Design of Adaptive Triggered Flip Flop Design
Based on a Signal Feed-Through Scheme

K.Lavanya
M.Tech,
Dept of ECE,
Sahasra College of Engineering for Women
Warangal.

T.Shirisha
Asst.Prof,
Dept of ECE,
Sahasra College of Engineering for Women
Warangal.

Abstract:
In this paper, a new explicit pulse triggered flip-flop (P-FF) design is implemented and simulated in GENERIC-TDK 130-nm technology. This explicit pulse triggered flip flop consist of a pulse generator and a true single phase clock latch based on a signal feed through scheme. The pulse generator is built with two CMOS inverters along with transmission gate logic which reduces the complexity of the circuit. The Pulse generation logic used in the explicit mode by a single pulse generator is shared for many number of flip flop at a time result in reduction of power not only this overall transistor count and delay can also been reduced. The transistor count has been reduced from 24 transistors to 16 transistors and power dissipated is 21.2133u watts. And this flip flop can achieve better D-Q delay and by using this explicit pulse triggered flip flop a synchronous counter is constructed and power dissipated is very less i.e. 19.928 nwatts.

Keywords:
flipflop , to reduce no:of transistor , delay, power

I. INTRODUCTION:
In current scenario the requirement of portable equipment is increasing rapidly so that development of VLSI design places a major role in the complex systems. Where the complex system consists of analog, digital as well as memory elements. Where all this can be integrated on a single chip. For designing a circuit we come across many design metrics like low power, high speed and reduced the area of chip by considering the above design metrics a novel explicit Pulse triggered flip flop is designed.
A. Some Explicit Type Pulse Triggered Flip-flop:
In this paper I have took some flip flop which exist already these designs are done in 130n meter technology and compare with other design which are done by changing the pulse generator fig 1(a) shows a classic explicit pulse triggered flip flop. In this design pulse generator is designed in a such way that four inverters are taken along with a N and gate and a tspc latch. This design face a problem of switching power dissipation. To overcome this problem another flip flop is designed. First a weak pmos transistor is taken and gate of pmos transistor is is connected to the ground and second a nmos pass transistor is used which controlled by the pulse clock is included so that input data can drive node. The node level can thus be quickly pulled up to shorten the data transition delay [8].

II. PROPOSED MODEL
A novel explicit pulse triggered flip flop is designed. This flip flop consist of a pulse generator and a transmission gate. this new explicit pulse triggered flip flop works on three stages i.e. pulse generator, latch and a bistable element. used. They are implicit and explicit type pulse triggered flip flops. In implicit type of pulse triggered flip flop the pulse generator is present inside the flip flop where as in the explicit pulse triggered flip flop the pulse generator is present outside the flip flop [1], [2].
Fig 2 Shows A Latch Which Consider With A Nmos Pass Transistor And Weak Pmos Transistor To Over Come The Problem Of Fliping Of The Output.

Principle Working:
Stage1: When Clock Is Given As Input To The First Cmos Inverter And Its Output Is Given As A Input To The Transmission Gate And The Out Of It Is Given As The Input Of The Second Cmos Inverter And Its Output Is The Pulse Generator Output his pulse generator generates the pulse and it is given to the latch.
Stage2: when the pulse generator gives 1 as input to the latch .since the latch consists of pmos and nmos transistors and when it is given ‘1’ then all pmos transistors are in off state i.e. non conducting and the nmos transistors are in on state so it passes the data which applied to it .since the data input is signally feed through to the pass transistor.
Stage3: this stage consists of a bistable element which stores the data. Since this bistable element is also called regenerator property. When clock is ‘0’ then all the nmos transistors are in off state and pmos transistors are in on state .these transistor retrieve whatever data present in bistable element as a output.

III. APPLICATION
By using a explicit pulse triggered flip flop a Synchronous counter with 3 bits is designed as shown in fig 3.which can be expanded to 4,8,12 and 16 bit.

IV. SIMULATION RESULTS:
The proposed pulse triggered flip flop is designed against existing flipflop design and this design is designed in GENERIC 130n meter technology and simulated both in pre-layout and post-layout simulation . after simulation delay ,number of tansistor and power is less compare to existing flip flop this is shown in table1 and fig 4 shows waveform of new explicit pulse triggered flip flop and fig 5 shows layout of it. And fig 6 shows waveform of synchronous counter and fig 7 shows layout it

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<th>PARAMETERS</th>
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<th>PROPOSED MODEL</th>
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<tbody>
<tr>
<td>DELAY</td>
<td>9.45ns</td>
<td>1.4ns</td>
</tr>
<tr>
<td>NO OF TRANSISTOR</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>LAYOUT AREA</td>
<td>69.13um²</td>
<td>45.13um²</td>
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<tr>
<td>POWER DISPATION</td>
<td>21.24 Watt</td>
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Fig. 3. Schematic of a 3-bit Synchronous Counter of Proposed Flip Flop

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Fig. 4. Simulation Waveform
V. CONCLUSION:
A novel explicit pulse triggered flip flop is designed in such a way that the pulse triggered flip flop is designed using two CMOS inverter and a transmission gate along with a tspc(true signal pulse clock) latch. This novel flip flop is mainly forced on reduction of no:of transistor ,delay , layout area as well as power dispation compare to existing flip flop design.

REFERENCES:


Author’s Profile:
K.Lavanya completed her graduation in SBIT in The year 2013 and pursuing her m. tech in Sahara College of Engineering for Women Warangal, India.

T.Shirisha is working as Assistant Professor of ECE Dept. Sahasra College of Engineering for Women Warangal, India.