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1 ;====================================================================

2 ;

3 ; Author : ADI - Apps

4 ;

5 ; Date : 11/19/99

6 ;

7 ; File : UART.asm

8 ;

9 ; Hardware : ADuC824

10 ;

11 ; Description : This Program saves 16 numbers in order initially

12 ; starting with 0 into memory locations 40h to 50h.

13 ; When finished the values in these locations are

14 ; transmitted down the UART in ASCII form to the PC

15 ; where they can be viewed using Hyperterminal.

16 ;

17 ; After the transmission of the 16 bytes a 5 second

18 ; delay is called and the process is repeated, this

19 ; time starting with the saving of 10h to location

20 ; 40h.

21 ;

22 ;====================================================================

23 ;

24 $MOD824 ;Use 8052 predefined Symbols

25

00B4 26 LED EQU P3.4

27

28 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

29 ; BEGINNING OF CODE

---- 30 CSEG

0000 31 ORG 0000H

32

0000 020060 33 JMP MAIN

34

0060 35 ORG 0060H ; Start code at address above interrupts

36

37

0060 38 MAIN: ; Main program

39

0060 75CBFF 40 MOV RCAP2H,#0FFh ; config UART for 9830baud

0063 75CAFB 41 MOV RCAP2L,#-5 ; (close enough to 9600baud)

0066 75CDFF 42 MOV TH2,#0FFh

0069 75CCFB 43 MOV TL2,#-5

006C 759852 44 MOV SCON,#52h

006F 75C834 45 MOV T2CON,#34h

46

0072 7800 47 MOV R0, #00 ; start output data at 0

0074 7940 48 MOV R1, #40h ; initialise R1 to 40 to store the

49 ; input data from memory location 40

0076 50 SAVENOS:

0076 E8 51 MOV A,R0

0077 F7 52 MOV @R1, A ; move R0 into memory location R1

0078 09 53 INC R1 ; increment memory location and data so

54 ; new data is stored in new address

0079 08 55 INC R0

007A B950F9 56 CJNE R1, #50H, SAVENOS ; reset memory location to 40h

57 ; when memory location reaches 50h

58 ; saving 16 bytes of data

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59

60 ; Transmit the values in locations 40h->50h up the UART wait for

61 ; 5 seconds and then repeat

62

63

007D B2B4 64 START: CPL LED ;CPL LED with each transmission

007F 9000F6 65 MOV DPTR, #TITLE

0082 1200AA 66 CALL SENDSTRING ; write title block on screen

67

0085 7940 68 MOV R1, #40h ; move value at address 40 into R2

0087 E7 69 MOV A, @R1

0088 FA 70 MOV R2, A

71

0089 72 NEXT: ; Put new value on a new line

0089 740A 73 MOV A, #10 ; Transmit a linefeed (= ASCII 10)

008B 1200C2 74 CALL SENDCHAR

008E 740D 75 MOV A, #13 ;Transmit a carriage return (=ASCII 13)

0090 1200C2 76 CALL SENDCHAR

77

0093 EA 78 MOV A, R2 ; Transmit R2 i.e. value @ address R1

0094 1200CA 79 CALL SENDVAL

0097 09 80 INC R1 ; Increment address

0098 E7 81 MOV A, @R1

0099 FA 82 MOV R2, A ; R2 holds the value @ addrR1

83

009A E9 84 MOV A, R1 ; Check if at address 50h

009B B450EB 85 CJNE A, #50h, NEXT ; if not jump to Next

009E 0200A1 86 JMP WAIT5S ; if so wait 5s and repeat

87

00A1 7432 88 WAIT5S: MOV A, #50

00A3 1200EA 89 CALL DELAY ; Wait 5 seconds

00A6 7940 90 MOV R1, #40h

00A8 80CC 91 JMP SAVENOS ; Resave new numbers to same addresses

92

93

94 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

95 ; SENDSTRING

96

00AA 97 SENDSTRING: ; sends ASCII string to UART starting at location

98 ; DPTR and ending with a null (0) value

99

00AA C0E0 100 PUSH ACC

00AC C0F0 101 PUSH B

00AE E4 102 CLR A

00AF F5F0 103 MOV B,A

00B1 E5F0 104 IO0010: MOV A,B

00B3 05F0 105 INC B

00B5 93 106 MOVC A,@A+DPTR

00B6 6005 107 JZ IO0020

00B8 1200C2 108 CALL SENDCHAR

00BB 80F4 109 JMP IO0010

00BD D0F0 110 IO0020: POP B

00BF D0E0 111 POP ACC

112

00C1 22 113 RET

114

115 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

116 ; SENDCHAR

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117

00C2 118 SENDCHAR: ; sends ASCII value contained in A to UART

119

00C2 3099FD 120 JNB TI,$ ; wait til present char gone

00C5 C299 121 CLR TI ; must clear TI

00C7 F599 122 MOV SBUF,A

123

00C9 22 124 RET

125

126 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

127 ; SENDVAL

128

00CA 129 SENDVAL: ; converts the hex value of A into two ASCII chars,

130 ; and then spits these two characters up the UART.

131 ; does not change the value of A.

132

00CA C0E0 133 PUSH ACC

00CC C4 134 SWAP A

00CD 1200DE 135 CALL HEX2ASCII

00D0 11C2 136 CALL SENDCHAR ; send high nibble

00D2 D0E0 137 POP ACC

00D4 C0E0 138 PUSH ACC

00D6 1200DE 139 CALL HEX2ASCII

00D9 11C2 140 CALL SENDCHAR ; send low nibble

00DB D0E0 141 POP ACC

142

00DD 22 143 RET

144

145

146 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

147 ; HEX2ASCII

148

00DE 149 HEX2ASCII: ; converts A into the hex character representing the

150 ; value of A's least significant nibble

151

00DE 540F 152 ANL A,#00Fh

00E0 B40A00 153 CJNE A,#00Ah,$+3

00E3 4002 154 JC IO0030

00E5 2407 155 ADD A,#007h

00E7 2430 156 IO0030: ADD A,#'0'

157

00E9 22 158 RET

159

160 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

161 ; DELAY

162

00EA 163 DELAY: ; Delays by 100ms \* A

164 ; 100mSec based on 1.5728MHZ

165 ; Core Clock

166 ; i.e. default ADuC824 Clock

167

00EA F9 168 MOV R1,A ; Acc holds delay variable

00EB 7A19 169 DLY0: MOV R2,#019h ; Set up delay loop0

00ED 7BFE 170 DLY1: MOV R3,#0FEh ; Set up delay loop1

00EF DBFE 171 DJNZ R3,$ ; Dec R3 & Jump here until R2 is 0

00F1 DAFA 172 DJNZ R2,DLY1 ; Dec R2 & Jump DLY1 until R1 is 0

00F3 D9F6 173 DJNZ R1,DLY0 ; Dec R1 & Jump DLY0 until R0 is 0

00F5 22 174 RET ; Return from subroutine

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175

176 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

177

178

00F6 0A0A0D5F 179 TITLE: DB 10,10,13,'\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_',10,13

00FA 5F5F5F5F

00FE 5F5F5F5F

0102 5F5F5F5F

0106 5F5F5F5F

010A 5F5F5F5F

010E 5F5F5F5F

0112 5F5F5F5F

0116 5F5F5F5F

011A 5F5F5F0A

011E 0D

011F 416E616C 180 DB 'Analog Devices MicroConverter ADuC824',10,13

0123 6F672044

0127 65766963

012B 6573204D

012F 6963726F

0133 436F6E76

0137 65727465

013B 72204144

013F 75433832

0143 340A0D

0146 20202020 181 DB ' UART Demo Routine',10,13

014A 20202020

014E 20554152

0152 54204465

0156 6D6F2052

015A 6F757469

015E 6E650A0D

0162 20204461 182 DB ' Data Stored in Memory in Hex Form',10,13,0

0166 74612053

016A 746F7265

016E 6420696E

0172 204D656D

0176 6F727920

017A 696E2048

017E 65782046

0182 6F726D0A

0186 0D00

183

184

185 END

VERSION 1.2h ASSEMBLY COMPLETE, 0 ERRORS FOUND

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ACC. . . . . . . . . . . . . . . D ADDR 00E0H PREDEFINED

B. . . . . . . . . . . . . . . . D ADDR 00F0H PREDEFINED

DELAY. . . . . . . . . . . . . . C ADDR 00EAH

DLY0 . . . . . . . . . . . . . . C ADDR 00EBH

DLY1 . . . . . . . . . . . . . . C ADDR 00EDH

HEX2ASCII. . . . . . . . . . . . C ADDR 00DEH

IO0010 . . . . . . . . . . . . . C ADDR 00B1H

IO0020 . . . . . . . . . . . . . C ADDR 00BDH

IO0030 . . . . . . . . . . . . . C ADDR 00E7H

LED. . . . . . . . . . . . . . . NUMB 00B4H

MAIN . . . . . . . . . . . . . . C ADDR 0060H

NEXT . . . . . . . . . . . . . . C ADDR 0089H

P3 . . . . . . . . . . . . . . . D ADDR 00B0H PREDEFINED

RCAP2H . . . . . . . . . . . . . D ADDR 00CBH PREDEFINED

RCAP2L . . . . . . . . . . . . . D ADDR 00CAH PREDEFINED

SAVENOS. . . . . . . . . . . . . C ADDR 0076H

SBUF . . . . . . . . . . . . . . D ADDR 0099H PREDEFINED

SCON . . . . . . . . . . . . . . D ADDR 0098H PREDEFINED

SENDCHAR . . . . . . . . . . . . C ADDR 00C2H

SENDSTRING . . . . . . . . . . . C ADDR 00AAH

SENDVAL. . . . . . . . . . . . . C ADDR 00CAH

START. . . . . . . . . . . . . . C ADDR 007DH NOT USED

T2CON. . . . . . . . . . . . . . D ADDR 00C8H PREDEFINED

TH2. . . . . . . . . . . . . . . D ADDR 00CDH PREDEFINED

TI . . . . . . . . . . . . . . . B ADDR 0099H PREDEFINED

TITLE. . . . . . . . . . . . . . C ADDR 00F6H

TL2. . . . . . . . . . . . . . . D ADDR 00CCH PREDEFINED

WAIT5S . . . . . . . . . . . . . C ADDR 00A1H