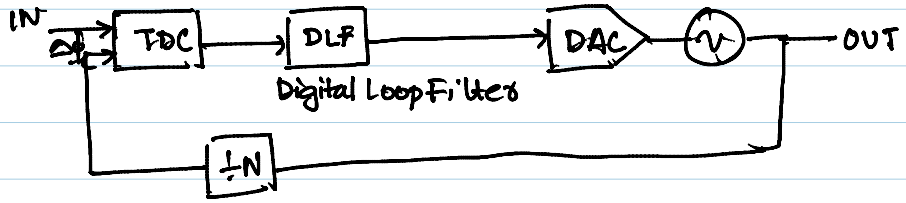
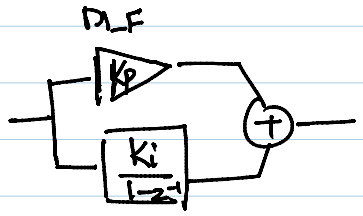
Lecture 36

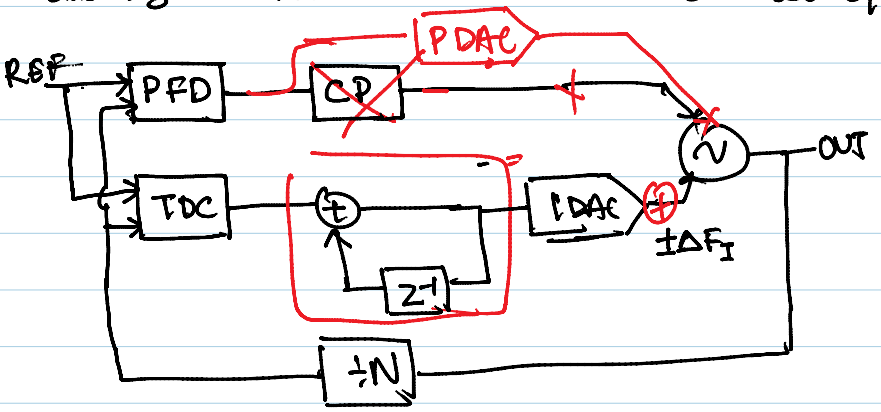
Wednesday, April 5, 2017
8:52 AM

DPLL

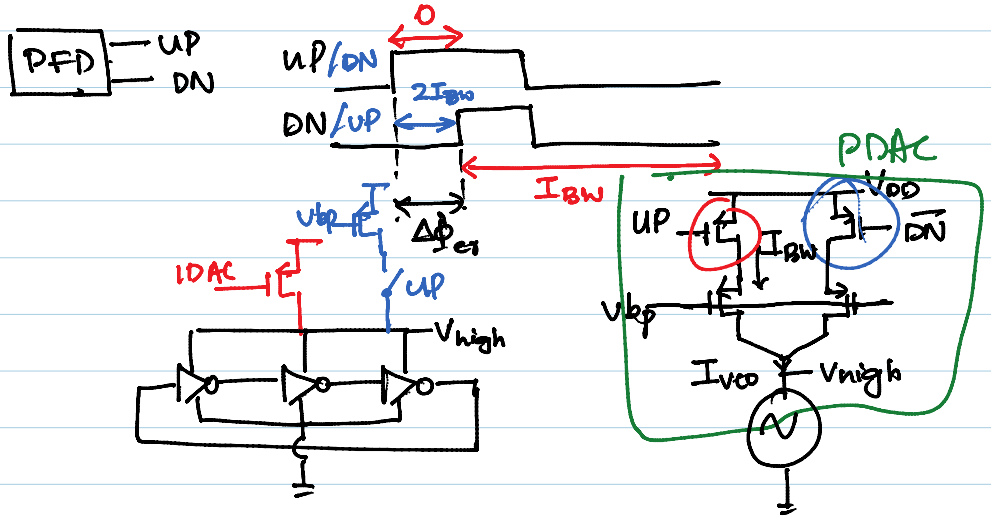




Quantization noise of TDC → increases o/p jitter



- No quantization noise in proportional path
- Digital accumulator has much lesser area as compared to C_I



UP	DN	I_{VCO}
0	0	I_{BW}
1	0	0
0	1	$2I_{BW}$
1	1	I_{BW}

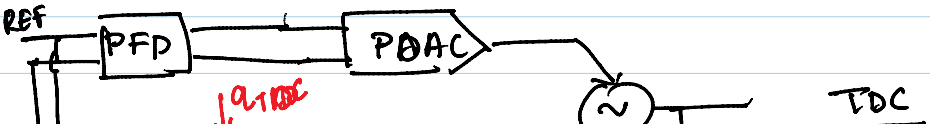
I_{VCO} : $\Delta\phi_{err}$: $0 \leftarrow I_{BW} \rightarrow 2I_{BW}$; $-\Delta\phi_{err}$

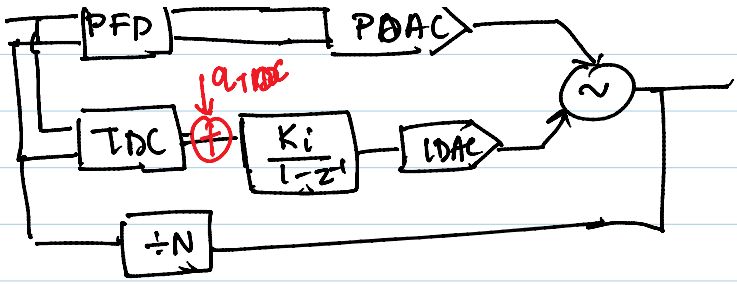
$\pm I_{BW}$

Proportional path gain, $K_\phi = \frac{1}{2\pi} \times I_{BW} \times \frac{K_{VCO}}{s}$

$\frac{\Delta\phi_{out}}{\Delta\phi_{in}} = \frac{1}{2\pi} I_{BW} \frac{K_{VCO}}{s}$

K_ϕ





TDC

- Req. Range of TDC $\pm 2\pi$ for infinite freq. acq.

Freq: 100 MHz. T_{freq} = 10 ns

Range: 20 ns.

q_{TDC} = 500 ps. $\Rightarrow \frac{20}{0.5} = 40$

1-bit TDC