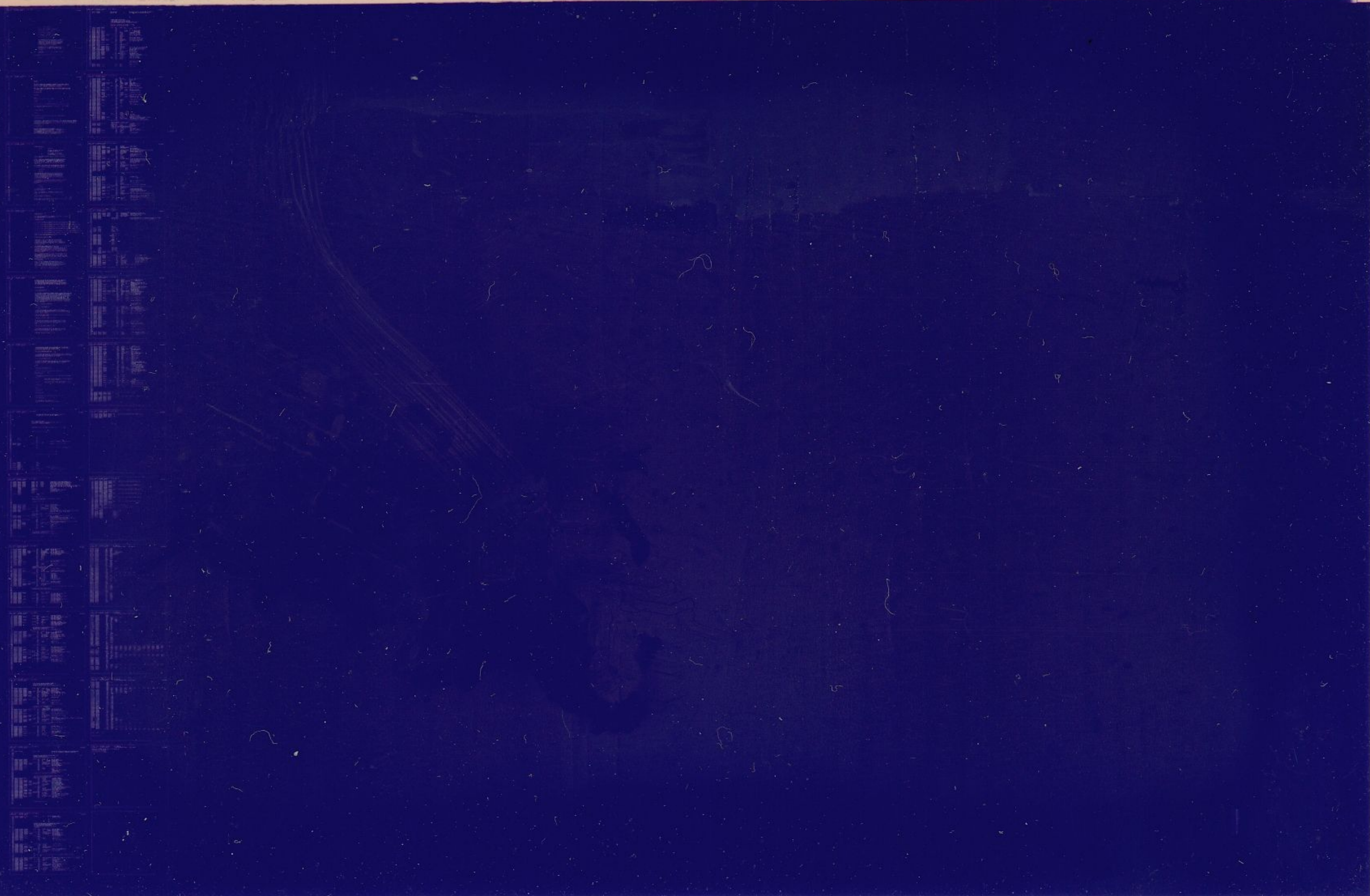


PDP11

PDP-11 POWER FAIL DIAGNOSTIC
MD-11-DZKAQ-G

EP-DZKAQ-G-DL
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MADE IN USA



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IDENTIFICATION

PRODUCT CODE MAINDEC-11-DZKAQ-G-D
PRODUCT NAME PDP-11 POWER FAIL DIAGNOSTIC
DATE RELEASED NOVEMBER 1, 1977
MAINTAINER DIAGNOSTIC ENGINEERING
MODIFIED BY BILL SCHLITZKUS

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1. ABSTRACT

THE PDP-11 POWER FAIL DIAGNOSTIC CONSIST OF TWO PARTS, ONE OF WHICH IS A EXERCISER TEST WHICH CHECK ALL FACETS OF POWER FAIL (REF SEC. 5.2) OPERATOR INTERVENTION IS REQUIRED

PART TWO IS MADE UP OF SEVERAL SMALL TESTS WHICH ENABLE THE USER TO TROUBLE-SHOOT THE POWER FAIL MODULE WITH SMALL BASIC ROUTINES (REF SEC 5 2)

2. REQUIREMENTS

2 1 EQUIPMENT

PDP-11
(MACHINE MAY HAVE UP TO 28K OF MEMORY)

2 2 STORAGE

2 2 1 THE MAIN BODY OF THE PROGRAM OCCUPIES FROM LOCATION 0 TO 4750

2 2 2 THE POWER FAIL EXERCISER USES ALL OF MEMOPY UP TO THE LOADERS, FOR A MEMORY VOLATILITY TEST

3 LOADING PROCEDURE

3 1 METHOD

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED

4 STARTING PROCEDURE

****NOTE**** WHEN RUNNING THIS DIAGNOSTIC THE TERMINAL SHOULD BE POWERED FROM AN UNSWITCHED POWER OUTLET (NOT CONTROLLED BY PROCESSOR ON/OFF SWITCH) POWER FAIL TYPE OUT MESSAGE MAY NOT BE TYPED IF TERMINAL IS NOT POWERED BY AN UNSWITCHED POWER OUTLET

4 1 SWITCH SETTING

WHEN THE EXERCISER TEST OR A DIAGNOSTIC TEST IS STARTED, THE PROGRAM WILL DETERMINE IF THE PROCESSOR HAS A HARDWARE SWITCH REGISTER (SWR) IF THERE IS NO HARDWARE SWR, THE PROGRAM WILL USE THE SOFTWARE SWR LOCATED AT ADDRESS 176 THE OPERATOR SHOULD SET UP LOC 176 BEFORE STARTING THE PROGRAM WITH THE

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APPROPRIATE VALUE.

| SWITCH | FUNCTION |
|--------|---|
| 15 | SET-HALT AT END OF TEST PASS CLEARED-LOOP ON TEST |
| 14 | SET-DISABLE TTY PRINTING CLEARED-ENABLE TTY PRINTING |

NOTE1. THE EXERCISER AND DIAGNOSTIC TESTS WILL ALWAYS HALT ON ERROR.

NOTE2. SINCE THE HARDWARE SWR MAY BE CLEARED ON POWER-UP, THE PROGRAM DOES NOT REFERENCE THE HARDWARE SWR DURING LOOP ON TEST. THEREFORE, TO CHANGE THE SWITCH SETTINGS USING THE HARDWARE SWR THE OPERATOR MUST RE-START A TEST

THE OPERATOR MAY CHANGE THE SWITCH SETTINGS FROM THE TTY AFTER STARTING A TEST, THE PROGRAM WILL OUTPUT AT THE TTY (IF SR14 IS CLEARED) THE FOLLOWING MESSAGE

SWR=XXXXXX
NEW SWR=

THE OPERATOR MAY THEN ENTER UP TO SIX OCTAL DIGITS ENTERING MORE THAN SIX DIGITS OR A CHARACTER OTHER THAN A DIGIT RESULTS IN A REPEAT OF THE PROMPTING MESSAGE CARRIAGE RETURN ENTERS THE UPDATED VALUE IF NO DIGITS HAVE BEEN ENTERED, THE SWITCH REGISTER VALUE REMAINS UNCHANGED.

THE OPERATOR MAY INTERRUPT THE EXERCISER TEST TO CHANGE THE SWITCH SETTINGS BY TYPING CONTROL-G AT THE TTY THE PROGRAM WILL OUTPUT AT THE TTY THE FOLLOWING MESSAGE

SWR=XXXXXX
NEW SWR=

THE OPERATOR MAY THEN RESPOND AS DESCRIBED IN THE PRECEDING PARAGRAPH

NOTE3. THE PROGRAM WILL RESPOND TO CONTROL-G ONLY DURING THE EXERCISER TEST, NOT DURING THE DIAGNOSTIC TESTS

4 2

STARTING ADDRESS OR ADDRESSES

BEFORE STARTING THE OPERATOR SHOULD REFERENCE THE PROGRAM LISTING FOR OPERATOR INSTRUCTIONS FOR EACH TEST

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4.2.1 EXERCISER TEST

THE STARTING ADDRESS OF THE POWERFAIL EXERCISER IS LOC 200
THE EXERCISER TEST IS CALLED TEST 5

4.2.2 DIAGNOSTIC TESTS

LOC 204 IS THE STARTING ADDRESS FOR TESTING THE POWER FAIL TRAP CAPABILITY
LOC. 210 IS THE STARTING ADDRESS FOR TESTING POWER FAIL RE-START CAPABILITY (USI
LOC. 214 IS THE STARTING ADDRESS FOR TESTING POWER FAIL RE-START CAPABILITY (C
LOC 220 IS THE STARTING ADDRESS FOR TESTING POWER FAIL RE-START CAPABILITY (USI
LOC 224 IS THE STARTING ADDRESS FOR TESTING 2MILLI SEC SHUT DOWN CAPABILITY OF
LOC 230 IS THE STARTING ADDRESS FOR TESTING 2 MILLI SEC UP TIME OF POWER FAIL
THESE SIX TESTS ARE REFERRED TO AS TEST1, TEST2, ALTEST,
ALTST1, TEST3, AND TEST4 RESPECTIVELY.

4.3 PROGRAM AND/OR OPERATOR ACTION

THE PROGRAM TITLE IS PRINTED EACH TIME THE EXER-
CISER TEST IS STARTED AN END-OF-PASS STATEMENT
IS PRINTED AT THE END OF EACH TEST LOOP A POWER FAIL
MESSAGE IS PRINTED AFTER THE POWER OFF-ON SEQUENCE OF
THE EXERCISER TEST.

THE OPERATOR HAS A LARGE PART IN THIS TEST IT IS HIS RESPONSI-
ABILITY TO GENERATE A POWER FAIL CONDITION
TO CAUSE A VALID POWER FAILURE ON A SYSTEM, REMOVE THE AC
FROM THE POWER CONTROL PANEL BY EITHER TRIPPING THE AC
BREAKER ON THE POWER BUS BOX, OR BY PULLING THE WALL PLUG,
WHICHEVER IS APPROPRIATE IN HOUSE, A POWER INTERRUPTER
MAY ALSO BE USED.

NOTE1. INTERRUPTING POWER BY USING THE FRONT PANEL KEY OR
THE BREAKER SWITCH ON A POWER SUPPLY IS NOT VALID. THIS
METHOD DEFEATS THE ACTION OF THE LINE FILTER OF THE POWER
CONTROL AND THUS CAN ALLOW NOISE FROM SWITCHING TRANSIENTS
TO ENTER THE SYSTEM.
REFER TO M A. S. T FOR MORE INFORMATION ON POWER
FAIL PROCEDURES

NOTE2 DO NOT INTERRUPT THE POWER DURING TITLE
PRINT-OUT, WHILE CHANGING THE SWITCH SETTINGS FROM
THE TTY, OR DURING THE END-OF-PASS PRINT-OUT OF A DIAG-
NOSTIC TEST. THE POWER MAY BE INTERRUPTED DURING THE
END-OF-PASS PRINT-OUT OF THE EXERCISER TEST

NOTE3 IF THE POWER IS INTERRUPTED DURING THE END-

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OF PASS PRINT-OUT OF THE EXERCISER TEST, THE POWER FAIL AND POWER RESTORE ROUTINES WILL BRANCH AROUND THE CODE THAT NORMALLY CHECKS THE STACK FOR A PROPER VALUE THE POWER FAIL AND POWER RESTORE ROUTINES WILL ALWAYS BE FULLY EXECUTED WHEN TTY PRINTING IS DISABLED (SR14 SET)

5 ROUTINE ABSTRACTS

5 1 MASTER EXERCISER TEST

THIS ROUTINE INCORPORATES A MEMORY VOLATILITY TEST WHILE WAITING FOR A POWER FAILURE THE ROUTINE FIRST DETERMINES THE AMOUNT OF MEMORY ON THE SYSTEM AND THEN FILLS THAT MEMORY WITH A 152525 PATTERN. THE ROUTINE THEN CHECKS MEMORY FOR THE CORRECT DATA, IF A POWER FAILURE OCCURS THE ROUTINE WILL STORE ALL OF THE ACTIVE REGISTERS AND WAIT FOR 2 MILLISECONDS AND HALT THE ROUTINE ON RESTART RESTORES THE ACTIVE REGISTERS AND WAITS TO SEE THAT NO OTHER POWER FAILURE OCCURS WITHIN A 2 MILLISECOND PERIOD WHEN THE ROUTINE EXITS FROM THE RESTORE IT GOES BACK TO CHECKING MEMORY

5 2 DIAGNOSTIC SUBROUTINE ABSTRACTS

POWER FAIL TRAP CAPABILITY

IN THIS TEST THE ABILITY OF THE POWER FAIL TO TRAP TO LOCATION 24 ON POWER DOWN AND POWER UP IS TESTED THE STACK IS CHECKED FOR THE CORRECT VALUE AND THE STACK POINTER IS TESTED FOR THE CORRECT CONTENTS

A HALT OCCURS WHEN POWER IS RESTORED, THE OPERATOR MUST DEPRESS CONTINUE TO COMPLETE TEST

POWER FAIL RE-START CAPABILITY (WAIT)

IN THIS ROUTINE THE ABILITY OF THE POWER FAIL TO TRAP AND STORE ACTIVE REGISTERS AND RESTART CORRECTLY USING A WAIT INSTRUCTION TO WAIT FOR POWER FAILURE IS TESTED HERE

POWER FAIL RE-START CAPABILITY (BR)

IN THIS ROUTINE THE ABILITY OF THE POWER FAIL TO TRAP AND STORE ACTIVE REGISTERS, AND RESTART CORRECTLY USING A BR, TO WAIT FOR POWER FAILURE IS TESTED HERE

POWER FAIL RE-START CAPABILITY (EMT)

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IN THIS ROUTINE THE ABILITY OF THE POWER FAIL TO TRAP AND STORE ACTIVE REGISTERS, AND RESTART CORRECTLY USING A EMT TO WAIT FOR THE POWER FAILURE IS TESTED HERE

TEST 2 MILLISECONDS DOWN TIME

IN THIS TEST THE AMOUNT OF TIME THE PROCESSOR HAS TO STORE THE ACTIVE REGISTERS IS CHECKED THIS TIME SHOULD EQUAL 2 MILLISECONDS BEFORE ALL PROCESSOR ACTION MUST BE STOPPED

TEST 2 MILLISECONDS UP TIME

IN THIS TEST THE POWER FAIL LOCK OUT OF 2 MILLISECONDS DURING RE-START IS CHECKED DURING RESTORE FOR 2 MILLISECONDS THE PROCESSOR WILL NOT ALLOW A POWER FAIL TRAP TO OCCUR

6 ERROR

6 1 ERROR HALTS AND DESCRIPTION

REFER TO LISTING FOR ALL HALTS AND DESCRIPTIONS

6 2 ERROR RECOVERY

IN THE EXERCISER MEMORY VOLATILITY TEST THERE ARE TWO RECOVERABLE HALTS

HALT NO 1 DATA LIGHTS CONTAIN BAD MEMORY LOCATION (DEPRESS CONTINUE TO TEST SEE DATA)

HALT NO 2 DATA LIGHTS CONTAIN DATA OF BAD MEMORY LOCATION (DEPRESS CONTINUE TO TEST NEXT WORD)

7 RESTRICTIONS

NONE

8 MISCELLANEOUS

8 1 EXECUTION TIME

EACH EXERCISER PASS TAKES APPROXIMATELY 5 SECONDS

8 2 ACT11 OPERATION

THIS PROGRAM WILL RUN UNDER ACT11
**NOTE IN QUICK VERIFY MODE THE PROGRAM WILL RUN

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BUT DOES NOT CHECK ANY OF THE POWERFAIL CIRCUITRY
 BECAUSE ACT WILL NOT POWER FAIL DURING QV

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 ; PDP-11 POWER FAIL TEST
 ; THIS PROGRAM CONSIST OF SEVERAL TEST THAT INSURE THAT
 ; POWER FAIL IS OPERATING CORRECTLY
 ;
 ;
 ; ***PROGRAM SUPPORTS SOFTWARE SWITCH REGISTER LOC 176 ***

; POWER FAIL TRAPS TO LOCATION 24

| | | | | | |
|--|--------|--------|--------|----|--|
| | | | ABS | | |
| | | | =0 | | |
| | | | REPT | 5 | |
| | | | +2 | | |
| | | | HALT | | ; POWER FAIL TRAPPED TO WRONG LOCATION |
| | | | ENDR | | |
| | 000024 | 000000 | PFHAND | 0 | ; ADDRESS OF POWER FAIL HANDLER |
| | 000026 | 000000 | | 0 | ; STATUS |
| | | 000072 | REPT | 72 | |
| | | | +2 | | |
| | | | HALT | | ; POWER FAIL TRAPPED TO WRONG LOCATION |
| | | | ENDR | | |

; 400 TO 1000 IN MEMORY IS ASSIGNED TO THE STACK

| | | | | | |
|--|--------|--------|--------|---------|-------------------------------------|
| | | 000046 | | =46 | |
| | 000046 | 003102 | | LOGICAL | |
| | | 000052 | | =52 | |
| | 000052 | 140000 | | 140000 | |
| | | 000176 | | =176 | |
| | 000176 | 000000 | SWREG | 0 | ; SOFTWARE SWITCH REGISTER |
| | | 000200 | | =200 | |
| | 000200 | 000167 | MASTER | JMP | TEST5 ; COMPLETE TEST OF POWER FAIL |


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385 000204 000167 000570 START1 JMP TEST1 ; ENTER TEST 1 (TEST TRAP CAPABILITY)
386 000210 000167 000676 START2: JMP TEST2 ; ENTER TEST2 (TEST RE-START CAPABILITY)
387 000214 000167 001166 STR2A: JMP ALTEST ; TEST RE-START USING BR. INSTRUCTION
388 000220 000167 001342 STR2B JMP ALTST1 ; TEST RE-START USING EMT INSTRUCTION
389 000224 000167 001606 START3 JMP TEST3 ; ENTER TEST3 (TEST FOR 2 MILLISECONDS TIME) DOWN TIME
390 000230 000167 002014 START4: JMP TEST4 ; ENTER TEST4 (TEST FOR TWO MILLISECONDS) UP TIME
391 000006 SP=%6 ; STACK
392 000000 LIGHTS=%0 ; DATA LIGHTS
393 177776 STATUS=177776 ; LOCATION OF STATUS REGISTER
394 000007 PC=%7 ; LOCATION OF PC
395 000030 EMTRP=30 ; EMULATOR TRAP LOCATION
396 000234 SWRG=
397 000234 177570 WORD 177570
398 001000 =1000
399
400 ; BASIC POWER FAIL TEST
401
402 ; TEST1 IS A ROUTINE USED TO THE POWER FAIL'S ABILITY
403 ; TO TRAP TO LOCATION 24
404 ;
405 ; OPERATOR INSTRUCTIONS
406 ;
407 ;
408 001000 012706 001000 TEST1 MOV #1000, SP ; SET UP STACK
409 001004 004767 002620 JSR PC, SETSWR ; SET UP SWR POINTER
410 001010 004767 002736 JSR PC, UPDATE ; UPDATE SWR
411 001014 012706 001000 LPTST1 MOV #1000, SP ; SET UP STACK
412 001020 012767 001036 176776 MOV #TEST1H, PFHAND ; SET UP POINTER
413 001026 052767 000357 176742 BIS #357, STATUS ; SET STATUS BITS
414 001034 000001 WAIT ; WAIT FOR POWER FAIL OPERATOR SHOULD TURN OFF HERE
415 001036 000000 TEST1H. HALT ; POWER FAIL HALTS HEPE ON WAY DOWN
416 ;
417 ; TEST1 CHECK - CHECK IF STACK WAS DECREMENTED AND
418 ; STATUS WAS SET UP
419 001040 026727 177730 001036 TEST1CH CMP 774, #TEST1H ; CHECK PC AND SP (LOCATION)
420 001046 001401 BEQ +4 ; ARE THEY EQUAL
421 001050 000000 HALT1 HALT ; ERROR! PROCESSOR FAILED TO TRAP
422 ; LOCATION 774 SHOULD CONTAIN #TEST1H IN STACK
423 001052 026727 177720 000357 CMP 776, #357 ; WAS THE STATUS STORED CORRECTLY
424 001060 001401 BEQ +4 ; TEST
425 001062 000000 HALT2 HALT ; ERROR THE STATUS BEFORE THE TRAP WAS NOT STORED
426 001064 012700 000210 MOV #START2, LIGHTS ; SET UP LIGHTS WITH ADDRESS
427 001070 012706 001000 MOV #1000, SP ; SET UP STACK
428 001074 004767 002604 JSR PC, PRINT ; END-OF-PASS MSG
429 001100 004470 MSG3
430 001102 005767 177070 TST SWREG ; LOOP ON TEST?
431 001106 002342 BGE LPTST1 ; YES
432 001110 000000 HALT ; NORMAL HALT NO EFRORS
433 ;
434 ;
435 ; TEST ROUTINE TO CHECK RE-START CAPABILITY
436 ; USING THE WAIT INSTRUCTION
437 ; OPERATOR MUST SET HALT SWITCH TO ENABLE POSITION
438 ;
439 ;
440 001112 012706 001000 TEST2 MOV #1000, SP ; SET UP STACK
  
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441 001116 004767 002506 JSR PC, SETSWR ;SET UP SWR POINTER
442 001122 004767 002624 JSR PC, UPDATE ;UPDATE SWR
443 001126 012767 000357 176642 LPTST2 MOV #357, STATUS ;SET UP CONDITION CODES
444 001134 012767 000005 176664 MOV #5, PFHAND+2 ;SET UP POWER FAIL CODES
445 001142 012767 001212 176654 MOV #TEST2A, PFHAND ;SET UP POINTER TO STORE ROUTINE
446 001150 012706 001100 MOV #1000, SP ;SP UP STACK POINTER
447 001154 012700 152525 MOV #152525, %0 ;SET UP FAST MEMORY
448 001160 010001 MOV %0, %1
449 001162 010102 MOV %1, %2
450 001164 010203 MOV %2, %3
451 001166 010304 MOV %3, %4
452 001170 010405 MOV %4, %5
453 001172 000001 WAIT ;WAIT FOR POWER FA L TRAP
454 001174 004767 002504 JSR PC, PRINT ;END-OF-PASS MSG
455 001200 004516 MSG4
456 001202 005767 176770 TST SWREG ;LOOP ON TEST?
457 001206 002347 BGE LPTST2 ;YES
458 001210 000000 HALT ;NORMAL TEST HALT NO ERRORS
459 ; OPERATOR MUST TURN POWER OFF HERE
460 ; ROUTINE TO STORE ACTIVE REG
461 001212 022706 000774 TEST2A CMP #774, SP ; IS STACK CORRECT
462 001216 001406 BEQ TEST2B
463 001220 010667 002342 MOV SP, SAVE ; CONTENTS OF STACK SAVED
464 001224 012767 001232 176572 MOV #HALT3E, PFHAND ; STACK CONTAINS WRONG ADDR
465 001232 000000 HALT3E HALT
466 001234 010046 TEST2B MOV %0, -(SP) ; STORE REG 0
467 001236 010146 MOV %1, -(SP) ; STORE REG 1
468 001240 010246 MOV %2, -(SP) ; STORE REG 2
469 001242 010346 MOV %3, -(SP) ; STORE REG 3
470 001244 010446 MOV %4, -(SP) ; STORE REG 4
471 001246 010546 MOV %5, -(SP) ; STORE REG RE STACK
472 001250 022706 000760 CMP #760, SP ; IS STACK CORRECT
473 001254 001404 BEQ TEST2D
474 001256 012767 001264 176540 MOV #HALT4E, PFHAND ; THE STACK IS WRONG
475 001264 000000 HALT4E HALT ; WAIT FOR RESTART
476 001266 012767 001310 176530 TEST2D MOV #TEST2CH, PFHAND ; SET UP NEW POINTER
477 001274 012767 000005 176524 MOV #5, PFHAND+2
478 001302 010667 002260 MOV SP, SAVE
479 001306 000000 HALT ; ALL ACTIVE REG STORED WAIT FOR RESTART
480
481 ; OPERATOR MUST TURN POWER ON HERE
482 ; ROUTINE TO RE-STORE ACTIVE REGISTER AFTER RE-START
483
484
485 001310 016706 002252 TEST2CH MOV SAVE, SP
486 001314 022726 152525 CMP #152525, (SP)+ ; TEST SAVE REG FOR FAST MEMORY
487 001320 001401 BEQ +4 ; TEST FAST MEMORY %5
488 001322 000000 HALT5E HALT ; SAVE REG IN ERROR
489 001324 022726 152525 CMP #152525, (SP)+ ; TEST SAVE REG FOR FAST MEMORY
490 001330 001401 BEQ +4 ; TEST FAST MEMORY %4
491 001332 000000 HALT6E HALT ; SAVE REG IN ERROR
492 001334 022726 152525 CMP #152525, (SP)+ ; TEST SAVE REG FOR FAST MEMORY
493 001340 001401 BEQ +4 ; TEST FAST MEMORY %3
494 001342 000000 HALT7E HALT ; SAVE REG IN ERROR
495 001344 022726 152525 CMP #152525, (SP)+ ; TEST SAVE REG. FOR FAST MEMORY
496 001350 001401 BEQ +4 ; TEST FAST MEMORY %2
    
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497 001352 000000          HALT8E HALT          ;SAVE REG IN ERROR
498 001354 022726 152525    CMP          #152525,(SP)+ ;TEST SAVE REG. FOR FAST MEMORY
499 001360 001401          BEQ          .+4          ;TEST FAST MEMORY %1
500 001362 000000          HALT9E. HALT          ;SAVE REG IN ERROR
501 001364 022726 152525    CMP          #152525,(SP)+ ;TEST FAST MEMORY %0
502 001370 001401          BEQ          .+4
503 001372 000000          HALT10E: HALT          ;SAVE REG. IN ERROR
504 001374 022706 000774    CMP          #774,SP      ;TEST STACK FOR CORRECT ADDR
505 001400 001401          BEQ          .+4          ;STACK SHOULD HAVE 2 WORDS
506 001402 000000          HALT11E HALT          ;STACK HAS WRONG ADDR
507 001404 000002          RTI           ;RETURN FROM TRAP
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513 001406 012706 001000    ALTEST. MOV          #1000, SP      ;SET UP STACK
514 001412 004767 002212    JSR          PC, SETSWR ;SET UP SWR POINTER
515 001416 004767 002330    JSR          PC, UPDATE ;UPDATE SWR
516 001422 012767 000357 176346 LPALT MOV          #357,STATUS ;SET UP CONDITION CODES
517 001430 012767 000005 176370 MOV          #5,PFHAND+2 ;SET UP POWER FAIL CODES
518 001436 012767 001470 176360 MOV          #ALT2,PFHAND ;SET UP POWER DOWN POINTER
519 001444 012706 001000    MOV          #1000,SP     ;SET UP STACK
520 001450 000777          REALST. BR          ;WAIT FOR POWER FAIL
521 001452 004767 002226    JSR          PC, PRINT   ;END-OF-PASS MSG
522 001456 004544          MSG5
523 001460 005767 176512    TST          SWREG       ;LOOP ON TEST?
524 001464 002356          BGE          LPALT      ;YES
525 001466 000000          HALT          ;NORMAL TEST HALT NO ERRORS
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529 001470 022706 000774    ALT2  CMP          #774,SP ;HAS STACK BEEN PUSHED TWICE
530 001474 001406          BEQ          ALT2A      ;YES STACK CORRECT
531 001476 010667 002064    MOV          SP,SAVE     ;SAVE STACK TO INTERAGATE
532 001502 012767 001510 176314 MOV          #ALT2X,PFHAND ;SET UP ERROR POINTER
533 001510 000000          ALT2X HALT          ;STACK WAS PUSHED >2<
534 001512 022767 001450 177254 ALT2A CMP          #REALST,774 ;DOES STACK CONTAIN CORRECT ADDRESS
535 001520 001404          BEQ          ALT2B      ;STACK CONTAIN LOC BR
536 001522 012767 001530 176274 MOV          #ALT2AX,PFHAND
537 001530 000000          ALT2AX. HALT         ;LOCATION 774 INCORPECT
538 001532 010667 002030    ALT2B MOV          SP,SAVE ;SAVE STACK
539 001536 012767 001554 176260 MOV          #ALT2C,PFHAND ;SET UP RESTART POINTER
540 001544 012767 000005 176254 MOV          #5,PFHAND+2
541 001552 000000          HALT          ;END OF STORE ROUTINE
542 001554 016706 002006    ALT2C MOV          SAVE,SP ;RE-SET STACK
543 001560 062716 000002    ADD          #2,(SP)     ;SET NEW RETURN ADDRESS
544 001564 000002          RTI           ;RETURN TO LOC (BF )+1
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553
554 ; TEST ROUTINE TO CHECK RESTART CAPABILITY
555 ; USING THE EMULATOR TRAP FOR A WAIT
556 ; OPERATOR MUST SET HALT SWITCH TO ENABLE POSITION
557
558
559 001566 012706 001000 ALTST1 MOV #1000, SP ; SET UP STACK
560 001572 004767 002032 JSR PC, SETSWR ; SET UP SWR POINTER
561 001576 004767 002150 JSR PC, UPDATE ; UPDATE SWR
562 001602 012767 000357 176166 LPALT1 MOV#357, STATUS ; SET UP CONDITION CODES
563 001610 012767 000005 176210 MOV #5, PFHAND+2 ; SET UP POWER FAIL CODES
564 001616 012767 001674 176200 MOV #ALT3A, PFHAND ; SET UP POWER DOWN POINTER
565 001624 012706 001000 MOV #1000, SP
566 001630 012767 003560 176172 MOV #LRT1, EMTRP ; SET UP EMT TRAP
567 001636 012767 000005 176166 MOV #5, EMTRP+2
568 001644 104002 EMTWT EMT +2 ; EMULATOR TRAP
569 001646 000776 BR -2
570 001650 016767 001730 176152 ALTST2 MOV SAVE7, EMTRP
571 001656 004767 002022 JSR PC, PRINT ; END-OF-PASS MSG
572 001662 004573 MSG6
573 001664 005767 176306 TST SWREG ; LOOP ON TEST?
574 001670 002344 BGE LPALT1 ; YES
575 001672 000000 HALT ; NORMAL HALT NO ERRORS
576
577 ; ROUTINE TO STORE ACTIVE REGISTERS
578 ; POWER DOWN
579
580 001674 016767 176130 001702 ALT3A MOV TOP SAVE7 ; SAVE EMULATOR TRAP
581 001702 012767 002034 176120 M EMTRP ; SET UP ERROR HALT
582 001710 022706 000774 ; HAS STACK BEEN PUSHED TWICE
583 001714 001414
584 001716 022706 000770 ; HAS STACK BEEN PUSHED 4 TIMES
585 001722 001411
586 001724 012767 001744 176072 ALT3B MOV #5, PFHAND ; SET UP POWER FAIL POINTER
587 001732 012767 000005 176066 #5, PFHAND+2
588 001740 010667 001622 MOV SP, SAVE ; SAVE STACK
589 001744 000000 ALT3BX HALT ; STACK INCORRECT (STACK PUSHED LESS THAN 2 OR MORE THAN
590 001746 012767 001770 176050 ALT3C MOV #ALT3D, PFHAND ; SET UP RE-START POINTER
591 001754 012767 000005 176044 MOV #5, PFHAND+2 ; SET UP NEW STATUS
592 001762 010667 001600 MOV SP, SAVE
593 001766 000000 HALT ; END OF STORE ROUTINE
594 ; ROUTINE TO TEST POWER UP SEQUENCE
595
596
597 001770 016706 001572 ALT3D MOV SAVE, SP ; RESTORE STACK
598 001774 022706 000774 CMP #774, SP ; WAS STACK PUSHED ONLY TWICE
599 002000 001723 BEQ ALTST2 ;
600 002002 022706 000770 CMP #770, SP ; ARE WE DOING AN EMT
601 002006 001403 BEQ ALT3E ;
602 002010 010667 001552 MOV SP, SAVE ; STACK IN SAVE REG
603 002014 000000 HALT ; STACK INCORRECT
604 002016 022767 003560 176744 ALT3E CMP #LRT1, 770 ; DOES STACK CONTAIN CORRECT INFO
605 002024 001711 BEQ ALTST2 ; YES EXIT
606 002026 011667 001534 MOV (SP), SAVE ;
607 002032 000000 HALT ; STACK CONTAINS WRONG ADDRESS
608

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609
610
611 002034 000000      ALT3X.  HALT      ; EMT ACTIVE INSTEAD OF POWER FAIL ON POWER DOWN
612                                     ; EMT ACTIVE ON RESTART INSTEAD OF POWER FAIL
613
614
615 ; ROUTINE TO CHECK TWO MILLISECOND STORE TIME
616 ; AVERAGE INSTRUCTION TIME
617 ; ROUTINE WAITS FOR SHUT DOWN IN EMT LOOP
618
619 002036 012706 001000  TEST3.  MOV      #1000, SP      ; SET UP STACK
620 002042 004767 001562      JSR      PC,      SETSWR    ; SET UP SWR POINTER
621 002046 004767 001700      JSR      PC,      UPDATE    ; UPDATE SWR
622 002052 012706 001000  LPTST3  MOV      #1000, SP      ; SET UP STACK
623 002056 012767 002112 175740  MOV      #TEST3A, PFHAND  ; SET UP POWER FAIL STORE POINTER
624 002064 012767 000005 175734  MOV      #5, PFHAND+2    ; SET UP STATUS
625 002072 000001          WAIT          ; WAIT FOR INTERRUPT
626 002074 004767 001604      JSR      PC,      PRINT    ; END-OF-PASS MSG
627 002100 004622          MSG7
628 002102 005767 176070      TST      SWREG          ; LOOP ON TEST?
629 002106 002361          BGE      LPTST3        ; YES
630 002110 000000          HALT          ; NORMAL TEST HALT NO ERRORS
631                                     ; LOOP ON TEST
632                                     ; RESTART PROGRAM
633 ; OPERATOR MUST TURN POWER OFF AND ON HERE
634
635
636 ; TEST FOR 2 MILLISECONDS OF AVERAGE INSTRUCTION TIME
637 ; TIME OF LOOP 57 4 MICROSECONDS
638 002112 022706 000774  TEST3A  CMP      #774, SP      ; IS STACK CORRECT
639 002116 001411          BEQ      TEST3B        ; STACKER IS CORRECT
640 002120 010667 001442          MOV      SP, SAVE      ; CONTENTS OF STACK IN SAVE REG
641 002124 012767 002140 175672  MOV      #HALT12E, PFHAND ; SETUP ERROR HALT
642 002132 012767 000000 175666  MOV      #0, PFHAND+2    ; SETUP STATUS WORD
643 002140 000000          HALT12E. HALT        ; WAIT FOR RE-START
644 002142 012767 003560 175660  TEST3B  MOV      #LRT1, EMTRP   ; SET UP EMULATOR TRAP
645 002150 012767 000005 175654  MOV      #5, EMTRP+2    ; SET UP EMULATOR STATUS
646 002156 005067 001422          CLR      SAVE7        ; SET COUNT TO ZERO
647 002162 104000          TIMLOP: EMT+0        ; EMT TRAP (EMT LOOP=57 4 MICROSEC)
648 002164 022706 000774          CMP      #774, SP      ; IS STACK CORRECT AFTER EMT
649 002170 001407          BEQ      TEST3D        ; STACK CORRECT CONTINUE
650 002172 012767 002206 175624  MOV      #HALT13E, PFHAND ; SETUP ERROR HALT
651 002200 012767 000000 175620  MOV      #0, PFHAND+2    ; SETUP STATUS
652 002206 000000          HALT13E: HALT        ; WAIT FOR RE-START
653 002210 062767 000001 001366  TEST3D  ADD      #1, SAVE7      ; +1 COUNT
654 002216 022767 000043 001360  CMP      #35, SAVE7     ; HAS LOOP TAKEN 2 MILLISECONDS
655 002224 001356          BNE      TIMLOP        ; TIME LESS THAN 2 MILLISECONDS
656 002226 012767 002242 175570  MOV      #TEST3CH, PFHAND ; SET POWER FAIL POINTER
657 002234 010667 001326          MOV      SP, SAVE      ; SAVE STACK
658 002240 000000          HALT          ; ROUTINE COMPLETE
659
660
661 ; PROGRAM RESTART ROUTINE
662
663
664

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665 002242 016706 001320 TEST3CH: MOV SAVE, SP ; RESTORE STACK
666 002246 000002 RTI ; RETURN TO TEST3
667
668
669
670
671
672 ; ROUTINE TO TEST FOR 2 MILLISECONDS OF AVERAGE INSTRUCTION TIME
673 ; ACTIVE TIME BEFORE NEXT POWER LOW FLAG
674 ; EMT LOOP TAKES 56 MICROSECONDS
675 ; THE OPERATOR MUST TURN POWER OFF AND ON
676 ; VIGOROUSLY
677
678 002250 012706 001000 TEST4: MOV #1000, SP ; SET UP STACK
679 002254 004767 001350 JSR PC, SETSWR ; SET UP SWR POINTER
680 002260 004767 001466 JSR PC, UPDATE ; UPDATE SWR
681 002264 012706 001000 LPTST4: MOV #1000, SP ; SET UP STACK
682 002270 012767 002324 175526 MOV #TEST4A, PFHAND ; SET POINTER TO HALT
683 002276 012767 000005 175522 MOV #5, PFHAND+2 ; SET UP STATUS
684 002304 000001 WAIT ; WAIT FOR POWER FAIL
685 002306 004767 001372 TEST4E JSR PC, PRINT ; END-OF-PASS MSG
686 002312 004650 MSG8
687 002314 005767 175656 TST SWREG ; LOOP ON TEST?
688 002320 002361 BGE LPTST4 ; YES
689 002322 000000 HALT ; HALT TEST OVER NO ERRORS
690
691
692
693 002324 022706 000774 TEST4A: CMP #774, SP ; IS STACK CORRECT
694 002330 001411 BEQ TEST4B
695 002332 010667 001230 MOV SP, SAVE ; STACK IN SAVE REG
696 002336 012767 002352 175460 MOV #HALT14E, PFHAND
697 002344 012767 000005 175454 MOV #5, PFHAND+2
698 002352 000000 HALT14E HALT ; STACK DID NOT CONTAIN 774
699 002354 012767 002376 175442 TEST4B MOV #TEST4CH, PFHAND ; SET UP RE-START POINTER
700 002362 012767 000005 175436 MOV #5, PFHAND+2 ; SET UP STATUS
701 002370 010667 001172 MOV SP, SAVE
702 002374 000000 HALT
703
704 ; ROUTINE TO TEST FOR 2 MILLISECONDS UP TIME (AVERAGE INSTPUCTION TIME)
705
706
707 002376 012767 002472 175420 TEST4CH: MOV #HALT15E, PFHAND ; SET UP HALT IF TRAP OCCURS BEFORE 2 MILLISECONDS
708 002404 012767 003560 175416 MOV #LRTI, EMTRP ; SET UP EMULATOR TRAP
709 002412 016706 001150 MOV SAVE, SP ; RESTORE STACK
710 002416 005067 001162 CLR SAVE7 ; ZERO SAVE 7
711 002422 104001 UPTIME EMT+1 ; EMT TRAP (LOOP=56 MICROSEC)
712 002424 022706 000774 CMP #774, SP ; TEST STACK
713 002430 001407 BEQ TEST4D ; STACK IS CORRECT CONTINUE
714 002432 012767 002474 175364 MOV #HALT16E, PFHAND ; SET UP ERROR HALT
715 002440 012767 000000 175360 MOV #0, PFHAND+2 ; SET UP STATUS
716 002446 000001 WAIT ; WAIT FOR POWER FAIL
717 002450 062767 000001 001126 TEST4D: ADD #1, SAVE7 ; +1 COUNTER
718 002456 022767 000044 001120 CMP #36, SAVE7 ; HAS LOOP TAKEN 2 MILLISECONDS
719 002464 001356 BNE UPTIME ; NOT YET 2 MILLISECONDS
720 002466 000167 177614 JMP TEST4E ; THE POWER HAS BEEN UP FOR 2 MILLISECONDS

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| | | | | | | | | | | |
|-----|--------|--------|--------|--------------|---------|--------|-----------------|--|--|---|
| 721 | 002472 | 000000 | | HALT15E HALT | | | | | | |
| 722 | 002474 | 000000 | | HALT16E HALT | | | | | | , WE DID NOT HAVE 2 MILLISECONDS OF POWER OK |
| 723 | | | | | | | | | | , STACK INCORRECT AFTER EMULATOR TRAP |
| 724 | | | | | | | | | | |
| 725 | | | | | | | | | | |
| 726 | | | | | | | | | | |
| 727 | | | | | | | | | | |
| 728 | | | | | | | | | | |
| 729 | | | | | | | | | | |
| 730 | | | | | | | | | | , MEMORY POWER ON/OFF TEST |
| 731 | | | | | | | | | | , LOAD MEMORY WITH SET DATA PATTERN |
| 732 | | | | | | | | | | , THEN COMPARE DATA FOR BIT DROP OUT OR BIT PICK UP |
| 733 | | | | | | | | | | , RE-ENTER COMPARE ROUTINE IF POWER FAIL OCCURS |
| 734 | | | | | | | | | | |
| 735 | | | | | | | | | | , ROUTINE TO DETERMINE THE AMOUNT OF MEMORY |
| 736 | | | | | | | | | | , ROUTINE TESTS FOR A MAX OF 28K |
| 737 | 002476 | 012706 | 001000 | TESTS: | MOV | #1000, | SP | | | , SET UP STACK |
| 738 | 002502 | 004767 | 001176 | | JSR | PC, | PRINT | | | , OUTPUT TITLE |
| 739 | 002506 | 004352 | | | MSG1 | | | | | |
| 740 | 002510 | 004767 | 001114 | | JSR | PC, | SETSWR | | | , SET UP SWR POINTER |
| 741 | 002514 | 004767 | 001232 | | JSR | PC, | UPDATE | | | , UPDATE SWR |
| 742 | 002520 | 005067 | 001040 | | CLR | TEMPST | | | | , CLEAR TEMP STORAGE |
| 743 | 002524 | 005067 | 002216 | | CLR | PINFLG | | | | , CLEAR PWR INT FLAG |
| 744 | 002530 | 012767 | 002576 | 175246 | LPTSTS: | MOV | #TREMST, 4 | | | , SET UP FOR BUS TRAP |
| 745 | 002536 | 012767 | 000340 | 175242 | | MOV | #340, 6 | | | , LOCK UP PRIORITY LEVELS |
| 746 | 002544 | 012706 | 001000 | | | MOV | #1000, SP | | | |
| 747 | 002550 | 005067 | 001012 | | | CLR | SAVE | | | , SET UP TEST FOR 8K |
| 748 | 002554 | 005777 | 001006 | | EXMST | TST | @SAVE | | | , TEST MEMORY FOR AVAILABILITY |
| 749 | 002560 | 062767 | 004000 | 001000 | | ADD | #4000, SAVE | | | , SET UP TEST FOR NEXT 1K |
| 750 | 002566 | 022767 | 160000 | 000772 | | CMP | #160000, SAVE | | | , TEST FOR BUS TRAP ERROR |
| 751 | 002574 | 001367 | | | | BNE | EXMST | | | , TEST NEXT 4K BLOCK |
| 752 | 002576 | 005737 | 000042 | | TREMST | TST | @#42 | | | |
| 753 | 002602 | 001407 | | | | BEQ | . +20 | | | |
| 754 | 002604 | 022737 | 003102 | 000042 | | CMP | #LOGICAL, @#42 | | | |
| 755 | 002612 | 001403 | | | | BEQ | . +10 | | | |
| 756 | 002614 | 162767 | 003000 | 000744 | | SUB | #3000, SAVE | | | |
| 757 | 002622 | 162767 | 000500 | 000736 | | SUB | #500, SAVE | | | , SET UP FOR LAST AVAILABLE BANK |
| 758 | 002630 | 016767 | 000732 | 000724 | | MOV | SAVE, HLIMIT | | | , LAST AVAILABLE MEMORY ADDRESS |
| 759 | 002636 | 012767 | 000006 | 175140 | | MOV | #6, 4 | | | , RESTORE TRAP HALT POINTER |
| 760 | 002644 | 016767 | 000706 | 175134 | | MOV | HLT, 6 | | | , RESTORE HALT. |
| 761 | 002652 | 012767 | 003166 | 175144 | | MOV | #TEST5A, PFHAND | | | , SET UP POINTER |
| 762 | 002660 | 012706 | 001000 | | | MOV | #1000, SP | | | , SET UP STACK |
| 763 | 002664 | 012702 | 004750 | | | MOV | #LLIMIT, %2 | | | , LOW MEMORY LIMIT |
| 764 | 002670 | 012722 | 152525 | | FILDAT: | MOV | #152525, (2)+ | | | , LOAD DATA INTO MEMORY |
| 765 | 002674 | 026702 | 000662 | | | CMP | HLIMIT, %2 | | | , COMPARE FOR LAST MEMEORY LOCATION |
| 766 | 002700 | 001373 | | | | BNE | FILDAT | | | , LOAD NEXT LOCATION |
| 767 | 002702 | 012702 | 004750 | | CMDX: | MOV | #LLIMIT, %2 | | | , SETUP FOR COMPARE |
| 768 | 002706 | 026702 | 000650 | | CMDAT: | CMP | HLIMIT, %2 | | | , TEST FOR LAST ADDRESS |
| 769 | 002712 | 001103 | | | | BNE | ACTMOD | | | |
| 770 | | | | | | | | | | |
| 771 | | | | | | | | | | , TEST THE TTY BUFFER |
| 772 | | | | | | | | | | , FOR A CONTROL-G |
| 773 | | | | | | | | | | |
| 774 | 002714 | 105737 | 177560 | | | TSTB | @#TKS | | | , CHAR IN BUFFER? |
| 775 | 002720 | 100020 | | | | BPL | 505 | | | , NO |
| 776 | 002722 | 013705 | 177562 | | | MOV | @#TKB, %5 | | | , STORE CHAR |

| | | | | | | | | |
|-----|--------|--------|--------|--------|---------|-----------------|---------------|--|
| 777 | 002726 | 042705 | 177600 | | BIC | #177600, | %5 | ,STRIP 8TH BIT |
| 778 | 002732 | 122705 | 000007 | | CMPB | #7, | %5 | ;CONTROL-G? |
| 779 | 002736 | 001401 | | | BEQ | 405 | | ;YES |
| 780 | 002740 | 000410 | | | BR | 505 | | ;NO |
| 781 | 002742 | 016767 | 175230 | 001772 | MOV | SWREG, | TEMSWR | ;SAVE SWREG |
| 782 | 002750 | 042767 | 040000 | 175220 | BIC | #40000, | SWREG | ;ENABLE TTY PRINTING |
| 783 | 002756 | 004767 | 000776 | | JSR | PC, | UPDAT1 | ;UPDATE SWR |
| 784 | 002762 | 105767 | 000576 | | TSTB | TEMPST | | ;PWR FAIL OCCURRED? |
| 785 | 002766 | 100016 | | | BPL | EOP | | ;NO |
| 786 | 002770 | 032767 | 040000 | 175200 | BIT | #40000, | SWREG | ;TTY PRINTING DISABLED? |
| 787 | 002776 | 001026 | | | BNE | CKACT | | ;YES |
| 788 | 003000 | 012767 | 000001 | 001740 | MOV | #1, | PINFLG | ;SET PWR INT FLAG |
| 789 | 003006 | 004767 | 000672 | | JSR | PC, | PRINT | ;OUTPUT PWR FAIL MSG |
| 790 | 003012 | 003614 | | | MSG | | | |
| 791 | 003014 | 005067 | 001726 | | CLR | PINFLG | | ;CLEAR PWR INT FLAG |
| 792 | 003020 | 005067 | 000540 | | CLR | TEMPST | | |
| 793 | 003024 | 032767 | 040000 | 175144 | BIT | #40000, | SWREG | ;TTY PRINTING DISABLED? |
| 794 | 003032 | 001010 | | | BNE | CKACT | | ;YES |
| 795 | 003034 | 012767 | 000001 | 001704 | MOV | #1, | PINFLG | ;SET PWR INT FLAG |
| 796 | 003042 | 004767 | 000636 | | JSR | PC, | PRINT | ;END-OF-PASS MSG |
| 797 | 003046 | 004436 | | | MSG2 | | | |
| 798 | 003050 | 005067 | 001672 | | CLR | PINFLG | | ;CLEAR PWR INT FLAG |
| 799 | 003054 | 013700 | 000042 | | MOV | @#42,%0 | | |
| 800 | 003060 | 001004 | | | BNE | AUTO | | ;BR IN AUTO MODE |
| 801 | 003062 | 005767 | 175110 | | TST | SWREG | | ;LOOP ON TEST? |
| 802 | 003066 | 002013 | | | BGE | LOC | | ;YES |
| 803 | 003070 | 000000 | | | HALT | | | ;HALT TEST OVER NO ERRORS |
| 804 | 003072 | 005767 | 000456 | | AUTO | TST | FLAG | |
| 805 | 003076 | 001407 | | | BEQ | LOC | | |
| 806 | 003100 | 000005 | | | RESET | | | |
| 807 | 003102 | 004710 | | | LOGICAL | JSR | %7,(0) | |
| 808 | 003104 | 000240 | | | NOP | | | |
| 809 | 003106 | 000240 | | | NOP | | | |
| 810 | 003110 | 000240 | | | NOP | | | |
| 811 | 003112 | 000137 | 000200 | | JMP | @#200 | | |
| 812 | 003116 | 000167 | 177406 | | LOC: | JMP | LPTST5 | |
| 813 | 003122 | 022722 | 152525 | | ACTMOD: | CMP | #152525,(2)+ | ;TEST DATA |
| 814 | 003126 | 001667 | | | BEQ | CMDAT | | ;COMPARE NEXT WORD |
| 815 | 003130 | 010267 | 000434 | | MOV | %2,SAVE1 | | ;ADDRESS OF ERROR+2 |
| 816 | 003134 | 162767 | 000002 | 000426 | SUB | #2,SAVE1 | | ;SUBTRACT TO CALCULATE CORRECT ADDRESS |
| 817 | 003142 | 016700 | 000422 | | MOV | SAVE1,LIGHTS | | ;DATA ERROR IN THIS ADDRESS |
| 818 | 003146 | 012767 | 003154 | 174650 | MOV | #HALT18E,PFHAND | | ;SET UP POWER FAIL TRAP FOR ERROR |
| 819 | 003154 | 000000 | | | HALT18E | HALT | | ;LOC DATA LIGHTS CONTAINS BAD DATA |
| 820 | | | | | | | | |
| 821 | | | | | | | | ;FAILING ADDRESS IN DATA LIGHTS |
| 822 | 003156 | 017700 | 000406 | | CONAD: | MOV | @SAVE1,LIGHTS | ;PUT DATA IN DISPLAY LIGHTS |
| 823 | 003162 | 000000 | | | HALT19E | HALT | | ;BAD DATA |
| 824 | 003164 | 000650 | | | CONAC: | BR | CMDAT | ;COMPARE NEXT WORD |
| 825 | | | | | | | | ;ENTER THIS ROUTINE WHEN POWER FAIL OCCURS |
| 826 | | | | | | | | ;STORE ALL ACTIVE REGISTERS THEN HALT; |
| 827 | 003166 | 010046 | | | TEST5A | MOV | LIGHTS,-(SP) | ;SAVE LIGHTS |
| 828 | 003170 | 010246 | | | | MOV | %2,-(SP) | ;SAVE MEMORY ADDRESS |
| 829 | 003172 | 005767 | 001550 | | | TST | PINFLG | ;PWR FAIL DURING PRINTOUT? |
| 830 | 003176 | 001053 | | | | BNE | BR1 | ;YES |
| 831 | 003200 | 022706 | 000770 | | | CMP | #770,SP | ;IS STACK CORRECT |
| 832 | 003204 | 001411 | | | | BEQ | TEST5E | ;STACK CORRECT |

| | | | | | | | |
|-----|--------|--------|--------|--------|---------------|--|--|
| 833 | 003206 | 010667 | 000354 | | MOV | SP, SAVE | ; STACK SAVED |
| 834 | 003212 | 012767 | 003226 | 174604 | MOV | #HALT20E, PFHAND | |
| 835 | 003220 | 012767 | 000005 | 174600 | MOV | #5, PFHAND+2 | ; SET UP STATUS |
| 836 | 003226 | 000000 | | | HALT20E: HALT | | ; WAIT FOR RE-START |
| 837 | 003230 | 012767 | 003550 | 174566 | TESTSE MOV | #HALT21E, PFHAND | ; SET UP FOR 2 MILLISECOND DOWN TIME ERROR |
| 838 | 003236 | 012767 | 000005 | 174562 | MOV | #5, PFHAND+2 | ; AVERAGE INSTRUCTION TIME |
| 839 | 003244 | 012767 | 003560 | 174556 | MOV | #LRT1, EMTRP | ; SET UP EMULATOR TRAP |
| 840 | 003252 | 012767 | 000005 | 174552 | MOV | #5, EMTRP+2 | |
| 841 | 003260 | 005067 | 000320 | | CLR | SAVE7 | ; CLEAR COUNT REGISTER |
| 842 | 003264 | 104002 | | | MASTIM. EMT | +2 | ; EXECUTE EMT |
| 843 | 003266 | 022706 | 000770 | | CMP | #770, SP | ; IS STACK CORRECT AFTER TRAP |
| 844 | 003272 | 001406 | | | BEQ | XTIME | ; YES |
| 845 | 003274 | 010667 | 000266 | | MOV | SP, SAVE | |
| 846 | 003300 | 012767 | 003306 | 174516 | MOV | #HALT22E, PFHAND | ; NO SET UP ERROR TRAP STACK NOT CORRECT |
| 847 | 003306 | 000000 | | | HALT22E: HALT | | ; STACK SHOULD EQUAL 770 (SAVE REG |
| 848 | | | | | | | ; CONTAINS CONTENTS OF STACK) |
| 849 | 003310 | 062767 | 000001 | 000266 | XTIME. ADD | #1, SAVE7 | ; ADD TO TIME COUNT |
| 850 | 003316 | 022767 | 000027 | 000260 | CMP | #23, SAVE7 | ; IS TIME OK |
| 851 | 003324 | 001357 | | | BNE | MASTIM | |
| 852 | 003326 | 012767 | 003364 | 174470 | BR1 MOV | #TESTSCH, PFHAND | ; YES SETUP RESTART ADDRESS |
| 853 | 003334 | 012767 | 000005 | 174464 | MOV | #5, PFHAND+2 | ; SAVE STACK |
| 854 | 003342 | 010667 | 000220 | | MOV | SP, SAVE | |
| 855 | 003346 | 010367 | 000234 | | MOV | %3, SAVE8 | ; SAVE REGISTERS |
| 856 | 003352 | 010467 | 000232 | | MOV | %4, SAVE9 | |
| 857 | 003356 | 010567 | 000230 | | MOV | %5, SAVE10 | |
| 858 | 003362 | 000000 | | | HALT | | |
| 859 | | | | | | | |
| 860 | | | | | | RESTORE ACTIVE REGISTERS AND RETURN FROM INTERRUPT | |
| 861 | | | | | | | |
| 862 | | | | | | | |
| 863 | | | | | | | |
| 864 | 003364 | 016706 | 000176 | | TESTSCH MOV | SAVE, SP | ; RESTORE STACK |
| 865 | 003370 | 016703 | 000212 | | MOV | SAVE8, %3 | ; RESTORE REGISTERS |
| 866 | 003374 | 016704 | 000210 | | MOV | SAVE9, %4 | |
| 867 | 003400 | 016705 | 000206 | | MOV | SAVE10, %5 | |
| 868 | 003404 | 005767 | 001336 | | TST | PINFLG | ; PWR FAIL DURING PRINTOUT? |
| 869 | 003410 | 001040 | | | BNE | BR2 | ; YES |
| 870 | 003412 | 022706 | 000770 | | CMP | #770, SP | ; IS STACK CORRECT |
| 871 | 003416 | 001404 | | | BEQ | UPXTIM | |
| 872 | 003420 | 012767 | 003426 | 174376 | MOV | #HALT23E, PFHAND | ; SET UP FOR STACK ERROR TRAP |
| 873 | 003426 | 000000 | | | HALT23E: HALT | | |
| 874 | 003430 | 012767 | 003552 | 174366 | UPXTIM MOV | #HALT24E, PFHAND | ; SET UP FOR 2 MILLISECOND UP TIME ERROR |
| 875 | 003436 | 012767 | 000005 | 174362 | MOV | #5, PFHAND+2 | |
| 876 | 003444 | 005067 | 000134 | | CLR | SAVE7 | ; CLEAR COUNT REGISTER |
| 877 | 003450 | 104003 | | | EMTUP EMT | +3 | ; EXECUTE EMULATOR TRAP |
| 878 | 003452 | 062767 | 000001 | 000124 | ADD | #1, SAVE7 | ; INCREMENT EMULATOR TRAP COUNT |
| 879 | 003460 | 022706 | 000770 | | CMP | #770, SP | ; IS STACK CORRECT AFTER EMT |
| 880 | 003464 | 001406 | | | BEQ | CNTEMT | ; YES |
| 881 | 003466 | 012767 | 003500 | 174330 | MOV | #HALT25E, PFHAND | ; STACK NOT CORRECT (SET UP ERROR HALT) |
| 882 | 003474 | 010667 | 000066 | | MOV | SP, SAVE | |
| 883 | 003500 | 000000 | | | HALT25E: HALT | | ; STACK DID NOT = 770 (SAVE REGISTER |
| 884 | | | | | | | ; CONTAINS CONTENTS OF STACK |
| 885 | 003502 | 022767 | 000043 | 000074 | CNTEMT CMP | #35, SAVE7 | ; HAS POWER BEEN UP 2 MILLISECONDS |
| 886 | 003510 | 001357 | | | BNE | EMTUP | |
| 887 | 003512 | 012602 | | | BR2 MOV | (SP)+, %2 | ; NO EXECUTE NEXT EMT |
| 888 | 003514 | 012600 | | | MOV | (SP)+, LIGHTS | ; YES TIME OK |

| | | | | | | | |
|-----|--------|--------|--------|--------|-------------------|-----------------|--|
| 889 | 003516 | 012767 | 003166 | 174300 | MOV | #TEST5A, PFHAND | , REST ARE ACTIVE REGISTER |
| 890 | 003524 | 012767 | 000005 | 174274 | MOV | #5, PFHAND+2 | ; RETURN FROM POWER FAIL TRAP |
| 891 | 003532 | 012767 | 177777 | 000014 | MOV | #177777, FLAG | ; SET POWER FAIL FLAG |
| 892 | 003540 | 152767 | 000200 | 000016 | BISB | #200, TEMPST | |
| 893 | 003546 | 000002 | | | RTI | | |
| 894 | 003550 | 000000 | | | HALT21E | HALT | , WE DID NOT HAVE TWO MILLISECONDS TO STORE ACTIVE REG |
| 895 | 003552 | 000000 | | | HALT24E | HALT | ; POWER WAS NOT ACTIVE FOR TWO MILLISECONDS |
| 896 | | | | | / | | |
| 897 | | | | | / | | |
| 898 | | | | | / | | |
| 899 | | | | | / | | |
| 900 | | | | | / | | |
| 901 | | | | | / | | |
| 902 | | | | | / | | |
| 903 | | 000240 | | | NOP=240 | | |
| 904 | 003554 | 177777 | | | FLAG 177777 | | |
| 905 | 003556 | 000000 | | | HLT | HALT | |
| 906 | 003560 | 000002 | | | LR ^T I | RTI | |
| 907 | 003562 | 017500 | | | HLIMIT | 17500 | |
| 908 | 003564 | 000000 | | | TEMPST | 0 | |
| 909 | | | | | | | |
| 910 | | | | | , WORK REGISTERS | | |
| 911 | 003566 | 000000 | | | SAVE | 0 | |
| 912 | 003570 | 000004 | | | SAVE1 | 4 | |
| 913 | 003572 | 000000 | | | SAVE2. | 0 | |
| 914 | 003574 | 000000 | | | SAVE3 | 0 | |
| 915 | 003576 | 000000 | | | SAVE4 | 0 | |
| 916 | 003600 | 000000 | | | SAVE5 | 0 | |
| 917 | 003602 | 000000 | | | SAVE6 | 0 | |
| 918 | 003604 | 000000 | | | SAVE7. | 0 | |
| 919 | 003606 | 000000 | | | SAVE8 | 0 | |
| 920 | 003610 | 000000 | | | SAVE9 | 0 | |
| 921 | 003612 | 000000 | | | SAVE10 | 0 | |
| 922 | | | | | | | |
| 923 | | | | | | | |
| 924 | | 177560 | | | TKS=177560 | | |
| 925 | | 177562 | | | TKB=177562 | | |
| 926 | | 177564 | | | TPS=177564 | | |
| 927 | | 177566 | | | TPB=177566 | | |
| 928 | 003614 | 005015 | 053520 | 020122 | MSG | ASCIZ | <15><12> PWR FAIL |
| 929 | 003622 | 040506 | 046111 | 000 | | | |
| 930 | | 003630 | | | | | |
| 931 | | | | | | | |
| 932 | 003630 | 013746 | 000006 | | SETSWR | MOV | @#6, -(SP) , SAVE CURRENT VECTOR |
| 933 | 003634 | 013746 | 000004 | | | MOV | @#4, -(SP) |
| 934 | 003640 | 012737 | 003654 | 000004 | | MOV | #15, @#4 , SET UP TIMEOUT VECTOR |
| 935 | 003646 | 005777 | 174362 | | | TST | @SWRG , TRY TO REFERENCE HARDWARE SWR |
| 936 | 003652 | 000404 | | | | BR | 25 , BR IF NO TIMEOUT OCCURS |
| 937 | 003654 | 012767 | 000176 | 174352 | 15 | MOV | #SWREG, SWRG , POINT TO SOFTWARE SWR |
| 938 | 003662 | 022626 | | | | CMP | (SP)+, (SP)+ , RESTORE STACK |
| 939 | 003664 | 012637 | 000004 | | 25 | MOV | (SP)+, @#4 , RESTORE TIMEOUT VECTOR |
| 940 | 003670 | 012637 | 000006 | | | MOV | (SP)+, @#6 |
| 941 | 003674 | 017767 | 174334 | 174274 | | MOV | @SWRG, SWREG , SAVE SWR AT LOC 176 |
| 942 | 003702 | 000207 | | | | RTS | PC |
| 943 | | | | | | | |
| 944 | 003704 | 032767 | 040000 | 174264 | PRINT | BIT | #40000, SWREG , SR14 SET? |

| | | | | | | | | |
|------|--------|--------|--------|--------|---------|--------|------------|--------------------------------|
| 945 | 003712 | 001014 | | | BNE | RETURN | | , YES -DISABLE PRINTING |
| 946 | 003714 | 023727 | 000042 | 003102 | CMP | @#42, | #LOGICAL | , UNDER ACT? |
| 947 | 003722 | 001410 | | | BEQ | RETURN | | , YES |
| 948 | 003724 | 011603 | | | MOV | (SP), | %3 | , ADDRESS OF MSG AFTER JSR |
| 949 | 003726 | 011303 | | | MOV | (%3), | %3 | , ADDRESS OF FIRST CHAR OF MSG |
| 950 | 003730 | 105737 | 177564 | | 45: | TSTB | @#TPS | , BUFFER READY? |
| 951 | 003734 | 100375 | | | BPL | 45 | | , NO-LOOP |
| 952 | 003736 | 112337 | 177566 | | MOV | (%3)+, | @#TPB | , YES-PUT MSG CHAR INTO BUFFER |
| 953 | 003742 | 001372 | | | BNE | 45 | | , CONTINUE IF CHAR WAS NOT 0 |
| 954 | 003744 | 062716 | 000002 | | RETURN: | ADD | #2, | (SP) |
| 955 | 003750 | 000207 | | | RTS | PC | | , SET UP RETURN |
| 956 | 003752 | 016767 | 174220 | 000762 | UPDATE | MOV | SWREG, | TEMSWR |
| 957 | 003760 | 032767 | 040000 | 174210 | UPDAT1 | BIT | #40000, | SWREG |
| 958 | 003766 | 001016 | | | BNE | 905 | | , YES-RETURN TO TEST |
| 959 | 003770 | 023727 | 000042 | 003102 | CMP | @#42, | #LOGICAL | , UNDER ACT? |
| 960 | 003776 | 001412 | | | BEQ | 905 | | , YES-RETURN TO TEST |
| 961 | 004000 | 004767 | 177700 | | JSR | PC, | PRINT | |
| 962 | 004004 | 004676 | | | MSG9 | | | |
| 963 | 004006 | 004767 | 000014 | | JSR | PC, | OUTPUT | , PRINT CURRENT SWR VALUE |
| 964 | 004012 | 004767 | 177666 | | JSR | PC, | PRINT | |
| 965 | 004016 | 004705 | | | MSG10 | | | |
| 966 | 004020 | 004767 | 000102 | | JSR | PC, | INPUT | , UPDATE OR SAVE SWR |
| 967 | 004024 | 000207 | | | 905 | RTS | PC | |
| 968 | | | | | | | | |
| 969 | | | | | | | | , PRINT CUPRENT SWR |
| 970 | | | | | | | | , AT THE TTY |
| 971 | | | | | | | | |
| 972 | 004026 | 012704 | 004722 | | OUTPUT | MOV | #TABLE, | %4 |
| 973 | 004032 | 016714 | 000704 | | | MOV | TEMSWR, | (%4) |
| 974 | 004036 | 011467 | 000702 | | 85 | MOV | (%4), | ROTATE |
| 975 | 004042 | 042714 | 177770 | | | BIC | #177770, | (%4) |
| 976 | 004046 | 062724 | 000060 | | | ADD | #60, | (%4)+ |
| 977 | 004052 | 022704 | 004736 | | | CMP | #TABLE+14, | %4 |
| 978 | 004056 | 001411 | | | | BEQ | 105 | , BR |
| 979 | 004060 | 016714 | 000660 | | | MOV | ROTATE, | (%4) |
| 980 | 004064 | 000241 | | | | CLC | | |
| 981 | 004066 | 006014 | | | | ROR | (%4) | |
| 982 | 004070 | 000241 | | | | CLC | | |
| 983 | 004072 | 006014 | | | | ROR | (%4) | |
| 984 | 004074 | 000241 | | | | CLC | | |
| 985 | 004076 | 006014 | | | | ROR | (%4) | |
| 986 | 004100 | 000756 | | | | BR | 85 | |
| 987 | 004102 | 105737 | 177564 | | 105 | TSTB | @#TPS | , PRINTER READY? |
| 988 | 004106 | 100375 | | | | BPL | 105 | |
| 989 | 004110 | 014437 | 177566 | | | MOV | -(%4), | @#TPB |
| 990 | 004114 | 022704 | 004722 | | | CMP | #TABLE, | %4 |
| 991 | 004120 | 001401 | | | | BEQ | 125 | |
| 992 | 004122 | 000767 | | | | BR | 105 | , CONTINUE |
| 993 | 004124 | 000207 | | | 125 | RTS | PC | |
| 994 | | | | | | | | |
| 995 | | | | | | | | , UPDATE OR SAVE SWR |
| 996 | | | | | | | | |
| 997 | | | | | | | | |
| 998 | 004126 | 005067 | 000606 | | INPUT | CLR | CNTR | , CLEAR CHARACTER COUNTER |
| 999 | 004132 | 005067 | 000600 | | | CLR | USWREG | , CLEAR LAST UPDATED SWR |
| 1000 | 004136 | 012704 | 004722 | | | MOV | #TABLE, | %4 |

| | | | | | | | | | |
|------|--------|--------|--------|--------|------|-------|--|--|-------------------------------|
| 1001 | 004142 | 105737 | 177560 | | 145 | TSTB | 2#TKS | | , CHAR IN BUFFER? |
| 1002 | 004146 | 100375 | | | | BPL | 145 | | , NO |
| 1003 | 004150 | 013714 | 177562 | | | MOV | 2#TKB, (%4) | | , PUT CHAR IN TABLE |
| 1004 | 004154 | 105737 | 177564 | | 165 | TSTB | 2#TPS | | , PRINTER READY? |
| 1005 | 004160 | 100375 | | | | BPL | 165 | | , NO |
| 1006 | 004162 | 011437 | 177566 | | | MOV | (%4), 2#TPB | | , ECHO INPUT |
| 1007 | 004166 | 042714 | 177600 | | | BIC | #177600, | | (%4) , STRIP 8TH BIT |
| 1008 | 004172 | 122714 | 000015 | | | CMPB | #15, (%4) | | , CARRIAGE RETURN? |
| 1009 | 004176 | 001417 | | | | BEQ | 205 | | , YES |
| 1010 | 004200 | 122714 | 000060 | | | CMPB | #60, (%4) | | , ILLEGAL CHAR? |
| 1011 | 004204 | 003055 | | | | BGT | 225 | | , YES |
| 1012 | 004206 | 122714 | 000067 | | | CMPB | #67, (%4) | | , ILLEGAL CHAR? |
| 1013 | 004212 | 002452 | | | | BLT | 225 | | , YES |
| 1014 | 004214 | 022767 | 000006 | 000516 | | CMP | #6, CNTR | | , 7TH DIGIT? |
| 1015 | 004222 | 003446 | | | | BLE | 225 | | , YES |
| 1016 | 004224 | 062704 | 000002 | | | ADD | #2, %4 | | , POINT TO NEXT TABLE LOC |
| 1017 | 004230 | 005267 | 000504 | | | INC | CNTR | | , INCREMENT CHARACTER COUNTER |
| 1018 | 004234 | 000742 | | | | BR | 145 | | , CONTINUE |
| 1019 | 004236 | 005014 | | | 205 | CLR | (%4) | | , CLEAR CR FROM TABLE |
| 1020 | 004240 | 005767 | 000474 | | | TST | CNTR | | , IF NO DIGITS WERE INPUT- |
| 1021 | 004244 | 001431 | | | | BEQ | 245 | | , GO SAVE OLD SWR VALUE |
| 1022 | 004246 | 012704 | 004722 | | | MOV | #TABLE, %4 | | , POINT TO TABLE |
| 1023 | 004252 | 042714 | 000060 | | 265 | BIC | #60, (%4) | | , STRIP ASCII BITS |
| 1024 | 004256 | 062467 | 000454 | | | ADD | (%4)+, USWREG | | , CREATE UPDATED SWR VALUE |
| 1025 | 004262 | 005367 | 000452 | | | DEC | CNTP | | , DECREMENT CHARACTER COUNTER |
| 1026 | 004266 | 005767 | 000446 | | | TST | CNTR | | , LAST CHAR INPUT? |
| 1027 | 004272 | 001412 | | | | BEQ | 285 | | , YES |
| 1028 | 004274 | 000241 | | | | CLC | | | , NO-ROTATE DIGITS |
| 1029 | 004276 | 006167 | 000434 | | | ROL | USWREG | | |
| 1030 | 004302 | 000241 | | | | CLC | | | |
| 1031 | 004304 | 006167 | 000426 | | | ROL | USWREG | | |
| 1032 | 004310 | 000241 | | | | CLC | | | |
| 1033 | 004312 | 006167 | 000420 | | | ROL | USWREG | | |
| 1034 | 004316 | 000755 | | | | BR | 265 | | , CONTINUE |
| 1035 | 004320 | 016767 | 000412 | 173650 | 285 | MOV | USWREG, SWREG | | , MOVE NEW VALUE TO LOC 176 |
| 1036 | 004326 | 000207 | | | | RTS | PC | | , RETURN |
| 1037 | 004330 | 016767 | 000406 | 173640 | 245 | MOV | TEMSWR, SWREG | | , RESTORE OLD SWR VALUE |
| 1038 | 004336 | 000207 | | | | RTS | PC | | , RETURN |
| 1039 | 004340 | 004767 | 177340 | | 225 | JSR | PC, PRINT | | , REPEAT PROMPTING MSG |
| 1040 | 004344 | 004705 | | | | MSG10 | | | |
| 1041 | 004346 | 000167 | 177554 | | | JMP | INPUT | | , BEGIN THIS ROUTINE AGAIN |
| 1042 | | | | | | | | | |
| 1043 | | | | | | | | | |
| 1044 | | | | | | | | | |
| 1045 | | | | | | | | | |
| 1046 | | | | | | | | | |
| 1047 | 004352 | 005015 | 040515 | 047111 | MSG1 | | ASCII<15><12>/MAINDEC-11-DZKAQG/ | | |
| 1048 | 004360 | 042504 | 026503 | 030461 | | | | | |
| 1049 | 004366 | 042055 | 045532 | 050501 | | | | | |
| 1050 | 004374 | 107 | | | | | | | |
| 1051 | 004375 | 015 | 050012 | 050104 | | | ASCII<15><12>/POP-11 POWER FAIL DIAGNOSTIC 15 12 | | |
| 1052 | 004402 | 030455 | 020061 | 047520 | | | | | |
| 1053 | 004410 | 042527 | 020122 | 040506 | | | | | |
| 1054 | 004416 | 046111 | 042040 | 040511 | | | | | |
| 1055 | 004424 | 047107 | 051517 | 044524 | | | | | |
| 1056 | 004432 | 006503 | 000012 | | | | | | |

| | | | | | | |
|------|--------|--------|--------|--------|------|--|
| 1057 | 004436 | 005015 | 054105 | 051105 | MSG2 | ASCIZ<15><12>/EXERCISER END OF PASS/<15><12> |
| 1058 | 004444 | 044503 | 042523 | 020122 | | |
| 1059 | 004452 | 047105 | 020104 | 043117 | | |
| 1060 | 004460 | 050040 | 051501 | 006523 | | |
| 1061 | 004466 | 000012 | | | | |

| | | | | | | |
|------|--------|--------|--------|--------|--------|---|
| 1062 | 004470 | 005015 | 042524 | 052123 | MSG3 | ASCIZ<15><12>/TEST1 END OF PASS/<15><12> |
| 1063 | 004476 | 020061 | 047105 | 020104 | | |
| 1064 | 004504 | 043117 | 050040 | 051501 | | |
| 1065 | 004512 | 006523 | 000012 | | | |
| 1066 | 004516 | 005015 | 042524 | 052123 | MSG4 | ASCIZ<15><12>/TEST2 END OF PASS/<15><12> |
| 1067 | 004524 | 020062 | 047105 | 020104 | | |
| 1068 | 004532 | 043117 | 050040 | 051501 | | |
| 1069 | 004540 | 006523 | 000012 | | | |
| 1070 | 004544 | 005015 | 046101 | 042524 | MSG5 | ASCIZ<15><12>/ALTEST END OF PASS/<15><12> |
| 1071 | 004552 | 052123 | 042440 | 042116 | | |
| 1072 | 004560 | 047440 | 020106 | 040520 | | |
| 1073 | 004566 | 051523 | 005015 | 000 | | |
| 1074 | 004573 | 015 | 040412 | 052114 | MSG6 | ASCIZ<15><12>/ALTST1 END OF PASS/<15><12> |
| 1075 | 004600 | 052123 | 020061 | 047105 | | |
| 1076 | 004606 | 020104 | 043117 | 050040 | | |
| 1077 | 004614 | 051501 | 006523 | 000012 | | |
| 1078 | 004622 | 005015 | 042524 | 052123 | MSG7 | ASCIZ<15><12>/TEST3 END OF PASS/<15><12> |
| 1079 | 004630 | 020063 | 047105 | 020104 | | |
| 1080 | 004636 | 043117 | 050040 | 051501 | | |
| 1081 | 004644 | 006523 | 000012 | | | |
| 1082 | 004650 | 005015 | 042524 | 052123 | MSG8 | ASCIZ<15><12>/TEST4 END OF PASS/<15><12> |
| 1083 | 004656 | 020064 | 047105 | 020104 | | |
| 1084 | 004664 | 043117 | 050040 | 051501 | | |
| 1085 | 004672 | 006523 | 000012 | | | |
| 1086 | 004676 | 005015 | 053523 | 036522 | MSG9 | ASCIZ<15><12>/SWR=/' |
| 108 | 004704 | 000 | | | | |
| 1088 | 004705 | 015 | 005012 | 042516 | MSG10 | ASCIZ<15><12><12>/NEW SWR=/' |
| 1089 | 004712 | 020127 | 053523 | 036522 | | |
| 1090 | 004720 | 000 | | | | |
| 1091 | | 004722 | | | | EVEN |
| 1092 | 004722 | 004736 | | | | = +14 |
| 1093 | 004736 | 000000 | | | TABLE | |
| 1094 | 004740 | 000000 | | | USWPEG | 0 |
| 1095 | 004742 | 000000 | | | CNTR | 0 |
| 1096 | 004744 | 000000 | | | TEMSWR | 0 |
| 1097 | 004746 | 000000 | | | ROTATE | 0 |
| 1098 | 004750 | 000000 | | | PINFLG | 0 |
| 1099 | | 000001 | | | LLIMIT | 0 |
| | | | | | END | |

| | | | | | | | | | | | | | | | | | | |
|---------|--------|------|-------|-------|-------|-------|-------|-------|------|------|------|-------|-------|-----|--|--|--|--|
| START2 | 000210 | 386# | 426 | | | | | | | | | | | | | | | |
| START3 | 000224 | 389# | | | | | | | | | | | | | | | | |
| START4 | 000230 | 390# | | | | | | | | | | | | | | | | |
| STATUS= | 177776 | 393# | 413* | 443* | 516* | 562* | | | | | | | | | | | | |
| STR2A | 000214 | 387# | | | | | | | | | | | | | | | | |
| STR2B | 000220 | 388# | | | | | | | | | | | | | | | | |
| SWREG | 000176 | 382# | 430 | 456 | 523 | 573 | 628 | 687 | 781 | 782* | 786 | 793 | 801 | 937 | | | | |
| | | 941* | 944 | 956 | 957 | 1035* | 1037* | | | | | | | | | | | |
| SWRG = | 000234 | 396# | 935 | 937* | 941 | | | | | | | | | | | | | |
| TABLE | 004722 | 972 | 977 | 990 | 1000 | 1022 | 1092# | | | | | | | | | | | |
| TEMPST | 003564 | 742* | 784 | 792* | 892* | 908# | | | | | | | | | | | | |
| TEMSWP | 004742 | 781* | 956* | 973 | 1037 | 1095# | | | | | | | | | | | | |
| TEST1 | 001000 | 385 | 408# | | | | | | | | | | | | | | | |
| TEST1C | 001040 | 419# | | | | | | | | | | | | | | | | |
| TEST1H | 001036 | 412 | 415# | 419 | | | | | | | | | | | | | | |
| TEST2 | 001112 | 386 | 77# | | | | | | | | | | | | | | | |
| TEST2A | 001212 | 445 | 461. | | | | | | | | | | | | | | | |
| TEST2B | 001234 | 462 | 46b# | | | | | | | | | | | | | | | |
| TEST2C | 001310 | 476 | 485# | | | | | | | | | | | | | | | |
| TEST2D | 001266 | 473 | 476# | | | | | | | | | | | | | | | |
| TEST3 | 002036 | 389 | 619# | | | | | | | | | | | | | | | |
| TEST3A | 002112 | 623 | 638# | | | | | | | | | | | | | | | |
| TEST3B | 002142 | 639 | 644# | | | | | | | | | | | | | | | |
| TEST3C | 002242 | 656 | 665# | | | | | | | | | | | | | | | |
| TEST3D | 002210 | 649 | 653# | | | | | | | | | | | | | | | |
| TEST4 | 002250 | 390 | 678# | | | | | | | | | | | | | | | |
| TEST4A | 002324 | 682 | 693# | | | | | | | | | | | | | | | |
| TEST4B | 002354 | 694 | 699# | | | | | | | | | | | | | | | |
| TEST4C | 002376 | 699 | 707# | | | | | | | | | | | | | | | |
| TEST4D | 002450 | 713 | 717# | | | | | | | | | | | | | | | |
| TEST4E | 002306 | 685# | 720 | | | | | | | | | | | | | | | |
| TEST5 | 002476 | 384 | 737# | | | | | | | | | | | | | | | |
| TEST5A | 003166 | 761 | 827# | 889 | | | | | | | | | | | | | | |
| TEST5C | 003364 | 852 | 864# | | | | | | | | | | | | | | | |
| TEST5E | 003230 | 832 | 837# | | | | | | | | | | | | | | | |
| TIMLOP | 002162 | 647# | 655 | | | | | | | | | | | | | | | |
| TKB = | 177562 | 776 | 925# | 1003 | | | | | | | | | | | | | | |
| TKS = | 177560 | 774 | 924# | 1001 | | | | | | | | | | | | | | |
| TPB = | 177566 | 927# | 952* | 989* | 1006* | | | | | | | | | | | | | |
| TPS = | 177564 | 926# | 950 | 987 | 1004 | | | | | | | | | | | | | |
| TREMST | 002576 | 744 | 752# | | | | | | | | | | | | | | | |
| UPDATE | 003752 | 410 | 442 | 515 | 561 | 621 | 680 | 741 | 956# | | | | | | | | | |
| UPDAT1 | 003760 | 783 | 957# | | | | | | | | | | | | | | | |
| UPTIME | 002422 | 711# | 719 | | | | | | | | | | | | | | | |
| UPXTIM | 003430 | 871 | 874# | | | | | | | | | | | | | | | |
| USWREG | 004736 | 999* | 1024* | 1029* | 1031* | 1033* | 1035 | 1093# | | | | | | | | | | |
| XTIME | 003310 | 844 | 849# | | | | | | | | | | | | | | | |
| = | 004752 | 353# | 358 | 364 | 377# | 379# | 381# | 383# | 396 | 398# | 420 | 424 | 487 | 490 | | | | |
| | | 493 | 496 | 499 | 502 | 505 | 520 | 569 | 753 | 755 | 930# | 1091# | 1092# | | | | | |

ABS. 004752 000

ERRORS DETECTED 0

DZKAQG BIN, DZKAQG LST/CRF/SOL/NL TOC=DZKAQG QRC
RUN-TIME 1 2 2 SECONDS
RUN-TIME RATIO 61/3=17 1
CORE USED 6K (11 PAGES)

