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# PIO and MMIO

PIO and MMIO operate in different address spaces.

PIO –

PIO (port I/O) uses special assembly instructions to communicate with a dedicated IO bus. All devices attached to the PIO bus has a small 16-bit address.

MMIO –

In case of MMIO, device’s registers are also mapped into RAM’s address space.

# PCIe Lane Negotiation

* PCIe link between two devices can be 1 to 32.
* In multi lane link, packet data is stripped across lanes.
* Lane count is automatically negotiated during device initialization and also can be restricted by Endpoint due to this single lane device can be used in multi-lane slot
* Number of lanes in a link can also be reduced dynamically.