How to Program the Watchdog Timer on AIMB series

AIMB-220/240/251/250/253

AIMB-542/562564

AIMB-763

Programming the watchdog timer

I. Programming the Watchdog Timer

This watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function after the programmed period. This section describes the operation of the watchdog timer and how to program it.

1. Watchdog timer overview

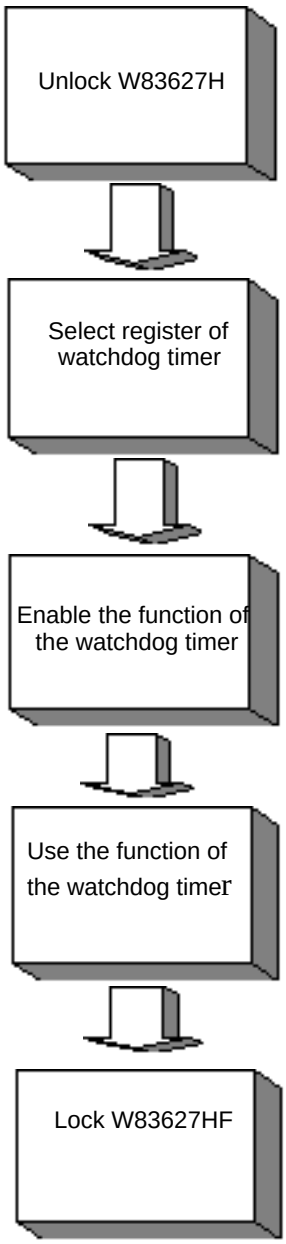
The watchdog timer is built-in the super I/O controller W83627EHG-A. It provides the following functions for user programming:

- Can be enabled and disabled by user's program
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes
- Generates an interrupt or resets signal if the software fails to reset the timer after time-out

2. Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port.

You must first assign the address of register by writing address value into address port 2E(hex), then write/read data to/from the assigned register through data port 2F (hex).



Watchdog Timer Registers		
Address of register (2E)	**Attribute**	
Read/Write	Value (2F) and description	

87 (hex)	-----	Write this address to I/O address port 2E (hex) twice to unlock theW83627HF
07 (hex)	write	Write 08 (hex) to select register of watchdog timer.
30 (hex)	write	Write 01 (hex) to enable the function of the watchdog timer. Disabled is set as default.
F5 (hex)Bit 3: set second as counting unit. [default]	write	Select WDTO# count mode. 0: Second Mode 1: Minute Mode
F5 (hex)Bit 1: set minute as counting unit	write	Disable / Enable the WDTO# output, low pulse to the KBRST# pin (PIN60) 0: Disable 1: Enable
F6 (hex)	write	0: stop timer [default] 01~FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register F5 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value.
F7 (hex)Bit 7	Read/write	Mouse interrupt reset watch-dog timer enable 0: Watchdog timer is not affected by mouse interrupt 1: Watchdog timer is reset by mouse interrupt
F7 (hex)Bit 6	Read/write	Keyboard interrupt reset watch-dog timer enable 0: Watchdog timer is not affected by keyboard interrupt 1: Watchdog timer is reset by keyboard interrupt
F7 (hex)Bit 5	Read/write	Trigger WDTO# event. This bit is self clearing.

F7 (hex)Bit 4	Read/write	WDTO# Status bit 0: Watchdog timer is running 1: Watchdog timer issues time-out event
F7 (hex)Bit 3~0	Read/write	These bits select IRQ resource for WDTO# (02h for SMI# event)
AA (hex)	-----	Write this address to I/O port 2E (hex) to lock the watchdog timer.2

Table A.1: Watchdog timer registers

3. Example Program

Example1. Enable watchdog timer and set 10 sec. as timeout interval and issue KBRST#

```
;------------------------------------------------------------
Mov dx,2eh              ; Unlock W83627HF
Mov al,87h
Out dx,al
Out dx,al
;------------------------------------------------------------
Mov al,07h              ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov   al,08h
Out   dx,al
;------------------------------------------------------------
Dec dx                  ; Enable the function of watchdog timer
Mov   al,30h
Out   dx,al
Inc   dx
Mov   al,01h
Out   dx,al
;------------------------------------------------------------
```

```
Dec dx                  ; Set second as counting unit and enalbe the WDTO#
Mov  al,0f5h
Out   dx,al
Inc    dx
In      al,dx
And al, 0f7h
Or     al,02h
Out   dx,al
;-------------------------------------------------------------
Dec dx                        ; Set timeout interval as 10 seconds and start counting
Mov  al,0f6h
Out   dx,al
Inc    dx
Mov  al,10
Out   dx,al
;-------------------------------------------------------------
Dec dx                        ; lock W83627HF
Mov  al,0aah
Out   dx,al
```

Example2. Enable watchdog timer and set 5 minutes as timeout interval and issue KBRST#

```
;-------------------------------------------------------------
Mov dx,2eh                    ; unlock W83627H
Mov al,87h
Out dx,al
Out dx,al
;-------------------------------------------------------------
Mov al,07h                    ; Select registers of watchdog timer
Out   dx,al
```

```
Inc     dx
Mov   al,08h
Out    dx,al
;-------------------------------------------------------------
Dec dx                          ; Enable the function of watchdog timer
Mov   al,30h
Out    dx,al
Inc     dx
Mov   al,01h
Out    dx,al
;-------------------------------------------------------------
Dec dx              ; Set minute as counting unit and enable the WDTO#
Mov   al,0f5h
Out    dx,al
Inc     dx
In       al,dx
Or     al,08h
Or      al,02h
Out    dx,al
;-------------------------------------------------------------
Dec dx               ; Set timeout interval as 5 minutes and start counting
Mov   al,0f6h
Out    dx,al
Inc     dx
Mov   al,5
Out    dx,al
;-------------------------------------------------------------
Dec dx               ; lock W83627HF
Mov   al,0aah
Out    dx,al
```

Example3. Enable watchdog timer to be reset by mouse

```
;--------------------------------------------------------
Mov dx,2eh                  ; unlock W83627H
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h                  ; Select registers of watchdog timer
Out   dx,al
Inc   dx
Mov   al,08h
Out   dx,al
;--------------------------------------------------------
Dec dx                      ; Enable the function of watchdog timer
Mov   al,30h
Out   dx,al
Inc   dx
Mov   al,01h
Out   dx,al
;--------------------------------------------------------
Dec dx                      ; Enable watchdog timer to be reset by mouse
Mov   al,0f7h
Out   dx,al
Inc   dx
In    al,dx
Or    al,80h
Out   dx,al
;--------------------------------------------------------
Dec dx                      ; lock W83627HF
Mov   al,0aah
```

```
Out    dx,al
```

Example4. Enable watchdog timer to be reset by keyboard

```
;--------------------------------------------------------
Mov dx,2eh                  ; unlock W83627H
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h                  ; Select registers of watchdog timer
Out    dx,al
Inc    dx
Mov   al,08h
Out    dx,al
;--------------------------------------------------------
Dec dx                      ; Enable the function of watchdog timer
Mov   al,30h
Out    dx,al
Inc    dx
Mov   al,01h
Out    dx,al
;--------------------------------------------------------
Dec dx                      ; Enable watchdog timer to be strobed reset by keyboard
Mov   al,0f7h
Out    dx,al
Inc    dx
In      al,dx
Or      al,40h
Out    dx,al
```

```
;------------------------------------------------------------
Dec dx                      ; lock W83627HF
Mov  al,0aah
Out   dx,al
```

Example5. Generate a time-out signal without timer counting

```
;------------------------------------------------------------
Mov dx,2eh                  ; unlock W83627H
Mov al,87h
Out dx,al
Out dx,al
;------------------------------------------------------------
Mov al,07h                  ; Select registers of watchdog timer
Out   dx,al
Inc    dx
Mov  al,08h
Out   dx,al
;------------------------------------------------------------
Dec dx                      ; Enable the function of watchdog timer
Mov  al,30h
Out   dx,al
Inc    dx
Mov  al,01h
Out   dx,al
;------------------------------------------------------------
Dec dx                      ; Generate a time-out signal
Mov  al,0f7h
Out   dx,al                       ;Write 1 to bit 5 of F7 register
Inc    dx
```

```
In      al,dx
Or      al,20h
Out     dx,al
;-------------------------------------------------------------
Dec dx                          ; lock W83627HF
Mov   al,0aah
Out     dx,al
```

4. Watchdog Memo

The example code in this document uses the internal path for Time out event which is KBRST#. This internal signal in the Winbond 83627EHG-A will reset the system when watchdog timeout event happen. These sample code is also workable for some for motherboard which has “Reset/Interrupt” Selection.