Experiment No. 07 21118

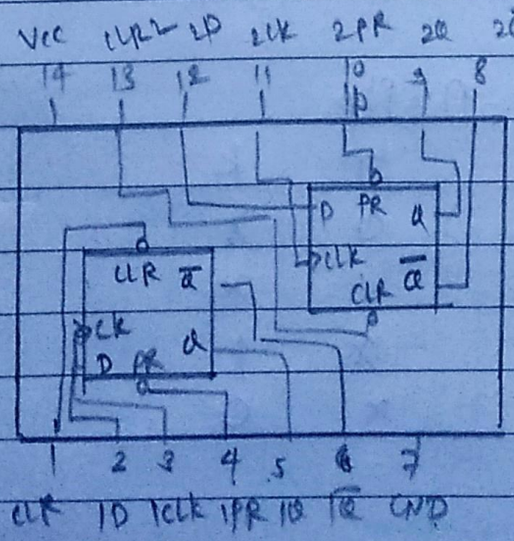
Title: Design & realization of flip-flop conversion

Objective:
1) To design & implement JK-to D ff conversion.
2) To design & implement D to T ff conversion.

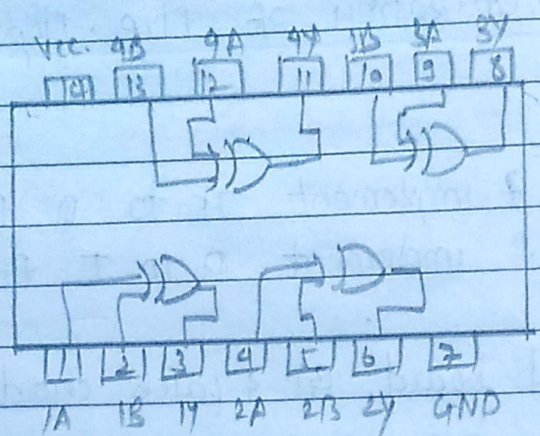
Apparatus: Digital board, GP-4-patch chords, IC74LS74, IC74LS86, IC74LS76, IC74LS04.

Theory
concept of ff conversion.
1) The conversion from one type of ff to other is actually a combination of given ff & combinational circuits using gates.
2) The inputs to ff conversion logic are the ff data inputs & the outputs of the given ff are the desired flip-flop outputs.
3) The conversion logic is designed by combining the excitation tables of both flip-flops.
4) Then we draw k-map for each output to obtain the simplified logic expressions.

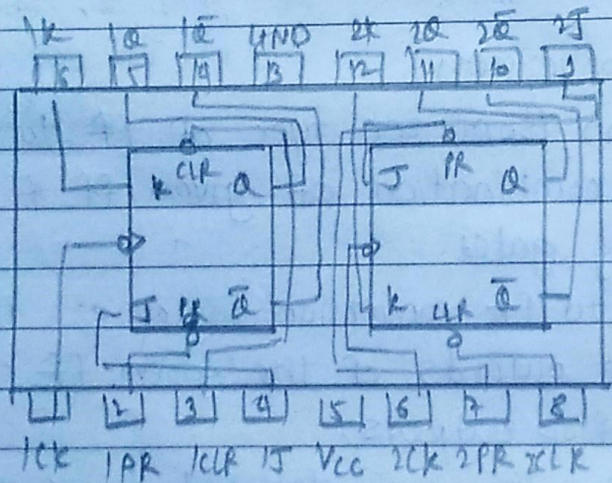
Pin diagram



7474



7486 pinout



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Procedure

1. Make the connections as per the truth table of JK to D flip-flop conversion.
2. Make the connections as per truth table of D to T flip-flop conversion.

Design of J-K to D flip-flop.

D	Q_n	Q_{n+1}	J	k
0	0	0	0	X
1	0	1	1	X
0	1	0	X	1
1	1	1	X	0

k map simplification.

for J

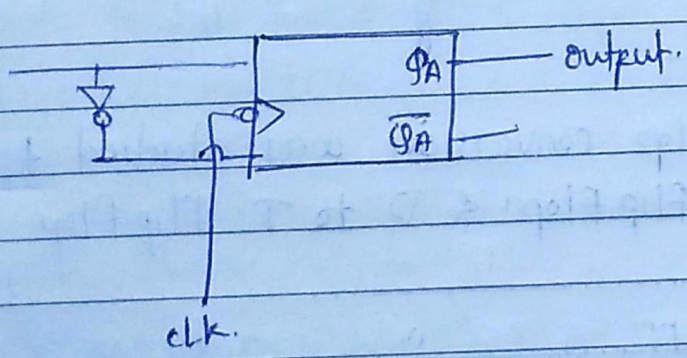
D \ Q_A	0	1
0		X
1	1	X

$J = D$

for K

D \ Q_A	0	1
0	X	1
1		

$K = \overline{D}$



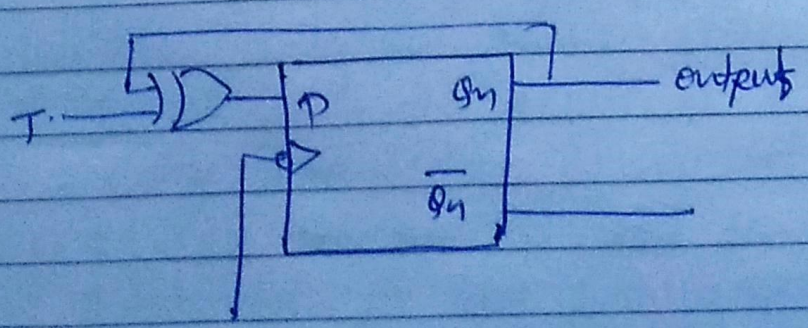
Design of D ff to T ff:

T	Q_n	Q_{n+1}	D
0	0	0	0
1	0	1	1
1	1	0	0
0	1	1	1

k-map simplification:

T \ Q_n	0	1
0	0	1
1	1	0

$D = T\overline{Q_n} + TQ_n$



Logic gates / MSI device required for implementation.

Sr No	Title	Name of IC	No. of gates	IC Number
1	Jk to D	Dual MS Jk ff	1	IC 74LS76
		NOT	1	IC 74LS04
2.	D to T	Dual D ff	1	IC74LS74
		XOR	1	IC74LS86

Conclusion

Concept of flip-flop conversion was studied & conversions from Jk to D flip-flop & D to T flip-flop were implemented.