000402* GETPAS,BEGIN,MBUFF3 ;GET PHYSICAL ADDRESS FROM 16-BIT MBUFF3
675 002254* 104415 000000* 000410* GETPAS,BEGIN,MJOB0 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB0
676 002254* 104415 000000* 000416* GETPAS,BEGIN,MJOB1 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB1
677 002254* 104415 000000* 000424* GETPAS,BEGIN,MJOB2 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB2
678 002254* 104415 000000* 000432* GETPAS,BEGIN,MJOB3 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB3
679 002254* 104415 000000* 000440* GETPAS,BEGIN,MJOB4 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB4
680 002254* 104415 000000* 000446* GETPAS,BEGIN,MJOB5 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB5
681 002254* 104415 000000* 000454* GETPAS,BEGIN,MJOB6 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB6
682 002254* 104415 000000* 000462* GETPAS,BEGIN,MJOB7 ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB7
683 002254* 104415 000000* 000470* GETPAS,BEGIN,MJOB0U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB0U
684 002254* 104415 000000* 000476* GETPAS,BEGIN,MJOB1U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB1U
685 002254* 104415 000000* 000504* GETPAS,BEGIN,MJOB2U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB2U
686 002254* 104415 000000* 000512* GETPAS,BEGIN,MJOB3U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB3U
687 002254* 104415 000000* 000520* GETPAS,BEGIN,MJOB4U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB4U
688 002254* 104415 000000* 000526* GETPAS,BEGIN,MJOB5U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB5U
689 002254* 104415 000000* 000534* GETPAS,BEGIN,MJOB6U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB6U
690 002254* 104415 000000* 000542* GETPAS,BEGIN,MJOB7U ;GET PHYSICAL ADDRESS FROM 16-BIT MJOB7U
691
692 002430* 006267 175720 ASP GETEAB ;WHAT WE HAD TO DO IS GET EXTION
693 002430* 006267 175720 ASP GETEAB ;NOW WE HAVE TO FIX EA BITS
694 002440* 016767 175710 175710 MOV GETEAB,GETRS ;FOR CSR BITS 2 AND 3.
695 002446* 006267 175702 ASP GETEAB ;PUT FOR CSR
696 002452* 006267 175676 ASP GETEAB ;RIGHT JUSTIFIED FOR BUFFER USE.
697 ;BITS IF ANY WERE NEEDED.
698
699 LOOP:
700 ;
701 ;HERE WE'LL EXERCISE ALL DEVICES THAT
702 ;THE USER INDICATES HE HAS ON THE SYSTEM
703 ;IF MULTI-USER MICRO CODE IS LOADED.
704 ;IF DEDICATED USER MICRO CODE IS LOADED,
705 ;WE'LL ONLY EXERCISE THE A/D'S.
706
707 002456* 012767 170000 002662 1S: MOV #170000,KWT+4 ;SET AN INITIAL CLOCK RATE.
708 002456* 012700 002350* MOV #JOB0,R0
709 002474* 160003 005504* MOV #JOB1,R3 ;GET DIF IN ADDR. BETWEEN JOBS.
710
711 2S:
712 CLR R3
713 CMP R0,#JOB7R
714 BNE 2S
715 MOV #JOB0,R0 ;GET JOB POINTER
716 SUB R3,R0 ;FUDGE POINTER
717 CLR SCDAT
718 BIT #BIT0|BIT10|BIT12,SR1 ;ANY A/D'S?
719 BEQ 4S ;NO-EXIT A/D'S.
720 ADD R3,R0 ;UPDATE JOB POINTER
721 MOV #12,(R) ;MODE WORD-START A/D.
722 BIS #12,(R) ;SINGLE CHAN.
723 MOV #12,(R) ;TAKE 512 SAMPLES
724 CLP JOB0U ;CLEAR USW
725 MOV #JOB0U,4(R) ;LOAD PA OF USW
726 BISR #BIT7|BIT11|7(0) ;BUFFER OVERRUN NOT FATAL, THREE BUFFERS.
727 MOV GRUFF0,10(R) ;SET BUFFER ADDR.
728 MOV GRUFF0,14(R)
729 MOV GRUFF0,20(R)

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725 002612* 012760 000010 000054 MOV #10,54(0) ;SET DELAY BEFORE START.
726 002620* 012760 000016 000060 MOV #16,60(0) ;SAMPLE 14 CHANNELS
727 002626* 012760 000200 000062 MOV #200,62(0) ;SET SAMPLE RATE.
728 ;NOW WE MUST SET ALL EXTION BITS.
730 002634* 116760 175514 000006 MOVR GETEAR,6(0)
731 002642* 116760 175506 000012 MOVR GETEAR,12(0)
732 002650* 116760 175500 000018 MOVR GETEAR,18(0)
733 002658* 116760 175492 000024 MOVR GETEAR,24(0)
734 002664* 116760 175484 000026 MOVR GETEAR,26(0)
735 002672* 005267 175450 INC SGGDAT
736 002678* 012760 000400 MOV #400,56(0) ;START CH0, INC=1
737 002704* 126727 175430 35: CMPB UCODE,#'D
738 002712* 001045 BNF 45
740 002714* 042710 000010 BIC #BIT3,(0) ;CLEAR MULTIUSER BIT.
741 002720* 032767 000020 175070 BIT #BIT4,SRI ;SECOND A/D?
742 002726* 001402 BEQ 75 ;NO CONTINUE.
743 002730* 012710 004442 MOV #4442,(0) ;YES=MAKE OPERATE IN DUAL A/D MODE.
744 002734* 012760 002760 MOV #1520,7(0) ;LARGER BUFFER.
745 002742* 016760 175414 75: GRUFF0,14(0) ;MORE BUFFERS.
746 002750* 016760 175400 MOV GETEAR,16(0)
747 002756* 016760 175400 MOV GRUFF0,20(0)
748 002764* 016760 175364 MOV GETEAR,22(0)
749 002772* 016760 175364 MOV GRUFF0,24(0)
750 003006* 016760 175350 MOV GETEAR,26(0)
751 003014* 112760 000323 MOVR #255,7(0) ;SET VALID BUFFER MASK.
752 003014* 116767 175204 MOV SP2VAL,KWT+4 ;SET A HICHER CLOCK RATE.
753 ;WE WILL TAKE SAMPLES AT 150KILOHERTZ.
754 003022* 000167 001430 35$: JMP FLOOP
755
756 003026* 45:
757
758 ;/-SDRM-
759
760 003026* 032767 100004 174762 BIT #BIT2#BIT15,SRI ;/THIS DR11K #1 OR LPS I/O SEL?
761 003034* 001466 BEQ 645
762 003036* 060300 ADD R3,R0 ;UPDATE JOB STORAGE AREA POINTER.
763 003040* 012710 000432 MOV #432,(0) ;SET I/O START, MULTI-USER, INPUT SINGLE CHAN.
764 003044* 012760 000256 MOV #256,2(0) ;WORD COUNT
765
766 003052* 005067 002524 CLR JOB1U ;CLEAR USW
767 003052* 015760 000000 MOVR GJOB1U,4(0) ;LOAD PA OF USW INTO RDA
768 003060* 015760 000000 MOV #0,6(0) ;LOAD THE USW PA INTO THE RDA
769 003072* 112760 000202 MOVR #BIT7#BIT1,7(0) ;3 BUFFERS.
771 003100* 016760 175272 MOV GRUFF2,10(0) ;SET BUFFER ADDR.
772 003106* 016760 175252 MOV GRUFF3,14(0)
773 003114* 016760 175252 MOV GRUFF3,20(0)
774 003122* 005060 000012 CLR 12(0)
775 003126* 005267 175214 INC SGGDAT ;RECORD THIS JOB
776 003132* 012760 000100 MOV #100,54(0) ;DELAY BEFORE START.
777 003140* 012760 000000 MOV #1,60(0) ;SAMPLING ONLY ONE CHAN.
778 003146* 012760 000000 MOV #1,56(0) ;SELECT CHAN #.
779 003154* 012760 000200 MOV #200,62(0)
780
  
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781 003162* 116760 175166 MOVR GETEAR,6(0)
782 003170* 016760 175160 MOV GETEAR,12(0)
783 003178* 016760 175152 MOV GETEAR,18(0)
784 003186* 016760 175144 MOV GETEAR,22(0)
785 64$:
786
787 003212* 032767 042010 174576 BIT #BIT3#BIT10#BIT14,SRI ;D/A OUTPUT SELECTED?
788 003220* 001461 55 BEQ 55 ;NO-NEXT SET-UP
789 003222* 005267 175120 INC SGGDAT
790 ;ALTHOUGH WE'RE GONNA WORK
791 ;WITH D/A, NO OUTPUT
792 ;WILL RESULT. D/A THROWN IN.
793 ;JUST TO TRY AND CONFUSE LPA.
794 003226* 060300 ADD R3,R0 ;UPDATE JOB STORAGE ARE POINTER
795 003230* 012710 001212 MOV #BIT1#BIT3#BIT7#BIT9,(0) ;START D/A, SEQ. CHAN.
796 003234* 012760 000256 MOV #256,2(A) ;SET XFERR COUNT
797
798 003242* 005067 002470 CLR JOB2U ;CLEAR USW
799 003246* 016760 175234 MOVR GJOB2U,4(0) ;LOAD THE USW PA INTO THE RDA
800 003254* 012760 000000 MOV #0,6(0)
801 003262* 116760 000202 MOVR #BIT7#BIT1,7(0) ;3 BUFFERS.
802 003270* 016760 175102 MOV GRUFF3,10(0) ;BUFFER ADDR.
803 003276* 016760 175102 MOV GRUFF3,14(0)
804 003304* 016760 175074 MOV GRUFF3,20(0)
805 003312* 012760 000100 MOV #100,54(0) ;DELAY BEFORE START.
806 003320* 012760 000000 MOV #1,60(0)
807 003326* 012760 000200 MOV #200,62(0)
808
809 003334* 016760 175014 MOV GETEAR,12(0) ;SET EA BITS
810 003342* 116760 175006 MOVR GETEAR,6(0)
811 003350* 116760 175000 MOVR GETEAR,16(0)
812 003356* 016760 174772 MOVR GETEAR,22(0)
813 5$: BIT #BIT4,SRI ;SECOND A/D?
814 003372* 001461 BEQ 65
815 003374* 060300 ADD R3,R0 ;UPDATE JOB STORAGE ARE POINTER.
816 003378* 012710 000012 MOV #12,(0) ;MODE WORD-START A/D.
817 003402* 012760 000512 MOV #512,2(0) ;TAKE 512 SAMPLES
818
819 003410* 005067 002456 CLR JOB3U ;CLEAR USW
820 003414* 016760 175074 MOVR GJOB3U,4(0) ;LOAD THE USW PA
821 003422* 152760 000202 BTRB #BIT7#BIT1,7(0) ;BUFFER OVERRUN NOT FATAL, ONE BUFFER.
822 003430* 016760 174776 MOV GRUFF0,10(0) ;SET BUFFER ADDR.
823 003438* 016760 174770 MOV GRUFF0,14(0)
824 003446* 016760 174762 MOV GRUFF0,20(0)
825 003452* 012760 000010 MOV #10,54(0) ;SET DELAY BEFORE START.
826 003460* 012760 000400 MOV #400,56(0) ;SAMPLE 14 CHANNELS.
827 003466* 012760 000016 MOV #16,60(0) ;SET SAMPLE RATE.
828 003474* 012760 000010 MOV #16,62(0)
829 003502* 005267 174640 INC SGGDAT
830
831 003506* 116760 174642 MOVR GETEAR,6(0)
832 003514* 016760 174634 MOV GETEAR,12(0)
833 003522* 016760 174626 MOV GETEAR,16(0)
834 003530* 016760 174620 MOV GETEAR,22(0)
835 6$:
836
  
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837
838
839 003536 032767 000040 174252 RIT #BIT5,SRI ;/-SDRM-
840 003544 001466 REQ 68S ;/THIS DR11K #2 SELECTED?
841 003546 060300 ADD R3,RO ;/UPDAT JOB STORAGE AREA POINTER.
842 003550 012710 MOV #432,(0) ;/SET I/O START, MULTI-USER, INPUT SINGLE CHAN.
843 003554 012760 MOV #256,2(0) ;/WORD COUNT
844
845 003562 005067 002440 CLR JOB4U ;CLEAR USW
846 003566 016760 174730 MOV GJOB4U,4(0) ;LOAD PA OF USW INTO RDA
847 003574 012760 000000 MOV #0,6(0)
848 003616 016760 000007 MOV #BIT7,1BIT1,7(0) ;3 BUFFERS.
849 003616 016760 174552 MOV GRUFF2,10(0) ;/SET BUFFER ADDR.
850 003616 016760 174554 MOV GRUFF2,14(0)
851 003624 016760 174545 MOV GRUFF2,20(0)
852 003632 005067 000012 CLR 12(0)
853 003636 005267 174374 INC $GDDAT ;RECORD THIS JOB
854 003642 012760 000100 MOV #100,54(0) ;DELAY BEFORE START.
855 003650 012760 000001 MOV #1,6(0) ;/SAMPLING ONLY ONE CHAN.
856 003656 012760 000001 MOV #2,1,56(0) ;/SELECT CHAN #.
857 003664 012760 000200 MOV #200,62(0)
858
859 003672 116760 174456 MOV#R GETEAB,6(0)
860 003700 016760 174450 MOV GETEAB,12(0)
861 003706 016760 174442 MOV GETEAB,16(0)
862 003714 016760 174434 MOV GETEAB,22(0)
863 003722
65S:
864
865 ;/-SDRM-
866
867 003722 032767 000200 174066 RIT #BIT7,SRI ;/THIS DR11K #3 SELECTED?
868 003730 001466 REQ 68S ;/UPDAT JOB STORAGE AREA POINTER.
869 003732 060300 ADD R3,RO ;/SET I/O START, MULTI-USER, INPUT SINGLE CHAN.
870 003734 012710 MOV #432,(0) ;/WORD COUNT
871 003740 012760 MOV #256,2(0)
872
873 003746 005067 002410 CLP JOBSU ;CLEAR USW
874 003752 016760 174552 MOV GJOBSU,4(0) ;LOAD PA OF USW INTO RDA
875 003760 012760 000000 MOV #0,6(0)
876 003766 012760 000007 MOV#R #BIT7,1BIT1,7(0) ;3 BUFFERS.
877 003766 012760 174370 MOV GRUFF2,10(0) ;/SET BUFFER ADDR.
878 004002 016760 174370 MOV GRUFF2,14(0)
879 004010 016760 174362 MOV GRUFF2,20(0)
880 004016 005067 000012 CLR 12(0)
881 004022 005267 174320 INC $GDDAT ;RECORD THIS JOB
882 004026 012760 000100 MOV #100,54(0) ;DELAY BEFORE START.
883 004034 012760 000001 MOV #1,6(0) ;/SAMPLING ONLY ONE CHAN.
884 004042 012760 000002 MOV #3,1,56(0) ;/SELECT CHAN #.
885 004050 012760 000200 MOV #200,62(0)
886
887 004056 116760 174272 MOV#R GETEAB,6(0)
888 004094 016760 174252 MOV GETEAB,12(0)
889 004100 016760 174250 MOV GETEAB,16(0)
890 004106 016760 174250 MOV GETEAB,22(0)
891
892

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893
894
895 004106 032767 000400 173702 RIT #BIT8,SRI ;/-SDRM-
896 004114 001466 REQ 67S ;/THIS DR11K #4 SELECTED?
897 004116 060300 ADD P3,RO ;/UPDAT JOB STORAGE AREA POINTER.
898 004120 012710 MOV #432,(0) ;/SET I/O START, MULTI-USER, INPUT SINGLE CHAN.
899 004124 012760 MOV #256,2(0) ;/WORD COUNT
900
901 004132 005067 002360 CLR JOB6U ;CLEAR USW
902 004136 016760 174374 MOV GJOB6U,4(0) ;LOAD PA OF USW INTO RDA
903 004144 012760 000000 MOV #0,6(0)
904 004160 012760 000007 MOV#R #BIT7,1BIT1,7(0) ;3 BUFFERS.
905 004166 016760 174204 MOV GRUFF2,10(0) ;/SET BUFFER ADDR.
906 004166 016760 174204 MOV GRUFF2,14(0)
907 004174 016760 174176 MOV GRUFF2,20(0)
908 004202 005067 000012 CLR 12(0)
909 004206 005267 174134 INC $GDDAT ;RECORD THIS JOB
910 004212 012760 000100 MOV #100,54(0) ;DELAY BEFORE START.
911 004220 012760 000001 MOV #1,6(0) ;/SAMPLING ONLY ONE CHAN.
912 004226 012760 000003 MOV #4,1,56(0) ;/SELECT CHAN #.
913 004234 012760 000200 MOV #200,62(0)
914
915 004242 116760 174106 MOV#R GETEAB,6(0)
916 004250 016760 174090 MOV GETEAB,12(0)
917 004256 016760 174072 MOV GETEAB,16(0)
918 004264 016760 174064 MOV GETEAB,22(0)
919 004272
67S:
920
921 ;/-SDRM-
922
923 004272 032767 001000 173516 RIT #BIT9,SRI ;/THIS DR11K #5 SELECTED?
924 004300 001466 REQ 68S ;/UPDAT JOB STORAGE AREA POINTER.
925 004302 060300 ADD R3,RO ;/SET I/O START, MULTI-USER, INPUT SINGLE CHAN.
926 004304 012710 MOV #432,(0) ;/WORD COUNT
927 004310 012760 MOV #256,2(0)
928
929 004316 005067 002330 CLR JOB7U ;CLEAR USW
930 004322 016760 174216 MOV GJOB7U,4(0) ;LOAD PA OF USW INTO RDA
931 004330 012760 000000 MOV #0,6(0)
932 004336 012760 000007 MOV#R #BIT7,1BIT1,7(0) ;3 BUFFERS.
933 004344 016760 174020 MOV GRUFF2,10(0) ;/SET BUFFER ADDR.
934 004344 016760 174012 MOV GRUFF2,14(0)
935 004360 016760 174012 MOV GRUFF2,20(0)
936 004366 005067 000012 CLR 12(0)
937 004372 005267 173750 INC $GDDAT ;RECORD THIS JOB
938 004376 012760 000100 MOV #100,54(0) ;DELAY BEFORE START.
939 004404 012760 000001 MOV #1,6(0) ;/SAMPLING ONLY ONE CHAN.
940 004412 012760 000003 MOV #4,1,56(0) ;/SELECT CHAN #.
941 004420 012760 000200 MOV #200,62(0)
942
943 004426 116760 173722 MOV#R GETEAB,6(0)
944 004434 016760 173714 MOV GETEAB,12(0)
945 004442 016760 173706 MOV GETEAB,16(0)
946 004450 016760 173700 MOV GETEAB,22(0)
947
948

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949 004456 012767 000011 000656 ELOOP: MOV #11,KWT ;SET UP CLOCK
950 004464 012767 000503 000652 MOV #503,KWT+2 ;PARAMETERS
951 ;*
952 ;* JOB0-JOB7 PRE SET UP
953 ;* SDDAT= NO. OF JOBS TO EXERCISE
954 ;*
955
956 004472 FLASH:
957
958 004472 2S:
959
960 004472 012701 005342 MOV #KWT,R1 ;SET UP TO GET PA
961 004478 010167 173646 MOV R1,GETADR ;MOV ADRS SO WE CAN GET THE PA
962 004502 104415 000000 GETPAS,BEGIN,GETADR ;GET PHYSICAL ADDRESS FROM 16-BIT GETADR
963 004514 016701 173636 MOV GETPAS,R1 ;RETURN PHYSICAL ADRS.
964 004514 010177 173516 MOV R1,@LPADEL ;START CLOCK
965
966 004520 056777 173632 173500 BIS GETPAS,@LPCI ;SET EXTION BITS.
967 004522 052777 000001 173472 FLASH2: BIS #BIT0,@LPCI
968 004534 012700 007466 MOV #TODDQ,R0
969
970 004540 005020 3S: CLP (0)+ ;CLEAR QUE AREA.
971 004542 020027 CMP R0,#DNEC
972 004546 001374 BNE 3S
973 004550 016700 173572 MOV SDDAT,R0 ;GET NO. OF JOBS
974 004554 012701 007466 MOV #TODDQ,R1 ;GET QUES AREA
975 004560 012703 005250 MOV #JOB0,R2 ;PICK UP 1ST JOB ADDRESS
976 004564 012703 005250 MOV #JOB1,R3 ;CALCULATE ADDR DIF.
977 004570 162703 005350 SUB #JOB0,R3
978 004574 010067 003006 MOV R0,TODOC ;REMEMBER HOW MANY JOBS ARE QUEUED
979 004600 012700 MOV #R,R0
980 004604 005712 4S: TST (2) ;ANYTHING IN THIS JOB??
981 004606 001401 REG 65
982 004610 010221 6S: MOV R2,(1)+ ;STORE FIRST JOB
983 004612
984 004612 060302 ADD R3,R2 ;POINT TO NEXT JOB
985 004614 005300 DEC R0 ;DONE ALL JOBS?
986 004616 001372 RNE 4S ;NO-LOOP.
987 004620 005027 173520 CLR SDDAT
988 004624 016700 173160 MOV VECTOR,R0
989 004630 012720 005004 MOV #OUPSRV,(0)+
990 004634 012720 000340 MOV #340,(0)+
991 004640 012720 004670 MOV #INPSRV,(0)+
992 004644 012720 000340 MOV #340,(0)+
993 004650 052777 000100 173350 BIS #BIT6,@LPCI
994 004654 052777 000100 173348 BIS #BIT6,@LPCI
995 004664 104400 000000 EXITS,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
996 004670 005767 002712 INPSRV: TST TODOC ;ANYTHING TO DO?
997 004674 001442 BEQ IEX
998
999 004676 000004 000000 004704 ;-----
1000 ;PIPQS,BEGIN,IS ; QUEUE UP TO CONTINUE AT IS AND RTI
1001
1002 004704 012700 007466 1S: MOV #TODDQ,R0
1003 004710 005720 2S: TST (0)+
1004 004712 001776 BEQ 2S

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1005 004714 014067 MOV -(0),GETADR ;SET TO GET PA
1006 004720 104415 000000 000350 GETPAS,BEGIN,GETADR ;GET PHYSICAL ADDRESS FROM 16-BIT GETADR
1007 004726 016777 173420 173302 MOV GETPAS,@LPADEL ;LOAD RDA IN LPA REG
1008 004734 006267 173414 ASL GETADR
1009 004740 006267 173410 ASR GETADR
1010 004744 006267 173404 MOV GETADR,R1
1011 004752 005010 BIS (0),@LPCI ;SET EXTION BITS
1012 004754 005367 002626 CLP TODOC ;ZERO THIS JOB
1013 004760 001003 DEC TODOC
1014 004762 042777 000100 173236 BNE 5S
1015 004766 042777 BIT #BIT6,@LPCI ;DON'T ALLOW ANOTHER INTERRUPT.
1016 004770 052777 000001 173230 5S: BIS #BIT0,@LPCI ;SET GO!
1017 004776 104400 000000 EXITS,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
1018 005002 000002 IEX: RTI
1019
1020 005004 OUPSRV:
1021
1022 005004 000004 000000 005012 ;-----
1023 ;PIRQS,BEGIN,IS ; QUEUE UP TO CONTINUE AT IS AND RTI
1024
1025 005012 017700 173214 1S: MOV @LPC0,R0 ;NOW LETS GET USER NUMBER.
1026 005016 042700 177770 RLC #C<<7,R0 ;RID OF REST OF JUNK.
1027 005022 010003 MOV R0,R3
1028 005024 006300 ASL R0
1029 005026 017701 173204 MOV @LPADEL,R1
1030 005032 105777 173176 TSTR @LPS0 ;SEE IF BIT15 SET SHOWING ERROR
1031 005036 100031 BPL NER ;IF NO ERROR,PROCEED.
1032 005040 122777 000250 173166 CMPR #250,@LPS0 ;JOB DONE ERROR?
1033 005046 051007 173270 BNE 2S ;NO-BR AND REPORT ERROR
1034 005050 005267 173270 INC SDDAT
1035 005054 026767 173266 173262 CMP SDDAT,SDDAT
1036 005062 001475 REG OFND
1037 005064 000467 RP OUTCON
1038
1039 005066 016767 173140 173004 2S: MOV LPC0,CSRA ;ADDR. OF CONTROL OUT REG.
1040
1041 005074 017767 173132 173000 MOV @LPC0,ACSP ;NOTE STATUS OUT IN HIGH BYTE.
1042 005102 017767 173120 172774 MOV @LPC1,ASTAT ;CONTENTS OF CSR REG.
1043 ;*****
1044 ;***** ;CONTENTS OF CONTROL IN REG.
1045 ;*****
1046 005110 104405 000000 000000 HRDRS,BEGIN,NULL ;LPA-11 MICRO CODE REPORTED AN ERROR
1047 ;*****
1048 005116 104410 000000 ENDS,BEGIN ;
1049
1050 005122 NER: ;COME HERE ON NO ERROR.
1051 005122 001014 BNE 13S ;IF STATUS IS 1 OR 2 BR. IF =0 THEN
1052 005124 017702 173106 MOV @LPADEL,R2 ;GET THE PA OF THE RDA FROM THE LPA
1053 005134 024713 000412 MOV #JOB0,R3 ;AND GO THRU THE TABLES TO FIND THE VA
1054 005136 001403 CMP R2,(R3) ;DOES THE PA MATCH?
1055 005140 001403 BEQ 12S ;YES GET THE VA FROM THE TABLE
1056 005144 000006 ADD #R,P3 ;NO-UPDATE POINTER AND TRY AGAIN
1057 005146 007773 177776 007610 12S: RP 11S
1058 005146 016360 MOV -2(R3),TABLE(0) ;STORE THE VA OF THE RDA IN A TABLE
1059 ;INDEXING OFF THE UID CODE RETURNED
1060 ;BY THE LPA MICRO-CODE
1061 ;PEFETCH RDA ADRES

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1061 005160 016103 000004      MOV      4(1),R3      ;GET THE PA OF THE USW
1062 005164 017704 000472      MOV      #JOB00,R4    ;SET TO FIND PA IN TABLE
1063 005170 020314      CMP      R3,(R4)      ;DOES THE PA MATCH
1064 005172 001403      BREQ    15$          ;YES-BR AND GET VA FROM TABLE
1065 005174 062704 000006      ADD      #6,R4        ;NO-TRY NEXT ENTRY
1066 005176 008773      INC      R4           ;
1067 005202 016403      MOV      -2(R4),R3    ;GET VA OF THE USW
1068 005206 116302 000001      MOVR    1(3),R2      ;GET THE LAST BUFFER USED
1069 005212 005202      INC      R2           ;UPDATE FOR NEXT BUFFER
1070 005214 042702 177770      RIC      #177770,R2   ;
1071 005220 116104 000007      MOVB    VB4(1),R4    ;GET LAST BUFFER MASK.
1072 005224 042704 177770      BIC     #177770,R4    ;
1073
1074 005230 110263 000001      MOVR    R2,1(3) ;UPDATE THE USER STATUS WORD
1075 005234 120204      CMPR    R2,R4        ;LAST BUFFER ?
1076 005236 003402      BLE     OUTCON       ;NO-BRANCH
1077 005240 052713 040000      BIS     #4000,(3)    ;SET STOP JOB BIT
1078 005244 042777 000200 172760 OUTCON: RIC      #BIT7,ALPCO
1079
1080 005252      OGPEX:
1081 005252 104400 000000      EXITS,REGTN          ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
1082
1083 005256 105077 172744      OEND:  CLRRL ALPCI
1084 005262 105077 172744      CLRRL ALPCO
1085 005266 104413 000000      ENDDITS,REGTN      ;SIGNAL END OF ITERATION.
1086
1087 005272 000167 173252      JMP     RESTRT      ;MONITOR SHALL TEST END OF PASS
1088
1089
1090
1091
1092
1093
1094
1095
1096 005276 052777 040000 172722 SRESET: RTS      #BIT14, #KMWADO
1097 005304 012700 001750      MOV     #1000,R0
1098
1099 1$:
1100 005310 104407 000000      BREAKS,REGTN      ;TEMPORARY RETURN TO MONITOR...
1101 005314 104407 000000      BREAKS,REGTN      ;THEN CONTINUE AT NEXT INSTRUCTION.
1102 005320 005300
1103 005322 001372
1104 005324 042777 040000 172674      BIC     #BIT14, #KMWADO
1105 005332 052777 104000 172666      BIS     #BIT15|BIT11, #KMWADO ;RESTART MICRO PROGRAM.
1106 005340 000207      RTS     PC
  
```

```

1106
1107
1108
1109
1110 005342 000000      KWT:   .WORD 0
1111 005344 000000      .WORD 0
1112 005346 000000      .WORD 0
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122 005350 000000      JOB0: .WORD 0 ;MODE INFORMATION.
1123 005352 000000      .WORD 0 ;WORD COUNT
1124 005354 005446      .WORD 0+JOB00 ;USW (USER STATUS WORD)
1125 005356 000      .BYTE 0 ;USW (EXTENDED ADDR. BITS)
1126 005358 000      .BYTE 0 ;VBM (VALID BUFFER MASK)
1127 005360 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1128 005362 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1129 005364 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1130 005366 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1131 005368 000      .BYTE 0 ;UNUSED
1132 005370 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1133 005372 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1134 005374 000      .WORD 0 ;UNUSED
1135 005376 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1136 005378 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1137 005380 000000      .WORD 0 ;UNUSED
1138 005400 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1139 005402 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1140 005404 000000      .WORD 0 ;UNUSED
1141 005406 000      .WORD 0 ;BUFFER ADDRESS #/STR
1142 005408 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1143 005410 000      .BYTE 0 ;UNUSED
1144 005412 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1145 005414 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1146 005416 000      .WORD 0 ;UNUSED
1147 005418 000000      .WORD 0 ;BUFFER ADDRESS #/STR
1148 005420 000      .BYTE 0 ;EXTENDED ADDRESS BITS
1149 005422 000      .BYTE 0 ;UNUSED
1150 005424 005450      .WORD 0 ;JOB0R ;RCLR (ADDR OF LIST OF RANDOM CHAN)
1151 005426 000      .BYTE 0 ;RCL EXTENDED ADDR. BITS
1152 005428 000      .BYTE 0 ;UNUSED.
1153
1154 005424 000      JOB0S: .BYTE 0 ;CHANNEL START ADDRESS
1155 005426 000      .BYTE 0 ;NUMBER OF CHANNELS
1156 005428 000      .BYTE 0 ;CHANNEL INCREMENT
1157 005430 000      .BYTE 0 ;FATAL ERROR MASK
1158
1159
1160 005430 000000      .WORD 0 ;DELAY
1161 005432 000000      .WORD 0 ;SAMPLE RATE
  
```

```
1386 006153 000000 .BYTE 0 ;/UNUSED
1387 006154 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1388 006155 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1389 006156 000000 .WORD 0 ;/UNUSED
1390 006157 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1391 006160 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1392 006162 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1393 006163 000000 .WORD 0 ;/UNUSED
1394 006164 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1395 006166 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1396 006167 000000 .WORD 0 ;/UNUSED
1397 006170 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1398 006172 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1399 006173 000000 .WORD 0 ;/UNUSED
1400 006174 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1401 006176 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1402 006177 000000 .WORD 0 ;/UNUSED
1403 006200 006230 .WORD JOB4R ;/RCLR (ADDR OF LIST OF RANDOM CHAN)
1404 006202 000000 .BYTE 0 ;/RCL EXTENDED ADR. BITS
1405 006203 000000 .BYTE 0 ;/UNUSED.
1406 006204 000000 JOB4S: .BYTE 0 ;/CHANNEL START ADDRESS
1407 006205 000000 .BYTE 0 ;/NUMBER OF CHANNELS
1408 006206 000000 .BYTE 0 ;/CHANNEL INCREMENT
1409 006207 000000 .BYTE 0 ;/FATAL ERROR MASK
1410 006210 000000 .WORD 0 ;/DELAY
1411 006212 000000 .WORD 0 ;/SAMPLE RATE
1412 006214 000000 .BYTE 0 ;/STWD
1413 006215 000000 .BYTE 0 ;/EMWD EVENT MARK DIGITAL INT WD#
1414 006216 000000 .WORD 0 ;/ST MSK
1415 006220 000000 .WORD 0 ;/EM MSK EVENT MARK DIGITAL INPUT MASK.
1416 006222 000003 .END REG. TABLE
1417 006224 000000 .WORD 0 ;/CONTAINS STOP CODE FOR THIS JOB.
1418 006226 000000 .WORD 0 ;/CONTAINS LOOP COUNT FOR JOB.(NO OF TIMES THRU BUFFER.)
1419 006226 000000 JOB4U: .WORD 0 ;/USW USER STATUS WORD
1420 006230 000016 JOB4R: .RLKW 16
1421 ***
1422 *** REQUEST DESCRIPTOR ARRAY FOR JOB #5
1423 ***
1424 *** THIS TABLE WILL BE ALTERED BY THIS PROGRAM
1425 *** AND BY THE LPA-11 OPTION.
1426 ***
1427 006264 000000 JOB5: .WORD 0 ;/MODE INFORMATION.
1428 006266 000000 .WORD 0 ;/WORD COUNT
1429 006270 006362 .WORD 0+JOB5U ;/USW (USER STATUS WORD)
1430 006272 000000 .BYTE 0 ;/USW (EXTENDED ADDR. BITS)
1431 006273 000000 .BYTE 0 ;/VRM (VALID BUFFER MASK)
1432 006274 000000 .WORD 0 ;/BUFFER ADDRESS #/STP
1433
1434
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1438
1439
1440
1441
```

```
1442 006276 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1443 006277 000000 .BYTE 0 ;/UNUSED
1444 006300 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1445 006302 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1446 006303 000000 .WORD 0 ;/UNUSED
1447 006304 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1448 006306 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1449 006307 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1450 006310 000000 .WORD 0 ;/UNUSED
1451 006312 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1452 006313 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1453 006316 000000 .WORD 0 ;/UNUSED
1454 006317 000000 .BYTE 0 ;/BUFFER ADDRESS #/STR
1455 006320 000000 .WORD 0 ;/EXTENDED ADDRESS BITS
1456 006323 000000 .BYTE 0 ;/UNUSED
1457 006324 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1458 006325 000000 .BYTE 0 ;/EXTENDED ADDRESS BITS
1459 006326 000000 .WORD 0 ;/UNUSED
1460 006327 000000 .BYTE 0 ;/BUFFER ADDRESS #/STR
1461 006330 000000 .WORD 0 ;/EXTENDED ADDRESS BITS
1462 006332 000000 .BYTE 0 ;/UNUSED
1463 006333 000000 .WORD 0 ;/BUFFER ADDRESS #/STR
1464 006334 006364 .WORD JOB5R ;/RCLR (ADDR OF LIST OF RANDOM CHAN)
1465 006336 000000 .BYTE 0 ;/RCL EXTENDED ADR. BITS
1466 006337 000000 .BYTE 0 ;/UNUSED.
1467 006340 000000 JOB5S: .BYTE 0 ;/CHANNEL START ADDRESS
1468 006341 000000 .BYTE 0 ;/NUMBER OF CHANNELS
1469 006342 000000 .BYTE 0 ;/CHANNEL INCREMENT
1470 006343 000000 .BYTE 0 ;/FATAL ERROR MASK
1471 006344 000000 .WORD 0 ;/DELAY
1472 006346 000000 .WORD 0 ;/SAMPLE RATE
1473 006350 000000 .BYTE 0 ;/STWD
1474 006351 000000 .BYTE 0 ;/EMWD EVENT MARK DIGITAL INT WD#
1475 006352 000000 .WORD 0 ;/ST MSK
1476 006354 000000 .WORD 0 ;/EM MSK EVENT MARK DIGITAL INPUT MASK.
1477 .END REG. TABLE
1478 006356 000003 .WORD 0 ;/CONTAINS STOP CODE FOR THIS JOB.
1479 006360 000000 .WORD 0 ;/CONTAINS LOOP COUNT FOR JOB.(NO OF TIMES THRU BUFFER)
1480 006362 000000 JOB5U: .WORD 0 ;/USW USER STATUS WORD
1481 006364 000016 JOB5R: .RLKW 16
1482 ***
1483 *** REQUEST DESCRIPTOR ARRAY FOR JOB #6
1484 ***
1485 *** THIS TABLE WILL BE ALTERED BY THIS PROGRAM
1486 *** AND BY THE LPA-11 OPTION.
1487 ***
1488 ***
1489 ***
1490 ***
1491 ***
1492 ***
1493 ***
1494 ***
1495 ***
1496 ***
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1786
1787 007466* 000050
1788 007608* 000000
1789
1790
1791
1792
1793
1794
1795
1796 007610* 000000
1797 007611* 000000
1798 007614* 000000
1799 007616* 000000
1800 007620* 000000
1801 007622* 000000
1802 007624* 000000
1803 007626* 000000
1804 007630* 000000
1805
1806
1807 007632* 000050
1808 007752* 000000
1809
1810 007754*
1811 007754*
1812 007754* 000401
1813 010776* 000401
1814 011786* 000401
1815 012762* 000401
1816 013764* 000200
1817 014364* 000200
1818 014764* 000200
1819 015364* 000200
1820
1821 015764*
1822

TODDQ: .RLKW 40-
TODOC: .WORD 0

THE FOLLOWING TABLE IS USED BY FLASH TO INDEX THE JOB BASED
ON THE INFO THE LPA RETURNS AS ASSIGNED JOB NUMBERS.
FLASH INDEXES THIS TABLE WITH THE JOB NUMBER TO STORE THE RDA
ADDR. WHEN CODE=0, ANY OTHER TIME TABLE IS INDEXED TO GET
THE RDA ADDR. OF A PARTICULAR JOB.

TABLE: .WORD 0
.WORD 0
.WORD 0
.WORD 0
.WORD 0
.WORD 0
.WORD 0
.WORD 0
.WORD 0
.WORD 0

DONEQ: .RLKW 40-
DONEC: .WORD 0

NOTE THIS AREA FROM TODDQ: TO DONEC: IS
CLEARED EACH TIME FLASH IS ENTERED.

FRECOR:
BUFFER: .RLKW 257.
BUFF0: .RLKW 257.
BUFF1: .RLKW 257.
BUFF2: .RLKW 257.
BUFF3: .RLKW 257.
BUFF4: .RLKW 128.
BUFF5: .RLKW 128.
BUFF6: .RLKW 128.
BUFF7: .RLKW 128.
ENDL:
.EVEN

1823
1824 015764* 000400
1825 015764* 071220
1826 015766* 065222
1827 015770* 065222
1828 015772* 063224
1829 015774* 063224
1830 015776* 063224
1831 016000* 063223
1832 016002* 063230
1833 016004* 063231
1834 016006* 063231
1835 016010* 063220
1836 016012* 016777
1837 016014* 063160
1838 016016* 101013
1839 016020* 000600
1840 016022* 063222
1841 016024* 020640
1842 016026* 061620
1843 016030* 103024
1844 016032* 100431
1845 016034* 063170
1846 016036* 101020
1847 016040* 063171
1848 016042* 101020
1849 016044* 104664
1850 016046* 023220
1851 016050* 000404
1852 016052* 053166
1853 016054* 101436
1854 016056* 104665
1855 016060* 000452
1856 016062* 023240
1857 016064* 060360
1858 016066* 115653
1859 016070* 104606
1860 016072* 070605
1861 016074* 063224
1862 016076* 024360
1863 016100* 053221
1864 016102* 101454
1865 016104* 064201
1866 016106* 043637
1867 016110* 106000
1868 016112* 113465
1869 016114* 063165
1870 016116* 105366
1871 016120* 000407
1872 016122* 063225
1873 016124* 023250
1874 016126* 063530
1875 016130* 107610
1876 016132* 103065
1877 016134* 104611
1878 016136* 060530

MMAST: .SRTTL LISTING OF MULTI-USER MICROCODE

.WORD 400
.WORD 71220
.WORD 65222
.WORD 63224
.WORD 63224
.WORD 63223
.WORD 63230
.WORD 63231
.WORD 467
.WORD 63226
.WORD 63160
.WORD 101013
.WORD 600
.WORD 63222
.WORD 20640
.WORD 61620
.WORD 103024
.WORD 100431
.WORD 63170
.WORD 101020
.WORD 63171
.WORD 101020
.WORD 104664
.WORD 23220
.WORD 464
.WORD 60360
.WORD 101436
.WORD 104665
.WORD 452
.WORD 73240
.WORD 60360
.WORD 115653
.WORD 104606
.WORD 70605
.WORD 63224
.WORD 24360
.WORD 53221
.WORD 64201
.WORD 43637
.WORD 106000
.WORD 113465
.WORD 63165
.WORD 105366
.WORD 407
.WORD 63225
.WORD 23250
.WORD 63530
.WORD 107610
.WORD 103065
.WORD 104611
.WORD 60530

1879	016140	107207	.WORD	107207
1880	016142	060603	.WORD	60603
1881	016144	104766	.WORD	104766
1882	016146	104564	.WORD	104564
1883	016150	120400	.WORD	120400
1884	016152	102157	.WORD	102157
1885	016154	123451	.WORD	123451
1886	016156	107766	.WORD	107766
1887	016158	120620	.WORD	120620
1888	016160	107766	.WORD	107766
1889	016164	060522	.WORD	60522
1890	016166	103544	.WORD	103544
1891	016170	123013	.WORD	123013
1892	016172	060602	.WORD	60602
1893	016174	103544	.WORD	103544
1894	016176	103544	.WORD	103544
1895	016200	060613	.WORD	60613
1896	016202	103527	.WORD	103527
1897	016204	104766	.WORD	104766
1898	016206	22365	.WORD	22365
1899	016212	060403	.WORD	60403
1900	016214	061230	.WORD	61230
1901	016216	120600	.WORD	120600
1902	016218	102114	.WORD	102114
1903	016220	123014	.WORD	123014
1904	016222	060600	.WORD	60600
1905	016224	060700	.WORD	60700
1906	016226	061230	.WORD	61230
1907	016230	000403	.WORD	403
1908	016232	061230	.WORD	61230
1909	016234	21370	.WORD	21370
1910	016236	000577	.WORD	577
1911	016240	063262	.WORD	63262
1912	016242	060533	.WORD	60533
1913	016244	103532	.WORD	103532
1914	016246	000541	.WORD	541
1915	016248	000700	.WORD	700
1916	016252	061230	.WORD	61230
1917	016254	000401	.WORD	401
1918	016256	063302	.WORD	63302
1919	016260	104766	.WORD	104766
1920	016262	060533	.WORD	60533
1921	016264	103544	.WORD	103544
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2129	017116	063366	.WORD	63366
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2265	017536	000403	.WORD	403
2266	017540	061230	.WORD	61230
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2407	020172	112113	.WORD	112113
2408	020174	112113	.WORD	112113
2409	020176	000406	.WORD	406
2410	020200	063236	.WORD	63236
2411	020202	000511	.WORD	511
2413	020204	063237	.WORD	63237
2414	020206	03176	.WORD	3176
2415	020210	101227	.WORD	101227
2416	020212	000411	.WORD	411
2417	020214	070401	.WORD	70401
2418	020216	000532	.WORD	532
2419	020220	114473	.WORD	114473
2420	020222	060602	.WORD	60602
2421	020224	113124	.WORD	113124
2422	020226	016534	.WORD	16534
2423	020230	002406	.WORD	2406
2424	020232	110535	.WORD	110535
2425	020234	016577	.WORD	16577
2426	020236	000413	.WORD	413
2427	020240	060401	.WORD	60401
2428	020242	063236	.WORD	63236
2429	020244	062476	.WORD	62476
2430	020246	070220	.WORD	70220
2431	020250	036400	.WORD	36400
2432	020252	110622	.WORD	110622
2433	020254	074624	.WORD	74624
2434	020256	043232	.WORD	43232
2435	020260	063072	.WORD	63072
2436	020262	072472	.WORD	72472
2437	020266	000406	.WORD	406
2438	020270	020640	.WORD	20640
		112141	.WORD	112141

2439	020272	000771	.WORD	771
2440	020274	064112	.WORD	60412
2441	020276	061620	.WORD	61620
2443	020300	062230	.WORD	62230
2444	020304	112147	.WORD	112147
2445	020306	022010	.WORD	202010
2446	020310	020640	.WORD	20640
2447	020312	112152	.WORD	112152
2448	020314	022030	.WORD	202030
2449	020316	020640	.WORD	20640
2450	020320	112555	.WORD	112555
2451	020322	020600	.WORD	20600
2452	020324	111574	.WORD	111574
2453	020326	036400	.WORD	36400
2454	020330	022420	.WORD	22420
2455	020332	004431	.WORD	4431
2456	020334	060372	.WORD	60372
2457	020336	111567	.WORD	111567
2458	020340	100454	.WORD	100454
2459	020342	046200	.WORD	46200
2460	020344	033302	.WORD	33302
2461	020346	030360	.WORD	30360
2462	020350	022660	.WORD	22660
2463	020352	100454	.WORD	100454
2464	020354	021006	.WORD	21006
2465	020356	104462	.WORD	104462
2466	020360	104462	.WORD	104462
2467	020362	000403	.WORD	403
2468	020364	070001	.WORD	70001
2469	020366	040620	.WORD	40620
2470	020370	112224	.WORD	112224
2471	020372	00413	.WORD	413
2472	020374	070401	.WORD	70401
2473	020376	043220	.WORD	43220
2474	020400	076560	.WORD	76560
2475	020402	111212	.WORD	111212
2476	020404	033220	.WORD	33220
2477	020406	020600	.WORD	20600
2478	020410	006407	.WORD	6407
2479	020412	070401	.WORD	70401
2480	020414	016656	.WORD	16656
2481	020416	043232	.WORD	43232
2482	020420	072472	.WORD	72472
2483	020424	020400	.WORD	20400
2484	020424	106063	.WORD	106063
2485	020426	076620	.WORD	76620
2486	020430	022420	.WORD	22420
2487	020432	100454	.WORD	100454
2488	020434	113227	.WORD	113227
2489	020436	004200	.WORD	4200
2490	020440	110630	.WORD	110630
2491	020442	000421	.WORD	421
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2493	020446	020640	.WORD	20640
2494	020450	107475	.WORD	107475

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2496	020454	060413	.WORD	60413
2497	020456	070401	.WORD	70401
2498	020460	000600	.WORD	600
2499	020462	033302	.WORD	33302
2500	020464	020640	.WORD	20640
2501	020466	020640	.WORD	20640
2502	020470	112241	.WORD	112241
2503	020472	022030	.WORD	202030
2504	020474	020640	.WORD	20640
2505	020476	112244	.WORD	112244
2506	020500	062230	.WORD	62230
2507	020502	020640	.WORD	20640
2508	020504	112247	.WORD	112247
2509	020506	042230	.WORD	42230
2510	020512	070204	.WORD	70204
2511	020514	022660	.WORD	22660
2512	020516	100454	.WORD	100454
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2514	020520	016614	.WORD	16614
2515	020524	043232	.WORD	43232
2516	020526	072472	.WORD	72472
2517	020528	020400	.WORD	20400
2518	020530	023013	.WORD	23013
2519	020532	063133	.WORD	63133
2520	020534	063133	.WORD	63133
2521	020536	000673	.WORD	6673
2522	020542	000451	.WORD	451
2523	020544	060401	.WORD	60401
2524	020546	060372	.WORD	60372
2525	020550	111700	.WORD	111700
2526	020552	000416	.WORD	416
2527	020554	000411	.WORD	411
2528	020556	060372	.WORD	60372
2529	020560	111707	.WORD	111707
2530	020562	100454	.WORD	100454
2531	020564	000407	.WORD	407
2532	020566	070401	.WORD	70401
2533	020570	016724	.WORD	16724
2534	020572	002432	.WORD	2432
2535	020574	000677	.WORD	677
2536	020576	063237	.WORD	63237
2537	020600	100657	.WORD	100657
2538	020602	000411	.WORD	411
2539	020604	070401	.WORD	70401
2540	020606	036760	.WORD	36760
2541	020610	023030	.WORD	23030
2542	020612	000407	.WORD	407
2543	020614	062670	.WORD	62670
2544	020616	062671	.WORD	62671
2545	020620	043231	.WORD	43231
2546	020622	060610	.WORD	60610
2547	020624	103454	.WORD	103454
2548	020626	000407	.WORD	407
2549	020630	062711	.WORD	62711

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2560	020654	060372	.WORD	60372
2561	020656	111737	.WORD	111737
2562	020660	100454	.WORD	100454
2563	020664	070640	.WORD	70640
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2565	020666	000500	.WORD	500
2566	020670	060704	.WORD	60704
2567	020672	062230	.WORD	62230
2568	020674	000402	.WORD	402
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2570	020700	064201	.WORD	64201
2571	020702	043201	.WORD	43201
2572	020704	056230	.WORD	56230
2573	020706	020640	.WORD	20640
2574	020710	112351	.WORD	112351
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2576	020716	020640	.WORD	20640
2577	020720	107475	.WORD	107475
2578	020722	000402	.WORD	402
2579	020724	063237	.WORD	63237
2580	020724	111834	.WORD	111834
2581	020730	004000	.WORD	4000
2582	020732	057233	.WORD	57233
2583	020734	057220	.WORD	57220
2584	020736	060573	.WORD	60573
2585	020740	111370	.WORD	111370
2586	020744	063350	.WORD	63350
2587	020746	020640	.WORD	20640
2588	020750	112371	.WORD	112371
2589	020752	062210	.WORD	62210
2590	020754	063540	.WORD	63540
2591	020756	114402	.WORD	114402
2592	020760	116000	.WORD	116000
2593	020762	110763	.WORD	110763
2594	020764	000401	.WORD	401
2595	020766	114403	.WORD	114403
2596	020770	004005	.WORD	4005
2597	020772	063234	.WORD	63234
2598	020774	020640	.WORD	20640
2599	020776	116004	.WORD	116004
2600	021000	056230	.WORD	56230
2601	021002	063174	.WORD	63174
2602	021004	115004	.WORD	115004
2603	021006	060477	.WORD	60477
2604	021010	112763	.WORD	112763

2607	021012	110477	.WORD	110477
2608	021014	061620	.WORD	61620
2609	021016	103043	.WORD	103043
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2611	021022	107603	.WORD	107603
2612	021024	000417	.WORD	417
2613	021026	060660	.WORD	60660
2614	021030	073224	.WORD	73224
2615	021032	004000	.WORD	4000
2616	021034	053221	.WORD	53221
2617	021036	105766	.WORD	105766
2618	021040	064201	.WORD	64201
2619	021042	060600	.WORD	60600
2620	021044	061620	.WORD	61620
2621	021046	061620	.WORD	61620
2622	021050	061620	.WORD	61620
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2625	021056	000407	.WORD	407
2626	021060	064266	.WORD	64266
2627	021062	104473	.WORD	104473
2628	021064	022202	.WORD	22202
2629	021066	000404	.WORD	404
2630	021070	070001	.WORD	70001
2631	021072	042226	.WORD	42226
2632	021074	043070	.WORD	43070
2633	021076	063070	.WORD	63070
2634	021100	076470	.WORD	76470
2635	021102	115172	.WORD	115172
2636	021104	056227	.WORD	56227
2637	021106	057230	.WORD	57230
2638	021108	000500	.WORD	500
2639	021110	123231	.WORD	123231
2640	021112	060671	.WORD	60671
2641	021114	060710	.WORD	60710
2642	021116	061231	.WORD	61231
2643	021118	020640	.WORD	20640
2644	021120	116457	.WORD	116457
2645	021122	022203	.WORD	22203
2646	021130	000421	.WORD	421
2647	021132	061230	.WORD	61230
2648	021134	043230	.WORD	43230
2649	021136	076570	.WORD	76570
2650	021140	115203	.WORD	115203
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2652	021144	076570	.WORD	76570
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2654	021150	000537	.WORD	537
2655	021152	063237	.WORD	63237
2656	021154	057231	.WORD	57231
2657	021156	057231	.WORD	57231
2658	021160	057232	.WORD	57232
2659	021162	057233	.WORD	57233
2660	021164	116100	.WORD	116100
2661	021166	123634	.WORD	123634
2662	021170	123634	.WORD	123634

2663	0211172	106100	.WORD	106100
2664	0211174	0422224	.WORD	422224
2665	0211176	0562226	.WORD	562226
2666	021200	0422225	.WORD	422225
2667	014504	0434454	.WORD	34454
2668	021206	060460	.WORD	60460
2669	021210	061230	.WORD	61230
2670	021212	000500	.WORD	500
2671	021214	060700	.WORD	60700
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2673	021220	061231	.WORD	61231
2674	021222	120600	.WORD	120600
2675	021224	1161117	.WORD	116117
2676	021226	120600	.WORD	120600
2677	021230	106077	.WORD	106077
2678	021232	000600	.WORD	600
2679	014524	023036	.WORD	23036
2680	021236	060716	.WORD	60716
2681	021240	062223	.WORD	62223
2682	021242	060536	.WORD	60536
2683	021244	117532	.WORD	117532
2684	021246	115210	.WORD	115210
2685	021250	000456	.WORD	456
2686	021252	070401	.WORD	70401
2687	021254	002401	.WORD	2401
2688	021256	060416	.WORD	60416
2689	021258	076610	.WORD	76610
2690	021262	000421	.WORD	421
2691	021264	061230	.WORD	61230
2692	021266	060536	.WORD	60536
2693	021270	117623	.WORD	117623
2694	021272	000444	.WORD	444
2695	014534	063676	.WORD	63676
2696	021276	060751	.WORD	60751
2697	021300	107476	.WORD	107476
2698	021302	000420	.WORD	420
2699	021304	060401	.WORD	60401
2700	021306	060416	.WORD	60416
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2706	021322	000404	.WORD	404
2707	021324	070401	.WORD	70401
2708	021326	076610	.WORD	76610
2709	021330	076611	.WORD	76611
2710	021332	076614	.WORD	76614
2711	021334	076614	.WORD	76614
2712	021336	076614	.WORD	76614
2713	021340	062616	.WORD	62616
2714	021342	120600	.WORD	120600
2715	021344	116167	.WORD	116167
2716	021346	164617	.WORD	164617
2717	021350	042227	.WORD	42227

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2720	021354	076470	.WORD	76470
2721	021356	115177	.WORD	115177
2722	021360	114451	.WORD	114451
2723	021362	043230	.WORD	43230
2724	021364	000404	.WORD	404
2725	021366	076410	.WORD	76410
2726	021370	114452	.WORD	114452
2727	021372	120600	.WORD	120600
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2729	021376	120620	.WORD	120620
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2733	021406	040620	.WORD	40620
2734	021410	106501	.WORD	106501
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2736	021414	063237	.WORD	63237
2737	021416	000600	.WORD	600
2738	021420	063236	.WORD	63236
2739	021422	062223	.WORD	62223
2740	021424	060560	.WORD	60560
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2743	021432	000403	.WORD	403
2744	021434	076401	.WORD	76401
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2749	021446	070401	.WORD	70401
2750	021450	043230	.WORD	43230
2751	021452	000440	.WORD	440
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2767	021512	000600	.WORD	600
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2769	021516	023260	.WORD	23260
2770	021520	020640	.WORD	20640
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2773	021526	020640	.WORD	20640
2774	021530	061620	.WORD	61620

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2777	021536	060360	.WORD	60360
2778	021540	115670	.WORD	115670
2779	021544	104601	.WORD	104601
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2781	021546	115256	.WORD	115256
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2783	021552	116272	.WORD	116272
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2789	021566	115703	.WORD	115703
2790	021570	104602	.WORD	104602
2791	021574	063160	.WORD	63160
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DMAST: .SBTTL LISTING OF DEDICATED MICROCODE

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2855	021770-	000400	.WORD 400
2856	021770-	071220	.WORD 71220
2857	021772-	065222	.WORD 65222
2858	021774-	063224	.WORD 63224
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2862	022004-	063223	.WORD 63223
2863	022006-	063230	.WORD 63230
2864	022010-	063231	.WORD 63231
2865	022012-	000407	.WORD 407
2866	022014-	063220	.WORD 63220
2867	022016-	063220	.WORD 63220
2868	022020-	063160	.WORD 63160
2869	022022-	101013	.WORD 101013
2870	022024-	000600	.WORD 600
2871	022026-	063222	.WORD 63222
2872	022030-	063222	.WORD 63222
2873	022032-	061620	.WORD 61620
2874	022034-	103024	.WORD 103024
2875	022036-	100431	.WORD 100431
2876	022040-	063170	.WORD 63170
2877	022042-	101020	.WORD 101020
2878	022044-	063171	.WORD 63171
2879	022046-	101620	.WORD 101620
2880	022050-	104612	.WORD 104612
2881	022052-	023220	.WORD 23220
2882	022054-	080404	.WORD 80404
2883	022056-	080404	.WORD 80404
2884	022060-	101436	.WORD 101436
2885	022062-	104613	.WORD 104613
2886	022064-	000452	.WORD 452
2887	022066-	023240	.WORD 23240
2888	022068-	063221	.WORD 63221
2889	022072-	115725	.WORD 115725
2890	022074-	104614	.WORD 104614
2891	022076-	063364	.WORD 63364
2892	022100-	024360	.WORD 24360
2893	022102-	053221	.WORD 53221
2894	022104-	101421	.WORD 101421
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3391	024044	063075	.WORD	63075
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3393	024050	020640	.WORD	20640
3394	024052	022203	.WORD	22203
3395	024054	022203	.WORD	22203
3396	024056	061210	.WORD	61210
3397	024060	063075	.WORD	63075
3398	024064	111052	.WORD	111052
3399	024066	063165	.WORD	63165
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401	024070	111013	.WORD	111013
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403	024074	043230	.WORD	43230
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405	024100	112030	.WORD	112030
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407	024104	106063	.WORD	106063
408	024106	062570	.WORD	62570
409	024110	101043	.WORD	101043
410	024114	145775	.WORD	145775
411	024116	120600	.WORD	120600
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413	024120	112053	.WORD	112053

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3415	024124	063270	.WORD	63270
3416	024126	111063	.WORD	111063
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3422	024142	000404	.WORD	00404
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3424	024146	062610	.WORD	62610
3425	024150	123231	.WORD	123231
3426	024152	060271	.WORD	60271
3427	024154	060271	.WORD	60271
3428	024156	060710	.WORD	60710
3429	024160	061231	.WORD	61231
3430	024162	110461	.WORD	110461
3431	024164	061620	.WORD	61620
3432	024166	113101	.WORD	113101
3433	024170	114524	.WORD	114524
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3478	024322	036400	.WORD	36400
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3687	025176	114467	.WORD	114467
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SPOINT 000032R	196#																		
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	923																		
	371																		
SR2 = 000020R	190#																		
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SR3 = 000022R	210#																		
SR4 = 000022R	191#																		
START = 000550R	195	351#																	
STAT = 000026R	194#																		
STPCOD = 000071	232#																		
SVR0 = 000024R	219#																		
SVR1 = 000024R	210#																		
SVR2 = 000066R	211#																		
SVR3 = 000070R	212#																		
SVR4 = 000072R	213#																		
SVRS = 000074R	214#																		
SVR6 = 000076R	215#																		
SVSCNT = 000055R	215#																		
TABLE = 007610R	1056*	1059	1796#																
TODDC = 007606R	978#		1012*	1788#															
TODDQ = 007466R	968#		1001	1787#															
TRDPFD = 000972R	381#																		
TS1 = 000972R	381#																		
TS2 = 001120R	423	465#																	
TS3 = 001304R	510#																		
TS4 = 002224R	645	664#																	
UCODES = 000340R	278#	401*	405*	737															
USMR = 000042R	279#	400*	404*	417															
VBM = 000007	232#	1071																	
VECTOR = 000010R	185#	988																	
VERSN = 000246R	260#	615																	
WARNMS = 000710R	397	1619#																	
WASADR = 000104R	398	431*																	
WDFR = 000116R	226#																		
WDT0 = 000114R	225#																		
WRNMSC = 006714R	1619	1621#																	
XFLAG = 000005R	183#																		
YBDDAT = 000344R	290#	987*	1034*	1635															
YSGDAT = 000346R	281#	712*	735*	775*	789*	829*	853*	881*	909*	937*	973	1035							
STR = 000001	1201#	1126#	1132#	1135#	1138#	1141#	1144#	1147#	1150#	1189#	1192#	1195#	1198#						
	1201#	1204#	1207#	1210#	1213#	1252#	1255#	1258#	1261#	1264#	1267#	1270#	1273#						
	1276#	1315#	1318#	1321#	1324#	1327#	1330#	1333#	1336#	1339#	1378#	1381#	1384#						
	1387#	1390#	1393#	1396#	1399#	1402#	1441#	1444#	1447#	1450#	1453#	1456#	1459#						
	1462#	1465#	1504#	1507#	1510#	1513#	1516#	1519#	1522#	1525#	1528#	1567#	1570#						
	1573#	1576#	1579#	1582#	1585#	1588#	1591#	1594#	1597#	1616#	1619#	1621#	1624#						
	1633#	1175#	1738#	1741#	1744#	1747#	1750#	1753#	1756#	1770#	1773#	1776#	1779#						
	1717#	1725#	1734#	1742#	1751#	1762#	1770#	1778#	1787#	1807#	1812#	1813#	1814#						
	1815#	1816#	1817#	1818#	1819#														

.DVL5 000250R 262# 367*
 .ABS. 000600 000
 025774 001

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0
 XLPH80 XLPH80/SOL/CRF:SYM=DDXCOM,XLPH80
 RUN-TIME: 0 12.6 SECONDS
 RUN-TIME RATIO: 00/21=4.1
 CORE USED: 22K (43 PAGES)