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1 ;\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

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5 ; Date : February 2001

6 ;

7 ; File : dataflsh.asm

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9 ; Hardware : ADuC814

10 ;

11 ; Description : Demonstrates use of the on-chip read/write 640 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 ADuC814 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 $MOD814 ; Use 8052&ADuC814 predefined symbols

25

00B3 26 LED EQU P3.3 ; P3.3 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 C2B3 42 CLR LED ; turn LED off

0002 75C600 43 MOV EADRL,#0 ; set data FlashEE address to page 0

44

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

46

0005 47 READFLASH:

0005 75B901 48 MOV ECON,#READ ; read current 4byte page of FlashEE

49 ; into EDATA1,2,3,4

0008 E5BF 50 MOV A,EDATA4

000A B4010A 51 CJNE A,#1,RECORD ; if EDATA4 is 1, then page contains

52 ; a valid play sequence

53 ; => Play this sequence

54 ; otherwise jump to record mode

55

56

57 ;--------------------------------------------------------------------

000D 58 PLAYBACK:

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000D 120043 59 CALL BLINK ; flash LED for period determined

60 ; by FlashEE data just read

0010 05C6 61 INC EADRL ; increment to next FlashEE page addr

0012 E5C6 62 MOV A,EADRL

0014 B4A0EE 63 CJNE A,#0A0h,READFLASH

64 ; if address is less than 160 then jump

65 ; to read the next page

66 ; when PLAYBACK is finished jump to RECORD mode

67

68 ;--------------------------------------------------------------------

0017 69 RECORD:

0017 C2B3 70 CLR LED

0019 20B2FD 71 JB BUTTON,$ ; wait for first button press

72

73 ; once button is pressed, erase dataflash

001C 75B906 74 MOV ECON,#ERASEALL ; clear all data FlashEE memory

001F 75C600 75 MOV EADRL,#0

76

77 ; record time of button press

78

0022 79 RECORD\_NEXT\_TIME:

0022 120059 80 CALL RECORDTIME

81

0025 8582BC 82 MOV EDATA1,DPL ; place DPTR in EDATA1,2,3

0028 8583BD 83 MOV EDATA2,DPH

002B 75BF01 84 MOV EDATA4,#1 ; put 1 in EDATA4 as identifier

002E 75B902 85 MOV ECON,#WRITE ; write EDATA1-4 into pre-erased

86 ; page of FlashEE data memory

87

0031 75B904 88 MOV ECON,#VERIFY ; verify current page is same as

0034 E5B9 89 MOV A,ECON ; EDATA1-4. If same, ECON=0.

0036 70DF 90 JNZ RECORD ; if verify fails, jump to RECORD

91

0038 05C6 92 INC EADRL ; increment to next FlashEE page addr

003A E5C6 93 MOV A,EADRL

003C B4A0E3 94 CJNE A,#0A0h,RECORD\_NEXT\_TIME

95 ; record first 160 button presses only

96

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

98 ; for a power cycle

003F C2B3 99 CLR LED

0041 80FE 100 JMP $

101

102

103 ;====================================================================

104 ; FUNCTIONS

105 ;====================================================================

106

107

108 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

109 ; SUBROUTINES

0043 110 BLINK:

111 ; Turn LED ON/OFF based on the time in EDATA2/1

0043 B2B3 112 CPL LED

113

0045 E4 114 CLR A

0046 F582 115 MOV DPL,A

0048 F583 116 MOV DPH,A ; clear DPTR

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117

004A 05BC 118 INC EDATA1 ; EDATA1 -> EDATA3 should be

004C 05BD 119 INC EDATA2 ; incremented for the below to work

120

004E 121 BLINKLOOP:

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

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

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

125 ; decrementing EDATA1 and hence the time required to decrement

126 ; EDATA2 (approx 1/256 time of main loop) ignored.

004E 00 127 NOP ; 1

004F 00 128 NOP ; 1

0050 00 129 NOP ; 1

0051 00 130 NOP ; 1

0052 D5BCF9 131 DJNZ EDATA1, BLINKLOOP ; 2

0055 D5BDF6 132 DJNZ EDATA2, BLINKLOOP ; EDATA1 overflows back to FFh

133

0058 22 134 RET

135

136 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

137

0059 138 RECORDTIME:

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

0059 E4 140 CLR A

005A F582 141 MOV DPL,A

005C F583 142 MOV DPH,A ; clear DPTR

143

005E B2B3 144 CPL LED

145

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

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

148 ; button is released then the LED is off.

0060 149 RECORDLOOP:

0060 A3 150 INC DPTR ; incrementing DPTR.. ; 2

0061 30B304 151 JNB LED, CHKB ; 2

0064 30B2F9 152 JNB BUTTON,RECORDLOOP ; 2

153 ; keep recording while button is pressed

0067 22 154 RET

0068 20B2F5 155 CHKB: JB BUTTON,RECORDLOOP ; 2

156 ; keep recording while button is released

006B 22 157 RET

158

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

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

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

162

163 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

164

165

166 END

VERSION 1.2h ASSEMBLY COMPLETE, 0 ERRORS FOUND

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BLINK. . . . . . . . . . . . . . C ADDR 0043H

BLINKLOOP. . . . . . . . . . . . C ADDR 004EH

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

CHKB . . . . . . . . . . . . . . C ADDR 0068H

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

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

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

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

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

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

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

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

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

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

LED. . . . . . . . . . . . . . . NUMB 00B3H

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

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

PLAYBACK . . . . . . . . . . . . C ADDR 000DH NOT USED

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

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

READFLASH. . . . . . . . . . . . C ADDR 0005H

RECORD . . . . . . . . . . . . . C ADDR 0017H

RECORDLOOP . . . . . . . . . . . C ADDR 0060H

RECORDTIME . . . . . . . . . . . C ADDR 0059H

RECORD\_NEXT\_TIME . . . . . . . . C ADDR 0022H

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

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