

# THỰC HÀNH VI XỬ LÝ – VI ĐIỀU KHIỂN

GVHD: Phạm Minh Quân

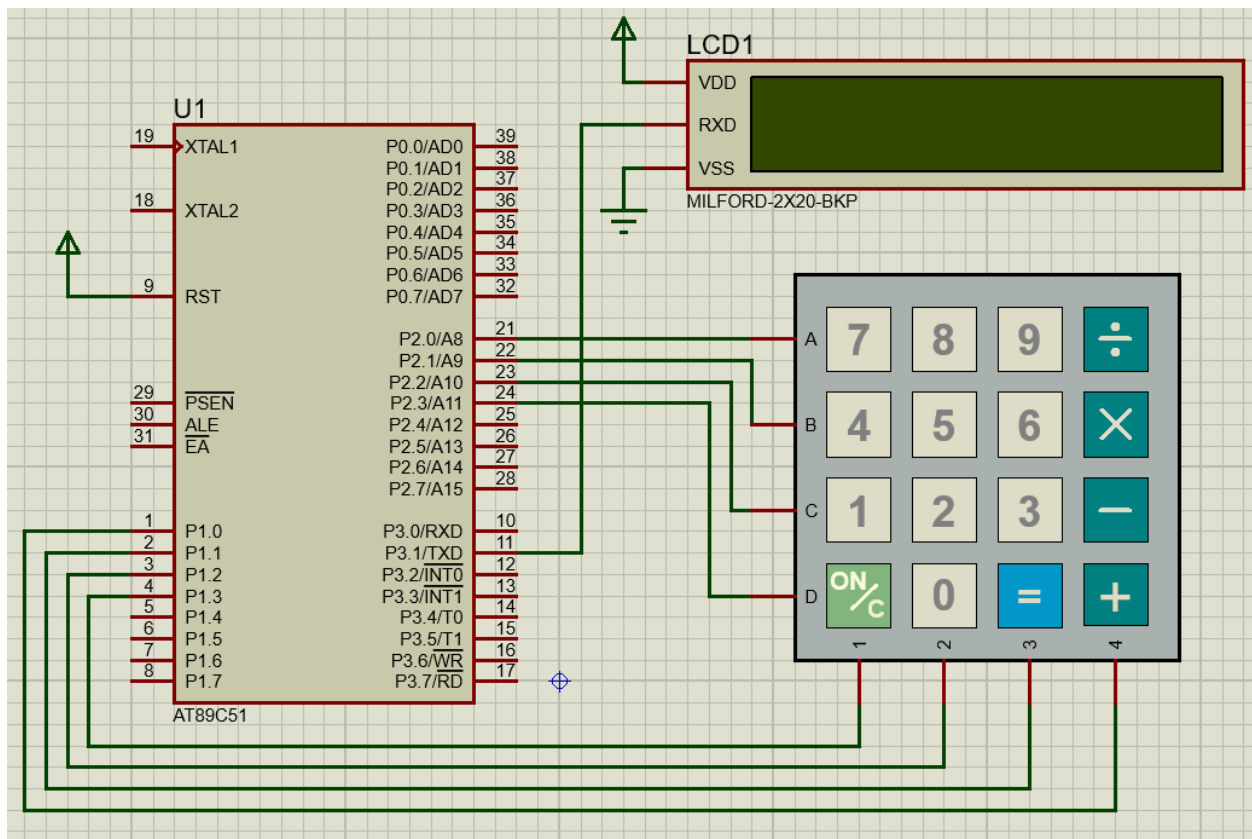
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## BÁO CÁO THỰC HÀNH LAB 6

### SỬ DỤNG UART

#### 1. Schematic Capture



#### 2. Giải thích code để xây dựng 1 máy tính cầm tay, hiển thị phép tính và kết quả trên 1 LCD nhận dữ liệu qua UART

- Source code

```

1
2
3 $NOMOD51
4 $INCLUDE (8051.MCU)
5
6
7     X     EQU 30H
8     Y     EQU 31H
9     OP    EQU 32H
10    Dau   EQU 33H
11    Dau_X EQU 34H
12    Dau_Y EQU 35H
13    SPACE EQU 80H
14
15    org    0000h
16    jmp    Start
17
18    ;=====
19    ; ma tran keypad
20    ORG 300H
21    RowD: DB '+', '=', '0', 'C' ; hang D
22    RowC: DB '-', '3', '2', '1' ; hang C
23    RowB: DB 'x', '6', '5', '4' ; hang B
24    RowA: DB '/', '9', '8', '7' ; hang A
25
26    ;=====
27    ; ham delay
28
29    Delay:
30        MOV TL0, #LOW(55536)
31        MOV TH0, #HIGH(55536)
32
33    AGAIN:
34        JNB TF0, $
35        CLR TF0
36        CLR TR0
37    RET
38
39    ;=====
40    ; CODE SEGMENT
41    ;=====
42
43    org    0100h
44    Start:
45        MOV TMOD, #21H ; set timer che do 1 va che do cua uart
46        MOV TH1, #0FDH
47        MOV SCON, #50H ; set up cho UART
48        SETB TR1 ; chay timer 1
49
50        MOV R0, SPACE
51        MOV R2, #0
52        MOV R3, #0
53        MOV X, #0
54        MOV Y, #0
55        MOV Dau, #'+'
56        MOV Dau_X, #1
57        MOV Dau_Y, #1
58        MOV OP, #0
59
60    Loop:
61        CALL KP ; ham doc input
62        jmp Loop

```

```

63
64 ;=====
65 ; Ham con de doc input tu key pad
66
67 KP:
68     MOV P2, #0
69     MOV A, P1          ; doc tin hieu P1
70     ANL A, #0FH
71     CJNE A, #0FH, KP; neu khong co tin hieu nhan, lap lai vong lap check
72 Press:
73     LCALL Delay
74     MOV A, P1          ; doc tin hieu P1
75     ANL A, #0FH
76     CJNE A, #0FH, Col_Check ; neu co tin hieu nhan, check cot
77     SJMP Press        ; neu khong thi doi tin hieu nhan
78 Col_Check:
79     MOV P2, #0F7H      ; Cot 0
80     MOV A, P1
81     ANL A, #0FH
82     CJNE A, #0FH, DOC_R0
83
84     MOV P2, #0FBH      ; Cot 1
85     MOV A, P1
86     ANL A, #0FH
87     CJNE A, #0FH, DOC_R1
88
89     MOV P2, #0FDH      ; Cot 2
90     MOV A, P1
91     ANL A, #0FH
92     CJNE A, #0FH, DOC_R2
93
94     MOV P2, #0FEH      ; Cot 3
95     MOV A, P1
96     ANL A, #0FH
97     CJNE A, #0FH, DOC_R3
98     LJMP Press        ; Doi neu khong co tin hieu nhan
99
100 DOC_R0:
101     MOV DPTR, #RowD    ; Load dia chi hang D
102     JMP DOC_KP
103 DOC_R1:
104     MOV DPTR, #RowC    ; Load dia chi hang C
105     JMP DOC_KP
106 DOC_R2:
107     MOV DPTR, #RowB    ; Load dia chi hanng B
108     JMP DOC_KP
109 DOC_R3:
110     MOV DPTR, #RowA    ; Load dia chi hang A
111     JMP DOC_KP
112 DOC_KP:
113     RRC A              ; dich bit sang phai, bit ngoai cung ben phai duoc load vao Carry Flag
114     JNC MATCH          ; Neu Carry Flag khong bat, tiep tục
115     INC DPTR           ; giam gia tri con tro
116     SJMP DOC_KP       ; tiep tục DOC_KP
117 MATCH:
118     CLR A
119     MOVC A, @A + DPTR
120     CJNE A, #'=', CON_MATCH ; neu khong nhan Dau =, chuyen sang CON_MATCH
121     DEC R0
122     LCALL Hien_Thi     ; hien thi so
123     LCALL Ket_Qua     ; hien thi ket qua
124     SJMP END_MATCH

```

```

125
126 CON_MATCH:
127     LCALL Nhap
128     CJNE A, #'C', KHONG_XOA ; neu khong nhan 'C' (clear) , chuyen sang KHONG_XOA
129     LCALL CLEAR             ; xoa tat ca nhung gi hien thi tren man hinh neu nhan 'C'
130     SJMP END_MATCH
131 KHONG_XOA:
132     DEC R0                  ;
133     CALL Hien_Thi           ; hien thi so
134 END_MATCH:
135 RET
136 ;=====
137 ; Ham input
138
139 Nhap:
140 Phep_Cong:
141     CJNE A, #'+', Phep_Tru
142     MOV OP, #1
143     SJMP END_Nhap
144 Phep_Tru:
145     CJNE A, #'-', Phep_Nhan
146     CJNE R3, #1, X_AM
147     MOV Dau_Y, #0
148     ; Kiem tra xem da nhap Dau gi chua
149     MOV R1, OP
150     CJNE R1, #0, END_Nhap
151     MOV OP, #1
152     SJMP END_Nhap
153 X_AM:
154     MOV Dau_X, #0
155     SJMP END_Nhap
156 Phep_Nhan:
157     CJNE A, #'x', Phep_Chia
158     MOV OP, #3
159     SJMP END_Nhap
160 Phep_Chia:
161     CJNE A, #'/', Nhap_tiep
162     MOV OP, #4
163     SJMP END_Nhap
164
165 Nhap_tiep:
166     MOV R1, OP
167     SUBB A, #48
168     CJNE R1, #0, NHAP_Y ; neu da nhap Dau thi nhap Y
169 NHAP_X:
170     MOV R3, #1
171     MOV R1, A
172     MOV A, X
173     MOV B, #10
174     MUL AB
175     ADD A, R1
176     MOV X, A
177     MOV A, R1
178     ADD A, #48
179     SJMP END_Nhap
180 NHAP_Y:
181     MOV R1, A
182     MOV A, Y
183     MOV B, #10
184     MUL AB
185     ADD A, R1
186     MOV Y, A

```

```

187     MOV A, R1
188     ADD A, #48
189 END_Nhap:
190 RET
191 ;=====
192 ; Ham de dao Dau + -
193
194 Dao_Dau:
195     MOV A, Dau_X
196     MOV B, Dau_Y
197     XRL A, B
198     CJNE A, #1, End_Dao_Dau; neu A khong bang 1, end Dao_Dau
199     MOV Dau, #'-'          ; Doi Dau
200 End_Dao_Dau:
201 RET
202
203 ;=====
204 ; Ham tinh toan
205
206 Tinh_Toan:
207     MOV R1, OP
208 Cong_Tru:
209     CJNE R1, #1, TT_Nhan
210     LCALL Dao_Dau
211     MOV Dau, #'+'
212     CJNE A, #0, Con_Cong
213     MOV A, X
214     MOV B, Y
215     ADD A, B
216
217     MOV R4, Dau_X
218     CJNE R4, #1, KetQuaAm
219     SJMP END_Tinh_Toan
220 Con_Cong:
221     MOV A, X
222     MOV B, Y
223     SUBB A, B
224     JC A_BeHon_B
225     MOV R4, Dau_X
226     CJNE R4, #1, KetQuaAm
227     SJMP END_Tinh_Toan
228
229 A_BeHon_B:
230     CPL A
231     INC A
232     MOV R4, Dau_Y
233     CJNE R4, #1, KetQuaAm
234     SJMP END_Tinh_Toan
235 KetQuaAm:
236     MOV Dau, #'-'
237 TT_Nhan:
238     CJNE R1, #3, TT_Chia
239     LCALL Dao_Dau
240     MOV A, X
241     MOV B, Y
242     MUL AB
243 TT_Chia:
244     CJNE R1, #4, END_Tinh_Toan
245     MOV A, Y
246     CJNE A, #0, Chia_Khac_0
247 ; Chia cho 0
248     MOV R2, #1

```

```

249     SJMP END_Tinh_Toan
250 Chia_Khac_0:
251     MOV A, X
252     SUBB A, B
253     JC Chia_So_Lon
254     LCALL Dao_Dau
255     MOV A, X
256     MOV B, Y
257     DIV AB
258     CJNE A, #0, END_Tinh_Toan
259 ; Triet tieu Dau:
260     MOV Dau, #'+'
261     SJMP END_Tinh_Toan
262 Chia_So_Lon:
263     MOV A, #0
264
265 END_Tinh_Toan:
266 RET
267 ;=====
268 ; Ham tra ket qua
269
270 Ket_Qua:
271     LCALL Tinh_Toan
272     CJNE R2, #1, Ket_Qua_1; neu R2 khong = 1, chuyen sang Ket_Qua_1
273 ; ket qua Loi
274     MOV A, #'E'
275     LCALL Hien_Thi          ; 'E'
276
277     MOV A, #'R'
278     LCALL Hien_Thi          ; 'R'
279
280     MOV A, #'R'
281     LCALL Hien_Thi          ; 'R'
282
283     MOV A, #'O'
284     LCALL Hien_Thi          ; 'O'
285
286     MOV A, #'R'
287     LCALL Hien_Thi          ; 'R'
288
289     MOV A, R0
290     SUBB A, #5
291     MOV R0, A
292     SJMP End_Ket_Qua
293 Ket_Qua_1:
294     MOV R1, #0
295 PUSH_A:
296     MOV B, #10
297     DIV AB
298     PUSH B
299     DEC R0
300     INC R1
301     CJNE A, #0, PUSH_A
302 ;Ktra Dau
303     MOV A, Dau
304     CJNE A, #'- ', POP_A
305     LCALL Hien_Thi
306     DEC R0
307 POP_A:
308     POP B
309     MOV A, B
310     ADD A, #48

```

```

311     LCALL Hien_Thi
312     DJNZ R1, POP_A
313 End_Ket_Qua:
314     RET
315
316 ;=====
317 ; Ham hien thi
318
319 Hien_Thi:
320     MOV SBUF, A          ; chuyen A vao buffer
321 HERE:
322     JNB TI, $            ; wait cho co ngat truyen
323     CLR TI               ; xoa co ngat truyen
324     RET
325
326 ;=====
327 ; Ham clear man hinh
328 CLEAR:
329     MOV A, #' '
330     MOV R1, #128
331 CLEAR1:
332     LCALL Hien_Thi       ; goi ham hien thi
333     DJNZ R1, CLEAR1      ; lap lai viec giam R1
334 CLEAR2:
335     LCALL Hien_Thi
336     DJNZ R0, CLEAR2      ; Lap lai viec giam R0
337     LCALL Resettt       ; goi ham reset
338     RET
339
340 ;=====
341 ; Ham reset
342
343 Resettt:
344     MOV R0, SPACE
345     MOV R2, #0
346     MOV R3, #0
347     MOV X, #0
348     MOV Y, #0
349     MOV Dau, #'+'
350     MOV OP, #0
351     MOV Dau_X, #1
352     MOV Dau_Y, #1
353     RET
354
355
356     END

```

- Link code và video: [22521126\\_NguyenGiaPhuc](#)