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

2 ;

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

4 ;

5 ; Date : October 2003

6 ;

7 ; File : WDtimer.asm

8 ;

9 ; Hardware : ADuC841

10 ;

11 ; Description : Demonstrates use of the on-chip watchdog timer.

12 ; In normal operation, WD timer is refreshed by code

13 ; every 100ms, as indicated by a flashing LED (10 Hz).

14 ; In a runaway code condition (which can be simulated

15 ; here by pressing the INT0 button on the eval board)

16 ; code fails to refresh WD bits, the LED stays in the

17 ; off position, before the WD timer generates a

18 ; reset after a user selected time-out period (from

19 ; 15.6ms to 2000ms) has elapsed. The time-out period

20 ; in this routine is 2.0s for visual clarity.

21 ;

22 ; After a reset the light blinks at a slower rate 5Hz.

23 ; Future watchdog resets can be enabled in the same

24 ; way. A hard reset will clear the WDS bit and the

25 ; quicker flashes will occur again.

26 ;

27 ; note: be sure to remove the PSEN pull-down

28 ; before allowing watchdog to time-out, or

29 ; you'll end up in serial download mode again

30 ; (the LED will stay in the on condition)

31 ; rather than recovering normal code execution.

32 ;

33 ;\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

34

35 $MOD841 ; Use 8052&ADuC841 predefined symbols

36

00B4 37 LED EQU P3.4 ; P3.4 drives red LED on eval board

00D5 38 ERROR EQU F0 ; the 'ERROR' flag is used here to

39 ; simulate an erroneous command that

40 ; sends code into an unknown state

41

42 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

43 ; BEGINNING OF CODE

---- 44 CSEG

45

0000 46 ORG 0000h

47

0000 020060 48 JMP MAIN ; jump to main program

49 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

50 ; EXTERNAL INTERRUPT VECTOR SPACE

0003 51 ORG 0003h ; (INT0 ISR)

52

0003 D2D5 53 SETB ERROR ; simulate an error condition..

54 ; ..when INT0 button is pressed

0005 32 55 RETI

56

57

58 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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59 ; MAIN PROGRAM

0060 60 ORG 0060h ; Start at address above interrupts

61

0060 20C205 62 MAIN: JB WDS, WDRESET

0063 780A 63 MOV R0, #10 ; this will blink the LED at 10Hz

0065 02006A 64 JMP START

65

0068 7814 66 WDRESET: MOV R0, #20 ; this will blink the LED at 5Hz

67

68 ; Enable external interupt to trigger simulated error condition...

69

006A D288 70 START: SETB IT0 ; make INT0 edge triggered

006C D2A8 71 SETB EX0 ; enable INT0 (button on eval board)

006E D2AF 72 SETB EA

73

74 ; Configure the Watchdog timer. It should be configured like this,

75 ; with the global interrupts turned off and setting WDWR to allow

76 ; writing to WDCON.

0070 C2AF 77 CLR EA

0072 D2C0 78 SETB WDWR

0074 75C072 79 MOV WDCON, #72h ; Enable Watchdog timer to cause

80 ; -2.0 second timeout period

81 ; -enable WDIR bit to generate

82 ; a reset and not an interrupt

0077 D2AF 83 SETB EA ; set global interrupts again

84

85 ; from this point forward, watchdog bits must be refreshed every

86 ; 2.0 seconds or less. if they are not, watchdog timer will

87 ; generate a reset.

88

0079 C2D5 89 CLR ERROR ; simulate error free operation

90

91 ; The below loop represents normal code execution...

92

007B E8 93 FLASH: MOV A, R0

007C 120090 94 CALL DELAY ; delay by 10ms x R0

007F B2B4 95 CPL LED ; blink (complement) the red LED

96

0081 C2AF 97 CLR EA ; refresh watchdog timer

0083 D2C0 98 SETB WDWR

0085 D2C1 99 SETB WDE

0087 D2AF 100 SETB EA

101

0089 30D5EF 102 JNB ERROR, FLASH ; jump if 'ERROR' flag is not set

103

104 ; The below endless loop represents run-away code execution...

105

008C D2B4 106 SETB LED ; turn LED off during runaway code

008E 80FE 107 JMP $ ; this endless loop is used to

108 ; represent an unknown state of

109 ; program execution

110

111 ; program will sit in the above endless loop until the watchdog

112 ; period (2000ms) has elapsed, at which time a reset will be

113 ; generated by the watchdog timer, thereby recovering the chip to

114 ; resume normal code execution.

115

116

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117 ;\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0090 118 DELAY: ; delay 10ms

0090 FA 119 MOV R2,A ; Acc holds delay variable

0091 7F90 120 DLY0: MOV R7,#090h ;

0093 7EFF 121 DLY1: MOV R6,#0FFh ;

0095 DEFE 122 DJNZ R6,$ ;

0097 DFFA 123 DJNZ R7,DLY1 ;

0099 DAF6 124 DJNZ R2,DLY0 ; Dec R2 & Jump DLY0 until R0 is 0

009B 22 125 RET ; 100ms DELAY

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

127

128 END

VERSION 1.2h ASSEMBLY COMPLETE, 0 ERRORS FOUND

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DELAY. . . . . . . . . . . . . . C ADDR 0090H

DLY0 . . . . . . . . . . . . . . C ADDR 0091H

DLY1 . . . . . . . . . . . . . . C ADDR 0093H

EA . . . . . . . . . . . . . . . B ADDR 00AFH PREDEFINED

ERROR. . . . . . . . . . . . . . NUMB 00D5H

EX0. . . . . . . . . . . . . . . B ADDR 00A8H PREDEFINED

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

FLASH. . . . . . . . . . . . . . C ADDR 007BH

IT0. . . . . . . . . . . . . . . B ADDR 0088H PREDEFINED

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

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

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

START. . . . . . . . . . . . . . C ADDR 006AH

WDCON. . . . . . . . . . . . . . D ADDR 00C0H PREDEFINED

WDE. . . . . . . . . . . . . . . B ADDR 00C1H PREDEFINED

WDRESET. . . . . . . . . . . . . C ADDR 0068H

WDS. . . . . . . . . . . . . . . B ADDR 00C2H PREDEFINED

WDWR . . . . . . . . . . . . . . B ADDR 00C0H PREDEFINED