6. HW & SW Interfaces

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2016-03-25 Fri

Outline

Based on

"Software Engineering for Embedded Systems. . .", R Oshana and M Kraeling, 2013

Notification of hardware events

Events generated in hw notify sw

1. software-initiated events
2. software intiated hardware taks
3. hardware send events to sw upon the completion of the task
4. External events
5. external triggers of events

Ways of notifying software of an event

- no notification
- timed delay
- status bit (polling)
- interrupt bit (interrupt)

Queue bit

- must be Read/Write 1 Set
- software must write a 1 to set the bit
- software must not write a zero to clear the bit
- if just Read/Write bit
  - either hardware can miss the set bit (slow hw)
  - or hardware can see the old set bit again (slow sw)

Queue bit handshake

- software reads the queue bit
- for the cleared queue bit, software can set the bit to give tasks to a hardware
- after setting it, software can poll the bit until it clears
- for the cleared queue bit, software recognizes the hardware's acknowledgement

- hardware checks the bit occasionally
- for the set bit, hardwar starts executing the task
- when starting, hardware clears the bit