DATAFLSH PAGE 1

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3 ; Author : ADI - Apps www.analog.com/MicroConverter

4 ;

5 ; Date : November 2001

6 ;

7 ; File : dataflsh.asm

8 ;

9 ; Hardware : ADuC836

10 ;

11 ; Description : Demonstrates use of the on-chip read/write 4096 byte

12 ; FlashEE data memory space. Stores a sequence of

13 ; button presses (INT0 button on eval board) in data

14 ; FlashEE space. Replays sequence on LED when board

15 ; is reset or power cycled.

16 ; The ADuC836 stores the play sequece in data flash

17 ; until another is recorded with a new set of button

18 ; presses. To record a new sequence, just wait until

19 ; the current one finishes playing (LED is off) and

20 ; enter new sequence via button (INT0).

21 ;

22 ;\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

23

24 $MOD836 ; Use 8052&ADuC836 predefined symbols

25

00B4 26 LED EQU P3.4 ; P3.4 drives red LED on eval board

00B2 27 BUTTON EQU P3.2 ; button on eval board drives P3.2

00D5 28 PREVIOUS EQU F0 ; flag to hold previous button value

0001 29 READ EQU 01h ; FlashEE command: 'read page'

0002 30 WRITE EQU 02h ; FlashEE command: 'write page'

0004 31 VERIFY EQU 04h ; FlashEE command: 'verify page'

0005 32 ERASE EQU 05h ; FlashEE command: 'erase page'

0006 33 ERASEALL EQU 06h ; FlashEE command: 'erase all'

34 ;--------------------------------------------------------------------

35 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

36 ; BEGINNING OF CODE

---- 37 CSEG

38

0000 39 ORG 0000h

40

0000 41 MAIN:

0000 C2B4 42 CLR LED ; turn LED off

0002 75C700 43 MOV EADRH,#0 ; set data FlashEE address to page 0

0005 75C600 44 MOV EADRL,#0

45

46 ; READ FLASH/EE DATA and indicate values via LED on and off times...

47

0008 48 READFLASH:

0008 75B901 49 MOV ECON,#READ ; read current 4byte page of FlashEE

50 ; into EDATA1,2,3,4

000B E5BF 51 MOV A,EDATA4

000D B40111 52 CJNE A,#1,RECORD ; if EDATA4 is 1, then page contains

53 ; a valid play sequence

54 ; => Play this sequence

55 ; otherwise jump to record mode

56

57

58 ;--------------------------------------------------------------------

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0010 59 PLAYBACK:

0010 12005A 60 CALL BLINK ; flash LED for period determined

61 ; by FlashEE data just read

0013 E5C6 62 MOV A,EADRL

0015 B4FF02 63 CJNE A,#0FFh,INCPAGE1 ; if low address is FFh then increment high address

0018 05C7 64 INC EADRH

001A 65 INCPAGE1:

001A 05C6 66 INC EADRL ; increment to next FlashEE page addr

001C E5C7 67 MOV A,EADRH

001E B404E7 68 CJNE A,#04h,READFLASH

69 ; if address is less than 160 then jump

70 ; to read the next page

71 ; when PLAYBACK is finished jump to RECORD mode

72

73 ;--------------------------------------------------------------------

0021 74 RECORD:

0021 C2B4 75 CLR LED

0023 20B2FD 76 JB BUTTON,$ ; wait for first button press

77

78 ; once button is pressed, erase dataflash

0026 75B906 79 MOV ECON,#ERASEALL ; clear all data FlashEE memory

0029 75C700 80 MOV EADRH,#0

002C 75C600 81 MOV EADRL,#0

82

83 ; record time of button press

84

002F 85 RECORD\_NEXT\_TIME:

002F 120077 86 CALL RECORDTIME

87

0032 8582BC 88 MOV EDATA1,DPL ; place DPTR in EDATA1,2,3

0035 8583BD 89 MOV EDATA2,DPH

0038 8584BE 90 MOV EDATA3,DPP

003B 75BF01 91 MOV EDATA4,#1 ; put 1 in EDATA4 as identifier

003E 75B902 92 MOV ECON,#WRITE ; write EDATA1-4 into pre-erased

93 ; page of FlashEE data memory

94

0041 75B904 95 MOV ECON,#VERIFY ; verify current page is same as

0044 E5B9 96 MOV A,ECON ; EDATA1-4. If same, ECON=0.

0046 70D9 97 JNZ RECORD ; if verify fails, jump to RECORD

98

0048 E5C6 99 MOV A,EADRL

004A B4FF02 100 CJNE A,#0FFh,INCPAGE2 ; if low address is FFh then increment high address

004D 05C7 101 INC EADRH

004F 102 INCPAGE2:

004F 05C6 103 INC EADRL ; increment to next FlashEE page addr

0051 E5C7 104 MOV A,EADRH

0053 B404D9 105 CJNE A,#04h,RECORD\_NEXT\_TIME

106 ; record first 160 button presses only

107

108 ; when flash/EE data space is full turn off LED and wait

109 ; for a power cycle

0056 C2B4 110 CLR LED

0058 80FE 111 JMP $

112

113

114 ;====================================================================

115 ; FUNCTIONS

116 ;====================================================================

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119 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

120 ; SUBROUTINES

005A 121 BLINK:

122 ; Turn LED ON/OFF based on the time in EDATA3/2/1

005A B2B4 123 CPL LED

124

005C E4 125 CLR A

005D F582 126 MOV DPL,A

005F F583 127 MOV DPH,A ; clear DPTR

0061 F584 128 MOV DPP,A

129

0063 05BC 130 INC EDATA1 ; EDATA1 -> EDATA3 should be

0065 05BD 131 INC EDATA2 ; incremented for the below to work

0067 05BE 132 INC EDATA3

133

0069 134 BLINKLOOP:

135 ; the record loop takes 6 instruction cycles hence 4 NOPs are

136 ; required to make the Playback loop 6 instruction cycles also.

137 ; NOTE: the main Playback loop will jump to BLINKLOOP after

138 ; decrementing EDATA1 and hence the time required to decrement

139 ; EDATA2 (approx 1/256 time of main loop) and EDATA3 are ignored.

0069 00 140 NOP ; 1

006A 00 141 NOP ; 1

006B 00 142 NOP ; 1

006C 00 143 NOP ; 1

006D D5BCF9 144 DJNZ EDATA1, BLINKLOOP ; 2

0070 D5BDF6 145 DJNZ EDATA2, BLINKLOOP ; EDATA1 overflows back to FFh

0073 D5BEF3 146 DJNZ EDATA3, BLINKLOOP ; EDATA2 overflows back to FFh

147

0076 22 148 RET

149

150 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

151

0077 152 RECORDTIME:

153 ; Record how long button is pressed for and store in EDATA3/2/1

0077 E4 154 CLR A

0078 F582 155 MOV DPL,A

007A F583 156 MOV DPH,A ; clear DPTR

007C F584 157 MOV DPP,A

158

007E B2B4 159 CPL LED

160

161 ; measure how long the button is either pressed or released

162 ; for. If the button is pressed then the LED is on. If the

163 ; button is released then the LED is off.

0080 164 RECORDLOOP:

0080 A3 165 INC DPTR ; incrementing DPTR.. ; 2

0081 30B404 166 JNB LED, CHKB ; 2

0084 30B2F9 167 JNB BUTTON,RECORDLOOP ; 2

168 ; keep recording while button is pressed

0087 22 169 RET

0088 20B2F5 170 CHKB: JB BUTTON,RECORDLOOP ; 2

171 ; keep recording while button is released

008B 22 172 RET

173

174 ; DPP,DPH,DPL now holds a number that represents the length of

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175 ; time between button edges. this data will be stored in FlashEE

176 ; space for use in controlling LED on and off times in "play" mode.

177

178 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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180

181 END

VERSION 1.2h ASSEMBLY COMPLETE, 0 ERRORS FOUND

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BLINK. . . . . . . . . . . . . . C ADDR 005AH

BLINKLOOP. . . . . . . . . . . . C ADDR 0069H

BUTTON . . . . . . . . . . . . . NUMB 00B2H

CHKB . . . . . . . . . . . . . . C ADDR 0088H

DPH. . . . . . . . . . . . . . . D ADDR 0083H PREDEFINED

DPL. . . . . . . . . . . . . . . D ADDR 0082H PREDEFINED

DPP. . . . . . . . . . . . . . . D ADDR 0084H PREDEFINED

EADRH. . . . . . . . . . . . . . D ADDR 00C7H PREDEFINED

EADRL. . . . . . . . . . . . . . D ADDR 00C6H PREDEFINED

ECON . . . . . . . . . . . . . . D ADDR 00B9H PREDEFINED

EDATA1 . . . . . . . . . . . . . D ADDR 00BCH PREDEFINED

EDATA2 . . . . . . . . . . . . . D ADDR 00BDH PREDEFINED

EDATA3 . . . . . . . . . . . . . D ADDR 00BEH PREDEFINED

EDATA4 . . . . . . . . . . . . . D ADDR 00BFH PREDEFINED

ERASE. . . . . . . . . . . . . . NUMB 0005H NOT USED

ERASEALL . . . . . . . . . . . . NUMB 0006H

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

INCPAGE1 . . . . . . . . . . . . C ADDR 001AH

INCPAGE2 . . . . . . . . . . . . C ADDR 004FH

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

MAIN . . . . . . . . . . . . . . C ADDR 0000H NOT USED

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

PLAYBACK . . . . . . . . . . . . C ADDR 0010H NOT USED

PREVIOUS . . . . . . . . . . . . NUMB 00D5H NOT USED

READ . . . . . . . . . . . . . . NUMB 0001H

READFLASH. . . . . . . . . . . . C ADDR 0008H

RECORD . . . . . . . . . . . . . C ADDR 0021H

RECORDLOOP . . . . . . . . . . . C ADDR 0080H

RECORDTIME . . . . . . . . . . . C ADDR 0077H

RECORD\_NEXT\_TIME . . . . . . . . C ADDR 002FH

VERIFY . . . . . . . . . . . . . NUMB 0004H

WRITE. . . . . . . . . . . . . . NUMB 0002H