

KIM

GEBRUIKERS CLUB NEDERLAND

SOFTWARE

KIM Memory test
Siep de Vries

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;
; --- PROGRAMMER:          SIEP DE VRIES
;                          WESTVRIES COMPUTER CONSULTING
;                          POSTBOX 20
;                          OOSTZAAN. HOLLAND
;
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;      WESTVRIES COMPUTER CONSULTING.
;
; --- THE PURPOSE OF THIS PROGRAM IS TO TEST ANY
;      ARBITRARY CONSECUTIVE PART OF RAM-MEMORY IN
;      A KIM-SYSTEM OF ANY SIZE.
;
; --- THE PROGRAM WILL TEST ALL LOCATIONS IN THE
;      AREA ASSIGNED FOR TEST WITH ALL POSSIBLE (256)
;      BITCOMBINATIONS AND CHECKS IF EACH LOCATION
;      CAN CONTAIN ANY OF THE POSSIBLE BITCOMBINATIONS.
;      - THE TEST IS BEING DONE IN SUCH A WAY, THAT NOT
;      ONLY BIT-ERRORS ARE DETECTED, BUT ALSO SELECTION
;      ERRORS, THAT CAUSE THE MEMORY TO HAVE MORE THAN ONE
;      ADDRESS FOR THE SAME PHYSICAL LOCATION.
; --- THE METHOD USED HERE IS TO WRITE INTO ALL
;      LOCATIONS A TESTPATTERN, THAT IS BEING INCREMENTED
;      AFTER IT HAS BEEN WRITTEN AWAY. IF THIS HAS BEEN
;      DONE 256 TIMES, ONE EXTRA INCREMENT IS GIVEN.
;      AFTER THE WHOLE AREA IS WRITTEN, EACH LOCATION
;      IS READ AND ITS VALUE COMPARED TO THE VALUE THAT
;      CAN BE EXPECTED TO RESIDE IN THAT LOCATION.
;      - THE RESULT IS, THAT THE LOCATIONS FROM 0-FF
;      CONTAIN A PATTERN FROM 0-FF, THE LOCATIONS FROM
;      100-1FF CONTAIN A PATTERN FROM 1-00, THE LOCATIONS
;      FROM 200-2FF CONTAIN A PATTERN FROM 2-01 ETC.
;      - THIS IS REPEATED OVER THE INDICATED AREA 256 TIMES
;      WHERE THE STARTING VALUE FOR EACH PASS IS EACH TIME
;      1 HIGHER THAN THE PREVIOUS PASS.
;
; --- PROCEDURE TO RUN THE TEST:
;
;      - CONNECT THE MEMORY TO THE KIM-SYSTEM.
;
;      - READ THE PROGRAM INTO THE KIM-MEMORY.
;      THE PROGRAM OCCUPIES LOCATIONS 200-3FF AND
;      USES PAGE ZERO LOCATIONS DF-FB.
;
;      - SELECT THE AREA TO BE TESTED. THE LOCATIONS,
;      THAT CONTAIN THE ADDRESSES OF THE AREA ARE THE
;      FOLLOWING:      17F5 = LOW ORDER PART OF FIRST
;                      LOCATION IN TESTAREA
;                      17F6 = HIGH ORDER PART OF FIRST
;                      LOCATION IN TESTAR+A
;                      17F7 = LOWORDER PART OF LAST
;                      LOCATION+1 IN TESTAREA
;                      17F8 = HIGHORDER PART OF LAST
;                      LOCATION+1 IN TESTAREA
;
;      EXAMPLE: THE TEST HAS TO BE APPLIED TO LOCATION
;      1200-17FF. THEN LOC. 17F5 = 00
;                      LOC. 17F6 = 12
;                      LOC. 17F7 = 00
;                      LOC. 17F8 = 18
;
;      - START THE TEST PROGRAM AT 0200.
;      THE TEST CAN WORK EITHER WITH THE KIM-DISPLAY,
;      OR WITH THE TELETYPE. THIS DEPENDS UPON THE
;      STATE OF THE TTY- BIT (AS THE KIM-MONITOR DOES).
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; TELETYPE: IF NO ERRORS ARE DETECTED, THE
; TYPEOUT "TEST DONE " OCCURS.
; ERRORS ARE TYPED AS:
; - PASS, ADDRESS, VALUE READ, EXPECTED
; KIM-KEYBOARD: IF NO ERRORS ARE DETECTED, FINALLY
; THE DISPLAY WILL SHOW ALL 0'S.
;
; * AN ERROR IS SIGNALLED BY THE DISPLAY
; OFF THE LOCATIONS ADDRESS AND THE
; PASS-NUMBER. THEN THE USER CAN
; PRESS DA IN ORDER TO GET
; READ VALUE AND EXPECTED VALUE ON
; THE DISPLAY IN THE RIGHT 4 DIGITS.
; PRESSING AD SHOWS AGAIN THE ADDRESS
;
; * AND PASS-NUMBER.
; THE TEST WILL CONTINUE IF GO
; IS PRESSED.
;
; - IF THE TEST IS FINISHED, IT CAN BE REPEATED, BY
; PRESSING ANY KEY OF THE KEYBOARD IN USE.
;
;
; - INDICATION OF SPEED: ONE COMPLETE 256-PASS RUN
; FOR A 4K AREA TAKES 130 SECONDS.
; THE TIME TO TEST AN AREA IS PROPORTIONAL TO THE
; SIZE OF THE AREA UNDER TEST.
;
;
; --- NOTE: THE TEST IS NOT AWARE OF THE FACT, THAT
; IT IS ORDERED TO DESTROY ITSELF IF THIS IS WANTED.
; THUS THE PARAMETERS MAY NOT BE SET IN ONE OF
; THE AREA'S OCCUPIED BY THE TEST.
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; --- D E F I N I T I O N S   O F   K I M
4017  SAD=$1740      TTY-BIT
F217  SPEED=$17F2   TTY-SPEED LOCATIONS
2F1E  CRLF=$1E2F    PRINT A CARRIAGE RETURN-LINEFEED
3B1E  PRTBYT=$1E3B  PRINT A IN HEX
9E1E  PRTSPA=$1E9E  PRINT ONE SPACE
A01E  OUTCH=$1EA0   PRINT CHARACTER IN A
5A1E  GETCH=$1E5A   READ CHARACTER FROM TTY
1F1F  SCANDS=$1F1F  DISPLAY CONTENTS OF $F9 ETC
6A1F  GETKEY=$1F6A  READ KIM-KEYBOARD
FE17  INTVEC=$17FE  INTERRUPTVECTOR
FA17  STPVEC=$17FA  NMIVECTOR
FE1E  ONEKEY=$1EFE  TEST IF KIM-KEY PRESSED
F517  FIRST=$17F5   FIRST ADDRESS TO BE TESTED
F717  LAST=$17F7    LAST ADDRESS + 1 TO BE TESTE-
;
; --- D E F I N E D   C O N S T A N T S
;
1C00  STPHI=$1C      STOPADDRESS. 2 BYTES
0000  STPLD=0
0200  DELAYH=2      TTY-SPEED DELAY FOR 110 BAUD. 2 BYTES
8000  DELAYL=$80
0000  BEGVAL=0      FIRST TESTPATTERN
1000  AD=$10        VALUE FOR AD-KEY
1100  DA=$11        VALUE FOR DA-KEY
1300  GO=$13        VALUEFOR GO-KEY
;
; --- P A G E   Z E R O   L O C A T I O N S
F900  POINT=$F9     DISPLAY AREA
E200  TSTAD=$E2     ADDRESS OF LOCATION TO TEST
E100  TSTVAL=$E1    INITIAL VALUE OF PASS
E000  HULP=$E0      TEMPORARY PATTERN
DF00  TSTCNT=$DF    TO INCREMENT PATTERN AFTER 256 LOC'S

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; --- TEST INITIALISATION
;
0002   *=$200
0200 78   INIT   SEI           DISABLE INTERRUPT
      D8           CLD           CLEAR DECIMAL MODE
      A980        LDA #DELAYL   SET TTY-SPEED
      8DF217      STA SPEED
      A902        LDA #DELAYH
      8DF317      STA SPEED+1
      A900        LDA #STPLO    SET THE VECTOR'S
      8DFA17      STA STPVEC
0211 8DFE17     STA INTVEC
      A91C        LDA #STPHI
      8DFB17      STA STPVEC+1
      8DFF17      STA INTVEC+1
      A900        LDA #BEGVAL   INITIALIZE FIRST VALUE
      85E1        STA TSTVAL
0220 A901        LDA #1        TEST IF TTY PRESENT
      2C4017      BIT SAD
      D010        BNE JMPTST   BRANCH IF NO
      202F1E      JSR CRLF     YES, INITIAL MESSAGE
      A200        LDX #0
      BDDD03 INTWER LDA INTMSG,X
      F20A01E     JSR DUTCH
0232 E8         INX
      E011        CPX #INTSIZ
      D0F5        BNE INTWER
      20FE1E JMPTST JSR ONEKEY  WAIT UNTILL GOKEY RELEASED
      D0FB        BNE JMPTST
      4C4A02      JMP TST1

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; --- S T A R T   O F   T H E   T E S T
4-02   *=$24A
024A 208502 TEST1   JSR TSTINT   INITIALIZE A PASS
      D 20A202 WRITS1 JSR WRTLOC   WRITE NEXT LOCATION
0250 20B802        JSR TSTEND   DONE ?
      3 F0F8        BEQ WRITS1   BRANCH IF NO
; --- READ PATTERN BACK.
5 208502        JSR TSTINT   INITIALIZE READ
8 85E0          STA HULP     SAVE PATTERN
A C6E0          DEC HULP
C 20E102 REATS1  JSR READNW   READ NEXT LOCATION
F C5E0          CMP HULP     COMPARE READ AND EXPECTED
0261 F003        BEQ READOK   BRANCH IF OK
      3 20F602        JSR ERROR   TOO BAD. REPORT THE PROBLEM
      6 20B802 READOK  JSR TSTEND   FINISHED WITH PASS ?
      9 F0F1        BEQ RETS1   BRANCH IF NO
; --- END OF A PASS
B E6E1          INC TSTVAL
D D0DB          BNE TEST1
; --- THE FULL TEST IS COMPLETE
F 207703        JSR TSTFIN
0272 4C0002        JMP INIT

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; --- S U B R O U T I N E S
;
; --- INITIALIZE A READ OR WRITE PASS.
;     T←TAD WILL CONTAIN FIRST ADDRESS
;     A WILL CONTAIN FIRST PATTERN
;     X WILL CONTAIN ZERO
      8502    *=$285
0285 ADF517 TSTINT LDA FIRST      PRESET ADDRESS
      8 85E2    STA TSTAD
      A ADF617  LDA #FSTHI
      D 85E3    STA TSTAD+1
      F A5E1    LDA TSTVAL      VALUE
0291 A200     LDX #0
      3 86DF    STX TSTCNT
      5 60     RTS
; --- WRITE PATTERN IN A INTO THE
;     LOCATION WHOSE ADDRESS IS IN "TSTAD"
;     - INCREMENT A.
      A202    *=$2A2
02A2 81E2    WRTLOC STA (TSTAD,X)  X ASSUMED TO BE ZERO
      4 18     CLC
      5 6901   ADC #1      INCREMENT PATTERN
      7 60     RTS
; --- TEST FOR END OF ONE PASS.
;     'TSTAD' IS INCREMENTED. ON LEAVE ZERO MEANS NOT DONE
;     A AND X ARE RETURNED
      B802    *=$2B8
02B8 E6E2    TSTEND INC TSTAD
      A D002    BNE NOHI
      C E6E3    INC TSTAD+1
      E A4E2    NOHI     LDY TSTAD
02C0 CCF717  CPY LAST
      3 D00A    BNE NOTEND
      5 A4E3    LDY TSTAD+1
      7 CCF817  CPY LAST+1
      A D009    BNE NOTEND
      C A0FF    LDY #$FF
      E 60     RTS
      F C6DF    NOTEND  DEC TSTCNT
02D1 D005    BNE HOPS
      3 E6E0    INS HULP
      5 18     CLC
      6 6901   ADC #1
      8 A000    NOPS     LDY #0
      A 60     RTS
; --- READ NEXT LOCATION
      E102    *=$2E1
02E1 E6E0    READNW INC HULP      NEXT PATTERN
      3 A1E2    LDA (TSTAD,X)  READ THE CELL
      5 60     RTS

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; --- E R R O R H A N D L I N G
;
; --- REPORT AN ERROR.
;       ON ENTRY A CONTAINS READ PATTERN, 'HULP' CONTAINS
;       EXPECTED PATTERN.
;       A, X AND Y REMAIN UNCHANGED.
F602   *=$2F6
02F6  48   ERROR   PHA           SAVE ALL REGISTERS
      7 8A           TXA
      8 48           PHA
      98           TYA
      A 48           PHA
      B AD4017      LDA SAD TEST WHICH DEVICE TO USE
      E 2901        AND #1
0300  F032        BEQ ITSTTY
; --- THE KIMDISPLAY AND KEYBOARD ARE USED
;       DISPLAY ADDRESS OF CELL IN ERROR AND PASSNUMBER
2 A5E1  ADPASS   LDA TSTVAL      MOVE DATA TO DISPLAYAREA
4 85F9           STA POINT
6 A5E2           LDA TSTAD
8 85FA           STA POINT+1
A A5E3           LDA TSTAD+1
C 85FB           STA POINT+2
E 20B903  DISPUM JSR READSS      DISPLAY AND READ
0311  C910        CMP #AD AD-KEY PRESSED ?
      3 F0ED        BEQ ADPASS
      5 C911        CMP #DA DA-KEY PRESSED
      7 F00A        BEQ BITS
      9 C913        CMP #GO GO-KEY PRESSED ?
      B D0F1        BNE DISPUM      IF NONE, IGNORE
      D 68          LEAVE   PLA      GO-KEY, RETURN
      E A8          TAY
      F 68          PLA
0320  AA          TAX
      1 68          PLA
      2 60          RTS
; --- DISPLAY DESIRED AND READ PATTERN
3 A900  BITS     LDA #0
5 85FB           STA POINT+2
7 BA           TSX
8 BD0301        LDA $103,X      GET SAVED ACC FROM STACK
B 85FA           STA POINT+1
D A5E0           LDA HULP
F 85F9           STA POINT
0331  4C0E03     JMP DISPUM
; --- PRINT ON TTY:
;       PASS ADRS VAL EXP
;       -----
4 202F1E  ITSTTY JSR CRLF
7 209E1E        JSR PRTSPA
A 209E1E        JSR PRTSPA
D A5E1           LDA TSTVAL
F 203B1E        JSR PRTBYT
0342  209E1E        JSR PRTSPA
      5 A5E3           LDA TSTAD+1
      7 203B1E        JSR PRTBYT
      A A5E2           LDA TSTAD
      C 203B1E        JSR PRTBYT
      F 209E1E        JSR PRTSPA
0352  209E1E        JSR PRTSPA
      5 BA           TSX
      6 BD0301        LDA $103,X
      9 203B1E        JSR PRTBYT
      C 209E1E        JSR PRTSPA

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F A5E0	LDA HULP
0361 203B1E	JSR PRBYT
4 4C1D03	JMP LEAVE

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; --- M I S C E L L A N E O U S   R O U T I N E S
;
; --- FINAL SUBROUTINE.
;     DISPLAY ALL ZEROES OR PRINT 'TEST DONE'
;
7703   *=$377
0377 AD4017 TSTFIN LDA SAD
      A 2901      AND #1
      C F00E      BEQ TYEND
      E A900      LDA #0
0380 85F9        STA POINT
      2 85FA      STA POINT+1
      4 85FB      STA POINT+2
      6 201F1F DISPEN JSR SCANDS
      9 F0FB      BEQ DISPEN          BRANCH IF NO KEY PRESSED
      B 60        RTS                KEY PRESSED. START AGAIN
      C 202F1E TYEND JSR CRLF
      F A200      LDX #0
0391 BDA003 WEREND LDA ENDMES,X
      4 20A01E    JSR OUTCH
      7 E8        INX
      8 E009      CPX #ENDSIZ
      A D0F5      BNE WEREND
      C 205A1E    JSR GETCH          WAIT UNTILL K-Y PRESSED
      F 60        RTS
03A0 544553 ENDMES .TEXT "TEST DONE"
      3 5420444F4E45
      0900      ENDSIZ=*-ENDMES
;     --- DISPLAY ON THE KIM-DISPLAY
;     RETURN TO CALLER AS SSDN AS A KEY HAS BEEN
;     PRESSED. RETURN WITH KEY-CODE IN A.
      B903      *=$3B9
03B9 48 READDs PHA
      A 201F1F PRESCA JSR SCANDS
      D F0FB      BEQ PRESCA
      F 206A1F    JSR GETKEY
03C2 BA TSX
      3 9D0101    STA $101,X
      6 201F1F VOKAL JSR SCANDS
      9 D0FB      BNE VOKAL
      B 68        PLA
      C 60        RTS
      DD03      *=$3DD
03DD 504153 INTMSG .TEXT "PASS ADRS VAL EXP"
03E0 5320414452532056414C20455850
      1100      INTSIZ=*-INTMSG
;     .END

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