8253 Timer IC General

The Intel 8253 is a programmable counter / timer chip designed for use as an Intel microcomputer peripheral. It uses nMOS technology with a single +5V supply and is packaged in a 24-pin plastic DIP.

It is organized as 3 independent 16-bit counters, each with a counter rate up to 2 MHz. All modes of operation are software programmable.

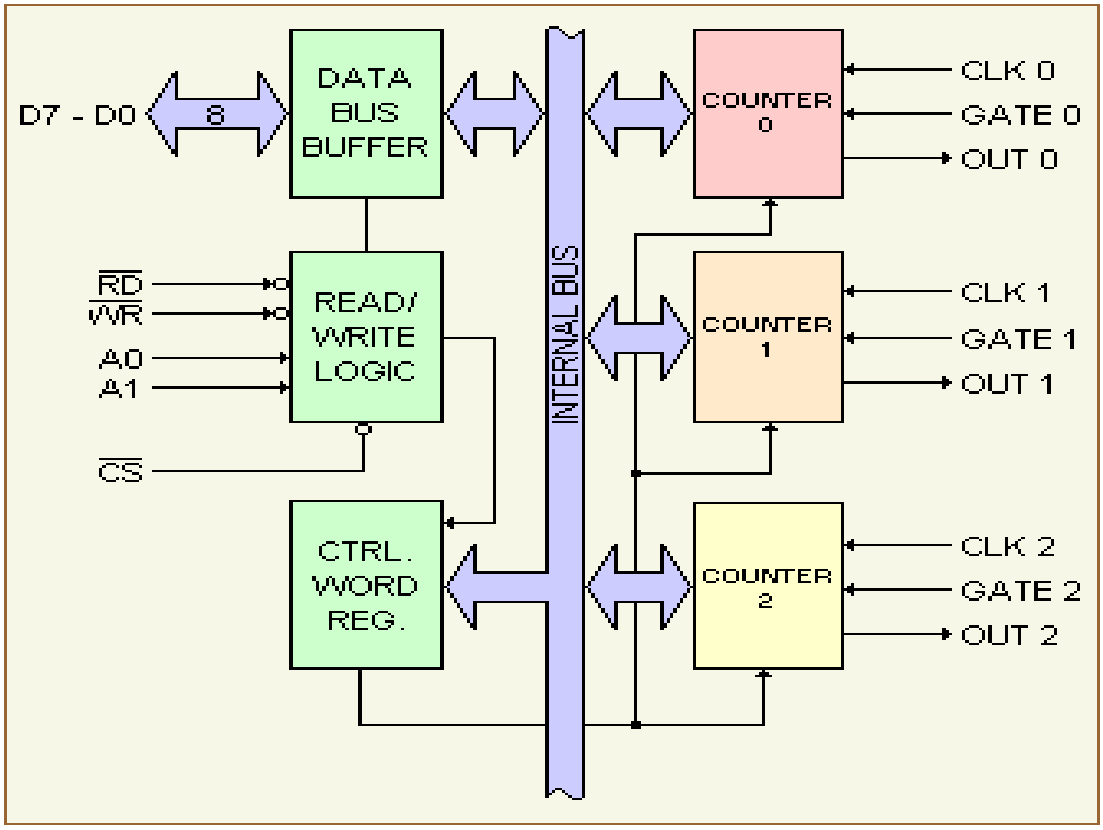
The 82C54 is pin compatible with the HMOS 8254, and is a superset of the 8253.

Six programmable timer modes allow the 82C54 / 8253 to be used as an event counter, elapsed time indicator, programmable one-shot, and in many other applications.

4.4.1 Block diagram

The timer has three independent, programmable counters and they are all identical. The block labeled *data bus buffer* contains the logic to buffer the data bus to / from the microprocessor, and to the internal registers. The block labeled *read / write logic* controls the reading and the writing of the counter registers. The final block, the *control word register*, contains the programmed information that is sent to the device from the microprocessor. In effect this register defines how the 8253 logically works.

Each counter in the block diagram has 3 logical lines connected to it. Two of these lines, clock and gate, are inputs. The third, labeled OUT is an output. The function of these lines changes and depends on how the device is initialized or programmed.



Block diagram of an 8253 programmable interval timer

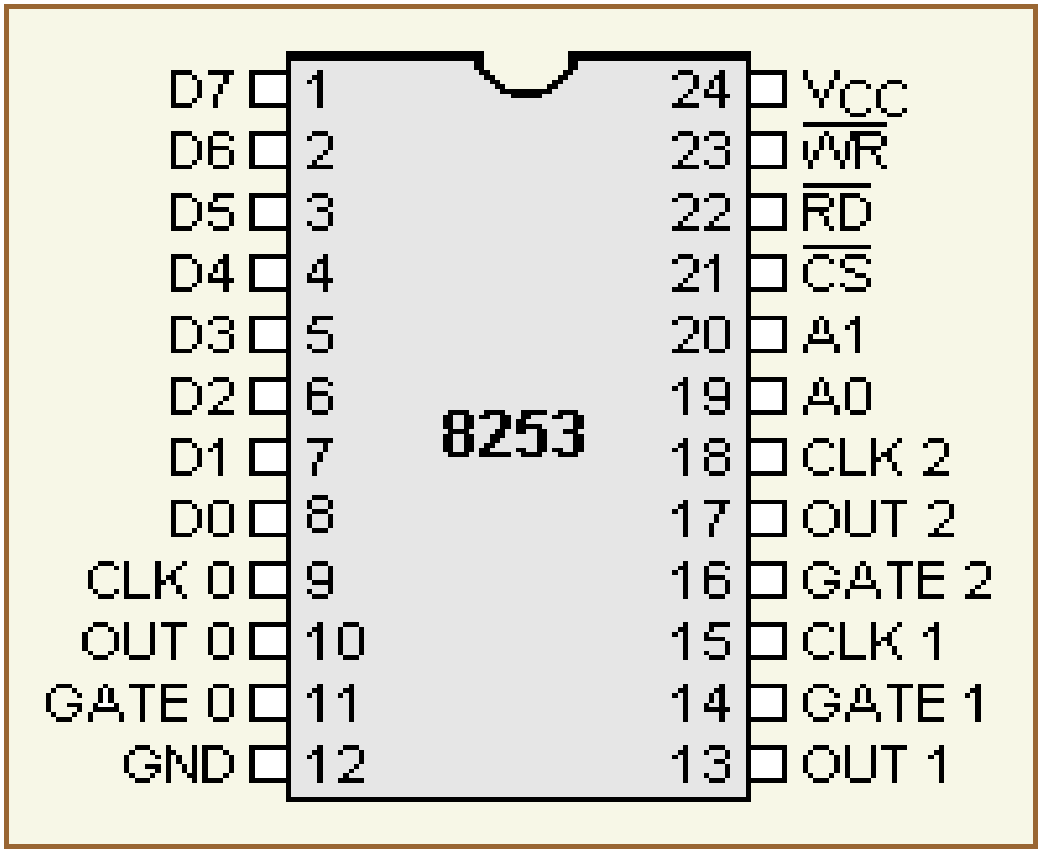
4.4.2 PIN configuration

The following picture shows the pin configuration of the 8253 and a general definition of the lines follows:

Clock This is the clock input for the counter. The counter is 16 bits. The maximum clock frequency is 1 / 380 nanoseconds or 2.6 megahertz. The minimum clock frequency is DC or static operation.

Out This single output line is the signal that is the final programmed output of the device. Actual operation of the out line depends on how the device has been programmed.

Gate This input can act as a gate for the clock input line, or it can act as a start pulse, depending on the programmed mode of the counter.



4.4.3 Uses of the 8253 gate input pin.

Signal Status	Low or going low	Rising	High
Mode			

0	Disables counting	- -	Enables counting
1	- -	1) Initiates counting 2) Resets output after next clock	- -
2	1) Disables counting 2) Sets output immediately high	1) Reloads counter 2) Initiates counting	Enables counting
3	1) Disables counting 2) Sets output immediately high	Initiates counting	Enables counting
4	Disables counting	- -	Enables counting
5	- -	Initiates counting	- -

This table shows the different uses of the 8253 gate input pin.

Each mode of operation for the counter has a different use for the GATE input pin

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