Lab #1 – Software

1. **How many bytes of code space does your program require?** (Don't count the illegal instruction. Show how you arrived at your answer.)
Code Size? _______26Bytes__________

```
0000                 ORG   $0000
0000  90 01 00       MOV   DPTR,#0100H        (3 bytes)
0003  78 0A          MOV   R0,#0AH            (2 bytes)
0005  79 00          MOV   R1,#00H            (2 bytes)
0007  FA        LOOP MOV   R2,A               (1 bytes)
0008  94 50          SUBB  A,#50H             (2 bytes)
000A  60 0C          JZ    END                (2 bytes)
000C  EA             MOV   A,R2               (1 byte)
000D  94 50          SUBB  A,#50H             (2 byte)
000F  50 07          JNC   END                (2 byte)
0011  EA                   MOV   A,R2         (1 byte)
0012  F0             MOVX  [DPTR],A           (1 byte)
0013  04             INC   A                  (1 byte)
0014  A3             INC   DPTR               (1 byte)
0015  09             INC   R1                 (1 byte)
0016  D8 EF          DJNZ  R0,LOOP            (2 byte)
0018  89 20     END  MOV   20H,R1             (2 byte)
001A  A5             DB    $A5                (not counting the illegal character)
-----------------------------------------------------------------------------------
                                              26Bytes
```

2. **How long did your program take to execute, assuming it completed 10 writes to external memory?** Assume an 11.0592 MHz clock. Don't include the illegal instruction ($A5). Show your detailed calculations on the code listing that you submit with the signoff sheet.

Execution Time? _______13.83us_________

The loop consists of 12 instructions out of which four are 2 bytes wide. Hence a total of 16 machine cycles which are executed 9 times in the loop.
Hence 16x9 =144 machine cycles
Rest of the instructions contribute to 9 cycles , Therefore total numbers of cycles are 144+9 =153cycles

Execution time = 153cycles /11.059MHz = 13.83us

3. **What would happen if your loop started writing to external memory at location 0008h when running in the simulator?**

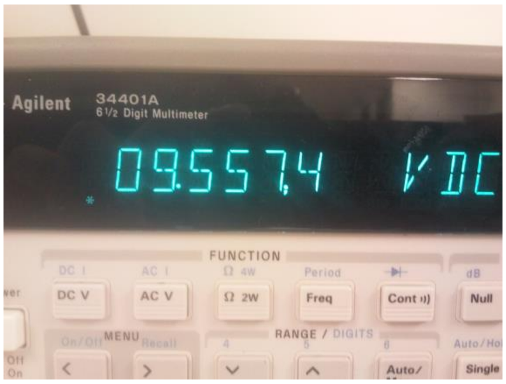
The program execution would overwrite instruction codes in the 0008h location and may lead to unexpected results

4. **What would happen if your loop started writing to external memory at location 0008h if the code was running in actual hardware?**

No significant effect would be noticed as the data memory would be assigned different addressing

Lab #1 Signoff Sheet – Hardware

1. **What voltage is present at the regulator input?** Use a digital multimeter. ______9.55V_______



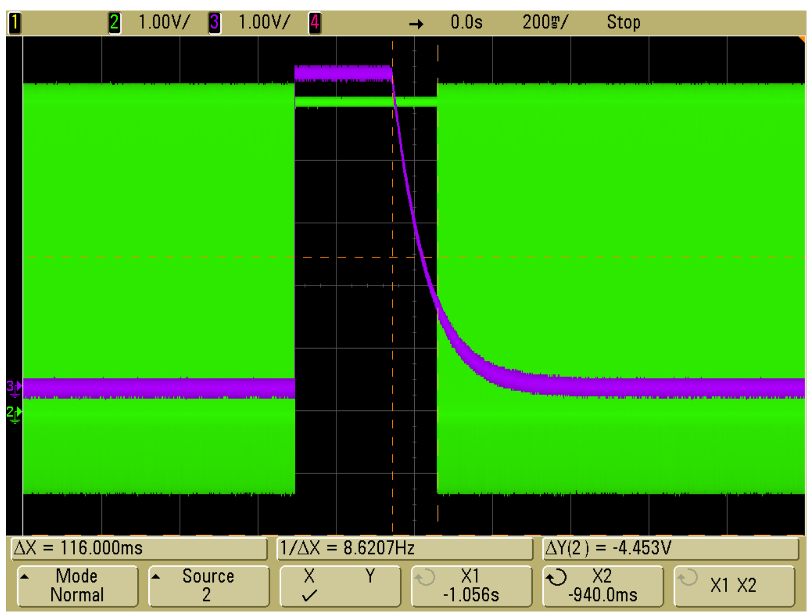
2. **What voltage is present at the regulator output?** Use a digital multimeter. _____5.01V________

3. **What peak to peak noise is present across the processor VCC and GND?** Use an oscilloscope.
Measured value at processor package pins on top side of board: ______181mV_______

Measured value at wire wrap socket pins on bottom side of board: ____124mV__________

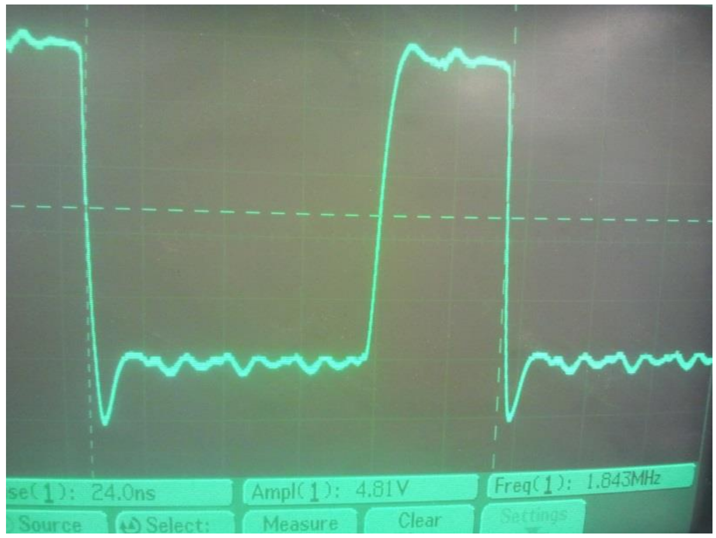
4. **How long is the processor held in reset after the run-time reset pushbutton is released?** Use an oscilloscope and try to measure the time between the release of the pushbutton and the time when noise from ALE is observed on the RST signal.

Measured value: _____116ms_________



The signal from ALE was given to channel 1 and the Reset signal to channel 2
The push button is pressed which makes the RST(Purple wave) signal go HIGH and ass soon as the pushbutton is released the Processor resets and the RST signal hoes low. After that noise from the ALE signal is obtained. In this case measured using cursor is 116ms.

5. **What frequency is present at the ALE pin?** Use an oscilloscope. _______1.843MHz_______



Measuring the frequency at ALE.

Lesson learned: Always check for faulty Probes on the oscilloscope or IC becoming loose from the socket.