# Monitor for the 6502

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This listing is a Monitor for the 6502, a-la the Ohio Scientific Model 420. The interrupt vector has been set to use John Zeiglers breakpoint routine. [*DDJ*, Vol.1, No.3]. His program needs to have a few addresses changed to use this Monitor, but they should be obvious from the subroutine names.

Ohio Scientific [11679 Hayden St., P.O. Box 269, Hiram, OH 44234] seems to be the cheapest way to go if you roll your own equipment. They sell [albeit slowly] a variety of bare boards at very reasonable prices and good quality. So far I have assembled the CPU board and 4K board, am finishing a homebrew panel, and wrote the Monitor to check things on a borrowed ASR33. The next step calls for revising the Monitor to take the Viatron keyboard and translate to ASCII with a look-up table.

The Viatron keyboard is optically encoded, has parallel output, and is a fantastic bargain at $20.00 from John Meshna [P.O. Box 62, E. Lynn MA 01904] These are new surplus with 73 (I think) keys. Anyway, I will pass along an updated version.

Eventually hope to get TB for the 6502 (if you publish a 6800 version someone will translate it overnight or vice-versa).

Note: I would like to hear from other 6502's in the area.

```
                  $
ADDR/ XX XX XX  LABEL   OP   (MODE) OPER
----  -- -- --  ----    ---  (---) --...
FF00/ A9 03     MAIN    LDA  (IMM) 03
FF02/ 8D 00 FC          STA  (ABS) FC00
FF05/ A9 B1             LDA  (IMM) B1
FF07/ 8D 00 FC          STA  (ABS) FC00
FF0A/ A2 FF             LDX  (IMMF) FF
FF0C/ 9A                TXS  (IMP)
FF0D/ 20 5E FF          JSR  (ABS) CRLF
FF10/ 20 C6 FF          JSR  (ABS) INPT
FF13/ AA                TAX  (IMP)
FF14/ 20 4F FF          JSR  (ABS) SPAC
FF17/ E0 4C             CPX  (IMM) 4C
FF19/ F0 09             BEQ  (REL) LOAD
FF1B/ E0 50             CPX  (IMM) 50
FF1D/ F0 14             BEQ  (REL) PRNT
FF1F/ E0 47             CPX  (IMM) 47
FF21/ D0 E7             BNE  (REL) FF0A
FF23/ 40                RTI  (IMP)
*
FF24/ 20 69 FF  LOAD    JSR  (ABS) ADDR
FF27/ 20 77 FF          JSR  (ABS) FILL
FF2A/ 91 FE             STA  (IND,Y) FE
FF2C/ C8                INY  (IMP)
FF2D/ D0 F8             BNE  (REL) FF2D
FF2F/ E6 FF             INC  (ZER) 00FF
FF31/ D0 F4             BNE  (REL) FF27
*
FF33/ 20 69 FF  PRNT    JSR  (ABS) ADDR
FF36/ 20 5E FF          JSR  (ABS) CRLF
FF39/ A9 F8             LDA  (IMM) F8
FF3B/ 85 FD             STA  (ZER) 00FD
FF3D/ 20 4C FF          JSR  (ABS) MEML
FF40/ E6 FD             INC  (ZER) 00FD
FF42/ D0 F9             BNE  (REL) FF3D
FF44/ AD 00 FC          LDA  (ABS) FC00
FF47/ 4A                LSR  (ACC)
FF48/ 90 EC             BCC  (REL) FF36
FF4A/ B0 BE             BCS  (REL) FF0A
*
FF4C/ 20 88 FF  MEML    JSR  (ABS) EMTY
*
FF4F/ A9 20     SPAC    LDA  (IMM) 20
*
FF51/ 48        OUTP    PHA  (IMP)
FF52/ AD 00 FC          LDA  (ABS) FC00
FF55/ 4A                LSR  (ACC)
FF56/ 4A                LSR  (ACC)
FF57/ 90 F9             BCC  (REL) FF52
FF59/ 68                PLA  (IMP)
FF5A/ 8D 01 FC          STA  (ABS) FC01
FF5D/ 60                RTS  (IMP)
*
*
FF5E/ A9 0D     CRLF    LDA  (IMM) 0D
FF60/ 20 51 FF          JSR  (ABS) OUTP
FF63/ A9 0A              LDA  (IMM) 0A
FF65/ 20 51 FF          JSR  (ABS) OUTP
FF68/ 60                RTS  (IMP)
*
FF69/ 20 77 FF  ADDR    JSR  (ABS) FILL
*$
*
FF69/ 20 77 FF  ADDR    JSR  (ABS) FILL
FF6C/ 85 FF             STA  (ZER) 00FF
FF6E/ 20 77 FF          JSR  (ABS) FILL
FF71/ A8                TAY  (IMP)
FF72/ A9 00             LDA  (IMM) 00
FF76/ 60                RTS  (IMP)
*$
*
FF77/ 20 98 FF  FILL    JSR  (ABS) READ
FF7A/ 0A                ASL  (ACC)
FF7B/ 0A                ASL  (ACC)
FF7C/ 0A                ASL  (ACC)
FF7D/ 0A                ASL  (ACC)
```

```
FF7E/ 85 FC          STA (ZER) 00FC
FF80/ 20 98 FF       JSR (ABS) READ
FF83/ 29 0F          AND (IMM) 0F
FF74/ 85 FE          STA (ZER) 00FE
FF83/ 29 0F          AND (IMM) 0F
FF85/ 65 FC          ADC (ZER) 00FC
FF87/ 60             RTS (IMP)
*
FF88/ B1 FE    EMTY  LDA (IND,Y) FE
FF8A/ 20 B5 FF       JSR (ABS) UNPK
FF8D/ B1 FE          LDA (IND,Y) FE
FF8F/ 20 B9 FF       JSR (ABS) UNPI
FF92/ C8             INY (IMP)
FF93/ D0 02          BNE (REL) FF97
FF95/ E6 FF          INC (ZER)
FF97/ 60             RTS (IMP)
*
FF98/ 20 C6 FF READ  JSR (ABS) INPT
FF9B/ C9 52          CMP (IMM) 52
FF9D/ D0 03          BNE (REL) FFA2
FF9F/ 4C 00 FF       JMP (ABS) MAIN
FFA2/ C9 30          CMP (IMM) 30
FFA4/ 30 F2          BMI (REL) FF4A
FFA6/ C9 3A          CMP (IMM) 3A
FFA8/ 30 0B          BMI (REL) FFB5
FFAA/ C9 41          CMP (IMM) 41
FFAC/ 30 EA          BMI (REL) FF4A
FFAE/ C9 46          CMP (IMM) 46
FFB0/ 10 E6          BPL (REL) FF4A
FFB2/ E9 07          SBC (IMM) 07
FFB4/ 60             RTI (IMP)
*
FFB5/ 4A       UNPK  LSR (ACC)
FFB6/ 4A             LSR (ACC)
FFB7/ 4A             LSR (ACC)
FFB8/ 4A             LSR (ACC)
*
FFB9/ 29 0F    UNPI  AND (IMM) 0F
FFBB/ 69 30          ADC (IMM) 30
FFBD/ C9 3A          CMP (IMM) 3A
FFBF/ 30 02          BMI (REL) FFC3
FFC1/ 69 07          ADC (IMM) 07
FFC3/ 20 51 FF       JSR (ABS) OUTP
*
FFC6/ AD 00 FC INPT  LDA (ABS) FC00
FFC9/ 4A             LSR (ACC)
FFCA/ 90 FA          BCC (REL)  FFC6
FFCC/ AD 01 FC       LDA (ABS) FC01
FFCF/ 29 7F          AND (IMM) 7F
FFD1/ C9 7F          CMP (IMM) 7F
FFD3/ F0 F1          BEQ (REL) FFC6
FFD5/ 4C 51 FF       JMP (ABS) OUTP
*
FFFC/ 00 FF          RES (RESET) VECTOR
FFFE/ 64 02          IRQ (INTERRUPT) VECTOR
*
```

## TINY TIM SEEKS TINY BASIC

Dear Doctor, June 22, 1976

I am an electronics instructor and at school where I teach I have a friend named TIM. Now when I first met TIM he was just a little fella', you know, a chip off the block of silicon. Well, he has put on some pounds with all the bytes he has been consuming. Now there's almost nothing left to feed him. What we need for him is some BASIC nutrition. If you know of even a Tiny BASIC meal for him we would appreciate it.

Thanks, and thanks for TIM.

John Bottoms
United Electronics Inst.
423 Knobloch Ave.
Keffersonville IN 47130

**Note: 'TIM' is a Monitor for the 6502.**

## A GOOD ASSEMBLER PROPOSAL

Dear Mr. Warren: June 27, 1976

All of the implementations of Tiny BASIC have been excellent, and the authors of each version deserve to be congratulated on a job well done. I agree that it may be time to ease up on Tiny for a bit, and devote more space to other equally useful items.

It seems to me that a really good assembler would be of great value to hobbyists. I am thinking primarily of an 8080 assembler, but any machine would benefit from a good assembler. By "good" I mean one with most or all of the following features:

1. Free-form source coding.
2. Symbols up to 15 characters long.
3. Symbol table assignable to tape cassette or floppy disc.
4. Provision for both local and global symbols.
5. Sophisticated macro expansion capability.
6. Operation in either absolute or relocatable mode, assuming use of a suitable link editor for relocation.
7. Optional output of object listing and/or diagnostics.
8. Optional retention of symbol table for use in debugging.
9. Automatic separation of procedural and data areas, to facilitate memory protection.
10. Optional concordance and/or memory map listing.
11. Provision for symbolic patching.
12. Optional inclusion of kitchen sink (for bit bucket overflow).

Sincerely,

Jim Day
17042 Gunther St.
Granada Hills CA 91344

**SUBSCRIBERS TO *JOURNAL* SENT A SECOND COPY OF JUNE/JULY ISSUE**

Our printers botched the first press run on *DDJ,* Vol.1 Number 6. They used the wrong paper (poorer quality), and they had a bad print blanket on one of the pages.

Before Picky Jim noticed it, Fast Tom (our super-duper mailer male) had processed the subscription issues and given them to the post office.

So, when we received the properly printed copies, we sent our subscribers a second copy. It involved some extra expense and effort for us, but that's the way we do things.