

Date: September 19, 1977

TM#
103



Equipment: SMB with Bytesaver

Situation: SMB will not work with Bytesaver unless the following modification is done. This is because of the way the Bytesaver does its wait state generation.

Solution: Remove U8 from socket on SMB. Bend pins 11 & 13 out so that they do not go back into the socket when the IC is re-inserted.

Re-insert U8.

Date: September 26, 1977

TM#
104



Equipment: TDL System Monitor Board

Situation: Lack of EMM-SEMI 4804 RAMS prevents the implementation of user I/O routines.

Solution: The enclosed routine, when placed at 0038 (Hex) will allow the implementation of user I/O routines and the 3 unused commands in the monitor.

Please Note!

This routine uses the RST 7 facility as does the break-point feature of the monitor. If a RST 7 is hit, and is not within the external transfer vector area of the monitor, this routine will restore all registers and trap to the break-point. However, if you use the G command with more than one address then the monitor will place a jump to its break-point at 00038 (Hex).

For routine see the two attached sheets.

```

.LIST
.PABS
.LADDR
;
; IF THE EMM-SEMI 4804 RAM CHIPS ARE NOT
; PRESENT IN THE SYSTEM MONITOR BOARD, THE
; EXTERNAL TRANSFER VECTOR AT F800 (HEX) CANNOT
; BE USED. WHEN ATTEMPTING TO IMPLEMENT A USER
; PROVIDED I/O ROUTINE OR ONE OF THE UNUSED
; COMMANDS, THE PROCESSOR WILL EXECUTE A RST 7
; INSTRUCTION. IF THIS ROUTINE IS PLACED AT
; 0038 (HEX) IT WILL CAUSE A BRANCH TO THE
; PROPER ROUTINE, BASED UPON AN ADDRESS TAKEN
; FROM A TABLE.
;
; LOC 0038H ;RESTART 7 LOCATION
0038 C33B00 RST7: JMP NORAM ;SPACE FOR TRAP
;
; NORMA: XTHL ;GET DUMMY RETURN
003B E3 PUSH PSW ;SAVE IT
003C F5 MVI A,0F8H ;TEST
003D 3EF8 CMP H ; RETURN
003F BC JRZ OK
0040 2805
;
; NG: POP PSW ;GO
0042 F1 XTHL ; TO
0043 E3 JMP 0F01EH ; TRAP
0044 C31EF0
;
; OK: MVI A,23H ;CHECK FOR
0047 3E23 CMP L ; BEYOND
0049 BD JRC NG ; TABLE
004A 38F6 PUSH B ;FOR LATER
004C C5 DCR L ;ADJ VALUE
004D 2D MVI H,0
004E 2600 LXI B,703H ;FOR /3
0050 010307 DAD H ;LEFT SHIFT
0053 29 DIV1: DAD H ;AGAIN
0054 29 MOV A,H ;SUBTRACT
0055 7C SUB C ; DIVISOR
0056 91 JRC DIV2 ;QUOTIENT 0
0057 3802 INX H ;QUOTIENT 1
0059 23 MOV H,A ;NEW DIVIDEND
005A 67 DIV2: DCR B ;DECREMENT COUNT
005B 05 JRNZ DIV1 ;STILL MORE
005C 20F6 ;L HAS QUOTIENT H HAS REMAINDER
;
005E 2600 MVI H,0 ;CLEAR REMAINDER
0060 29 DAD H ;TWO BYTES
0061 017400 LXI B,TABLE ; PER ENTRY
0064 09 DAD B ;ENTRY ADDRESS
0065 017200 LXI B,JUMP+1
0068 7E MOV A,M ;GET LOW
0069 02 STAX B ; BYTE
006A 23 INX H
006B 03 INX B
006C 7E MOV A,M ;GET HIGH

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```
006D 02          STAX  B      ; BYTE
006E C1          POP   B      ;IT S LATER
006F F1          POP   PSW    ;RESTORE
0070 E1          POP   H      ; REGISTERS
0071 C30000     JUMP: JMP   .-.   ;SPLIT
```

```
;  
;  
; THIS TABLE IS TO BE FILLED WITH  
; THE ADDRESSES OF THE VARIOUS I/O AND  
; COMMAND ROUTINES.  
;  
; (THE PRESENT ADDRESSES ARE FOR THE TTY.)  
;
```

```
0074 1FF6     TABLE: .WORD 0F61FH ;CONSOLE INPUT
0076 90F4     .WORD 0F490H ;CONSOLE OUTPUT
0078 1FF6     .WORD 0F61FH ;HIGH-SPEED READER
007A 1FF6     .WORD 0F61FH ;USER READER
007C 90F4     .WORD 0F490H ;HIGH-SPEED PUNCH
007E 90F4     .WORD 0F490H ;USER PUNCH
0080 90F4     .WORD 0F490H ;LINE PRINTER
0082 90F4     .WORD 0F490H ;USER PRINTER
0084 20F5     .WORD 0F520H ;CONSOLE STATUS
0086 1EF0     .WORD 0F01EH ;I COMMAND
0088 1EF0     .WORD 0F01EH ;K COMMAND
008A 1EF0     .WORD 0F01EH ;O COMMAND
```

;
.END

+++++ SYMBOL TABLE +++++

```
DIV1 0054      DIV2 005B      JUMP 0071
NG   0042      NORAM 003B      OK   0047
RST7 0038      TABLE 0074
```



SEARCH PARK BLDG. H 1101 STATE ROAD
PRINCETON, NEW JERSEY 08540 (609) 921-0321

Equipment: System Monitor Board

Situation: The Macro Assembler and Text Output Processors need a controlled reader. As implemented, the cassette circuitry on the SMB board is inadequate for this task.

Solution: The following hardware will provide a buffered cass-controlled read and write operation which will allow cassette operation of the Assembler and Output Processor.

Note: This routine requires implementation of the user I/O routines.

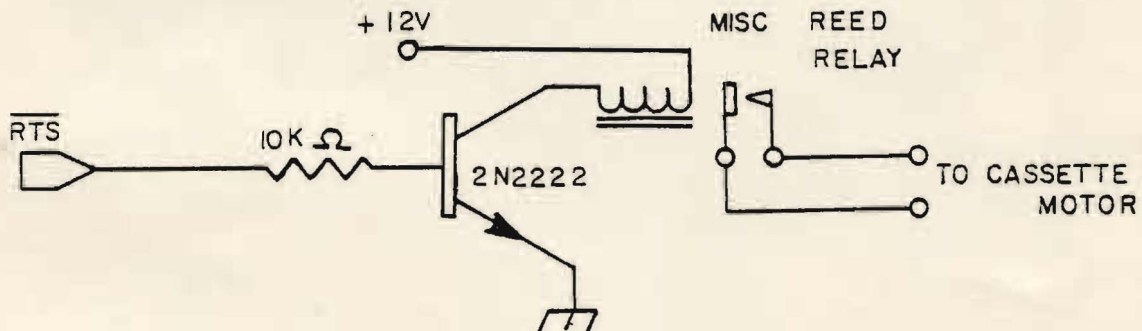
The Buffered Cassette Routine provides utility commands to open and close the input/output buffers and to control the cassette motors.

Please note! When using the Buffered Cassette Routine you must be careful not to do the right thing at the wrong time. I.e. you must open, close, and rewind cassettes at various times during the running of your programs, and it is very easy to get mixed up. Cassette player 0 is the playback unit and cassette recorder 1 is the record unit.

The Buffered Cassette Routine is provided by Technical Design Labs for use with the ROM Zapple and the System Monitor Board. This Routine provides the user with the ability to simulate a controlled paper tape reader and punch with two cassette tape recorders of adequate quality.

You must implement two motor control relays which are driven from the REQUEST TO SEND leads from two of the ACIA's on the System Monitor Board.

This circuit was used at TDL.



The $\overline{\text{RTS}}$ leads come out on the 26 wire ribbon cable. The $\overline{\text{RTS}}$ leads from the TTY and cassette ACIA's are used for motor control, and the $\overline{\text{RTS}}$ lead from the video (crt) ACIA is not used.

Study this example of text editing and assembly:

- 1) Sign on Zapple Monitor (turns on both motors).
- 2) Place a cassette containing the cassette routines on cassette 0 (playback). Type AR=C (cr) which assigns the reader to cassette. Type R,F830 (cr) and turn on cassette 0 which loads the cassette routines into memory at F830 Hex. When the prompt character " " is printed stop and rewind the Cassette Routine tape.
- 3) Place a cassette containing the Text Editor on cassette 0 (playback). Type R,1000 (cr) and turn on cassette 0 which loads the Text Editor into memory at 01000 Hex. When the prompt character " " is printed, stop and rewind the Editor tape.
- 4) Type K,O,F to stop the cassette motors. Place the cassette containing the text material to be edited on cassette 0 (playback). Place a blank cassette on cassette 1 (record). Press the play button on cassette 0 and the record button on cassette 1. Note the motors should be off at this time.
- 5) Type AR=U (cr) and AP=U (cr) to assign the reader and punch to the Buffered Cassette Routine.
- 6) Type K,O,O to open the output file (reset the pointer). Type K,O,I to open the input file (starts the cassette 0 and preloads the buffer, then turns the motor off).
- 7) Type G1000 (cr) to execute the Text Editor (follow the Text Editor manual for procedures). Every time you type A (escape) (escape) the Text Editor will read 50 lines of text. The cassette routine will start up the cassette 0 motor every time the input buffer gets empty. When you type W (escape) (escape) or E (escape) (escape) the Text Editor writes out text to the punch buffer and when the buffer is full, the Buffered Cassette Routine will start cassette 1 (record) and write the buffer to the cassette and then stop the cassette.
- 8) When ending the text edit with the E command, the last buffer load may not have been written to the cassette. Type X (escape) (escape) to get back to Zapple. Then type K,C,O to close the output file and write the last buffer to the cassette.
- 9) Turn off the cassette, type K,O,N to start the motors. Then rewind the cassette in the record machine.
- 10) Type AR=C (cr), place the assembler tape in the playback machine, type R,1000 (cr), and start the cassette to load in the assembler. When the prompt character " " is printed, stop and rewind the assembler tape.
- 11) Remove the source tape from cassette 1 (record), see step 9, and place it in cassette 0 (playback). Type AR=U (cr) and AP=U (cr) to assign the reader and punch to the Buffered Cassette Routine. Type K,O,I to open both output and input files. Cassette 0 (playback) will start up and preload the first buffer. Place a blank tape in the output machine.

12) Type G1ØØ (cr), and when the assembler types "PASS=" respond with "1". Cassette Ø (playback) should start up, and the assembler should process pass 1.

13) When the assembler next types "PASS=" respond with "Ø", the assembler should trap to the monitor. Type K,O,I - the cassette Ø (playback) motor should start, rewind and play the tape again. The machine should stop after loading the first buffer.

14) Type G (cr) to return to the assembler. The assembler types "PASS=" and you respond with "4". The assembler should process the second pass and type the listing on the line printer device and output the Hex Object tape to cassette 1 (record).

15) At the end of this pass, when the assembler types "PASS=" answer "Ø" and you type K,C,O to cause the writing of the last block to cassette 1 (record).

16) Load the object tape using the Buffered Cassette Routines and the R command. I.e. AR=U instead of AR=C as with the TDL supplied tapes, because the tapes that you create using these routines are in a blocked format.

Date: September 27, 1977

**TM#
105**

Equipment: ZPU

Situation: The original ZPU had some problems which were corrected on Rev. 1. They should be published so that those with old ZPU's can correct their boards.

Solution:

1. There should be a 1K Ohm pullup resistor on the PRESET line. On the back of the board install a 1K Ohm (brown, black, red) resistor between pin 16 of IC 2, (+5 Volts) and the extra feedthrough hole between C5 and R11 (reset line).
2. ZPU will not honor the ready line being pulled low during an input or output operation. On the top of the board there is a trace that comes from Pin 9 of IC 20, runs out from under the socket for IC 20 near Pin 14, and connects to a feedthrough hole above and between IC 20 and IC 21. Carefully cut this trace near the feedthrough hole and solder a small piece of wire between the TRACE (not the feedthrough hole) and the ground trace that runs near the top edge of the board.
3. The data receivers on the ZPU are in a write configuration at the time the Z80 should be receiving the interrupt instruction, thus the Z80 always sees a Restart 7.
 - A. On the back of the board there is a trace between Pin 3 of IC 21 and a feedthrough hole. Cut this trace, and solder a IN270 Germanium diode between Pin 3 of IC 21 and that feedthrough hole with the cathode end of the diode connected to Pin 3.
 - B. Check the pictorial for the location of the 4.7K pullup resistor (yellow, violet, red), and install it on the back of the board between Pin 16 of IC 5 and the indicated feedthrough hole.
 - C. There is a feedthrough hole that connects to pin 15 of IC 9, on the back of the board, connect a IN270 Germanium diode between this feedthrough hole and Pin 1 of IC 12 with the cathode end of the diode connected to Pin 1 of IC 12.

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3. Cont.
 - D. On the back of the board connect a piece of wire between Pin 10 of IC 11 and Pins 2 and 3 of IC 12.
4. For more reliable operation of the Z80 replace the 100 Ohm resistor at R31 with a 330 Ohm (orange, orange, brown) resistor.
5. For more reliable operation with TDL Z16 memory replace the .001mfd capacitor at C15 with a 560pf capacitor.



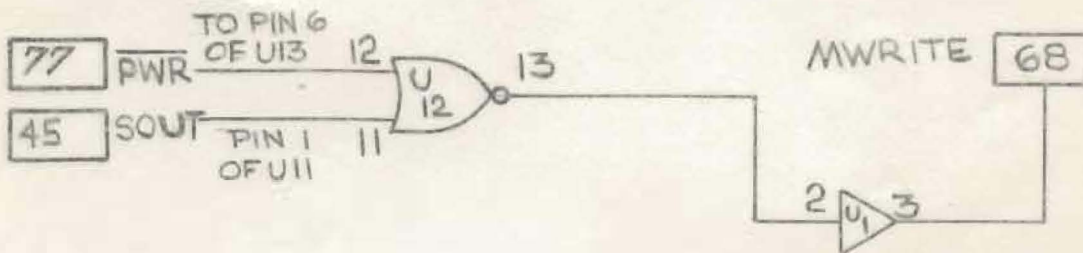
RESEARCH PARK BLDG. H 1101 STATE ROAD
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Date: 11/17/77

Equipment: ZPU Board

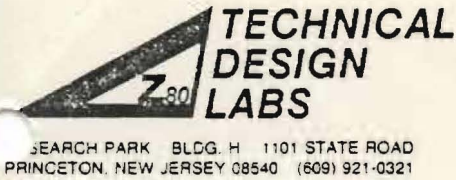
Situation: Many mother boards do not properly take care of the "MWRITE" transfer normally done by a front panel. The signal "MWRITE" is a function of "PWR" and "SOUT".

Solution: There are spare "NOR" gates on the "ZPU" board. Use one of these to perform the function.



To improve drive ability, one section of an 8T97 is used.

Date: 10/19/77



Equipment: System Monitor Board

Situation: Reset will not restart monitor, and will cause programs to blow-up.

Solution: The reset circuitry uses a CMOS one-shot CD4528, chip U9. The cassette circuit also uses the 4528, U35. But for various reasons involving response time, only one manufacturer's 4528 has been found to be satisfactory for U9, the Fairchild Chip. Due to the short supplies of Fairchild CMOS, only one is packed in each System Monitor Board. The SMB owner should make certain that the U9 is the Fairchild, and not some other brand chip. Any brand 4528 will suffice for U35.

Date: 11/17/77

**TM#
113**

RESEARCH PARK BLDG. H 1101 STATE ROAD
PRINCETON, NEW JERSEY 08540 (609) 921-0321

Equipment: Version 3.02 Basic with CP/M Disk Operating System.

Situation: Typing control E will not abort a listing or stop the execution of a program.

Solution: The CP/M disk operating system generates the true/false indication in a slightly different manner than other systems. Using your DDT utility, make the following modifications to Basic.

- 1) Load into memory a copy of Basic DDT BASIC.COM
- 2) Patch 4 bytes using S command at:
 - OCF9H change 3C to B7
 - OCFAH change CO to C8
 - OCOBH change 3C to B7
 - OCOCH change CC to C4
- 3) Type control C to get back to CPM
- 4) Save the modified basic back to disk.
SAVE 58 BASIC.COM