TEMPUART PAGE 1

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

2 ;

3 ; Author : ADI - Apps

4 ;

5 ; Date : November 2001

6 ;

7 ; File : TempUart.asm

8 ;

9 ; Hardware : ADuC836

10 ;

11 ; Description : This Program takes a temperature measurement every

12 ; second from the on-chip temp sensor and sends the

13 ; temp in degrees Celcius up the UART to the PC where

14 ; it can be read using hyperterminal

15 ;====================================================================

16 ;

17 $MOD836 ; Use 8052 / ADuC836 predefined Symbols

18

00B4 19 LED EQU P3.4

0000 20 FLAG EQU 00h

21

22 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

23 ; DEFINE VARIABLES IN INTERNAL RAM

---- 24 DSEG

25

0033 26 ORG 0033h

0033 27 COUNT1: DS 1

0034 28 COUNT2: DS 1

0035 29 COUNT3: DS 1

0036 30 DIG1: DS 1

0037 31 DIG2: DS 1

0038 32 DIG3: DS 1

33 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

34 ; BEGINNING OF CODE

---- 35 CSEG

0000 36 ORG 0000H

37

0000 020060 38 JMP MAIN

39

40 ;====================================================================

41

0060 42 ORG 0060H ; Start code at address above interrupts

43

44

45

0060 46 MAIN: ; Main program

47

0060 759E82 48 MOV T3CON,#82h

0063 759D12 49 MOV T3FD,#12h

0066 759852 50 MOV SCON,#52h

51

52 ; Configure ADC

0069 75D110 53 MOV ADCMODE, #10H ; ENABLE AUX Mode - Power down

006C 75D320 54 MOV ADC1CON, #20H ; USE INTERNAL REFERENCE

55 ; PTAT(+) --> PTAT(-)

56 ; BIPOLAR MODE

57 ; Fixed +/- 2.5V range

58

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006F 900101 59 MOV DPTR, #TITLE

0072 1200DD 60 CALL SENDSTRING ; write title block on screen

61

62 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

63 ; TEMP MEASURE LOOP

0075 64 TEMPLOOP:

0075 75D112 65 MOV ADCMODE, #12H ; INITIATE A SINGLE AUX CONV

0078 30DEFD 66 JNB RDY1,$ ; Wait for conversion results

67

68 ; conversion result ready

69 ; a value of 80h in AD1H=0degC

70

007B E5DD 71 MOV A, ADC1H ; 80h=0, FFh=+127, 00h=-128

007D C3 72 CLR C

007E 9480 73 SUBB A, #80H ; convert to 2's comp

74 ; FFh=-1, 80h=-128, 00h=0, 7Fh=+127

75

76

0080 77 SENDDECs: ; SENDs the signed decimal number in Acc up UART

78 ; -128->127

0080 C0F0 79 PUSH B

0082 C0E0 80 PUSH ACC

0084 30E70B 81 JNB ACC.7, HUNDREDS

0087 742D 82 MOV A, #'-' ; transmit minus sign

0089 1200D5 83 CALL SENDCHAR

008C D0E0 84 POP ACC ; restore original value of A

008E C0E0 85 PUSH ACC ; remember original value of A

0090 F4 86 CPL A

0091 04 87 INC A

88

0092 89 HUNDREDS: ; check #hundreds

0092 75F064 90 MOV B, #100 ; divide remainder by 100

0095 84 91 DIV AB ; A receives integer quotient

92 ; B receives the remainder

0096 D2D5 93 SETB F0

0098 6007 94 JZ TENS ; if ACC=0 then num=0xx

009A C2D5 95 CLR F0

009C 2430 96 ADD A, #'0'

009E 1200D5 97 LCALL SENDCHAR

98

00A1 99 TENS: ; check tens

00A1 E5F0 100 MOV A,B

00A3 75F00A 101 MOV B,#10

00A6 84 102 DIV AB ; divide remainder by 10

00A7 30D502 103 JNB F0, SEND0 ; if F0 is cleared the a number

104 ; exists in the 100s

00AA 6005 105 JZ UNITS

106

00AC 2430 107 SEND0: ADD A, #'0' ; only send a zero if number

00AE 1200D5 108 CALL SENDCHAR ; existed in the 100s

109

00B1 E5F0 110 UNITS: MOV A,B ; send remainder (even if 0)

00B3 2430 111 ADD A, #'0'

00B5 1200D5 112 CALL SENDCHAR

00B8 D0E0 113 POP ACC

00BA D0F0 114 POP B

115

00BC 9000F4 116 MOV DPTR, #DEGREES

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00BF 1200DD 117 CALL SENDSTRING

00C2 7401 118 MOV A, #01

00C4 1200C9 119 CALL DELAY

120

00C7 80AC 121 JMP TEMPLOOP

122

123 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

124 ; DELAY

125

00C9 126 DELAY: ; Delays by 100ms \* A

127 ; 100mSec based on 1.573MHZ Core Clock

128

00C9 FA 129 MOV R2,A ; Acc holds delay variable

00CA 7B32 130 DLY0: MOV R3,#50 ; Set up delay loop0

00CC 7C83 131 DLY1: MOV R4,#131 ; Set up delay loop1

00CE DCFE 132 DJNZ R4,$ ; Dec R4 & Jump here until R4 is 0

133 ; wait here for 131\*15.3us=2ms

00D0 DBFA 134 DJNZ R3,DLY1 ; Dec R3 & Jump DLY1 until R3 is 0

135 ; Wait for 50\*2ms

00D2 DAF6 136 DJNZ R2,DLY0 ; Dec R2 & Jump DLY0 until R2 is 0

137 ; wait for ACC\*100ms

00D4 22 138 RET ; Return from subroutine

139

140 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

141 ; SENDCHAR

142

00D5 143 SENDCHAR: ; sends ASCII value contained in A to UART

144

00D5 3099FD 145 JNB TI,$ ; wait til present char gone

00D8 C299 146 CLR TI ; must clear TI

00DA F599 147 MOV SBUF,A

148

00DC 22 149 RET

150

151 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

152 ; SENDSTRING

153

00DD 154 SENDSTRING: ; sends ASCII string to UART starting at location

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

156

00DD C0E0 157 PUSH ACC

00DF C0F0 158 PUSH B

00E1 E4 159 CLR A

00E2 F5F0 160 MOV B,A

00E4 E5F0 161 IO0010: MOV A,B

00E6 05F0 162 INC B

00E8 93 163 MOVC A,@A+DPTR

00E9 6004 164 JZ IO0020

00EB 11D5 165 CALL SENDCHAR

00ED 80F5 166 JMP IO0010

00EF D0F0 167 IO0020: POP B

00F1 D0E0 168 POP ACC

169

00F3 22 170 RET

171

172 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

173

00F4 20646567 174 DEGREES: DB ' degrees C',10,13,0

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00F8 72656573

00FC 20430A0D

0100 00

175

176

0101 0A0A0D5F 177 TITLE: DB 10,10,13,'\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_',10,13

0105 5F5F5F5F

0109 5F5F5F5F

010D 5F5F5F5F

0111 5F5F5F5F

0115 5F5F5F5F

0119 5F5F5F5F

011D 5F5F5F5F

0121 5F5F5F5F

0125 5F5F5F0A

0129 0D

012A 416E616C 178 DB 'Analog Devices MicroConverter ADuC836',10,13

012E 6F672044

0132 65766963

0136 6573204D

013A 6963726F

013E 436F6E76

0142 65727465

0146 72204144

014A 75433833

014E 360A0D

0151 20202020 179 DB ' Temp Sensor Demo Routine',10,13,0

0155 20205465

0159 6D702053

015D 656E736F

0161 72204465

0165 6D6F2052

0169 6F757469

016D 6E650A0D

0171 00

180

181 END

VERSION 1.2h ASSEMBLY COMPLETE, 0 ERRORS FOUND

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

ADC1CON. . . . . . . . . . . . . D ADDR 00D3H PREDEFINED

ADC1H. . . . . . . . . . . . . . D ADDR 00DDH PREDEFINED

ADCMODE. . . . . . . . . . . . . D ADDR 00D1H PREDEFINED

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

COUNT1 . . . . . . . . . . . . . D ADDR 0033H NOT USED

COUNT2 . . . . . . . . . . . . . D ADDR 0034H NOT USED

COUNT3 . . . . . . . . . . . . . D ADDR 0035H NOT USED

DEGREES. . . . . . . . . . . . . C ADDR 00F4H

DELAY. . . . . . . . . . . . . . C ADDR 00C9H

DIG1 . . . . . . . . . . . . . . D ADDR 0036H NOT USED

DIG2 . . . . . . . . . . . . . . D ADDR 0037H NOT USED

DIG3 . . . . . . . . . . . . . . D ADDR 0038H NOT USED

DLY0 . . . . . . . . . . . . . . C ADDR 00CAH

DLY1 . . . . . . . . . . . . . . C ADDR 00CCH

F0 . . . . . . . . . . . . . . . B ADDR 00D5H PREDEFINED

FLAG . . . . . . . . . . . . . . NUMB 0000H NOT USED

HUNDREDS . . . . . . . . . . . . C ADDR 0092H

IO0010 . . . . . . . . . . . . . C ADDR 00E4H

IO0020 . . . . . . . . . . . . . C ADDR 00EFH

LED. . . . . . . . . . . . . . . NUMB 00B4H NOT USED

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

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

RDY1 . . . . . . . . . . . . . . B ADDR 00DEH PREDEFINED

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

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

SEND0. . . . . . . . . . . . . . C ADDR 00ACH

SENDCHAR . . . . . . . . . . . . C ADDR 00D5H

SENDDECS . . . . . . . . . . . . C ADDR 0080H NOT USED

SENDSTRING . . . . . . . . . . . C ADDR 00DDH

T3CON. . . . . . . . . . . . . . D ADDR 009EH PREDEFINED

T3FD . . . . . . . . . . . . . . D ADDR 009DH PREDEFINED

TEMPLOOP . . . . . . . . . . . . C ADDR 0075H

TENS . . . . . . . . . . . . . . C ADDR 00A1H

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

TITLE. . . . . . . . . . . . . . C ADDR 0101H

UNITS. . . . . . . . . . . . . . C ADDR 00B1H