

IDENTIFICATION  
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PRODUCT CODEI MAINDEC-00'DHKPA-000  
PRODUCT NAMEI KPBE POWER FAIL/AUTO RESTART TEST  
DATE REVISEDI APRIL 9, 1973  
MAINTAINERI DIAGNOSTIC GROUP  
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MAYNARD, MASS.

1: ABSTRACT  
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THIS DIAGNOSTIC IS A COMPLETE TEST OF THE PDPS-8E POWER FAIL OPTION WITH THE INTERVENTION OF THE OPERATOR.

2: REQUIREMENTS  
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PDPS-8E  
KROE POWER FAIL OPTION

STORAGE  
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THE MAIN PROGRAM OCCUPIES THE FIRST THREE PAGES IN CORE,  
ONE BUFFER WHICH CONTAINS IOT CHAIN STARTING AT LOCATION 1000  
TWO ADDITIONAL BUFFERS OF 2000 WORDS EACH

2000 TO 3777 LOWER BUFFER

4000 TO 5777 HIGH BUFFER

LOADING PROCEDURE  
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THE PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE EXERCISED;

3: STARTING PROCEDURE  
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CONTROL SWITCHES  
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BITS 0-3 ARE USED FOR TEST SELECTION

0 1 2 3 TEST NUMBER  
-----

0 0 0 1 TEST 1

0 0 1 0 TEST 2

0 1 0 0 TEST 3

1 0 0 0 TEST 4

STARTING ADDRESS  
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THE STARTING ADDRESS FOR ALL TESTS IS LOCATION 200

PROGRAM AND OPERATION ACTION  
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- A: SET SWITCH REGISTER TO 200
- B: DEPRESS LOAD ADDRESS
- C: SET CONTROL SWITCH TO SELECT DESIRED TEST.  
IF A TEST IS NOT SELECTED PROGRAM WILL HALT.  
USER MAY THEN SELECT TEST AND PRESS CONTINUE
- D: DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- E: THE OPERATOR MUST NOW CAUSE POWER TO FAIL, EITHER BY DIRECTLY TURNING THE POWER KEY OFF AND/OR BY THE USE OF A POWER INTERRUPTER.
- F: WHEN THIS DIAGNOSTIC IS USED ON THE IN HOUSE ACT-OE SYSTEM, POWER OFF/ON INTERVENTION WILL NOT BE REQUIRED BY THE OPERATOR SINCE AN IOT HAS BEEN PROVIDED TO CAUSE POWER TO FAIL.

3. OPERATING PROCEDURE  
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A METHOD OF RUNNING THE TESTS IN NUMERICAL ORDER IS SUGGESTED;

IF A TEST IS NOT SELECTED, PROGRAM WILL HLT.  
USER MAY THEN SELECT TEST AND PRESS CONTINUE

TEST 1  
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TEST 1 CONTAINS TWO TESTS OF THE INTERRUPT AND SKIP CAPABILITY OF THE OPTION WHEN OPERATIVE POWER IS LOST;

A. NON-RESTART TEST  
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- 1. TURN POWER KEY OFF.
- 2. SWITCH ON POWER FAIL/AUTO RESTART MODULE SHOULD BE DOWN.
- 3. TURN POWER KEY ON.
- 4. EXAMINE LOCATION 0 FOR A HLT.

B. RESTART TEST  
-----

- 1. TURN POWER KEY OFF.
- 2. SWITCH ON POWER FAIL/AUTO RESTART MODULE SHOULD BE UP.
- 3. TURN POWER KEY ON.
- 4. MACHINE HALTS AT LOCATION 0

TEST 2  
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TEST 2 IS A TEST TO EVALUATE THE TIME WHICH THE MACHINE HAS TO STORE ITS ACTIVE REGISTERS. THIS TIME IS DEFINED AS 1 MS 20% TOLERANCE FOR THE POPBE

- A. TURN POWER KEY OFF.
- B. SWITCH ON POWER FAIL/AUTO RESTART MODULE SHOULD BE IN RESTART POSITION=<UP>.
- C. TURN POWER KEY ON.
- D. TEST 2 HAS PASSED IF PROGRAM HALTS AT LOCATION 464. WITH THE A.C. 5777.
- E. PRESS CONTINUE AFTER HALT AT LOCATION 464 TO RECYCLE TEST 2.

TEST 3  
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TEST 3 IS A TEST TO EVALUATE THE ABILITY OF THE MACHINE TO EXECUTE IOT'S DURING A POWER FAILURE WITHOUT DESTROYING CORE.

- A. TURN POWER KEY OFF.
- B. SWITCH ON POWER FAIL/AUTO RESTART MODULE SHOULD BE IN RESTART POSITION=<UP>.
- C. TURN POWER KEY ON.
- D. THIS TEST WILL RECYCLE AND HLT ON ERROR.

TEST 4  
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TEST 4 IS A TEST TO STORE THE ACTIVE REGISTERS (PO,AC, LINK AND MQ) WHEN POWER FAILS AND RESTORES THEM WHEN POWER BECOMES OPERATIVE.

- A. TURN POWER KEY OFF.
- B. SWITCH ON POWER FAIL/AUTO RESTART MODULE SHOULD BE IN RESTART POSITION=<UP>.
- C. TURN POWER KEY ON.
- D. THIS TEST WILL RECYCLE AND HLT ON ERROR.

BACKGROUND TEST  
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DURING TESTS, A MEMORY POWER ON/OFF TEST IS BEING EXECUTED. THIS TEST COMPARES TWO BUFFERS WHICH SHOULD BE THE COMPLEMENT OF EACH OTHER.

6:  
ERRORS  
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\*IF PROGRAM HALTS AT LOCATION 304, THIS INDICATES AN ILLEGAL  
SPL INTERRUPT OCCURED;

TEST 1 ERRORS  
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A: NON-RESTART CONDITION

LOCATION B CONTAINS ALL ONE'S

SHOULD CONTAIN A HALT

REASON: NO INTERRUPT

1: MALFUNCTION OF POWER FAIL/AUTO RESTART  
MODULE;

B: RESTART CONDITION

THE ABOVE CONDITIONS FOR NON-RESTART STILL PREVAIL FOR A  
RESTART CONDITION;

TEST 2 ERRORS  
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IF TEST 2 DOES NOT HALT AT LOCATION 464, 0 THE MACHINE  
HALTED IN LOCATION 51 INDICATES THE 1 MS DELAY IN THE POWER  
FAIL OPTION IS NOT PROPERLY SET. (LESS THAN 1 MS.)

TEST 3 ERRORS  
-----

ERROR HALTS WILL OCCUR IN TEST 3 WHEN A LOCATION IN THE IOY  
CHAIN HAS BEEN ALTERED; THE FIRST HALT THE AC CONTAINS THE  
LOCATION OF THE ERROR; DEPRESS CONTINUE AND THE SECOND HALT  
WILL OCCUR; THE AC NOW CONTAINS THE WORD IN ERROR; DEPRESS  
CONTINUE AGAIN AND THE NEXT WORD WILL BE COMPARED;

TEST 4 ERRORS  
-----

ERROR HALTS WILL OCCUR WHEN AN INCORRECT MEMORY COMPARISON IS  
MADE; THE DATA FROM THE LOWER BUFFER WILL BE DISPLAYED IN THE  
AC; DEPRESS CONTINUE AND THE UPPER BUFFER WILL BE DISPLAYED  
DEPRESS CONTINUE AGAIN AND THE NEXT COMPARISON WILL TAKE PLACE;

ANOTHER ERROR HALT WILL OCCUR WHEN AN INCORRECT COMPARISON  
TAKES PLACE WITH THE M0. BY DEPRESSING CONTINUE, THE PROGRAM  
WILL RECOVER.

7: RESTRICTIONS  
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8: MISCELLANEOUS  
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IF COMPARISON ERRORS OCCUR FREQUENTLY IN TEST 3 BETWEEN BUFFERS,  
IT IS SUGGESTED THAT THE OPERATOR REFER TO MEMORY POWER  
ON/OFF TEST.

9: PROGRAM DESCRIPTION  
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DUE TO THE FUNCTION OF THE POWER FAIL OPTION, IT BECOMES  
NECESSARY FOR THE OPERATOR TO TAKE AN ACTIVE PART IN  
DIAGNOSING THE ERROR IN THE PROGRAM. THE PROGRAM HAS A  
TWO-FOLD PURPOSE.

FIRST TO TEST THE ABILITY OF THE K90E TO ENABLE THE PROCESSOR  
TO STORE ITS ACTIVE REGISTERS DURING POWER DOWN. THEN THE  
ABILITY TO RESTART CORRECTLY.

THE SECOND PURPOSE IS TO VERIFY THE FACT THAT MEMORY HAS  
UNDISTURBED DURING POWER ON/OFF.

10: LISTING  
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0057 0467 TYPEL, TYPE
0060 0463 ER, EM
0061 0207 BELL, 0207
0062 0200 RESTART, RESTART,
0063 0312 XPF, PE
0064 0400 K0400,
0065 6771 XIOT, 6771
0066 0400 SET, SETUP
0067 0777 IOBF, 0777
0070 3000 PONT, DCA INT
0071 5421 PNT10, JMP I K1000
0072 7443 M334, 7443
0073 1074 PNT2AL, TAD PNT2A
0074 5475 PNT2A, JMP I T10TL
0075 0501 T10TL, T10T
0076 0000 TST4, 0
0077 7200 ACLA, CLA
    
```

```

*200
START,
0200 JMS I SET
0466 CLA CMA
7240 DCA INT
3000 TAD HALT
1054 DCA PNT1
0204 DCA PNT1
0205 CLA CLL
0206 DCA COUNT2
0207 3076 DCA TST4
0210 1034 TAD SAV3
0211 3001 DCA INT+1
0212 6002 IOF
0213 7004 LAG
0214 3020 DCA SAV
0215 1020 TAD SAV
0064 AND K0400
0217 7640 SEA CLA
0220 5326 JMP TEST1
0221 1020 TAD SAV
0222 0021 AND K1000
0223 7640 SEA CLA
0224 5333 JMP TEST2
0225 1020 TAD SAV
0226 0022 AND K2000
0227 7640 SEA CLA
0230 5340 JMP TEST3
0231 1020 TAD SAV
0232 0023 AND K4000
0233 7640 SEA CLA
0234 5237 JMP TEST4
0235 7402 HLT
0236 5200 JMP START
0237 1037 TAD PNT1C
0240 3304 DCA PNT1
0241 CLA
    
```

/SETUP FOR MEMORY

/TRAP FOR ILLEGAL SPL IOT  
/STORE INTO INTERRUPT ROUTINE

/SETUP TEST 1

/SETUP TEST 2

/SETUP TEST 3

/SETUP TEST 4  
/A TEST WAS NOT SELECTED  
/SELECT TEST AND HIT CONTINUE

0242	TAD	K5252			
0243	ORA				
0244	ORA	K5252			
0245	TAD	K5252			
0246	MQL				/LOAD BAE
0247	ION				/2000 LOC,
0250	TAD	K6880			
0251	ORA	COUNT1			/LOWER LIMIT
0252	TAD	LOUF			/AUTO INDEX
0253	ORA	10			/UPPER LIMIT
0254	TAD	UBUF			/AUTO INDEX
0255	ORA	11			
0256	TAD	10			
0257	ORA	STOR1			
0260	TAD	11			
0261	ORA	STOR2			
0262	TAD	1 STOR1			/LOWER ADDRESS
0263	TAD	1 STOR2			/UPPER ADDRESS
0264	ORA				
0265	SEA				
0266	JMP	1+4			/ERROR
0267	ISE	COUNT1			
0270	JMP	PT1			
0271	JMP	PHR107			/ISSUE IN HOUSE 107
0272	CLA	1 STOR1			
0273	TAD	1 STOR1			
0274	HLI				
0275	CLA	1 STOR2			
0276	TAD	1 STOR2			
0277	HLI				
0300	CLA				
0301	JMP	PT2			

/POWER FAIL ROUTINE TO SERVICE  
 /SPL AND GO INTO ONE OF THE FOUR TEST  
 /SERVICE ROUTINES WHILE POWER IS GOING DOWN.

0302	CLT	SPL			/SKIP ON POWER LOW
0303		SKP			
0304	PNT1	HLT			/HLT SHOULD GET MODIFIED BY TEST SERVICE ROUTINES
0305		KCC			/CLEAR KEYBOARD FLAG
0306		TGF			/CLEAR TELEPRINTER FLAG
0307		ION			
0310		CLA	CLL		
0311		JMP	START		

0312	PF1	ORA	AC		/STORE AC
0313		RAR			
0314		ORA	LINK		/STORE LINK

0315 1000  
 0316 3092  
 0317 7501  
 0320 3093  
 0321 1040  
 0322 3000  
 0323 7200  
 0324 7040  
 0325 7402

TAD INT  
 DCA PC  
 MGA HQ  
 DCA HQ  
 TAD PNT2  
 DCA INT  
 CLA  
 CHA  
 HLT

/STORE PC  
 /LOAD AC WITH HQ  
 /JMP RESTORE  
 /SET AC EQUAL TO MINUS ONE

0326 6001  
 0327 7300  
 0330 1036  
 0331 3304  
 0332 5200

/SETUP FOR TEST 1  
 /CHECK FOR INTERRUPT AND SKIP CAPABILITY  
 TEST1:  
 JON  
 CLA CLL  
 TAD PNT1B  
 DCA PNT1  
 JMP PT

0333 6001  
 0334 7300  
 0335 1039  
 0336 3304  
 0337 5200

/SETUP FOR TEST 2  
 /ROUTINE TO DETERMINE THE LENGTH OF TIME BEFORE POWER IS INOPERATIVE;  
 TEST2:  
 JON  
 CLA CLL  
 TAD PNT1A  
 DCA PNT1  
 JMP PT

0340 6001  
 0341 1072  
 0342 3026  
 0343 1067  
 0344 3010  
 0345 1077  
 0346 3410  
 0347 1073  
 0350 3410  
 0351 1070  
 0352 3410  
 0353 1065  
 0354 3410  
 0355 2026  
 0356 5383  
 0357 1094  
 0360 3410  
 0361 1071  
 0362 3304  
 0363 5200  
 0377 0540  
 0400 0400

/SET UP FOR TEST 3  
 /IOT CHAIN  
 TEST3:  
 JON  
 TAD M334  
 DCA COUNT1  
 TAD I0BUF  
 DCA I0  
 TAD AC LA  
 DCA I 10  
 TAD PNT2AL  
 DCA I 10  
 TAD PONT  
 DCA I 10  
 TAD XIOT  
 DCA I 10  
 DCA I 10  
 ISE COUNT1  
 JMP I03  
 TAD HALT  
 DCA I 10  
 TAD PNT1D  
 DCA PNT1  
 JMP PT

/# OF IOTS  
 /STORE COUNT  
 /ADDRESS OF CHAIN  
 /AUTO INDEX

/RESTART ADDRESS  
 /STORE  
 /IOT FOR STRING  
 /LOAD WORD  
 /#1 COUNT  
 /FETCH NEXT WORD  
 /FETCH HALT  
 /LOC. OF STRING

0400 0000  
 0401 7300  
 0402 1025  
 0403 3026

\*400  
 /SETUP FOR MEMORY TEST  
 SETUP:  
 0  
 CLA CLL  
 TAD K000  
 DCA COUNT1

/2000 LOC

0404	1030	TAD LBUF
0405	3010	DCA 10
0406	1043	TAD C1
0407	3410	DCA I 10
0410	2026	ISE COUNT1
0411	5206	JMP I03
0412	7300	CLA CLL
0413	1025	TAD K6000
0414	3026	DCA COUNT1
0415	1031	TAD UBUF
0416	3010	DCA 10
0417	1044	TAD C2
0420	3410	DCA I 10
0421	2026	ISE COUNT1
0422	5217	JMP I03
0423	7300	CLA CLL
0424	5000	JMP I SETUP

/LOWER BUFFER  
/PATTERN 1

/2000 LOC  
/HIGHER BUFFER  
/PATTERN 2

/CONTINUE

/ROUTINE TO RESTORE ACTIVE  
/REGISTERS  
/CLEAR ALL FLAGS  
/RESTORE LINK

0425	6007	RESTOR, CAP
0426	1050	TAD LINK
0427	7004	RAI
0430	7200	CLA MQ
0431	1053	TAD MQ
0432	7041	CIA
0433	1024	TAD K5252
0434	7440	SEA
0435	7402	HLT
0436	7200	CLA MQ
0437	1053	TAD MQ
0440	7421	HQL
0441	1052	TAD PC
0442	3000	DCA INT
0443	1031	TAD AC
0444	2076	ISE TST4
0445	6001	ION
0446	5400	JMP I INT

/INCORRECT MQ  
/RESTORE MQ  
/LOAD MQ FROM AC  
/RESTORE PC  
/RESTORE AC

0447	7300	COUNT, CLA CLL
0450	1052	TAD PC
0451	3052	DCA PC
0452	1034	TAD HALT
0453	3000	DCA INT
0454	1055	TAD TIME
0455	3032	DCA SAV1
0456	2032	ISE SAV1
0457	5256	JMP I04
0460	1033	TAD SAV2
0461	3000	DCA INT

/TEST 2 SERVICE ROUTINE  
/NOTATE TO DETERMINE LENGTH  
/OF OPERATIVE POWER

/STORE PC

/ONE MILLISECOND

/STORE JMP MESSAGE



0531 7402  
0532 7200  
0533 5321

HLT  
CLA  
JMP T10T2

/COMPARE NEXT WORD

/TEST & SERVICE ROUTINE

0534 7300  
0535 1054  
0536 3000  
0537 7402

CR,  
CLA GLL  
TAD HALT  
DCA INT  
HLT

/SEARCH HALT

0540 7300  
0541 1076  
0542 7440  
0543 5402  
0544 7200  
0545 1027  
0546 7450  
0547 7000  
0550 2027  
0551 5353  
0552 5462  
0553 4200  
0554 5777  
0577 0200

PHRIOT,  
CLA GLL  
TAD TST4  
SZA  
JMP I RESTART  
CLA  
TAD COUNT2  
SNA  
NOP  
ISE COUNT2  
JMP RESET  
JMP I RESTART  
JMS SETUP  
JMP PT  
S

/IN HOUSE POWER ON/OFF IOY

0000	11110000	00000000	11111111	11111111	00000000	11111111	00000000	11111111	00000000	11111111	00000000	11111111	00000000
0100	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111

0600  
0700

1000  
1100

1200  
1300

1400  
1500

1600  
1700

2000  
2100

2200  
2300

2400  
2500

2600  
2700

3000  
3100

3200  
3300

3400  
3500

3600  
3700

4000  
4100  
4200  
4300  
4400  
4500  
4600  
4700  
5000  
5100  
5200  
5300  
5400  
5500  
5600  
5700  
6000  
6100  
6200  
6300  
6400  
6500  
6600  
6700  
7000  
7100  
7200  
7300  
7400  
7500  
7600  
7700

PAL10

0051 0077 0061 0045 0043 0044 6007 0302 0302 0056 0042 0447 0026 0027 0027 0534 0443 0444 0060 0054 0000 0067 0064 0021 0022 0023 0024 0025 0030 0050 0072 0053 7501 7421 0052 0312 0304 0035 0036 0037 0071 0040 0074 0073 0070 0250 0256 0267 0540 0041 0553 0062 0425 0020

AC SAV1  
ACLA SAV2  
BELL SAV3  
C SET  
C1 SETUP  
C2 SPL  
CAF START  
CLF STOR1  
CLFL STOR2  
COU TEST1  
COUNT TEST2  
COUNT1 TEST3  
COUNT2 TEST4  
CR TIME  
EM TIOT  
EM1 TIOT1  
ER TIOT2  
HALT TIOTL  
INT TSI4  
IOBUF TYPE  
K0400 TYPEL  
K1000 UBUF  
K2000 XIOT  
K4000 XPF  
K5252  
K6000

0032 0033 0034 0066 0400 6102 0200 0046 0047 0326 0333 0340 0237 0055 0501 0511 0521 0075 0467 0057 0031 0065 0063

0051 0077 0061 0045 0043 0044 6007 0302 0302 0056 0042 0447 0026 0027 0027 0534 0443 0444 0060 0054 0000 0067 0064 0021 0022 0023 0024 0025 0030 0050 0072 0053 7501 7421 0052 0312 0304 0035 0036 0037 0071 0040 0074 0073 0070 0250 0256 0267 0540 0041 0553 0062 0425 0020

/PDP8-E POWER FAIL/AUTO RESTART TEST PAL10 V142 6-APR-73 16141 PAGE 1-10

ERRORS DETECTED: 0

LINKS GENERATED: 2

RUN-TIME: 3 SECONDS

2K CORE USED