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10/6/2019
EEL 4742 0002
HW2B
Question 1
use   MSP 430 Datasheet
A) What   is   FRAM (Non-Volatile) size? (P.7)

> 128KB

B) what is   SRAM size?

> 2KB

C) How many timer_A modules   with 3
   Channels   does   the   Chip have?

> Supports 2

D) How many timer_A modules   with 3
   Channels   does   this chip have?

> Supports 1

e) The   eUSCI   communication   module   Consists
   of   Channel A (UART, SPI)   and   Channel B
   (I2C, SPI).   How many   eUSCI   modules
   does   the   chip   have?

> 8 serial communication protocols

F) what is the "absolute maximum rating" Vcc Value
(Pg 29) $V_{cc} = 4.1$ max -0.3 min

G) what is   the "recommended operating conditions"
   Vcc range?

> Vcc range = 1.8V to 3.6V
>
> recommend operating conditions
> $V_{cc} = 3.0 V$ $T_A = 25°C$

HW 2B

Question 1
H) Is it acceptable to run the
Chip based on the absolute maximum
ratings? Explain.

The Chip should run between the
absolute ratings to ensure the
Chip does not, Burn up,
erroneously write to SRAM or FRAM,
may effect overall device reliability.

HW 2B
Question 2   Datasheet

A) The VLO is an internal RC clock
that has the lowest power consumption.
what is the current drawn by the VLO?
what is the typical frequency and min/max
frequency values of VLO? (P44)

	- Current Consumption	100 nA	
	Min	Typical	Max
Frequency	6 KHz	9.4 KHz	14 KHz

B) MODOSC (module oscillator) is an internal
RC clock. what is the current drawn
by MODOSC? what is the typical, min
and max frequency values of MODOSC?

	- Current consumption	25 uA	
	Min	typical	Max
Frequency	4.0 MHz	4.8 MHz	5.4 MHz

C) what is the typical resistor value
(and Min/Max values) of the built-in resistor
at the pins (P. 47)

	Min	typical	Max
Resistence	20 KΩ	35 kΩ	50 kΩ

HW 2B
Question 2
D) what is the maximum current
and corresponding power that can be
drawn from the pin when $V_{cc} = 2.2$
$$V_{cc} = 3.0$$

$V_{cc} = 2.2$ V?
$I_{(OL_{MAX})} = 3$ mA
power $= 6.6$ mW

$V_{cc} = 3.0$ V?
$I_{(OM_{AX})} = 6$ mA
power $= 18$ mW

e) which Vector has higher interrupt
priority Timer0-A's A0 or A1 vector?
Give the word address for each of
these vectors. (Pg 78)

- Timer0-A's A0 Vector has Higher
  interrupt priority

Vector	word Adress
A0	0FFE6H — 0FFE8H
A1	0FFDCH — 0FFDEH

HW2B
Question 2

F) which timer has higher interrupt
priority? Timer 0-A or Timer 1-A?

> Timer 0-A has higher Interrupt
> priority.

G) The Variable PIDIR (like many others)
is memory-mapped. To what address is
this Variable mapped?
Compute address: base + offset = address

> base: 0200   offset: 04
>
>   0200
>   +   04
>   ─────────
>   0204
>
> PIDIR mapped to   0X0204

Hw2B
Question 3

a) The rollback-to-zero event, channels 1
and 2 share the vector A1, who is
responsible for clearing the interrupt flag?

- the user or programmer must
clear the interrupt flag each
time the clock rollsback.

B) Channel 0 has its own vector,
who is responsible for clearing
the interrupt?

- A line of code must be
written to clear the
interrupt flag.

C) Code #1 is running and an interrupt
occurs. Explain what happens regarding
saving the status of the CPU.

The status of the CPU (SR) is
stored on the stack.

D) Low-power mode 3 is engaged and an interrupt occurs.
Explain what happens to the status of the CPU.

- The status of the CPU is stored
on the stack

Hw 2B
Question 3

E) By default, are interrupts in
MSP430 preemptable? Explain

> Yes, there are default priorities
> for interrupts. Located on Vector table

F) How is interrupt priority in
· MSP 430 Determined?

> - Interrupt priority is determined
> by the Vector table.
> higher addresses have higher
> priority.

G) What is the "reset vector"?
Where is it Located

> Located @ 0FFFF to 0FFFE
> Also known as the power Vector
> Contains the 16-bit address pointing
> to the start address of the application
> program.

H) A button is configured to Active Low config using
the built-in resistor. Pull-up or pull-down?

Active high	Active Low
pull-down	pull-up