8253/54 Programmable Interval Timer

❖ Features of 8253/54 Programmable Interval Timer

- ❑ 8254 is designed to work with various microprocessors like 8085, 8086 etc.
- ❑ 8254 is used as Timer to generate Hardware Delay.
- ❑ 8254 can be used as real time clock or as square wave generator.
- ❑ Hardware delay is more useful then software delay as microprocessor is not actively involved in generating delay. So when delay is produced by 8254 at that time microprocessor is free do to execute other programs.
- ❑ 8254 has three independent 16 bits Down counters.
- ❑ These counters can take count in BCD or in Binary.
- ❑ Once counters finishes count [required delay], 8254 interrupts Microprocessor.

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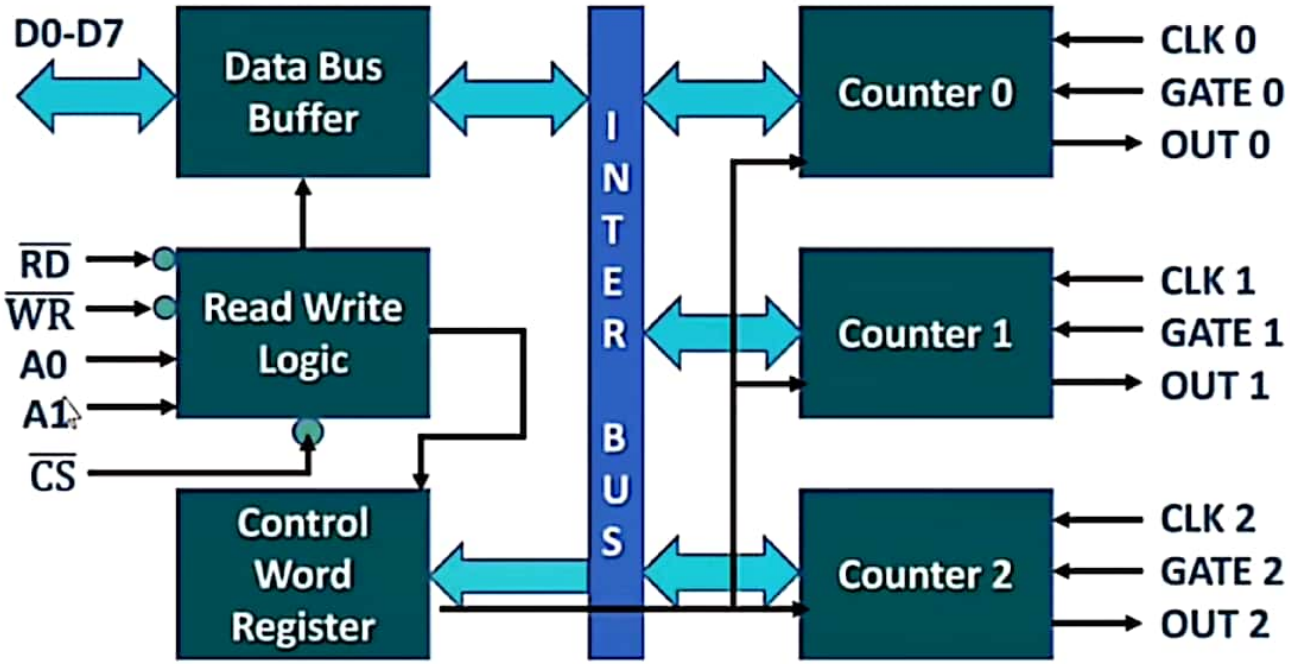
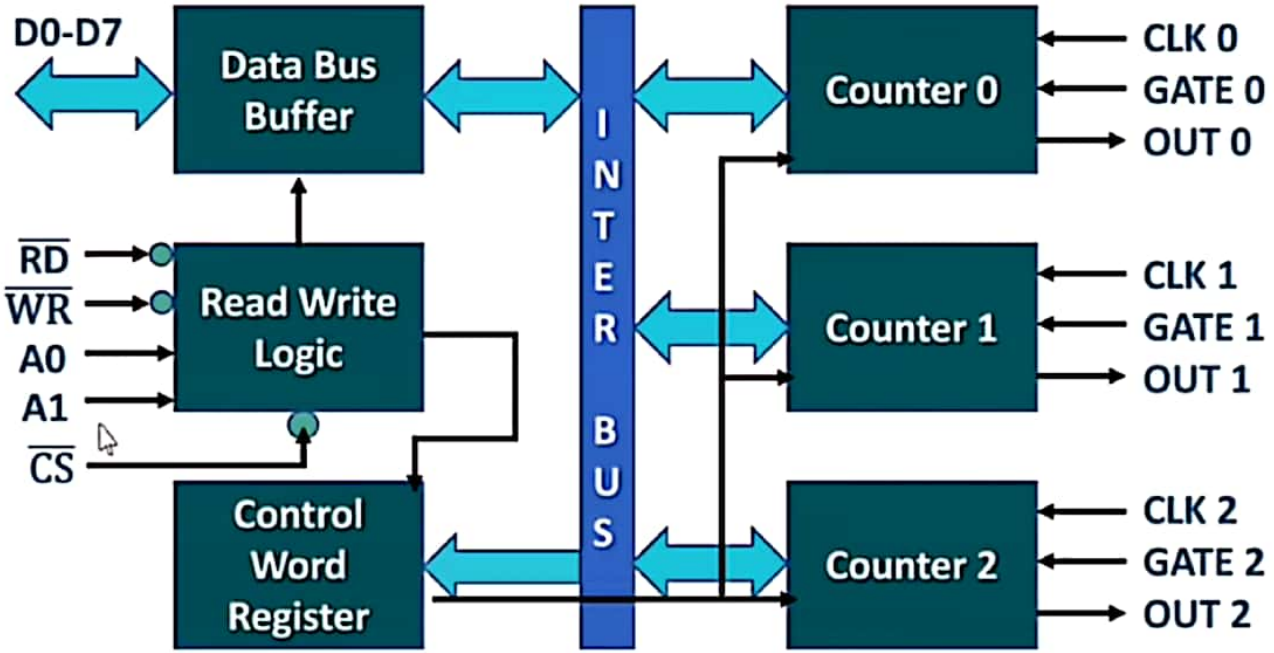
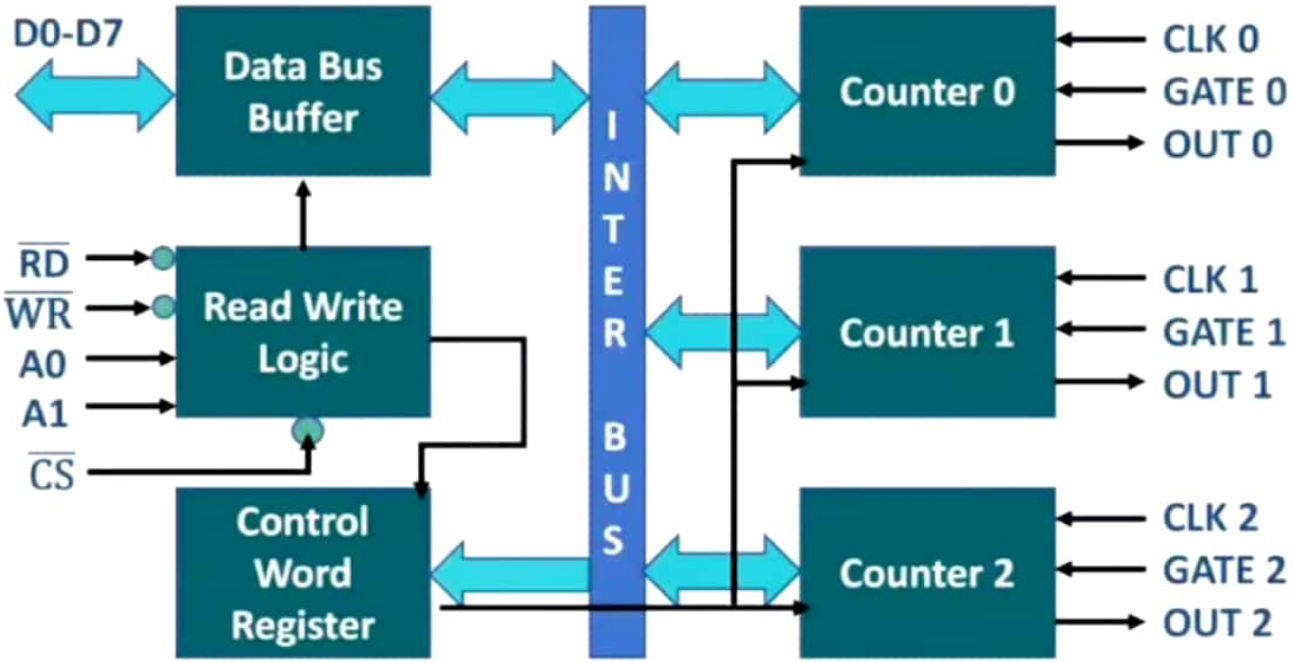
❖ Block Diagram of 8253/54 Programmable Interval Timer





❖ Data Bus Buffer

- ❑ It has bidirectional data bus D0 – D7.
- ❑ D0 – D7 is interfaced with system data bus of Microprocessor.



❖ Read Write Logic

- ❑ $\overline{RD}$ and $\overline{WR}$ is used to read write on D0 – D7.
- ❑ A1 and A0 lines are used to select counter and control word.
- ❑ $\overline{CS}$ will select chip of 8254.

$\overline{CS}$	A1	A0	Selected	Sample Address
0	0	0	Counter 0	80H [1000 0000]
0	0	1	Counter 1	81H [1000 0001]
0	1	0	Counter 2	82H [1000 0010]
0	1	1	Control Word	83H [1000 0011]
1	X	X	8254 is not selected	

Control Word and Modes of 8254

D7	D6	D5	D4	D3	D2	D1	D0
SC1	SC0	RW1	RW0	M2	M1	M0	

Select Counter [SC1 – SC0]

SC1	SC0	Selected
0	0	Counter 0
0	1	Counter 1
1	0	Counter 2
1	1	Read Back Command

Read Write [RW1 – RW0]

RW1	RW0	Operation
0	0	Counter Latch command
0	1	R/W Least Byte significant Only
1	0	R/W Most Byte significant Only
1	1	R/W least Byte significant 1st then most significant Byte.

Mode selection [M2, M1 & M0]

Mode Select			Bit
0	0	0	Mode 0
0	0	1	Mode 1
X	1	0	Mode 2
X	1	1	Mode 3
1	0	0	Mode 4
1	0	1	Mode 5

Modes of 8253/54 Programmable Interval Timer

- Modes of 8253/54 is selected by Control word with M0, M1 & M2 bits.
  - There are six modes & three counters with 8254.
  - All modes works with clock input.
  - First we need to load value of count in 8254 by 8085.
  - After every clock count works in auto decrement mode.

Mode selection [M2, M1 & M0]

Mode Select			Bit	Name of Mode
0	0	0	Mode 0	Interrupt on terminal count
0	0	1	Mode 1	Monostable Multivibrator
X	1	0	Mode 2	Rate Generator
X	1	1	Mode 3	Square Wave Generator
1	0	0	Mode 4	Software Trigger Strobe
1	0	1	Mode 5	Hardware Trigger Strobe