Devdhar Kodiatar

ME333
Homework 5

01/29/19

3. Functions of pin 12 (PIC32MX795F512H) :-

AN4 :- Analog input channel

C1IN- :- Comparator negative input

CN6 :- Change notification input (pin 6)
ie, change in voltage generates interupts.

RB4 :- Digital input/output pin.

Pin 12 is not 5V tolerant.

4. The /TRISC register can be set to '1' to enable the pin as an input.

5. Reset value for CM1CON = 00c3

6. SYSCLK : A clock used to set the CPU's speed, Higher frequency ⇒ Faster Calculations.

PBCLK : (Peripheral bus clock) A clock used by the peripheral on the PIC32.

PORTA to PORTG :- Digital input/output ports.

PORTB :- Has all the analog pins.

Timer1 to Timer5 :- 16-bit counters that counts the number of pulses of a signal which occurs at a regular freqyerey.

10-bit ADC :- A 10-bit analog-to-digital converter which can connect to 16 pins.

PWM OC1-5 :- These are used to generate a single pulse or a continuous pulse train having a duty cycle.

Data RAM :- Volatile memory where temporary data is stored.

Program flash memory :- Non-volatile memory which preserses its content when powered off.

Prefetch Cache module :- This stores recent program instructions, so that they can be executed again faster, thus speeding CPU processing.

8. The 10-bit ADC is able to distinguish 1024 differeat voltage levels.

∴ Largest voltage differeace that it will not be able to detect is $\frac{3.3\,V}{1024} = 0.0032\,V$

9. The prefetch cache can completely store 16 byte program loop instructions at most. Larger loops will have to access the flash memory.

10. The 128 bits data gap between the prefetch module and flash memory allows the prefetch module to fetch more instructions ahead of execution compared to other bit variants.

7. Peripherals not clocked by PBCLK,

PORTA - PORTG, Prefech Module, Priority interrupt controller, USB, CAN1 and CAN2, Ethernet, DMAC and ICD.

11. A digital output pin can be configured as open drain. This means the pin is connected by an external pull-up resistor of voltage 4V, allowing the pin to either sink or two off. Therefore the pin can have output voltages of a broader range.

12. Program Flash :-

Max. Memory of Available Program Flash = 0x1F800000 - 0x1D000000

= 40 MB

Max. Memory of Available RAM = 0x10000000 - 0x0

= 464 MB

13. a). bit 13-12 have to be changed to '01' for PBCLK = SYSCLK divided by 2.

b). bit 23 of the DEVCFG1 (Device configuration Word 1 Register) is the watchdog timer enable bit.

bit 20-16 :- Watchdog Timer PostScale Select bits

For maximum Time Interval :- Change bits to 10100

c). bit 2-0 :- Oscillator selection bits

These bits need to be changed to 011.

14. We should not try to draw more than 300mA from the NU32

$$\therefore \text{Minimum Resistance} = \frac{V}{I} = \frac{5V}{0.3A} = 16.67\,\Omega$$

Ohm Law gives the safe amount of resistance required for the maximum allowable current. (at a constant voltage)

15. The PIC32 requires a supply voltage between 2.3 and 3.6 V. Although, the NU32 has a 5V regulator for large voltages. Anything between 2.3V and 9V is a reasonable limit.

Voltages higher than 9V will heat up the regulator.

16. LED 1 is connected to pin 58 and has the function RF0.
LED 2 is connected to pin 59 and has the function RF1.
USER button is connected to pin 55 and has the function RD7.
RESET button is connected to pin 7 and has the function $\overline{MCLR}$.