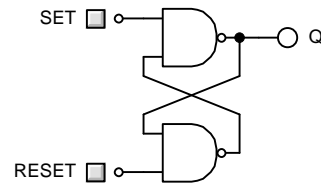


FROM BISTABLES TO LATCHES

Problem with a bistable is that it needs to independent signals, one to SET and one to RESET, remember these signals are active low.



The latch is a device that monitors a data signal when the LE input is high and then locks the data **at the moment** the LE input goes low.

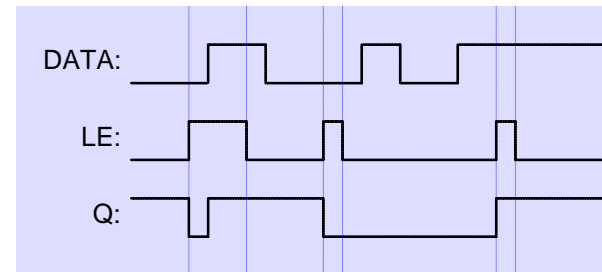
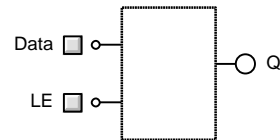
So the LE input acts like a gate.

When LE is high, Q output copies the DATA input.
When LE is low, Q is frozen.

Below is a Timing Diagram to show how the Latch works:

THE DATA LATCH

If we want to the status of a single signal or bit of information we need to modify the bistable and make it into a LATCH



A CLOSER LOOK AT A LATCH...

If we look inside a latch, the difference is clear to see. The Data and LE signals are converted to set or reset the bistable. So a Latch has some decoding logic and a bistable inside it.

FUNCTION

If the Data = 1:
When LE=1 then NAND gate A goes low setting the bistable so Q=1

If the Data = 0:
When LE=1 then NAND gate B goes low, resetting the bistable so Q=0

When LE=0 no further change will occur in the bistable.
The output is latched to the last data signal..

