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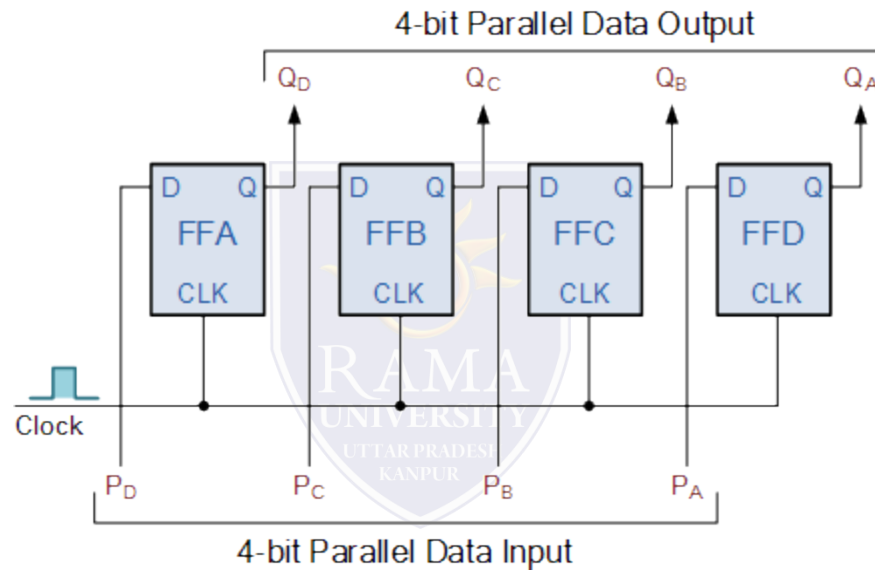
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4. Parallel-in to Parallel-out (PIPO) Shift Register

4-bit Parallel-in to Parallel-out Shift Register

Universal Shift Register

Today, there are many high speed bi-directional "universal" type Shift Registers available such as the TTL 74LS194, 74LS195 or the CMOS 4035 which are available as 4-bit multi-function devices that can be used in either serial-to-serial, left shifting, right shifting, serial-to-parallel, parallel-to-serial, or as a parallel-to-parallel multifunction data register, hence their name "Universal".

Parallel Outputs

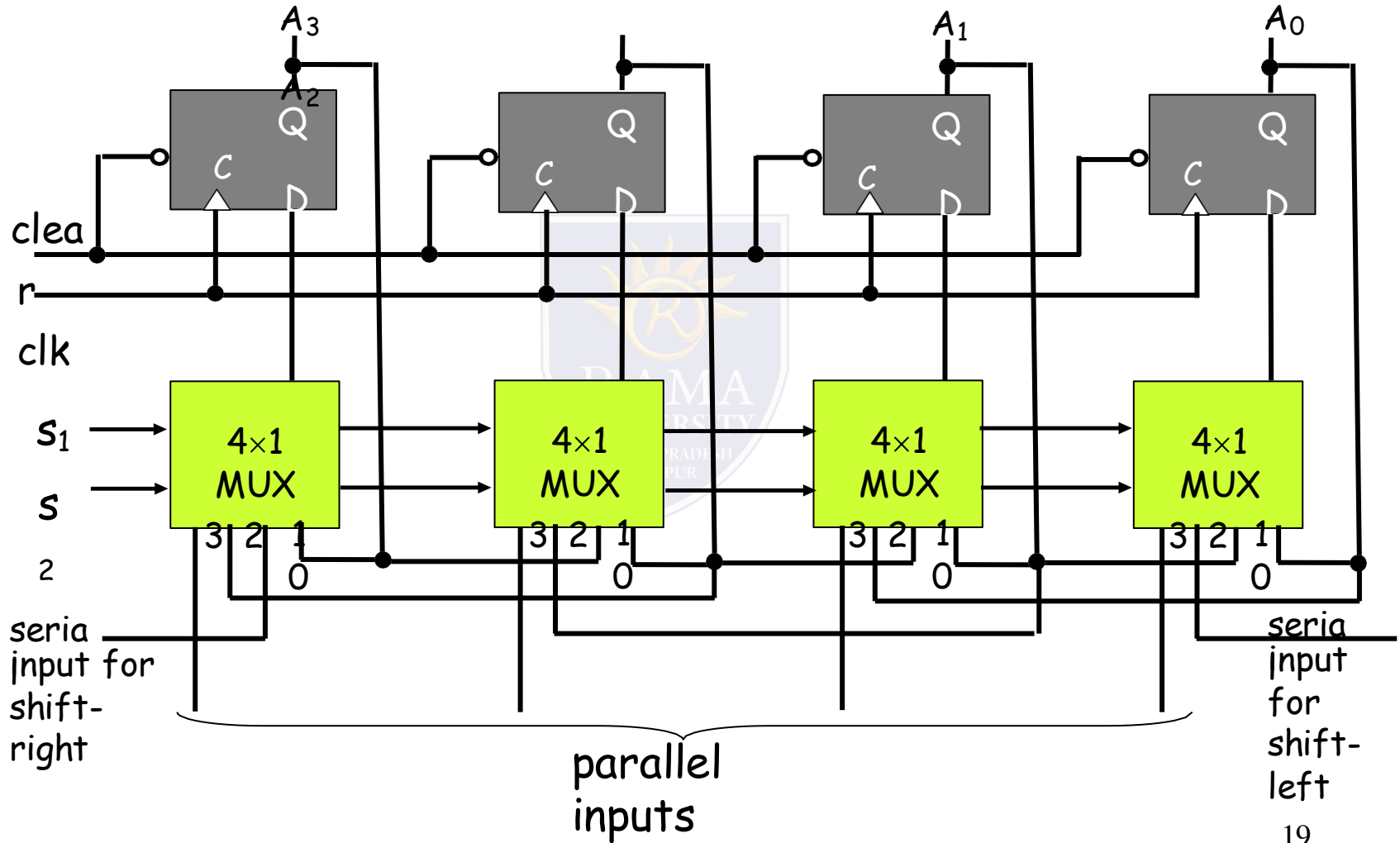

Diagram of Universal Shift Register

These universal shift registers can perform any combination of parallel and serial input to output operations but require additional inputs to specify desired function and to pre-load and reset the device. A commonly used universal shift register is the TTL 74LS194 as shown below.

4-bit Universal Shift Register 74LS194

Register Select	Mode Control		Register Type
	S_1	S_0	
	0	0	Hold
	0	1	Shift to right
	1	0	Shift to left
	1	1	Parallel Mode