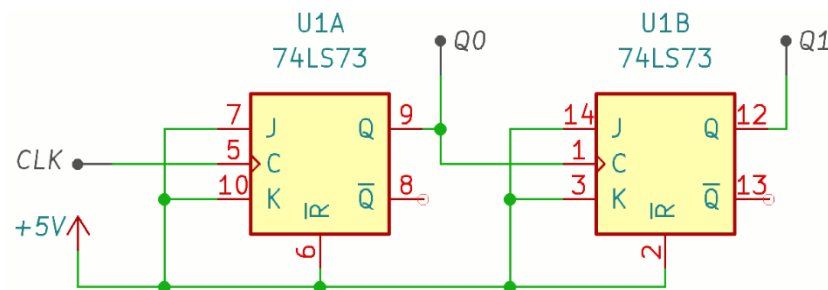# Digital Electronic Development Kit
Tutorial – 01
# 2-bit Asynchronous Counter Using JK Flip-Flop

- Asynchronous Counters use flip-flops which are serially connected together.

- In JK Module, we are using 74LS73 that has two JK flip-flops

Circuit Diagram of 2-bit asynchronous counter

- We need to setup this circuit in the JK Module as shown in the next page. Use hookup wires and make relevant connection between IC pins.

- +5V connections shown in **RED** color, GND connections in **BLACK** colors, other signal connections in **CYAN** color

- It is possible to connect clock input of 2nd JK flip-flop to Q or $\overline{Q}$ of the 1st JK flip-flop. If Q is used you can make up counter and vice versa. This is shown in dashed line **CYAN** color connection.

- You need to input clock signal to CLK input (Pin No. 5). You need to make the connection in **YELLOW** colored as shown.

- How to make Q_0 and Q_1 connection to the 7-Segment module? As shown in **MAGENTA** color, you have to use two hookup wires.

- **How to make power connection?** All you have to do is connect the Clock Module to one of the four connector. It provide correct power supply to the ICs and also distribute Clock signal to relevant points of all connected modules.
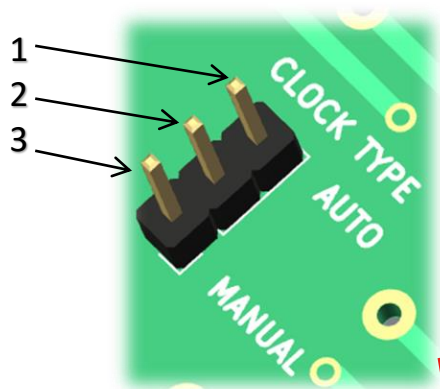
Connect Module Together
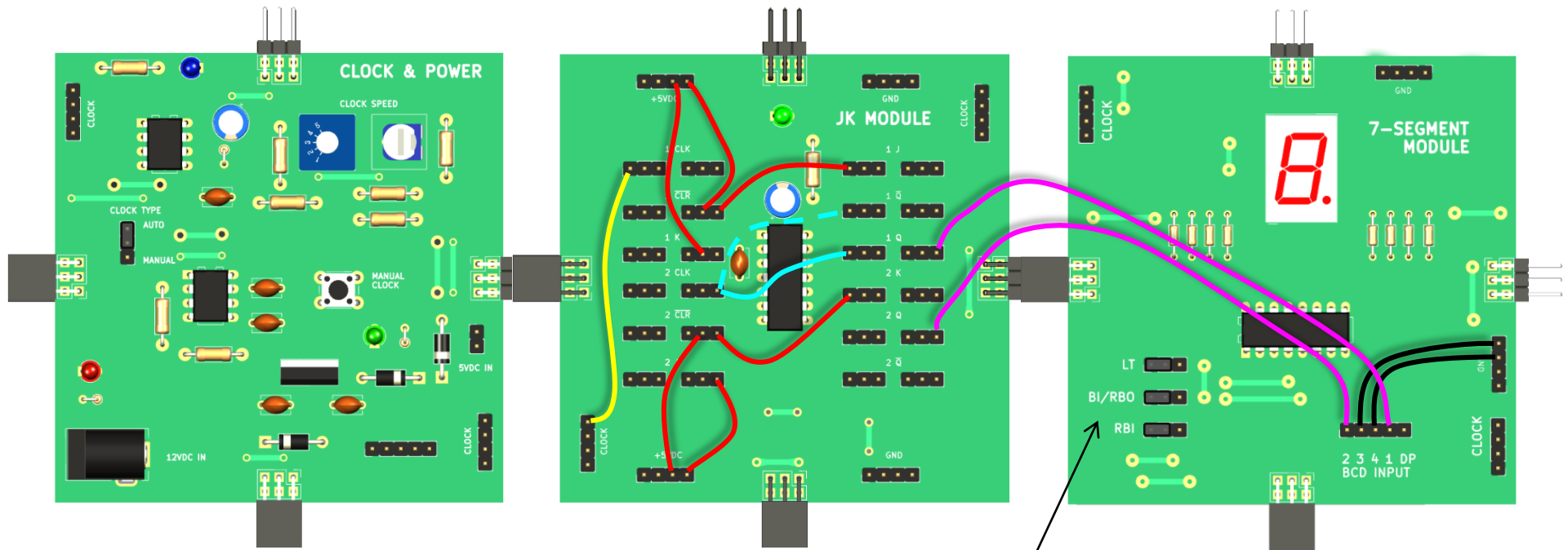
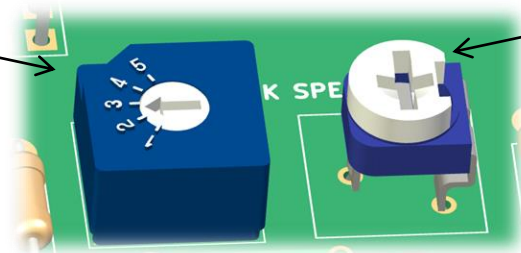Follow instructions in the next page for configuration of Clock & Power Module

Refer User Manual for complete description of module

Connect LT, BI/RBO, RBI as shown

We have setup 2-bit counter, Only 1 and 2 input enough as BCD input. Connect 3 and 4 to GND as shown in **BLACK**

Clock Switch

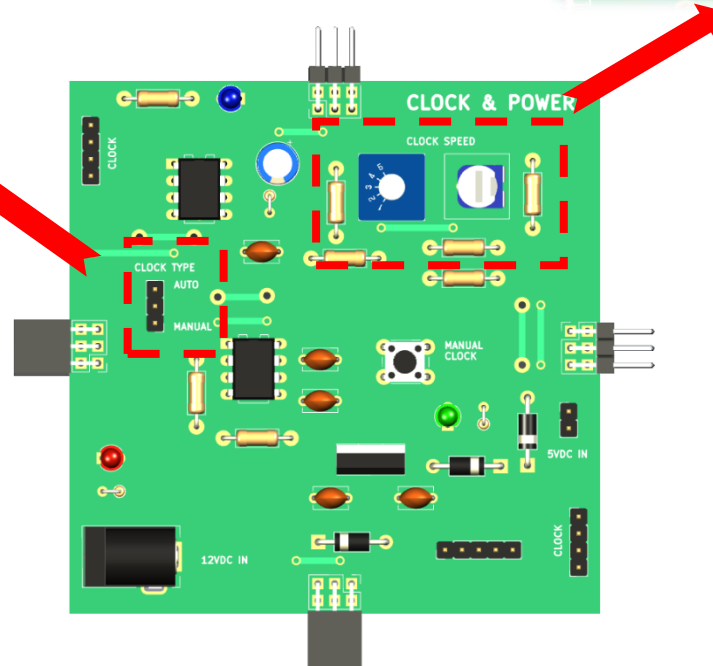Variable Resistor

1
2
3

CLOCK TYPE
AUTO
MANUAL

You can use either manual or auto clock type by changing the Shunt location.

1-2 → Auto
2-3 → Manual

Use the clock switch and variable resistor to change clock frequency in Auto mode.

You can use **push button** to manually increase the counter value.

Refer User Manual for complete description of module

CLOCK & POWER
CLOCK SPEED
CLOCK TYPE
AUTO
MANUAL
MANUAL CLOCK
5VDC IN
12VDC IN
CLOCK

If **Manual clock type** is selected, and Clock Switch position is **1**, You can change counting speed by variable resistor.

In **Auto clock type** is selected, You can change counting speed to predefined values by setting Clock Switch to below positions,

2 → 1 count every 5s(0.2Hz)
3 → 1 count every 2s (0.5Hz)
4 → 1 count every 1s (1Hz)
5 → 1 count every 500ms (2Hz)