

⊗ 8284 \Rightarrow Clock Generator

- MHz Range
- Reset
- Ready

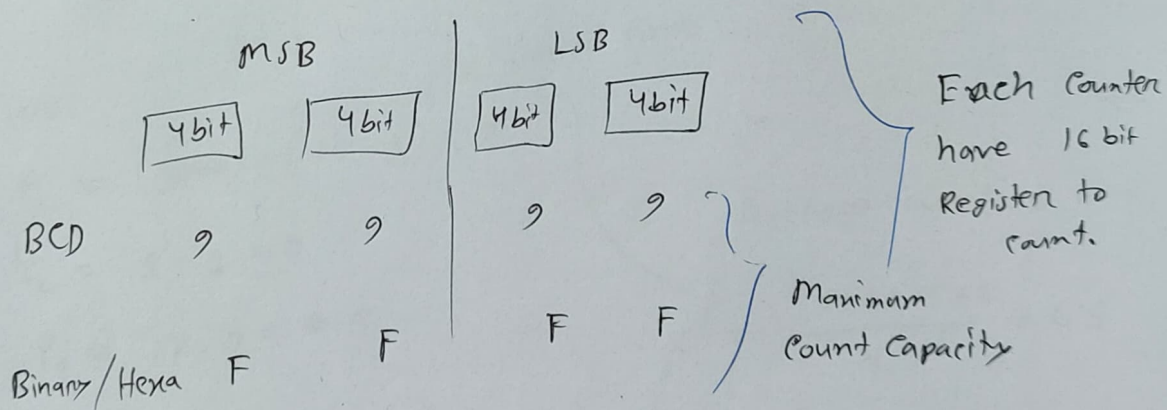
What, if we need kHz Range frequency on some customized waveform?

\Rightarrow We can use 8254

The Timer/Counter IC.

⊗ Difference between 8255A and 8254 is, in place of Port, here we have three counter.

⊗ ~~Control Word Register is 16 bit~~



⊗ Control Register is 8 bit.

$D_7 \dots D_0$ to for configure control Register.

⊗ If our counting limit is 99 then we can use LSB only. If our counting value is more than 99, then we need to use both LSB & MSB.

Slide - 40, 41

Slide - 42

Mode-1: Example mismatch.

count 4 & count 5

Mode-2: Rate generator

if count is upto 10

then upto 9 will be 1 (high)

* Question: Examples

Given CPU clock = 3.072 MHz

We need clock = 9.6 kHz

$$\text{then, the count is} = \frac{3.072 \text{ MHz}}{9.6 \text{ kHz}} = 320 \text{ D} = 140 \text{ H}$$

* Solve approach, similar to previous one.

Identify control Register value

$D_7 \dots D_0$
 $\underbrace{0011}_3 \quad \underbrace{0100}_4$

Identify Address:

~~A₁₅~~

$A_{15} \dots A_8$ $A_7 \dots A_0$
 $\underbrace{111 \dots 1}_{\text{FF}}$ $\underbrace{0101 \ 0000}_{50}$

Then,

$$C0 = FF00$$

$$C1 = FF10$$

$$C2 = FF40$$

$$CR = FF50$$

One Question must.

⇒ connection can be changed.

⇒ Microprocessor Address connection can be changed.

⇒ Diagram & Wave will be given.

⊗ Mode-0: Interrupt on Terminal Count

- control word loaded ⇒ OUT becomes Low immediately
- After count end, OUT = high
- We can pause or resume the count.

$$GATE = 0 = \text{Pause}$$

$$GATE = 1 = \text{Resume}$$

- Use as an interrupt signal.

⊗ Mode-1: Hardware -retriggerable one-shot

- We don't need to provide continuous 1 on GATE.
- Just a rising edge on GATE start the count.
- we can't pause or resume the count but we can restart the count by providing another pulse on GATE

~~(*) Mode~~

- Monostable ! only one state, no other state in between. ~~the~~ counting.

(*) Mode-2: Rate Generator**

~~mainly frequency~~

- provide pulse continuously in a given interval.
- Continued as long as GATE is Enable = 1.
- During Count = High (1)
- Just in last count it becomes Low (0).

=> Like if count value is 10

the $1-9 = 1$ (High)

$10 = 0$ (Low)

(*) Mode-3: Square Wave Generator

- Generate Square wave

- use can be use as a clock pulse with customized frequency.

- GATE = 1 continuous wave form

- Count Value \Rightarrow Even \Rightarrow High = $\text{count}/2$
Low = $\text{count}/2$

ODD \Rightarrow High = $(\text{count}+1)/2$
Low = $(\text{count}-1)/2$

⊗ Mode-4: Software-triggered strobe

- During counting, $OUT = 1$ (high)
- Just after the counting ends, next one CLK will be $OUT = LOW$ and again back to high.
- Provide pulse on GATE by using software.
~~GATE~~ Rising edge on GATE = start the count.
- Only one pulse no, repeat.

⊗

- $GATE = 0$ = disable counting
= 1 = Enable counting

⊗ Mode-5: Hardware-triggered strobe

- same as mode-4.
- Enable counting when GATE receives a rising edge.

Slide-44

Next Class Online
8 pm
18.05.2024

Quiz-2
23.05.2024

END of The Final
Syllabus