

KT11-D

KT11-D ACCESS KEYS TEST
MD-11-DBKTB-A

EP-DBKTB-A-DL-A

OCT 1976

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digital

FICHE 1 OF 1

Made In U.S.A.

Frame 1	Frame 2	Frame 3
Frame 4	Frame 5	Frame 6
Frame 7	Frame 8	Frame 9
Frame 10	Frame 11	Frame 12
Frame 13	Frame 14	Frame 15
Frame 16	Frame 17	Frame 18
Frame 19	Frame 20	Frame 21
Frame 22	Frame 23	Frame 24

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DBKTB-A
PRODUCT NAME:	KT11-D ACCESS KEYS TEST
DATE CREATED:	SEPTEMBER 1, 1972
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	ROBERT WHITTON

1.0 ABSTRACT

THIS PROGRAM CHECKS THE OPERATION OF EACH ACCESS KEY FOR EACH OF THE FOUR UNIBUS CYCLES (OR COMBINATION OF CYCLES) WHICH MAY REFERENCE AN ADDRESS THRU SEGMENTATION. THESE CYCLES ARE DATI, DATO (NO DATIP), DATIP-DATO, AND DATIP-DATO. EACH OF THESE CASES IS TESTED WITH AND WITHOUT MEMORY MANAGEMENT ENABLE SET. THIS EIGHT CASES ARE TESTED FOR EACH KEY, S00, S01, S02, THE CORRESPONDING PDR'S, AND THE PROPER EXECUTION OR PREVENTION OF EXECUTION OF THE INSTRUCTION ARE CHECKED IN EACH CASE.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP 11/40 WITH KT11-D OPTION

2.2 STORAGE

THE PROGRAM REQUIRES 5K OF MEMORY, STARTING AT LOCATION 0.

3.0 LOADING PROCEDURE

LOAD PROGRAM INTO MEMORY USING ABS LOADER.

4.0 STARTING PROCEDURE

4.1 NORMAL DIAGNOSTIC OPERATION

LOAD ADDRESS 200.

SET DESIRED SWITCH REGISTER SETTINGS (ALL DOWN FOR WORST CASE).

PRESS START.

THE PROGRAM WILL RING THE BELL ON COMPLETION OF A PASS.

4.2 SINGLE SUBTEST LOOP (TESTX)

LOAD ADDRESS 210.

PRESS START.

AT THE FIRST HALT, LOAD THE ADDRESS OF THE DESIRED SUBTEST

(THE ADDRESS OF THE TESTX TAG) INTO THE SWITCH REGISTER.

THEN PRESS "CONTINUE".

AT THE SECOND HALT, SET THE OPERATIONAL SWITCH SETTINGS DESIRED (SW11 MUST BE SET TO ZERO). THEN PRESS CONTINUE.

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SM15=1 OR UP-- HALT ON ERROR
 SM14=1 OR UP-- SCOPE LOOP
 SM13=1 OR UP-- INHIBIT PRINTOUT
 SM11=1 OR UP-- INHIBIT ITERATIONS
 SM10=1 OR UP-- HALT AT END OF CURRENT TEST
 NEXT TEST NUMBER IN DATA LIGHTS

5.2 SUBROUTINE ABSTRACTS

5.2.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST. IT RECORDS THE STARTING ADDRESS OF EACH SUB-TEST AS IT IS BEING ENTERED. IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE START OF THE SUBTEST THAT THE SCOPE LOOP IS REQUESTED FOR. IF SCOPE LOOP IS NOT REQUESTED, THERE WILL BE 1024 ITERATIONS ON THAT SUBTEST BEFORE THE NEXT SUBTEST IS ENTERED. SWITCH 11 ON A 1 INHIBITS ITERATION OF SUBTESTS.

5.2.2 HLT

THIS ENT CALLS THE SUBROUTINE PRINT, WHICH PRINTS OUT THE LOCATION COUNTER AT THE TIME OF FAILURE AND THE CONTENTS OF THE PROCESSOR STATUS REGISTER. NOTE THAT THE LOCATION COUNTER WILL BE THE ADDRESS OF THE HLT PLUS TWO.

5.2.3 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0 DESIGNED TO DETECT AND ISOLATE UNEXPECTED TRAPS AND INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

IF A HALT OCCURS IN THE TRAP OR INTERRUPT AREA, EXAMINE REGISTER SIX. IT WILL CONTAIN THE CURRENT STACK ADDRESS. THE CONTENTS OF THE CURRENT STACK ADDRESS IS THE VALUE OF THE LOCATION COUNTER WHEN THE TRAP OR INTERRUPT OCCURRED.

5.2.4 TESTX (SINGLE SUBTEST LOOP)

THIS ROUTINE ALLOWS A SINGLE SUBTEST TO BE RUN CONTINUOUSLY FOR SCOPE LOOP PURPOSES. WHILE A SCOPE LOOP SWITCH OPTION EXISTS, IT REQUIRES THAT YOU ARE WITHIN THE TEST IN WHICH YOU WISH TO LOOP. IN SOME CASES (SUCH AS WITH INTERMITTENT FAILURES) THAT'S NOT EASY TO DO. THIS SUBROUTINE ALLOWS YOU TO LOAD THE ADDRESS OF ANY SUBTEST AT THE HALT AND THEN GO DIRECTLY TO THAT TEST.

5.2.5 ENTSRV (ENT DECODER)

THIS ROUTINE DECODES ALL ENT CALLS, INCLUDING PATCHES AND THE HLT CALL WHICH PASSES CONTROL TO THE PRINT ROUTINE.

5.2.6 CLRALL

THIS ROUTINE CLEARS ALL THE PAR'S AND POR'S OF THE KT11-0, AS WELL AS SRO.

5.2.7 RWALL

THIS ROUTINE MAPS ALL PAGES TO BANK 0 BY CLEARING ALL THE PAR'S. ALL PAGES ARE MADE 4K READ-WRITE BY LOADING ALL THE POR'S WITH THE VALUE 77406.

5.2.8 SETUP

THIS ROUTINE FIRST CALLS RWALL TO MAP ALL THE PAGES 4K RW BANK 0. IT THEN SETS THE KEY FOR KERNEL PAGE 1 TO WHATEVER VALUE WAS STORED ON THE STACK BEFORE THE ROUTINE WAS CALLED. THIS ALLOWS A REFERENCE TO PAGE 1 TO TEST THE DESIRED ACCESS KEY. FINALLY, KERNEL PAGE 7 IS MAPPED TO THE EXTERNAL BANK.

5.3 PROGRAM AND/OR OPERATOR ACTION**5.3.1 SA 200 (NORMAL DIAGNOSTIC OPERATION)**

THE PROGRAM EXECUTES SEVERAL TESTS OF EACH KEY. TESTS 5 THRU 10 ARE CYCLED THRU 3 TIMES, ONCE FOR EACH OF THE KEYS WHICH GIVES A NON-RESIDENT ABORT. AT THE END OF EACH PASS THRU THE DIAGNOSTIC THE BELL IS RUNG.

5.3.2 SA 210 (SINGLE SUBTEST LOOP)

THIS STARTING ADDRESS ALLOWS THE USER TO RUN A SINGLE SUBTEST REPEATEDLY BY GIVING THE ADDRESS OF THE DESIRED SUBTEST AT THE FIRST HALT. IF SW11 IS SET TO A ONE, NORMAL TEST EXECUTION WILL BE RESUMED.

6.0 ERRORS**6.1 ERROR PRINTOUT**

PRINTOUTS ARE IN A STANDARD TWO-WORD FORMAT. THE FIRST WORD IS THE OCTAL VALUE OF THE PC+2 OF THE DETECTED ERROR. THE SECOND IS THE CONTENTS OF THE PROCESSOR STATUS REGISTER WHEN THE ERROR WAS DETECTED.

6.2 ERROR RECOVERY

IN GENERAL, TEST FAILURES WILL PRINTOUT AN ERROR MESSAGE AND CONTINUE. IF THE "HALT ON ERROR" SWITCH IS SET, HITTING CONTINUE WILL RECOVER. IF THE PROGRAM HANGS UP IN A LOOP, THE ERROR IS LIKELY TO BE A SIGNAL WHICH HAS NEVER RECEIVED. IF A HALT OCCURS IN THE TRAP AND VECTOR AREA THE PROGRAM MUST BE RESTARTED. IF THE PROGRAM HALTS IN THE MAIN FLOW, CONSULT THE LISTING IF NO MESSAGE IS TYPED OUT.

7.0 RESTRICTIONS

PROGRAM MUST BE LOADED INTO LOWER 5K OF MEMORY.

8.0 MISCELLANEOUS**8.1 EXECUTION TIME**

EACH PASS TAKES APPROXIMATELY 1 MINUTE WITH CORE MEMORY.

9.0 PROGRAM DESCRIPTION

THE PROGRAM RUNS SEVERAL SEPARATE TESTS OF EACH ACCESS KEY. DATI, DATO (NO DATIP), DATIP-DATO, AND DATIP-DATOB ARE CHECKED FOR EACH KEY, WITH AND WITHOUT MEMORY MANAGEMENT ENABLE SET. THE BELL IS RUNG AT THE END OF EACH PASS.

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;TEST OF THE KT11-D ACCESS KEYS

;OPERATING INSTRUCTIONS
1. LOAD TEST USING THE ABSOLUTE LOADER
2. LOAD SR 200
3. SET SR TO INITIAL SETTINGS
4. PRESS START

;DYNAMIC SWITCH REGISTER SETTINGS ARE:
SW15=1 CAUSES HALT ON ERROR
SW14=1 CAUSES SCOPE LOOPING
SW13=1 INHIBITS ERROR PRINTOUT
SW11=1 INHIBITS ITERATIONS
SW10=1 HALT AT END OF CURRENT TEST WITH NEXT TEST NUMBER
IN DATA LIGHTS. PRESS CONTINUE TO ADVANCE TO NEXT TEST.

;DEFINITIONS
SCOPE=TRAP
NOP=240
R0=X0
R1=X1
R2=X2
R3=X3
R4=X4
R5=X5
R6=X6
R7=X7
SP=X6
PC=X7
SR=177570
PS=177776
STATUS=PS
HLT=104006

104400
000240
000000
000001
000002
000003
000004
000005
000006
000007
000006
000007
177570
177776
177776
104006

;LOAD TRAP CATCHER IN LOCATIONS 0 THRU 377
;EACH VECTOR ADDRESS IS LOADED WITH THE ADDRESS
;OF THE NEXT LOCATION, AND THE NEXT LOCATION IS LOADED
;WITH A HALT INSTRUCTION (000000)

;LOAD VECTOR AREA
. =30
ENTSRV
340
. =34
SCOPEC
0

000030 000030
000030 006326
000032 000340
000034 000034
000034 005632
000036 000000

;LOAD STARTING AREA
. =200
JMP START
. =210
JMP TESTX

000200 000200 001744
000210 000167 001744
000210 000167 005320

;LOAD DATA AREA
. =1000

001000


```

001000 000000
002000 002000
002002 000000
002004 000000
002006 000000
002008 000000
002010 000000
002012 177564
002014 177566
002016 177568
002018 177570
002020 177572
002022 177574
002024 177576
002026 000250
002028 000252
002030 000000
002032 177600
002034 177602
002036 177604
002038 177606
002040 177610
002042 177612
002044 177614
002046 177616
002050 177640
002052 177642
002054 177644
002056 177646
002060 177650
002062 177652
002064 177654
002066 177656
002070 172300
002072 172302
002074 172304
002076 172306
002100 172310
002102 172312
002104 172314
002106 172316
002110 172340
002112 172342
002114 172344
002116 172346
002120 172350
002122 172352
002124 172354
002126 172356
002130 000000
002132 177573
002134 177575
002136 177577
002140 000000
002142 000000
002146 125252

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000000 000000

000004

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KSTACK: 0
USTACK: 0
          =. +776
          .WORD 0,0,0,0
TCSR: 177564
TCSR: 177566
SR0: 177572
SR1: 177574
SR2: 177576
KTVEC: 0
KTSTA: 0
AORTAB:
UPDR0: 177600
UPDR1: 177602
UPDR2: 177604
UPDR3: 177606
UPDR4: 177610
UPDR5: 177612
UPDR6: 177614
UPDR7: 177616
UPAR0: 177640
UPAR1: 177642
UPAR2: 177644
UPAR3: 177646
UPAR4: 177650
UPAR5: 177652
UPAR6: 177654
UPAR7: 177656
KPOR0: 172300
KPOR1: 172302
KPOR2: 172304
KPOR3: 172306
KPOR4: 172310
KPOR5: 172312
KPOR6: 172314
KPOR7: 172316
KPAR0: 172340
KPAR1: 172342
KPAR2: 172344
KPAR3: 172346
KPAR4: 172350
KPAR5: 172352
KPAR6: 172354
KPAR7: 172356
ADREND: -2
FTITLE: 0
SR0H: 177573
SR1H: 177575
SR2H: 177577
NRKNT: 0
NRKEYS: 0,4
DESTAD: 125252

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;TELETYPE PRINTER CSR
;KT11-D STATUS REGISTER ADDRESSES
;KT11-D INTERRUPT VECTOR
;USER PAGE DESCRIPTOR REGISTER ADDRESSES
;USER PAGE ADDRESS REGISTER ADDRESSES
;KERNEL PAGE DESCRIPTOR REGISTER ADDRESSES
;KERNEL PAGE ADDRESS REGISTER ADDRESSES
;TITLE PRINTED FLAG
;KT11-D STATUS REGISTER HIGH BYTE ADDRESSES
;COUNTER FOR TEST OF THE 3 NR KEYS
;VALUES OF THE 3 NON RESIDENT KEYS
;LOCATION USED FOR READS AND WRITES TO CHECK
;EXECUTION OR ABORTING AT CORRECT POINT

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002150 005037 177776          :SET UP FOR START OF TESTS
002154 012706 001000          START: CLR 00PS
002160 012737 140000          MOV 0KSTACK,SP          :SETUP KERNEL STACK
002166 012706 002000 177776          MOV 0L40000,00PS      :SETUP USER STACK POINTER
002172 005037 177776          CLR 00PS
002176 012767 002000 003520          MOV 02000,ICOUNT      :INITIALIZE ITERATION COUNT
002204 012767 002250 003516          MOV 0TEST1+2,RETURN  :SETUP SCOPE AND ITERATION LOOP RETURN
002212 005067 177722          CLR 0NRCNT           :INITIALIZE FOR NR TEST
002216 012767 000001 004366          MOV 01,TESTCT        :SET UP TEST SEQUENCE
002224 005767 177700          TST FTITLE           :TITLE PRINTED
002230 001013          BNE TEST1+2         :YES, SKIP
002232 004767 004156          JSR PC,CALF         :PRINT TITLE
002236 004767 004204          JSR PC,TYPE
002242 005376          HTIT
002244 004767 004144          JSR PC,CALF
002250 005267 177654          INC FTITLE
002254 000401          BR .+4

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:SHOW THAT DATI TO A RAO PAGE (ACF=2) NEITHER TRAPS NOR ABORTS
:SHOW THAT THE KT11-D STATUS REGISTERS CONTINUE TO TRACK, AND THAT
:THE PDR CORRESPONDING TO THE REFERENCE IS CORRECT

002256 104400
002260 012706 001000
002264 005077 177526
002270 004767 004232
002274 000001
002276 104006
002300 012746 000002
002304 004767 003174

TEST1: SCOPE
MOV #KSTACK,SP
CLR #SR0
JSR PC,ORDER
1
HLT
MOV #2,-(SP)
JSR #7,SETUP

:INITIALIZE KERNEL STACK POINTER
:INITIALIZE SR0
:CHECK TEST SEQUENCE
:TEST NUMBER
:TEST EXECUTED OUT OF SEQUENCE
:PUSH RAO KEY ON STACK
:MAKE KERNEL PAGE 1 RAO, BANK 0
:MAKE KERNEL PAGE 7 RM, EXTERNAL
:MAKE ALL OTHER PAGES RM, BANK 0
:RESTORE STACK
:SETUP ABORT RETURN IN CASE

002310 005726
002312 012777 002426 177504
002320 005077 177502
002324 012767 125252 177614
002332 012701 022146

TST (SP)+
MOV #NET1,#KTVEC
CLR #KTSTA
MOV #125252,DESTAD
MOV #DESTAD+2000,R1

:SETUP LOCATION TO BE REFERENCED
:R1 CONTAINS VIRTUAL ADDRESS OF LOCATION TO
:BE REFERENCED THRU KERNEL PAGE 1

002336 005777 177454
002342 022721 125252
002346 001404
002350 005377 177442
002354 104006
002356 004227
002360 017702 177432
002364 105377 177426
002370 022702 000017
002374 001401
002376 104006

INC #SR0
CMP #125252,(R1)+
BEQ #CPOK1
DEC #SR0
HLT
BR
CPOK1: MOV #SR0,R2
DEC# #SR0
CMP #17,R2
BEQ #+4
HLT

:TURN ON KT11-D
:DATI TO RAO PAGE
:BRANCH IF CORRECT VALUE HAS READ
:ON ERROR, TURN OFF KT11-D
:RELOCATION FAILED THRU KERNEL PAGE 1

002400 022777 002400 177414
002406 001401
002410 104006

CMP #+,#SR2
BEQ #+4
HLT

:SAVE CONTENTS OF SR0
:TURN OFF KT11-D
:CHECK SAVED CONTENTS OF SR0

002412 022777 077402 177452
002420 001401
002422 104006

CMP #77402,#KPDRI
BEQ #+4
HLT

:SR2 INCORRECT-SHOULD TRACK EVEN
:WHEN KT11-D IS OFF
:CHECK PDR FOR
:THE RAO PAGE REFERENCED
:KPDRI INCORRECT-SHOULD NOT
:HAVE BEEN CHANGED

002424 000404
002426 042777 000001 177362
002434 104006

BR
BIC
HLT
RET1: #1,#SR0

:TURN OFF KT11-D
:DATI TO RAO PAGE CAUSED
:A TRAP OR ABORT
:RESTORE TRAP RETURN TO CAUSE HALT
:ON AN UNEXPECTED TRAP
:INITIALIZE SR0
:INITIALIZE PROCESSOR STATUS

002436 016777 177364 177360
002444 005077 177356
002450 005077 177342
002454 005037 177776

DONE1: MOV #KTSTA,#KTVEC
CLR #KTSTA
CLR #SR0
CLR #RPS

:SHOW THAT A DATO (NO DATIP) TO A RAO PAGE (ACF=2) ABORTS
:SHOW THAT THE KT11-D STATUS REGISTERS LOCK UP, AND THAT THE PDR
:CORRESPONDING TO THE REFERENCE IS CORRECT

002460 104400
002462 012706 001000
002466 005077 177324

TEST2: SCOPE
MOV #KSTACK,SP
CLR #SR0

:INITIALIZE KERNEL STACK POINTER
:INITIALIZE SR0

K01

KEYV8 MACY11 27(732) 09-SEP-76 14:29 PAGE 10
DBKTBA.P11

002472	004767	004030		JSR	PC,ORDER		:CHECK TEST SEQUENCE
002476	000002			2			:TEST NUMBER
002500	104006			HLT			:TEST EXECUTED OUT OF SEQUENCE
002502	012746	000002		MOV	R2,-(SP)		:PUSH RRO KEY ON STACK
002506	004767	002772		JSR	X7,SETUP		:MAKE KERNEL PAGE 1 RRO, BANK 0
							:MAKE KERNEL PAGE 7 RM, EXTERNAL
							:MAKE ALL OTHER PAGES RM, BANK 0
002512	005726			TST	(SP)+		:RESTORE STACK POINTER
002514	012777	002560	177302	MOV	RRET4,KTVEC		:SETUP ABORT RETURN
002522	005077	177300		CLR	KTSTA		
002526	005067	177414		CLR	DESTAD		:INITIALIZE LOCATION TO BE ADDRESSED
							:BY DATO TO RRO PAGE
002532	012702	022146		MOV	RDESTAD+20000,R2		:R2 CONTAINS ADDRESS OF LOCATION
							:TO BE REFERENCED THRU KERNEL PAGE 1
002536	012777	000001	177252	MOV	R1,RSRO		:TURN ON KT11-0
002544	012722	125252		MOV	R125252,(R2)+		:DATO TO RRO PAGE-SHOULD ABORT
002550	005377	177242		DEC	RSRO		:TURN OFF KT11-0
002554	104006			HLT			:DATO TO RRO PAGE FAILED TO ABORT
002556	000426			BR	DONE4		
002560	017701	177232		MOV	RSRO,R1		:SAVE CONTENTS OF SR0
002564	005377	177226		DEC	RSRO		:TURN OFF KT11-0
002570	022701	020003		CHP	R20003,R1		:CHECK SAVED CONTENTS OF SR0
002574	001401			BEQ	.+4		
002576	104006			HLT			:SR0 INCORRECT-SHOULD HAVE LOCKED
							:ON DATO TO KERNEL PAGE 1(RRO)
							:AND ACCESS FAULT SHOULD BE SET
							:CHECK SR2
002600	022777	002544	177214	CHP	R04,RSR2		
002606	001401			BEQ	.+4		
002610	104006			HLT			:SR2 INCORRECT-SHOULD HAVE LOCKED
							:ON THE ABORTED REFERENCE, WITH THE
							:VIRTUAL ADDRESS OF THE INSTRUCTION
							:CHECK INSTRUCTION SPACE FOR
002612	022777	077402	177252	CHP	R77402,RPDR1		
002620	001401			BEQ	.+4		
002622	104006			HLT			:RPDR1 INCORRECT-SHOULD NOT
							:HAVE BEEN CHANGED SINCE THE
							:DATO DIDN'T WRITE
							:MAKE CERTAIN THAT DESTINATION
							:LOCATION WAS NOT WRITTEN
							:DATO TO RRO PAGE WROTE
							:INTO THE DESTINATION LOCATION
002624	005767	177316		TST	DESTAD		
002630	001401			BEQ	.+4		
002632	104006			HLT			:CHANGE KT11-0 TRAP RETURN
							:TO CAUSE A HALT ON AN UNEXPECTED TRAP
002634	016777	177166	177162	MOV	KTSTA,KTVEC		
002642	005077	177160		CLR	KTSTA		
002646	005077	177144		CLR	RSRO		
002652	005037	177776		CLR	RPS		
							:SHOW THAT A DATIP, DATO SEQUENCE TO A RRO PAGE (ACF=2) ABORTS
							:SHOW THAT THE KT11-0 STATUS REGISTERS LOCK UP, AND THAT THE FOR
							:CORRESPONDING TO THE REFERENCE IS CORRECT
002656	104400			TEST3:	SCOPE		
002660	012706	001000		MOV	RKSTACK,SP		:INITIALIZE KERNEL STACK POINTER
002664	005077	177126		CLR	RSRO		:INITIALIZE SR0
002670	004767	003632		JSR	PC,ORDER		:CHECK TEST SEQUENCE
002674	000003			3			:TEST NUMBER
002676	104006			HLT			:TEST EXECUTED OUT OF SEQUENCE
002700	012746	000002		MOV	R2,-(SP)		:PUSH RRO KEY ON STACK
002704	004767	002574		JSR	X7,SETUP		:MAKE KERNEL PAGE 1 RROT,BANK 0

002710	005726			TST	(SP)+		: MAKE KERNEL PAGE 7 RM, EXTERNAL
002712	012777	002756	177104	MOV	RET5,KTVEC		: MAKE ALL OTHER PAGES RM, BANK 0
002720	005077	177102		CLR	KTSTA		: RESTORE STACK POINTER
002724	005067	177216		CLR	DESTAD		: SETUP ABORT RETURN
002730	012703	022150		MOV	#DESTAD+20002,R3		: INITIALIZE LOCATION TO BE ADDRESSED
002734	052777	000001	177054	BIS	#1,SR0		: BY DATIP, DATO TO RRO PAGE
002742	005243			INC	-(R3)		: R3 CONTAINS VIRTUAL ADDRESS+2 OF LOCATION
002744	042777	000001	177044	BIC	#1,SR0		: TO BE REFERENCED THRU KERNEL PAGE 1
002752	104006			HLT			: TURN ON KT11-0
002754	000427			BR	DONES		: DATIP, DATO TO RRO PAGE
002756	017701	177034		MOV	SR0,R1		: TURN OFF KT11-0
002762	042777	000001	177026	BIC	#1,SR0		: DATIP, DATO TO RROT PAGE FAILED TO
002770	022701	020003		CMP	#20003,R1		: ABORT
002774	001401			BEG	.+4		: SAVE CONTENTS OF SR0
002776	104006			HLT			: TURN OFF KT11-0
							: CHECK SAVED CONTENTS OF SR0
003000	022777	002742	177014	CMP	#A05,SR2		: SR0 INCORRECT-SHOULD HAVE LOCKED
003006	001401			BEG	.+4		: ON DATO TO KERNEL PAGE 1(RRO) AND
003010	104006			HLT			: ACCESS FAULT SHOULD BE SET
							: CHECK SR2
003012	022777	077402	177052	CMP	#77402,PKPDR1		: SR2 INCORRECT-SHOULD HAVE LOCKED
003020	001401			BEG	.+4		: ON THE ABORTED REFERENCE, WITH THE
003022	104006			HLT			: VIRTUAL ADDRESS OF THE INSTRUCTION
							: CHECK PDR
003024	005767	177116		TST	DESTAD		: KPDR1 INCORRECT - SHOULD NOT HAVE
003030	001401			BEG	.+4		: BEEN CHANGED, SINCE DATIP IS ABORTED
003032	104006			HLT			: SINCE IT WILL BE FOLLOWED BY A DATO OR DATOB
							: MAKE CERTAIN THAT DESTINATION
003034	016777	176766	176762	MOV	KTSTA,KTVEC		: LOCATION WAS NOT WRITTEN
003042	005077	176760		CLR	KTSTA		: DATO TO RRO PAGE WROTE INTO
003046	005077	176744		CLR	SR0		: THE DESTINATION LOCATION
003052	005037	177776		CLR	SRPS		: CHANGE PAGE FAULT RETURN
							: TO CAUSE A HALT ON AN UNEXPECTED
							: TRAP
							: SHOW THAT A DATIP, DATOB SEQUENCE TO A RRO PAGE (ACF=2) WORD ABORTS
							: SHOW THAT THE KT11-0 STATUS REGISTERS LOCK UP, AND THAT THE PDR
							: CORRESPONDING TO THE REFERENCE IS CORRECT
003056	104400			TEST4:	SCOPE		
003060	012706	001000		MOV	#KSTACK,SP		: INITIALIZE KERNEL STACK POINTER
003064	005077	176726		CLR	SR0		: INITIALIZE SR0
003070	004767	003432		JSR	PC,ORDER		: CHECK TEST SEQUENCE
003074	000004			4			: TEST NUMBER
003076	104006			HLT			: TEST EXECUTED OUT OF SEQUENCE
003100	012746	000002		MOV	#2,-(SP)		: PUSH RRO KEY ON STACK
003104	004767	002374		JSR	#7,SETUP		: MAKE KERNEL PAGE 1 RRO, BANK 0
							: MAKE KERNEL PAGE 7 RM, EXTERNAL
							: MAKE ALL OTHER PAGES RM, BANK 0
003110	005726			TST	(SP)+		: RESTORE STACK POINTER
003112	012777	003154	176704	MOV	RET6,KTVEC		: SETUP ABORT RETURN
003120	005077	176702		CLR	KTSTA		

MO1

KEYV8 MACY11 27(732) 09-SEP-76 14:29 PAGE 12
DBKTBA.P11

003124	005067	177016		CLR	DESTAD	: INITIALIZE LOCATION TO BE ADDRESSED
003130	012704	022146		MOV	#DESTAD+20000	: BY DATIP DAT08 TO RAO PAGE
003134	052777	000001	176654	BIS	#1,SR0 ;TURN ON	: R4 CONTAINS VIRTUAL ADDRESS OF LOCATION
003142	105224			AD6: INC8	(R4)+	: TO BE REFERENCED THRU KERNEL PAGE 1
003144	005377	176646		DEC	SR0	: DATIP, DAT08 TO RAO PAGE
003150	104006			HLT		: TURN OFF KT11-0
003152	000426			BR	DONE6	: DATIP, DAT0 TO RAO PAGE FAILED TO ABORT
003154	017701	176636		RET6: MOV	SR0,R1	: SAVE CONTENTS OF SR0
003160	005377	176632		DEC	SR0	: TURN OFF KT11-0
003164	022701	020003		CMP	#20003,R1	: CHECK SAVED CONTENTS OF SR0
003170	001401			BEQ	.+4	
003172	104006			HLT		: SR0 INCORRECT-SHOULD HAVE LOCKED ON
						: DAT08 TO KERNEL PAGE 1 (RAO)
						: ACCESS FAULT SHOULD BE SET
003174	022777	003142	176620	CMP	#AD6,SR2	: CHECK SR2
003202	001401			BEQ	.+4	
003204	104006			HLT		: SR2 INCORRECT-SHOULD HAVE LOCKED
						: ON THE ABORTED REFERENCE, WITH THE
						: VIRTUAL ADDRESS OF THE INSTRUCTION
003206	022777	077402	176656	CMP	#77402,#KPOR1	: CHECK POR
003214	001401			BEQ	.+4	
003216	104006			HLT		: KPOR1 INCORRECT - SHOULD NOT HAVE
						: BEEN CHANGED-DATIP IS ABORTED
						: SINCE IT MUST BE FOLLOWED BY A DAT0
						: MAKE CERTAIN THAT DESTINATION
						: LOCATION WAS NOT WRITTEN
						: DAT08 TO RAO PAGE WROTE INTO
						: THE DESTINATION LOCATION
003220	005767	176722		TST	DESTAD	: CHANGE KT11-0 FAULT
003224	001401			BEQ	.+4	: RETURN TO CAUSE A HALT ON AN
003226	104006			HLT		: UNEXPECTED TRAP
003230	016777	176572	176566	DONE6: MOV	KTSTA,#KTVEC	
003236	005077	176564		CLR	KTSTA	
003242	005077	176550		CLR	SR0	
003246	005037	177776		CLR	#PS	

: THE FOLLOWING TESTS (5-10) ARE RUN FOR BOTH OF THE NON-RESIDENT
: KEYS - A PASS IS MADE FOR KEY 0, THEN A PASS IS MADE FOR KEY 4,
: THE CURRENT KEY IS STORED ON THE STACK
: SHOW THAT DATI TO A NR PAGE ABORTS WITHOUT COMPLETING
: SHOW THAT THE KT11-0 STATUS REGISTERS LOCK UP, AND THAT
: THE POR CORRESPONDING TO THE REFERENCE IS CORRECT

003252	104400			TEST5: SCOPE		
003254	012706	001000		MOV	#KSTACK,SP	: INITIALIZE KERNEL STACK POINTER
003260	005077	176532		CLR	SR0	: INITIALIZE SR0
003264	004767	003236		JSR	PC,ORDER	: CHECK TEST SEQUENCE
003270	000005			S		: TEST NUMBER
003272	104006			HLT		: TEST EXECUTED OUT OF SEQUENCE
003274	005037	001000		CLR	#KSTACK	: PUT 0 ON STACK AS FIRST NR KEY TO BE TESTED
						: THIS INSTRUCTION IS SKIPPED WHEN TESTING THE
						: OTHER WHICH IS SETUP AFTER TEST30
003300	012706	001000		RERUNA: MOV	#KSTACK,SP	
003304	005077	176506		CLR	SR0	
003310	004767	002170		JSR	%7,SETUP	: MAKE KERNEL PAGE 1 NR, BANK 0
						: MAKE KERNEL PAGE 7 RW, EXTERNAL
						: MAKE ALL OTHER PAGES RW, BANK 0
003314	012777	003360	176502	MOV	#RET21,#KTVEC	: SETUP ABORT RETURN

003322	005077	176500		CLR	2KTSTA	
003326	005003			CLR	R3	: INITIALIZE DESTINATION LOCATION
003330	012767	125252	176610	MOV	8125252,DESTAD	: INITIALIZE SOURCE LOCATION
003336	012701	022146		MOV	8DESTAD+20000,R1	: R1 CONTAINS VIRTUAL ADDRESS OF LOCATION : TO BE REFERENCED THRU KERNEL PAGE 1
003342	005277	176450		INC	2SR0	: TURN ON KT11-D
003346	012103		AD21:	MOV	(R1)+,R3	: DATI TO NR PAGE - SHOULD ABORT
003350	005377	176442		DEC	2SR0	: ON ERROR, TURN OFF KT11-D
003354	104006			HLT		: NO ABORT ON DATI TO A NON-RESIDENT PAGE
003356	000430			BR	DONE21	
003360	017702	176432	RET21:	MOV	2SR0,R2	: SAVE CONTENTS OF SR0
003364	105377	176426		DECB	2SR0	: TURN OFF KT11-D
003370	022702	100003		CMF	8100003,R2	: CHECK SAVED CONTENTS OF SR0
003374	001401			BEQ	.+4	
003376	104006			HLT		: SR0 INCORRECT-SHOULD HAVE : LOCKED ON REFERENCE TO : KERNEL PAGE 1 WHICH WAS NON-RESIDENT : CHECK SR2
003400	022777	003346	176414	CMF	8AD21,2SR2	
003406	001401			BEQ	.+4	
003410	104006			HLT		: SR2 INCORRECT-SHOULD HAVE LOCKED ON : NR REFERENCE
003412	017705	176454		MOV	2KPDR1,R5	: MOVE CONTENTS OF KPDR1 TO R5
003416	042705	000007		BIC	87,R5	: TO MASK OFF ACCESS KEY
003422	022705	077400		CMF	877400,R5	: CHECK PDR FOR
003426	001401			BEQ	.+4	: THE NR PAGE REFERENCED (BITS 0-2 MASKED OUT)
003430	104006			HLT		: KPDR1 INCORRECT-SHOULD NOT : HAVE BEEN CHANGED
003432	005703			TST	R3	: CHECK DESTINATION LOCATION TO SEE
003434	001401			BEQ	.+4	: IF INSTRUCTION ALTERED IT BEFORE ABORTING
003436	104006			HLT		: INSTRUCTION COMPLETED BEFORE ABORT OCCURRED
003440	016777	176362	176356	MOV	KTSTA,2KTVEC	: RESTORE TRAP RETURN TO CAUSE HALT
003446	005077	176354		CLR	2KTSTA	: ON AN UNEXPECTED TRAP
003452	005077	176340		CLR	2SR0	: INITIALIZE SR0
003456	005037	177776		CLR	2MPS	: INITIALIZE PROCESSOR STATUS
: SHOW THAT A DATO (NO DATIP) TO A NR PAGE						
: ABORTS WITHOUT COMPLETING THE DATO						
: SHOW THAT THE KT11-D STATUS REGISTERS LOCK UP, AND THAT THE PDR						
: CORRESPONDING TO THE REFERENCE IS CORRECT						
003462	104400			TEST6:	SCOPE	
003464	012706	001000		MOV	8KSTACK,SP	: INITIALIZE KERNEL STACK POINTER
003470	005077	176322		CLR	2SR0	: INITIALIZE SR0
003474	004767	003026		JSR	PC,ORDER	: CHECK TEST SEQUENCE
003500	000006			6		: TEST NUMBER
003502	104006			HLT		: TEST EXECUTED OUT OF SEQUENCE
003504	004767	001774		JSR	87,SETUP	: MAKE KERNEL PAGE 1 NR, BANK 0 : MAKE KERNEL PAGE 7 RW, EXTERNAL : MAKE ALL OTHER PAGES RW, BANK 0 : SETUP ABORT RETURN
003510	012777	003556	176306	MOV	8RET23,2KTVEC	
003516	005077	176304		CLR	2KTSTA	
003522	005067	176420		CLR	DESTAD	: INITIALIZE LOCATION TO BE ADDRESSED : BY DATO TO NR PAGE
003526	012701	022146		MOV	8DESTAD+20000,R1	: R1 CONTAINS ADDRESS OF LOCATION : TO BE REFERENCED THRU KERNEL PAGE 1
003532	112777	000001	176256	MOV8	81,2SR0	: TURN ON KT11-D
003540	012721	125252	AD23:	MOV	8125252,(R1)+	: DATO TO NR PAGE-SHOULD ABORT

003544	042777	000001	176244		BIC	01,2SR0	:TURN OFF KT11-0
003552	104006				HLT		:DATO TO NR PAGE FAILED TO ABORT
003554	000431				BR	DONE23	
003556	017702	176234		RET23:	MOV	2SR0,R2	:SAVE CONTENTS OF SR0
003563	005377	176230			DEC	2SR0	:TURN OFF KT11-0
003566	022702	100003			CMP	0100003,R2	:CHECK SAVED CONTENTS OF SR0
003572	001401				BEQ	.+4	
003574	104006				HLT		:SR0 INCORRECT-SHOULD HAVE LOCKED
							:ON DATO TO KERNEL PAGE 1(NR)
							:NR FAULT SHOULD BE SET
003576	022777	003540	176216		CMP	0A023,2SR2	:CHECK SR2
003604	001401				BEQ	.+4	
003606	104006				HLT		:SR2 INCORRECT-SHOULD HAVE LOCKED
							:ON THE ABORTED REFERENCE, CONTAINING THE
							:VIRTUAL ADDRESS OF THE INSTRUCTION
003610	017703	176256			MOV	2KPOR1,R3	:MOVE CONTENTS OF KPOR1 TO R3
003614	042703	000007			BIC	07,R3	:TO MASK OFF THE ACCESS KEY
003620	022703	077400			CMP	077400,R3	:CHECK FOR
003624	001401				BEQ	.+4	:(BITS 0-2 MASKED OUT)
003626	104006				HLT		:KPOR1 INCORRECT-SHOULD NOT HAVE
							:BEEN CHANGED
003630	005767	176312			TST	DESTAD	:MAKE CERTAIN THAT DESTINATION
003634	001401				BEQ	.+4	:LOCATION HAS NOT WRITTEN
003636	104006				HLT		:DATO TO NR PAGE MADE
							:INTO THE DESTINATION LOCATION
003640	016777	176162	176156	DONE23:	MOV	KTSTA,2KTVEC	:CHANGE KT11-0 FAULT RETURN
003646	005077	176154			CLR	2KTSTA	:TO CAUSE A HALT ON AN UNEXPECTED TRAP
003652	005077	176140			CLR	2SR0	
003656	005037	177776			CLR	28PS	
							:SHOW THAT A DATIP, DATO SEQUENCE TO A NR PAGE WORD ABORTS
							:SHOW THAT THE KT11-0 STATUS REGISTERS LOCK UP, AND THAT THE POR
							:CORRESPONDING TO THE REFERENCE IS CORRECT
003662	104400			TEST7:	SCOPE		
003664	012706	001000			MOV	2KSTACK,SP	:INITIALIZE KERNEL STACK POINTER
003670	005077	176122			CLR	2SR0	:INITIALIZE SR0
003674	004767	002626			JSR	PC,ORDER	:CHECK TEST SEQUENCE
003700	000007				?		:TEST NUMBER
003702	104006				HLT		:TEST EXECUTED OUT OF SEQUENCE
003704	004767	001574			JSR	x7,SETUP	:MAKE KERNEL PAGE 1 NR, BANK 0
							:MAKE KERNEL PAGE 7 RN, EXTERNAL
							:MAKE ALL OTHER PAGES RN, BANK 0
							:SETUP ABORT RETURN
003710	012777	003754	176106		MOV	2RET25,2KTVEC	
003716	005077	176104			CLR	2KTSTA	
003722	005067	176220			CLR	DESTAD	:INITIALIZE LOCATION TO BE ADDRESSED
							:BY DATIP, DATO TO NR PAGE
003726	012703	022150			MOV	2DESTAD+20002,R3	:R3 CONTAINS ADDRESS+2 OF LOCATION
							:TO BE REFERENCED THRU KERNEL PAGE 1
003732	052777	000001	176056		BIS	01,2SR0	:TURN ON KT11-0
003740	005243			AD25:	INC	-(R3)	:DATIP, DATO TO NR PAGE-SHOULD ABORT
003742	042777	000001	176046		BIC	01,2SR0	:TURN OFF KT11-0
003750	104006				HLT		:DATIP, DATO TO NR PAGE FAILED TO
003752	000432				BR	DONE25	:ABORT
003754	017701	176036		RET25:	MOV	2SR0,R1	:SAVE CONTENTS OF SR0
003760	042777	000001	176030		BIC	01,2SR0	:TURN OFF KT11-0
003766	022701	100003			CMP	0100003,R1	:CHECK SAVED CONTENTS OF SR0

003772	001401			BEG	.+4			
003774	104006			HLT				:SR0 INCORRECT-SHOULD HAVE LOCKED :ON DAT0 TO KERNEL PAGE 1(NR) :NR FAULT SHOULD BE SET
003776	022777	003740	176016	CMP	8AD25,SR2			:CHECK SR2
004004	001401			BEG	.+4			
004006	104006			HLT				:SR2 INCORRECT-SHOULD HAVE LOCKED :ON THE ABORTED REFERENCE, CONTAINING THE :VIRTUAL ADDRESS OF THE INSTRUCTION
004010	017704	176056		MOV	2KPD01,R4			:MOVE CONTENTS OF PDR TO R4
004014	042704	000007		BIC	87,R4			:TO MASK OFF THE ACCESS KEY
004020	022704	077400		CMP	877400,R4			:CHECK PDR
004024	001401			BEG	.+4			:WITH BITS 0-2 MASKED OFF
004026	104006			HLT				:KPD01 INCORRECT-SHOULD NOT HAVE :BEEN CHANGED
004030	005767	176112		TST	DESTAD			:MAKE CERTAIN THAT DESTINATION :LOCATION WAS NOT WRITTEN
004034	001401			BEG	.+4			:DAT0 TO NR PAGE WROTE INTO :THE DESTINATION LOCATION
004036	104006			HLT				:CHANGE PAGE FAULT RETURN :TO CAUSE A HALT ON AN UNEXPECTED :TRAP
004040	016777	175762	175756	MOV	KTSTA,2KTVEC			
004046	005077	175754		CLR	2KTSTA			
004052	005077	175740		CLR	2SR0			
004056	005037	177776		CLR	2SR2			
								:SHOW THAT A DATIP DAT08 SEQUENCE TO A NR PAGE WORD ABORTS :SHOW THAT THE KT11-0 STATUS REGISTERS LOCK UP, AND THAT THE PDR :CORRESPONDING TO THE REFERENCE IS CORRECT
004062	104100			TEST10:	SCOPE			
004064	012706	001000		MOV	2KSTACK,SP			:INITIALIZE KERNEL STACK POINTER
004070	005077	175722		CLR	2SR0			:INITIALIZE SR0
004074	004767	002426		JSR	PC,ORDER			:CHECK TEST SEQUENCE
004100	000010			LD	10			:TEST NUMBER
004102	104006			HLT				:TEST EXECUTED OUT OF SEQUENCE
004104	004767	001374		JSR	X7,SETUP			:MAKE KERNEL PAGE 1 NR, BANK 0 :MAKE KERNEL PAGE 7 RM, EXTERNAL :MAKE ALL OTHER PAGES RM, BANK 0 :SETUP ABORT RETURN
004110	012777	004152	175706	MOV	2RET27,2KTVEC			
004116	005077	175704		CLR	2KTSTA			
004122	005067	176020		CLR	DESTAD			:INITIALIZE LOCATION TO BE ADDRESSED :BY DATIP DAT08 TO NR PAGE
004126	012704	022146		MOV	8DESTAD+20000,R4			:R4 CONTAINS ADDRESS OF LOCATION :TO BE REFERENCED THRU KERNEL PAGE 1
004132	052777	000001	175656	BIS	81,2SR0			:TURN ON KT11-0
004140	105224			AD27:	(R4)+			:DATIP DAT08 TO NR PAGE-SHOULD ABORT
004142	005377	175650		DEC	2SR0			:TURN OFF KT11-0
004146	104006			HLT				:DATIP DAT0 TO NR PAGE FAILED :TO ABORT
004150	000431			BR	DONE27			
004152	017701	175640		RET27:	2SR0,R1			:SAVE CONTENTS OF SR0
004156	005377	175634		DEC	2SR0			:TURN OFF KT11-0
004162	022701	100003		CMP	8100003,R1			:CHECK SAVED CONTENTS OF SR0
004166	001401			BEG	.+4			
004170	104006			HLT				:SR0 INCORRECT-SHOULD HAVE LOCKED ON :DATIP DAT08 TO KERNEL DATA PAGE 1 (NR) :NR FAULT SHOULD BE SET
004172	022777	004140	175622	CMP	8AD27,2SR2			:CHECK SR2
004200	001401			BEG	.+4			
004202	104006			HLT				:SR2 INCORRECT SHOULD HAVE LOCKED


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004204 017702 175662      MOV      2KPOR1,R2
004210 042702 000007      BIC      87,R2
004214 022702 077400      CMP      877400,R2
004220 001401      BEQ     .+4
004222 104006      HLT

004224 005767 175716      TST     DESTAD
004230 001401      BEQ     .+4
004232 104006      HLT

004234 016777 175666 175662  DONE27:  MOV     KTSTA,2KTVEC
004236 005077 175660      CLR     2KTSTA
004238 005077 175654      CLR     2SR0
004240 005037 177776      CLR     2MPS
004242 104400      SCOPE
004244 005667 175654      INC     NRCNT
004246 022767 000002 175646      CMP     82,NRCNT
004272 001416      BEQ     NXTST
004274 016701 175640      MOV     NRCNT,R1
004300 006301      RSL     R1
004302 016137 002142 001000      MOV     NRKEYS(R1),2KSTACK
004310 012767 003300 001412      MOV     2RERUNA,RETURN
004316 012767 000005 002266      MOV     85,TESTCT
004324 000167 176750      JMP     2RERUNA
004330 005067 175604      CLR     NRCNT
004334 012767 004000 001364      MOV     84000,SCOPEF
004342 005367 002244      DEC     TESTCT
004346

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;ON THE ABORTED REFERENCE, CONTAINING THE
;VIRTUAL ADDRESS OF THE INSTRUCTION
;MOVE CONTENTS OF POR 1 TO R2
;TO MASK OFF THE ACCESS KEY
;CHECK INSTRUCTION SPACE FOR
;WITH BITS 0-2 MASKED OFF
;KPOR1 INCORRECT-SHOULD NOT HAVE
;BEEN CHANGED
;MAKE CERTAIN THAT DESTINATION
;LOCATION HAS NOT WRITTEN
;DATA TO NR PAGE WRITE INTO
;THE DESTINATION LOCATION
;CHANGE KT11-0 FAULT
;RETURN TO CAUSE A HALT ON AN
;UNEXPECTED TRAP

;COUNT HOW MANY NR KEYS HAVE BEEN TESTED
;IF ALL 2 HAVE BEEN TESTED, BRANCH
;OTHERWISE, CALCULATE OFFSET TO GET NEXT KEY
;PUT NEXT NR KEY ON STACK
;PUT NEW SCOPE LOOP ADDRESS IN RETURN
;REINIT TEST COUNTER SEQ
;JUMP TO EXECUTE TESTS WITH NEXT NR KEY

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;SHOW THAT DATI TO A RW PAGE (ACF=6)
;NEITHER TRAPS NOR ABORTS
;SHOW THAT THE KT11-0 STATUS REGISTERS CONTINUE TO TRACK, AND THAT
;THE POR CORRESPONDING TO THE REFERENCE IS CORRECT
TEST11:

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004346 104400
004350 012706 001000      MOV     2KSTACK,SP
004354 005077 175436      CLR     2SR0
004360 004767 002142      JSR     PC,ORDER
004364 000011      LI     11
004366 104006      HLT
004370 012746 000006      MOV     86,-(SP)
004374 004767 001104      JSR     X7,SETUP

004400 005726      TST     (SP)+
004402 012777 004516 175414      MOV     2RET31,2KTVEC
004410 005077 175412      CLR     2KTSTA
004414 012767 125252 175524      MOV     8125252,DESTAD
004422 012701 022146      MOV     8DESTAD+2000,R1

004426 005277 175364      INC     2SR0
004432 022721 125252      CMP     8125252,(R1)+
004436 001404      BEQ     OK31
004440 005377 175352      DEC     2SR0
004444 104006      HLT

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;INITIALIZE KERNEL STACK POINTER
;INITIALIZE SR0
;CHECK TEST SEQUENCE
;TEST NUMBER
;TEST EXECUTED OUT OF SEQUENCE
;PUSH RW KEY ON STACK
;MAKE KERNEL PAGE 1 RW, BANK 0
;MAKE KERNEL PAGE 7 RW, EXTERNAL
;MAKE ALL OTHER PAGES RW, BANK 0
;RESTORE STACK POINTER
;SETUP ABORT RETURN IN CASE

;INITIALIZE LOCATION TO BE READ
;R1 CONTAINS VIRTUAL ADDRESS OF
;LOCATION TO BE REFERENCED THRU KERNEL PAGE 1
;TURN ON KT11-0
;DATI TO RW PAGE-SHOULDN'T TRAP OR ABORT

;ON ERROR, TURN OFF KT11-0
;RELOCATION FAILED THRU KERNEL PAGE 1

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00446	000427			BR	DONE31		
004450	017702	175342		MOV	2SR0,R2		:SAVE CONTENTS OF SR0
004454	105377	175336		DECB	2SR0		:TURN OFF KT11-0
004460	022702	000017		CMP	817,R2		:CHECK SAVED CONTENTS OF SR0
004464	001401			BEQ	.+4		
004466	104006			HLT			:SR0 INCORRECT-SHOULD HAVE
							:TRACKED REFERENCE TO
							:PAGE 0, WHICH GOT THE ADDRESS
							:OF SR0 TO TURN OFF KT11-0
							:CHECK SR2
004470	022777	004470	175324	CMP	8,2SR2		
004476	001401			BEQ	.+4		
004500	104006			HLT			:SR2 INCORRECT-SHOULD TRACK EVEN
							:WHEN KT11-0 IS OFF
							:CHECK FOR FOR
							:THE RM PAGE REFERENCED
							:KPOR1 INCORRECT-SHOULD NOT
							:HAVE BEEN CHANGED
004502	022777	077406	175362	CMP	877406,2KPOR1		
004510	001401			BEQ	.+4		
004512	104006			HLT			
004514	000404			BR	DONE31		
004516	042777	000001	175272	BIC	81,2SR0		:TURN OFF KT11-0
004524	104006			HLT			:DATA TO RM PAGE CAUSED
							:A TRAP OR ABORT
							:RESTORE TRAP RETURN TO CAUSE HALT
							:ON AN UNEXPECTED TRAP
							:INITIALIZE SR0
							:INITIALIZE PROCESSOR STATUS

:SHOW THAT A DAT0 (NO DATIP) TO A RM PAGE (ACF=6)
 :NEITHER TRAPS NOR ABORTS
 :SHOW THAT THE KT11-0 STATUS REGISTERS CONTINUE TO TRACK, AND THAT
 :THE PDR CORRESPONDING TO THE REFERENCE IS CORRECT

004550	104000			TEST12: SCOPE			
004552	012706	001000		MOV	8KSTACK,SP		:INITIALIZE KERNEL STACK POINTER
004556	005077	175234		CLR	2SR0		:INITIALIZE SR0
004562	004767	001740		JSR	PC,ORDER		:CHECK TEST SEQUENCE
004566	000012			12			:TEST NUMBER
004570	104006			HLT			:TEST EXECUTED OUT OF SEQUENCE
004572	012746	000006		MOV	86,-(SP)		:PUSH RM KEY ON THE STACK
004576	004767	000702		JSR	x7,SETUP		:MAKE KERNEL PAGE 1 RM, BANK 0
							:MAKE KERNEL PAGE 7 RM, EXTERNAL
							:MAKE ALL OTHER PAGES RM, BANK 0
							:RESTORE STACK POINTER
							:SETUP ABORT RETURN IN CASE
004602	005726			TST	(SP)+		
004604	012777	004716	175212	MOV	8RET33,2KTVEC		
004612	005077	175210		CLR	2KTSTA		
004616	005067	175324		CLR	DESTAD		:INITIALIZE LOCATION TO BE REFERENCED
004622	012701	022146		MOV	8DESTAD+20000,R1		:R1 CONTAINS VIRTUAL ADDRESS OF
							:LOCATION TO BE REFERENCED THRU KERNEL PAGE 1
							:TURN ON KT11-0
							:DATA TO RM PAGE-SHOULDN'T TRAP OR ABORT
							:SAVE CONTENTS OF SR0
							:TURN OFF KT11-0
							:CHECK SAVED CONTENTS OF SR0
004626	005277	175164		INC	2SR0		
004632	012721	125252		MOV	8125252,(R1)+		:SR0 INCORRECT-SHOULD HAVE
004636	017702	175154		MOV	2SR0,R2		:TRACKED REFERENCE TO DATA SPACE,
004642	105377	175150		DECB	2SR0		:PAGE 0, WHICH GOT THE ADDRESS
004646	022702	000017		CMP	817,R2		:OF SR0 TO TURN OFF KT11-0
004652	001401			BEQ	.+4		
004654	104006			HLT			


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005320 104006          HLT
005322 016777 174500 174474 DONE37: MOV   KTSTA,2KTVEC
005330 005077 174472          CLR   2KTSTA
005334 005077 174456          CLR   2SR0
005340 005037 177776          CLR   2APS
005344 104400          SCOPE
005346 004767 001024          JSR   X7,BELL
005352 013701 000042          MOV   2R42,R1      ;MONITOR HOOK
005354 001405          BEQ   END
005356 000005          RESET
005358 004711          LOGIC: JSR   X7,2R1
005360 000240          NOP
005362 000240          NOP
005364 000240          NOP
005366 000240          NOP
005370 000240          NOP
005372 000167 174552          END:  JMP   START

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;DATIP, DATOB TO RW PAGE CAUSED
;A TRAP OR ABORT
;RESTORE TRAP RETURN TO CAUSE HALT
;ON AN UNEXPECTED TRAP
;INITIALIZE SR0
;INITIALIZE PROCESSOR STATUS

```



```

005376 052113 030461 042055
005404 040440 041503 051505
005412 020123 042513 051531
005420 052040 051505 040124
005426 041520 020075 100
005433 040 050040 036523
005440 040040

```

```

: MESSAGE AREA
RTIT: .ASCII 'KT11-D ACCESS KEYS TEST3'

NPC: .ASCII 'PC= 3'
NPS: .ASCII 'PS= 3'

```

```

005442 005077 174350
005446 012701 002030
005450 012700 000010
005454 005071 000020
005458 012731 077406
005462 077005
005470 052701 000020
005474 020127 002126
005500 003764
005502 000207

```

```

EVEN
: SUBROUTINE TO MAKE ALL PAGES RM, BANK 0, 4K, UP
RMALL: CLR 2SR0
      MOV 8AORTAB,R1
RM1:  MOV 810,R0
RM2:  CLR 220(R1)
      MOV 877406,2(R1)+
      SOB R0,RM2
      ADD 820,R1
      CMP R1,8AOREND
      BNE RM1
      RTS X7

```

```

005504 004767 177732
005510 012777 077400 174354
005516 056677 000002 174346
005524 012777 007600 174374
005532 000207

```

```

: SUBROUTINE TO SET ALL PAGES RM EXCEPT KERNEL PAGE 1
: KERNEL PAGE 1 IS SET TO DESIRED KEY
: KEY IS PASSED VIA THE STACK
: ALL PAGES ARE MAPPED TO BANK 0 EXCEPT KERNEL PAGE 7, WHICH IS MAPPED TO
: THE EXTERNAL BANK
SETUP: JSR X7,RMALL ;INITIALLY MAP ALL PAGES RM, BANK 0
      MOV 877400,2KPOR1 ;MAKE KERNEL PAGE ONE 4K, UP
      BIS 2(SP),2KPOR1 ;SET TO DESIRED KEY
      MOV 87600,2KPAR7 ;MAP KERNEL PAGE 7 EXTERNAL
      RTS X7

```

```

005534 005037 177776
005540 012706 001000
005544 012737 140000 177776
005548 012706 002000
005552 005037 177776
005556 000000
005560 016767 172000 000036
005564 052767 000002 000030
005568 000000
005572 005067 000120
005576 012767 005620 000114
005580 000177 000010
005584 005067 000102
005588 000177 000000
005592 000000

```

```

: ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST
: LOAD THE STARTING ADDRESS OF THE TEST
: YOU WISH TO RUN (THE ADDRESS OF THE TESTX
: TAG) AT THE 1ST HALT, SET SWITCH REGISTER
: OPTIONS AT THE 2ND HALT.
: NOTE THAT SMI1 MUST BE DOWN AFTER THE 2ND HALT
TESTX: CLR 28PS
      MOV 8KSTACK,SP
      MOV 814000,28PS ;SETUP USER STACK POINTER
      MOV 8USTACK,SP
      CLR 28PS
      HALT
      MOV SR,RETRNX ;WAIT FOR STARTING ADDRESS
      ADD 82,RETRNX ;LOAD STARTING ADDRESS IN RETRNX
      HALT ;ADD 2 TO POINT TO INSTRUCTION AFTER
      CLR 28PS ;SET SR OPTIONS
      MOV SCOPEF ;KEEP COUNT AT ZERO
      MOV 8XLOOP,RETURN ;LOAD SCOPE LOOP RETURN POINTER
      JMP 2RETRNX ;JUMP TO TEST
XLOOP: CLR SCOPEF ;KEEP COUNT AT ZERO
      JMP 2RETRNX ;JUMP TO TEST
RETRNX: 0

```



```

:SCOPE AND/OR ITERATION LOOP FOR EACH TEST 4000 TIMES
005730 032737 040000 177570 SCOPEC: BIT 84000,SR      :TEST SR FOR SCOPE
005740 001015 004000 177570 SCOPEC: BIT 84000,SR      :YES SCOPE
005750 001016 004000 177570 SCOPEC: BIT 84000,SR      :NO-TEST FOR ITERATION
005760 005767 000050 000044 SCOPEC: CHS 84000,SR      :INITIATE ITERATION
005770 100012 000040 000044 SCOPEC: CHS 84000,SR      :COMPARE CURRENT COUNT TO MAX NUMBER
005780 005267 000040 000044 SCOPEC: BPL 84000,SR      :EXIT-DONE
005790 012737 000340 177776 SCOPEB: INC 8340,SR      :INCREMENT COUNT
005800 012737 000340 177776 SCOPEB: MOV 8340,SR      :PREVENT TRAPPING WHILE MOVING STACK
005810 012637 177776 177776 SCOPEB: CHS (6)+,SR      :REPOSITION STACK
005820 000177 000022 000022 SCOPEB: MOV (6)+,SR      :RESTORE PREVIOUS PROCESSOR STATUS
005830 005067 000014 000014 SCOPEG: JNB 84000,SR      :REPEAT TEST
005840 005267 000074 000074 SCOPEG: CLR 84000,SR      :CLEAR COUNT
005850 011637 000006 000006 SCOPEG: INC TESTCT      :STEP TEST COUNTER
005860 000002 000002 000002 SCOPEG: MOV 8340,SR      :SAVE SCOPE RETURN POINTER
005870 004000 000000 000000 SCOPEG: RTI 84000,SR      :RETURN INLINE-NEXT TEST
005880 000000 000000 000000 SCOPEG: RTI 84000,SR      :ITERATION COUNT
005890 000000 000000 000000 SCOPEG: RTI 84000,SR      :COUNT LOCATION FOR ITERATION LOOP
005900 000000 000000 000000 SCOPEG: RTI 84000,SR      :ADDRESS OF LAST TEST

ICOUNT: 4000
SCOPEC: 0
RETURN: 0

```

```

:ENTERED WITH SYSTEM TRAP CALL (HLT)
005732 012767 000340 172036 PRINT: MOV 8340,SR      :PRINT OUT THE ERROR PC+2 AND STATUS REGISTER
005740 036727 171624 020000 PRINT: BIT SR,820000    :SET PRIORITY TO 7
005750 001401 000432 000432 PRINT: BR 8340,SR      :TEST FOR INHIBIT PRINT OUT
005760 012667 000072 000072 PRINT: BR 8340,SR      :BRANCH TO PRINT
005770 012667 000070 000070 PRINT: MOV (6)+,SAVPC      :INITIATE, CHECK FOR HALT
005780 012667 000070 000070 PRINT: MOV (6)+,SAVPSR     :PC OF FAILING ROUTINE
005790 012667 000070 000070 PRINT: CHS -(6),-(6)      :PSR OF ERROR CONDITION
005800 012767 000200 172004 PRINT: MOV 8200,SR      :RESTORE STACK
005810 004767 000416 000416 PRINT: JNB X7,CALF        :OUTPUT CARRIAGE RETURN AND LINE FEED
005820 016767 000046 000314 PRINT: MOV SAVPC,PTEMP1   :LOAD WITH FAILING PC+2
005830 004767 000436 000436 PRINT: JNB PC,TYPE
005840 005426 000036 000036 PRINT: JNB PC,PRSHRT
005850 004767 000424 000424 PRINT: JNB PC,TYPE
005860 005426 000022 000266 PRINT: MOV SAVPSR,PTEMP1  :LOAD PROCESSOR STATUS
005870 004767 000050 000050 PRINT: JNB X7,PROCT      :PRINT PROCESSOR STATUS
005880 005767 171526 000050 CK: TST SR          :CHECK SR FOR HALT SWITCH
005890 100001 000001 000001 CK: BPL .+4         :BRANCH IF NOT SET
005900 000000 000000 000000 CK: HALT            :HALT ON ERROR UP
005910 000002 000002 000002 CK: RTI            :RETURN TO MAIN LINE
005920 000000 000000 000000 SAVPC: 0
005930 000000 000000 000000 SAVPSR: 0

```



```

SUBROUTINE TO PRINT OUT OCTAL NUMBER
PRSHRT DELETES LEADING ZEROS
PROCT PRINTS OUT 6 OCTAL DIGITS
006054 012767 000001 000232 PRSHRT: MOV      R1, PRSFLG      ;SET FLAG TO INDICATE SHORT PRINTOUT
006056 005767 000232          TST      PTEMP1        ;CHECK FOR ZERO
006058 001011          BNE     PROCT+4      ;BRANCH IF NOT ZERO
006070 012777 000260 173716 NOV     R260, R0DBR    ;OUTPUT A SINGLE ZERO
006076 105777 173710          TSTB   R0DBR        ;WAIT FOR TTY READY
006100 100375          BPL     -4          ;RETURN
006104 000207          RTS     -7          ;RETURN
006106 005067 000202          CLR     PRSFLG     ;CLEAR FLAG TO INDICATE FULL PRINTOUT
006112 005067 000206          CLR     PTEMP3     ;CLEAR R4 FOR COUNTING CHARACTERS OUTPUT
006116 005067 000174          CLR     PRFLG      ;INITIALIZE CARRY FLAG FOR ROTATES
006120 012767 000260 000172 NOV     R260, PTEMP2 ;SETUP R3
006126 005767 000164          TST     PTEMP1     ;CHECK BIT 15 OF NUMBER
006134 100002          BPL     +6          ;BRANCH IF ZERO
006140 005267 000160          INC     PTEMP2     ;INCREMENT R3 IF ONE
006146 006167 000160          ROL     PTEMP1     ;ROTATE LEFT MOST OCTAL TO RIGHT END
006150 006167 000146          ROL     PTEMP1     ;
006154 005567 000140          ADC     PRFLG      ;STORE CARRY
006160 005767 000132          TST     PRSFLG     ;CHECK FOR SHORT PRINTOUT
006164 001404          BEQ     P.WAIT     ;BRANCH IF NOT SET
006172 006727 000132 000260          CMP     PTEMP2, R260 ;CHECK FOR ZERO IF SET
006176 001410          BEQ     P.CONT    ;IF SET, GO TO NEXT CHARACTER
006202 016777 000122 173612 P.WAIT: NOV     PTEMP2, R0DBR ;OUTPUT NEXT CHARACTER
006206 105777 173604          TSTB   R0DBR        ;WAIT FOR TTY READY
006210 100375          BPL     -4          ;PRINT REST OF NUMBER AFTER A NON-ZERO DIGIT
006214 005067 000100          CLR     PRSFLG     ;COUNT
006220 006727 000104          INC     PTEMP3     ;CHECK FOR DONE
006226 001001 000100 000006          CMP     PTEMP3, R6 ;BRANCH IF NOT DONE
006230 000207          BNE     P.CNT1    ;
006234 000241          RTS     -7          ;
006240 005767 000056          CLC     -4          ;CLEAR CARRY
006246 001403          TST     PRFLG     ;CHECK FOR PREVIOUS CARRY
006250 005067 000050          BEQ     +10        ;BRANCH IF PREVIOUSLY ZERO
006254 000261          CLR     PRFLG     ;INITIALIZE FLAG
006258 006167 000044          SEC     -4          ;SET CARRY
006264 006167 000040          ROL     PTEMP1     ;ROTATE NEXT CHARACTER INTO RIGHT END OF REGISTER
006270 006167 000034          ROL     PTEMP1     ;
006274 005567 000026          ROL     PTEMP1     ;
006278 016767 000024 000024          ADC     PRFLG      ;STORE CARRY
006276 012767 177770 000016          NOV     PTEMP1, PTEMP2 ;LOAD DATA INTO R3
006304 002767 000260 000010          BIC     R177770, PTEMP2 ;CLEAR ALL BUT LOWEST OCTAL DIGIT
006312 000721          BIS     R260, PTEMP2 ;SET TO ASCII EQUIVALENT
006314 000000          BR     P.CK       ;LOOP
006316 000000          PRSFLG: 0
006320 000000          PRFLG: 0
006322 000000          PTEMP1: 0
006324 000000          PTEMP2: 0
          PTEMP3: 0
          ;CONTAINS VALUE TO BE OUTPUT
          ;SCRATCH
          ;USED TO COUNT CHARACTERS OUTPUT

```



```

:ENT HANDLER
:FIRST 3 CALLS LEFT OPEN IN TABLE FOR EASY PATCHES
ENTSRV:  MOV    $SP,EPC      ;GET CALL
          SUB    $2,EPC
          MOV    $EPC,EPC
          CLRB   EPC+1
          ADD    $ENTAB,EPC  ;SAVE OFFSET ONLY
          MOV    $EPC,PC     ;POINT TO TABLE OF ADDRESSES
                               ;JUMP TO DESIRED ROUTINE
EPC:      0
          PATCH1=0
          PATCH2=0
          PATCH3=0
ENTAB:    PATCH1
          PATCH2
          PATCH3
          PRINT
                               ;SUBSTITUTE 10400 WHERE 1ST PATCH IS NEEDED
                               ;104002 FOR 2ND PATCH
                               ;104004 FOR 3RD PATCH
                               ;LOAD ADDRESS OF 1ST PATCH HERE
                               ;LOAD ADDRESS OF 2ND PATCH HERE
                               ;LOAD ADDRESS OF 3RD PATCH HERE

006326 011667 000032
006332 162767 000002 000024
006340 017767 000020 000016
006346 105067 000013
006352 062767 006366 000004
006360 017707 000000
006364 000000
          000000
          000000
          000000
006366 000000
006370 000000
006372 000000
006374 005732

```

```

:BELL ON PASS COMPLETE
BELL:    MOV    $207,@TLBR
          TSTB  @TCSR
          BPL   .-4
          RTS   %7

006376 012777 000207 173410
006404 105777 173402
006410 100375
006412 000207

```

```

:SUBROUTINE TO OUTPUT CARRIAGE RETURN AND LINEFEED
CALF:    MOV    $215,@DDBR ;ROUTPUT CARRIAGE RETURN
          TSTB  @TCSR      ;WAIT FOR TTY READY
          BPL   .-4
          MOV    $212,@DDBR ;OUTPUT LINEFEED
          TSTB  @TCSR      ;WAIT FOR TTY READY
          BPL   .-4
          RTS   %7        ;RETURN

006414 012777 000215 173372
006422 105777 173364
006426 100375
006430 012777 000212 173356
006436 105777 173350
006442 100375
006444 000207

```



```

:SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE
006446 010067 000052 TYPE: MOV %D, SAVRO
006452 011600 MOV (6), %D ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
006454 062716 000002 ADD #2, %D ;SET UP EXIT
006460 011000 MOV %D, %D
006462 112067 000034 TYPA: MOVB (0), TYPDAT ;GET CHARACTER
006466 122767 000100 000026 CMPB #100, TYPDAT ;CHECK FOR "3" CHARACTER
006474 001003 BNE TYPB ;BRANCH IF NOT "3"
006476 016700 000022 MOV SAVRO, %D ;RESTORE RD
006502 000207 RTS PC ;TERMINATOR CHAR. EXIT
006504 116777 000012 173302 TYPB: MOVB TYPDAT, %TDBR ;OUTPUT CHAR TO PRINTER
006512 105777 173274 TSTB %TCSR ;WAIT FOR TTY READY
006516 100375 BPL -4
006520 000760 BR TYPA
006522 000000 TYPDAT: 0
006524 000000 SAVRO: 0

:SUBROUTINE TO CHECK TEST SEQUENCE
006526 005037 177776 ORDER: CLR %PS ;CLEAR PROCESSOR STATUS
006532 011667 000052 MOV (SP), TEMPN ;GET TEST NUMBER ADDRESS
006536 017767 000046 000044 MOV %TEMPN, TEMPN ;GET TEST NUMBER
006544 032737 002000 177570 BIT #2000, %SR
006552 001404 BEQ ORDERB
006554 016700 000030 MOV TEMPN, RD
006560 000005 RESET
006562 000000 HALT
006564 026767 000022 000016 ORDERB: CMP TESTCT, TEMPN ;IS TEST SEQUENCE CORRECT
006572 001403 BEQ ORDERA ;YES, CONTINUE
006574 062716 000002 ADD #2, (SP) ;UPDATE FOR ERROR RETURN
006600 000207 RTS PC
006602 062716 000004 ORDERA: ADD #4, (SP) ;UPDATE FOR GOOD RETURN
006606 000207 RTS PC
006610 000000 TEMPN: 0
006612 000000 TESTCT: 0
000001 .END

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KEYV8 MACY11 27(732) 09-SEP-76 14:29 PAGE 32
DBKTBA.P11 CROSS REFERENCE TABLE -- MACRO NAMES

TESTNO 3298 352 401 452 503 557 611 661 710 775 826 876 926

KEYV8 MACY11 27(732) 09-SEP-76 14:29 PAGE 35
DBKTBA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

TST	340	362	411	440	462	491	513	542	599	649	699	748	785	836	886
TSTB	836	1077	1088	1098	1104	1117									
.ABS	1091	1109	1155	1161	1164	1179									
.ASCII	985	989	990												
.END	1202														
.EVEN	992														
.LIST	1	257	329	352	401	452	503	557	611	661	710	775	826	876	926
.MACR	329														
.NLIST	1	257	329	352	401	452	503	557	611	661	710	775	826	876	926
.REN	1														
.REPT	257														
.TITLE	1														
.WORD	277														

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

#DBKTBA,DBKTBA.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSK1:DBKTBA.P11
RUN-TIME: 4 7 1 SECONDS
RUN-TIME RATIO: 52/14=3.5
CORE USED: 7K (13 PAGES)

H03

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