

Digital Electronic Development Kit

User Manual

Version 1.0

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1 **INTRODUCTION**

1.1 *Overview*

This manual gives general description of the development kit and its content and how to work the product.

This development kit mainly useful to the students who are learning the functions of 74xx series TTL logic ICs. (Basic gates, Flip-Flop, Multiplexers, De-Multiplexers and so on.)

The circuit based on a modular concept. It consists of a Clock & power module, Input Output module, JK module, Basic Logic Gate Module and more.*

Basically, the power input and the clock signals are already embedded in the clock & power module.

The student needs to refer the user manual or the data sheet of the IC to carry out the pin programming of the circuit to function correctly. In this circuit board power and ground line are hardwired.

Both jumper wires male or female can be used for pin program.

2.1 *Package Contents*

The development board package includes all the essential components required to get started with your digital electronics projects. Please ensure all items listed below are present in your package before use. If any items are missing or damaged, contact customer support.

* Modules not included in the default package must be purchased separately

Included Items:

1. Power Supply

Provides the necessary power for the development board and its modules.

2. Female-to-Female Connector Wires

A set of connector wires to facilitate easy connections between modules.

3. JK Flip-Flop Modules (2 Units)

Digital modules for implementing JK flip-flop circuits in your experiments.

4. Clock and Power Module (1 Unit)

A versatile module providing a clock signal and additional power support for your circuits.

5. Basic Logic Modules (2 Units)

Pre-configured modules for performing fundamental logic operations (e.g., AND, OR, NOT).

6. 7-Segment Display Module (1 Unit)

A display module for visualizing numerical outputs or other simple data representations.

7. I/O Module (1 Unit)

A versatile module designed for accepting input signals and providing output via LEDs for visual feedback. Ideal for experimenting with signal flow and basic input-output operations.

2 DEFINITIONS

Caution: Any action that can harm the personnel or the circuit board

TOP SIDE: This means the top side of the circuit board should be in this way when user takes the PCB to user hand (mentioned in figures)

BOTTOM SIDE: This means the bottom side of the circuit board should be in this way when user takes the PCB to user hand (mentioned in figures)

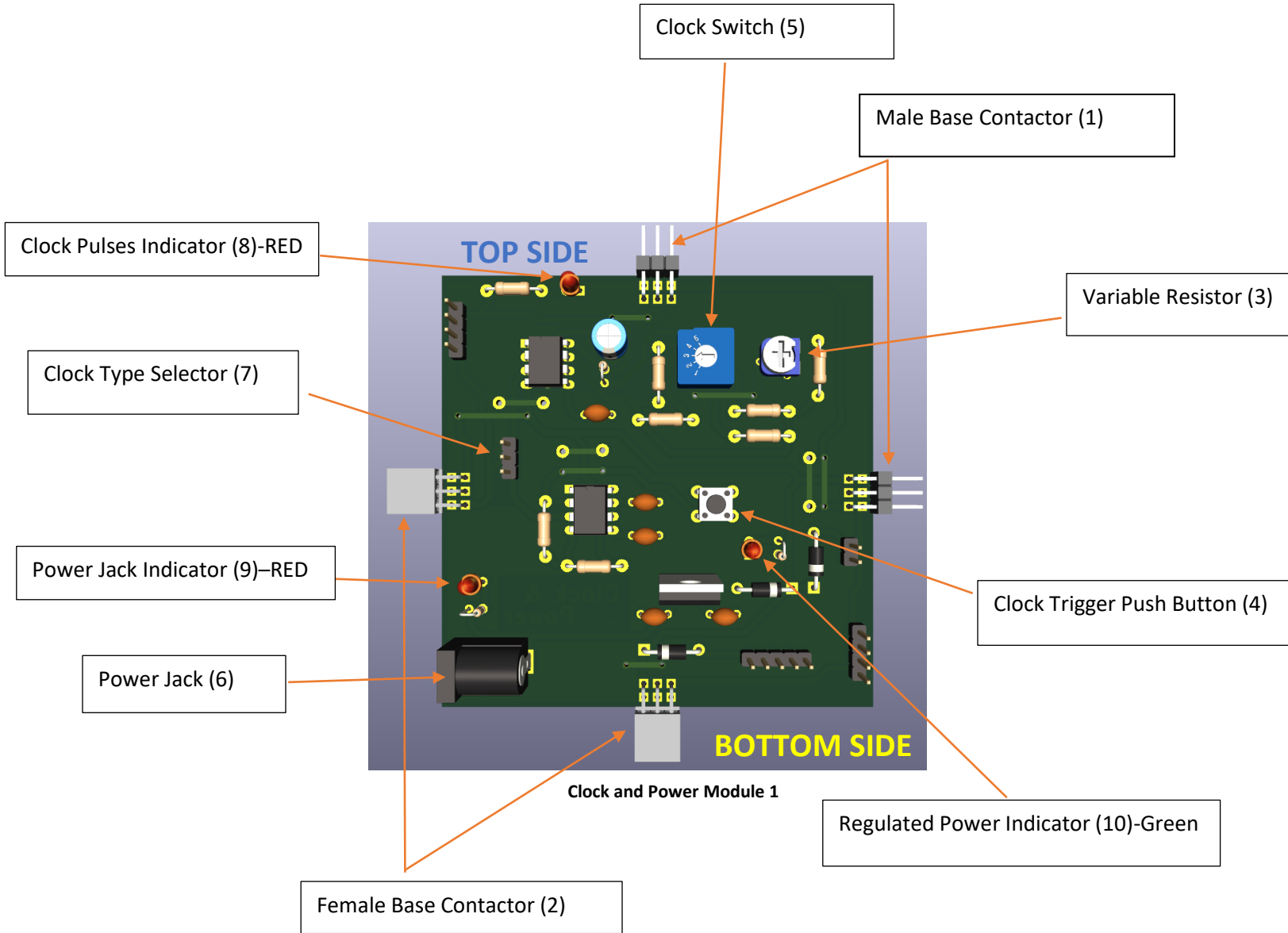
Orange Arrow: Anything mentioned in orange arrow is the name given to the component of the board

Green Arrow: Anything mentioned in green is the pin numbers or letters which easy to under understand

NOTE: Any special configuration procedure to achieve another configuration or special points

3 CLOCK AND POWER MODULE

3.1 Components and Its Functions.



There are multiple configurations to adjust the clock signals.

Clock signals can be changed through,

i. Clock Switch (5)

Position no 1 of Switch : This position is to switch to the Variable resistor.

Position no 2 of Switch : For 5 seconds 1 pulse

Position no 3 of Switch : For 2 seconds 1 pulse

Position no 4 of Switch : For 1 seconds 1 pulse

Position no 5 of Switch : For 0.5 seconds 1 pulse

ii. Variable Resistor (3)

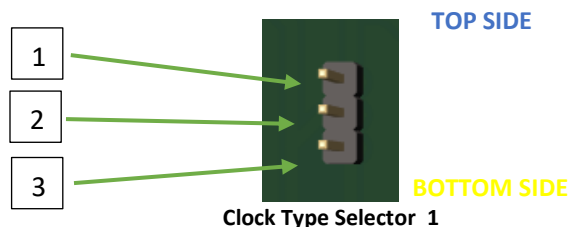
This is used to get the clock pulses as per user requirement periodically. But to switch to this position you need to switch to position 1 in the switch.

iii. Clock trigger Push Button (4)

Can be used to triggering Push Button to create pulses as required by the user. This can be achieved by using a shunt on the clock type selector (7) to manual position. Manual Position defined under clock type selector (7)

Clock Type Selector (7)

A shunt is used to define the clock signal is automatic or manual.



Pin 1 AND 2: Automatic Clock (Bistable 555)

Pin 2 AND 3 : Manual Clock (Astable 555)

Indicators

These are LED indicators as the name implies Clock pulse indicator (8) indicate clock pulses in Red, Power jack indicator (9) indicate power supply in Red and Regulated power indicator (10) indicate regulated power in green.

3.1 How to configure the Clock And power module.

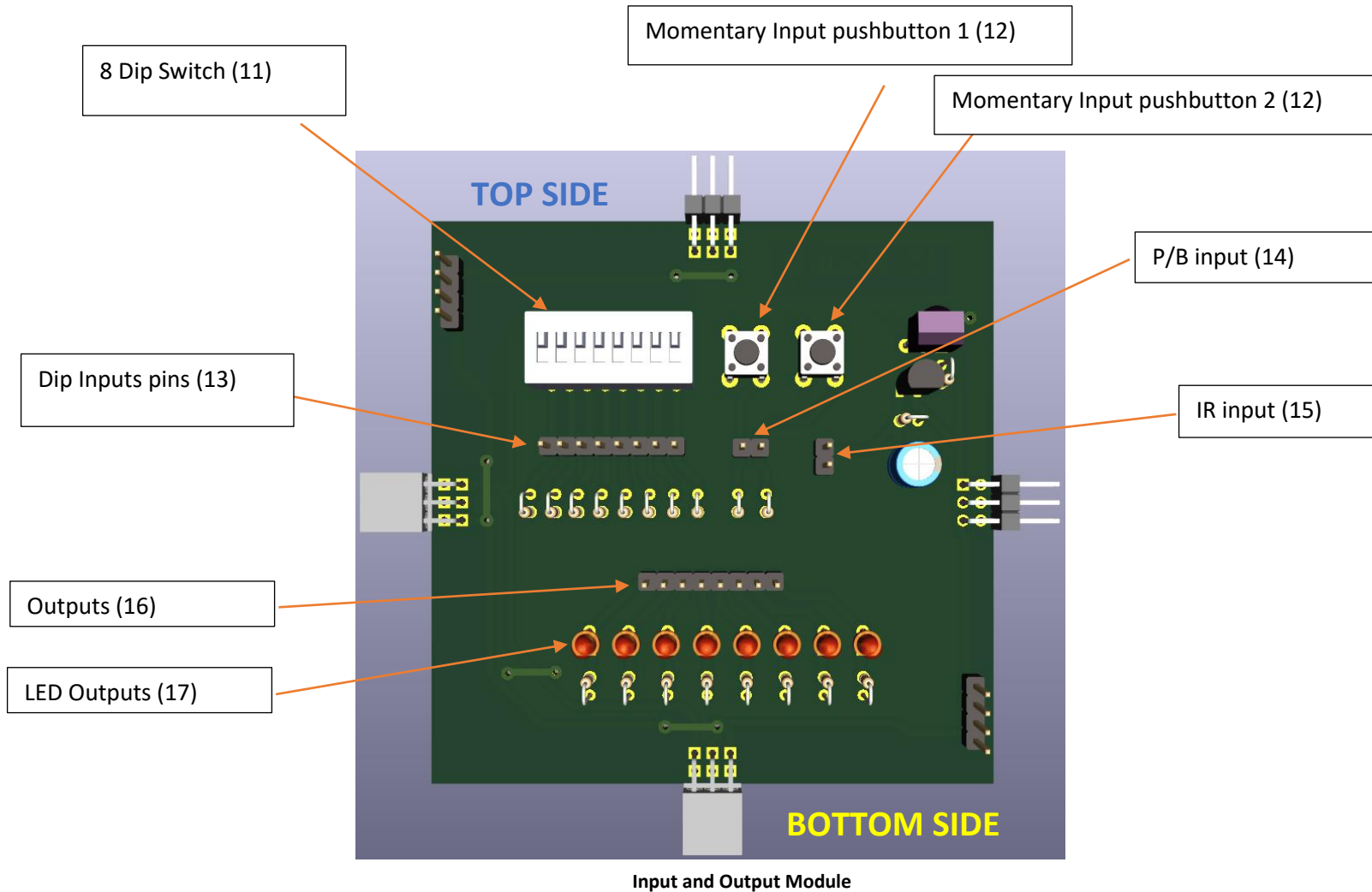
Caution: Make sure that when you supply power to the module to be 12V. Otherwise it can damage the circuit board or harm the personnel.

1. Supply 12V power to the circuit through the power Jack (6)
2. According to requirement apply the clock frequency **if required.**
3. Connect Input Output Module to the clock and power module through male base contactor (1) and female base contactor (2)

All the connectors that are on the edges are supplying only power (5V) or Clock pulses

4 INPUT AND OUTPUT MODULE

4.1 *Components and its functions*



LED lights are used to give the outputs of the IC's

Inputs are given by

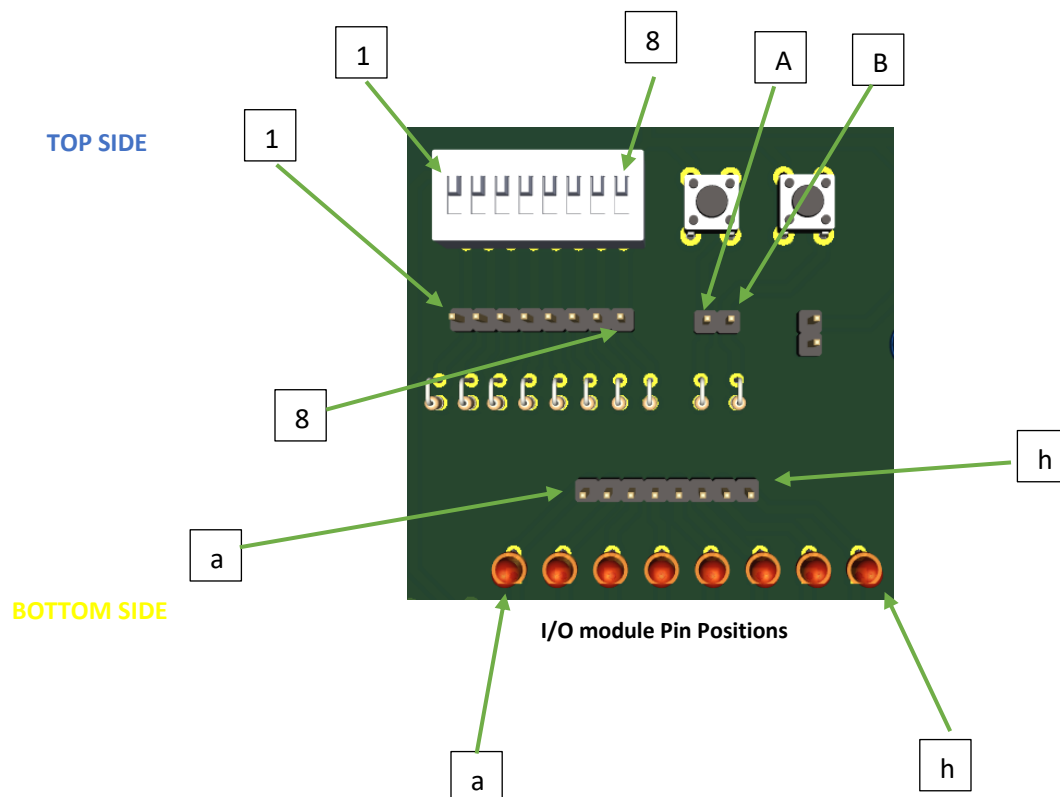
- i. 8 dip switch (11)
- ii. Momentary Push button (12)

a. IR sensor

this can be used trigger a signal from a remote and be used to check the functionality of a remote

All these inputs segments are isolated there's no separate switching function to activate the input method. Whatever the method the user use, is the method to work the circuit.

4.2 How to configure the module

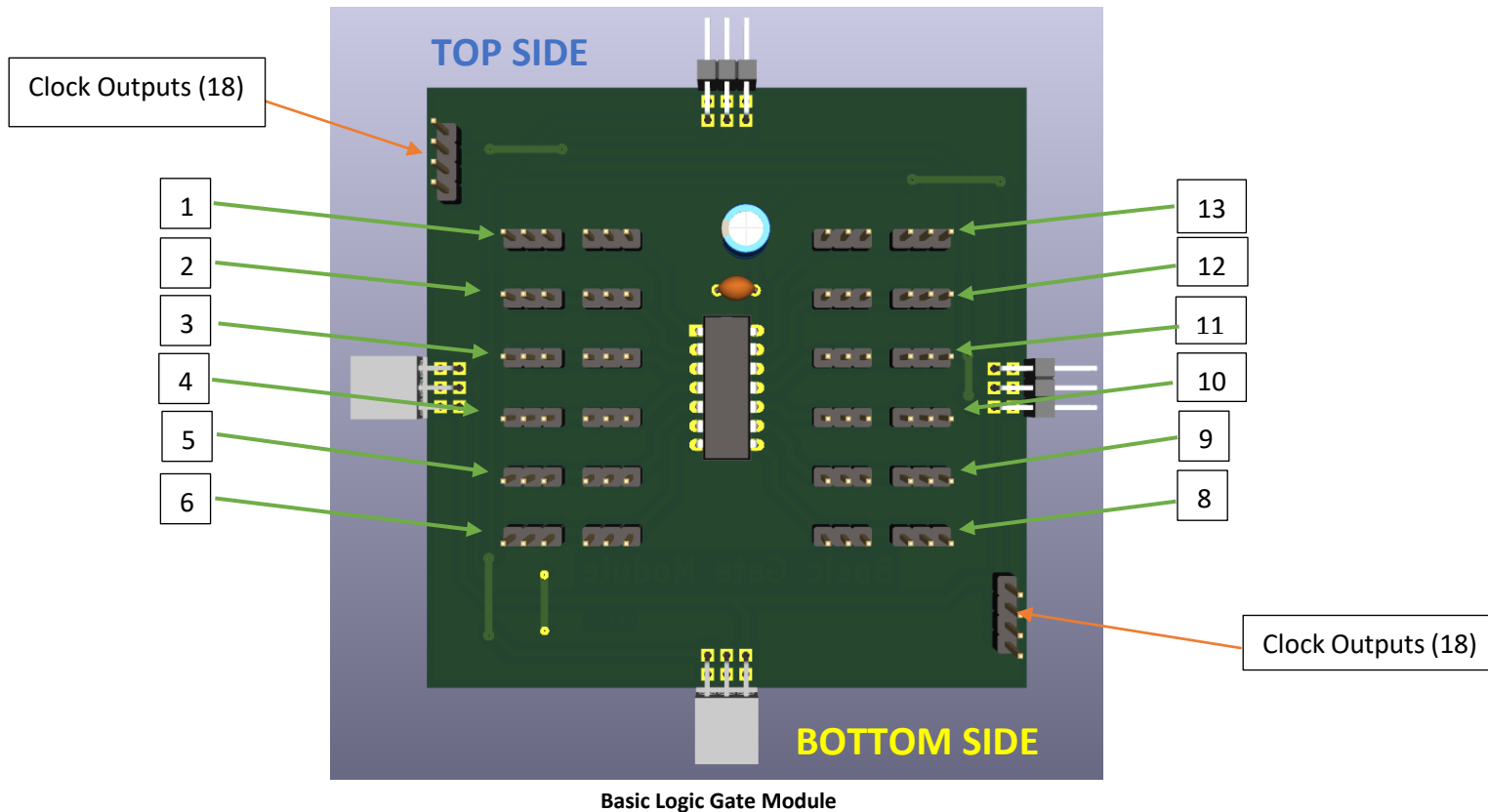


1. Connect the input output module to the clock and power module
2. Connect whichever the module that the user needs to function. As example Basic logic gate module, JK module, 7 segment Module.

3. According to figure pin A used for the momentary push button 1 and pin B for the momentary push button 2
4. IR input (15) both pins can be used as a signal input (Both are same)
5. 8 Dip switch Inputs (11) and Dip Inputs pins (13) corresponds to the relevant numbering of the pins and switch (1 to 8)
6. Outputs (16) and LED outputs (17) are corresponding to the relevant simple alphabet letters of relevant pins and LED outputs (a to h)

5 BASIC LOGIC GATE MODULE (ANY IC WITHING 74XX SERIES)

5.1 *Components in the module*



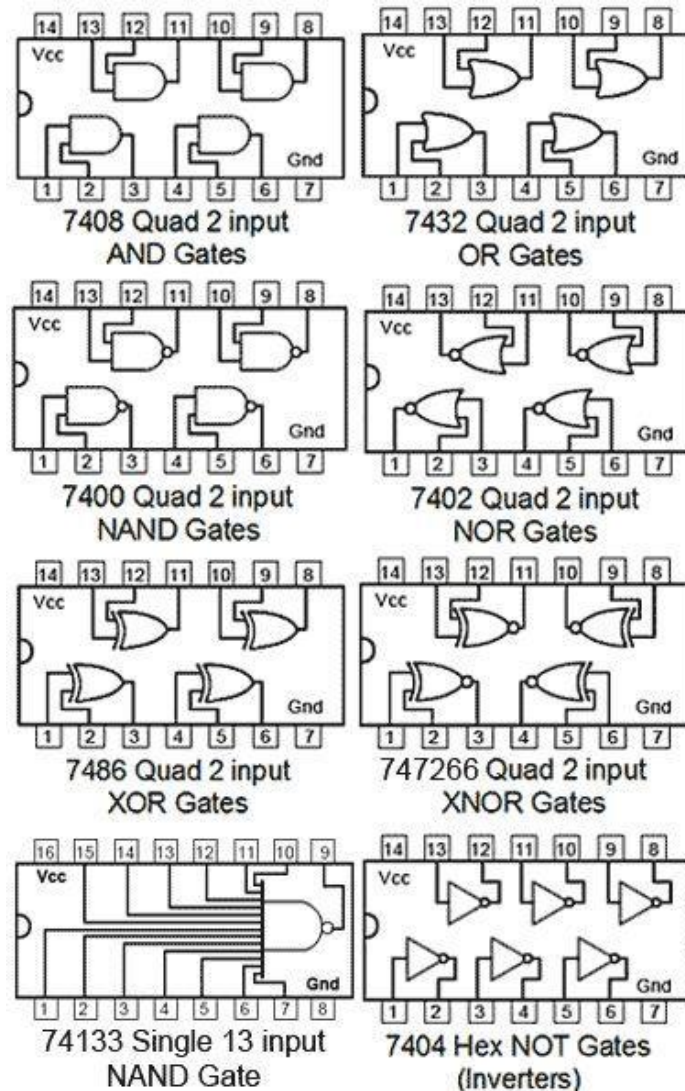
The pins that are mentioned in board are same as the data sheet of the IC. Since POWER and GROUND lines are already hardwired pin 14 and pin 7 not mentioned.

5.2 *How to configure the module*

1. Connect the module to the any of the power sockets available in the already build up Input Output or power and clock module
2. Then connect the jumper wires as per the guideline diagram mentioned in guideline tab (refer the correct IC for pin programming)

3. Jumper cables draw to and from, Input and output module

5.3 Guidelines to the Basic gates IC



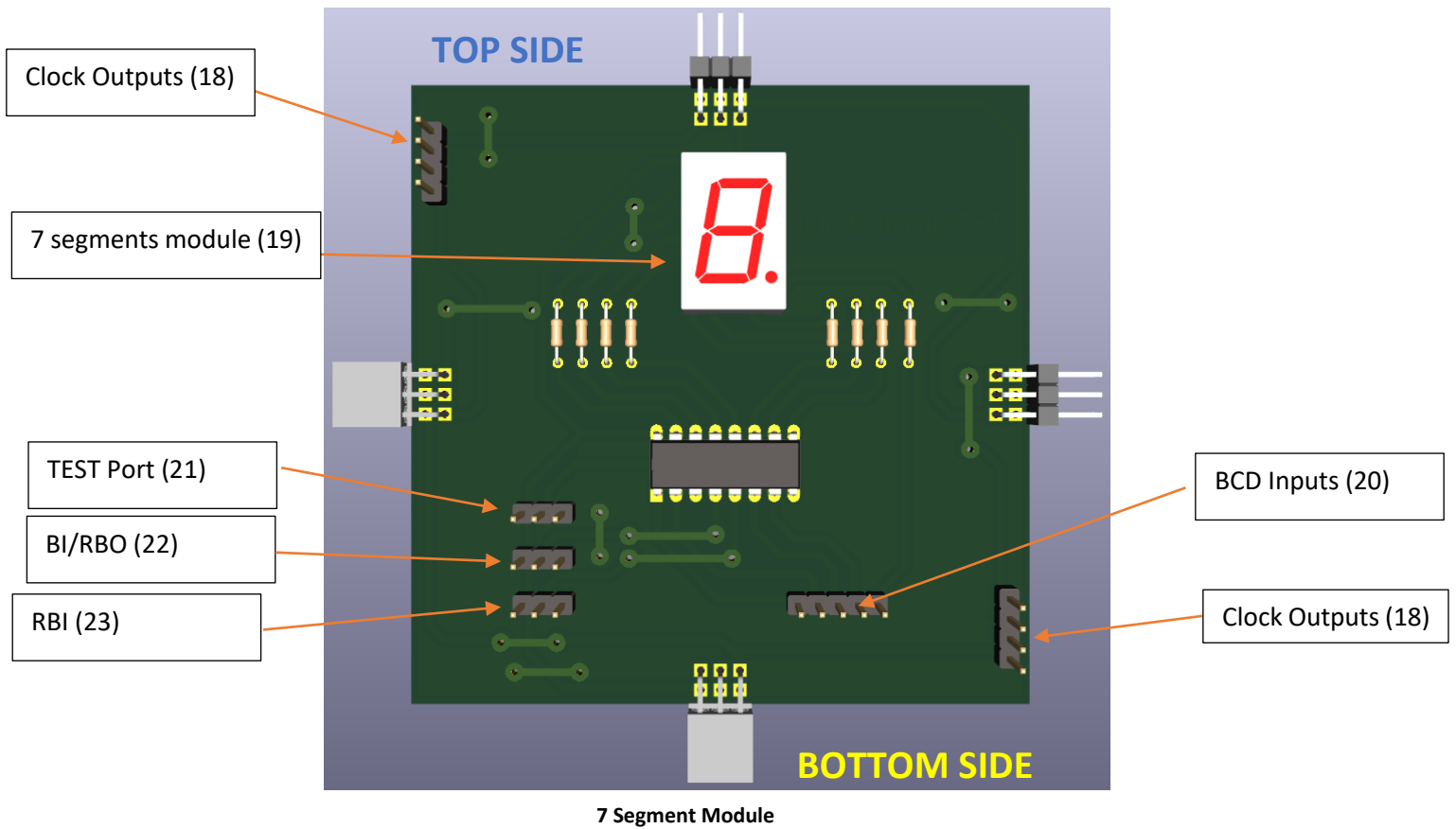
Basic Logic Gates Easy Guidelines

Basically, this is used to learn the IC programming of the logic gates user needs to figure out which pin the input is given and which pin to output is given by going through the above figure.

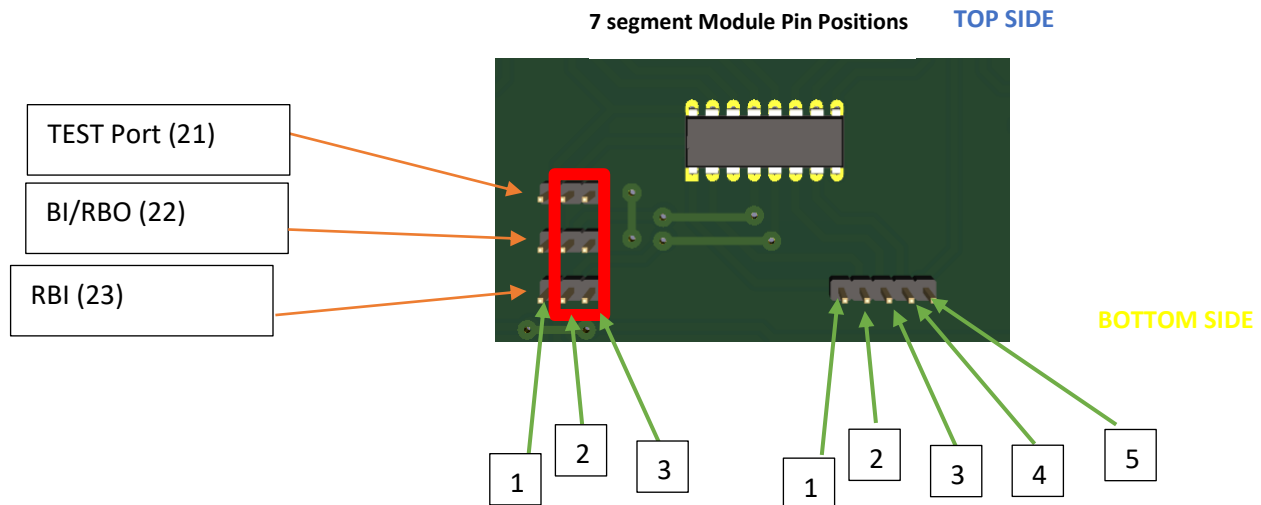
NOTE: THIS BASIC LOGIC GATE MODULE CAN BE USED FOR ANY IC THAT HAS THE CONFIGURATION OF IC WHICH HAS 14 PINS AND THE 14TH PIN IS POWER AND 7TH PIN IS GROUND.

6 7 SEGMENT MODULE

6.1 Components in the module



6.2 How to configure the module



3 shunts should be added to TEST port (21), BI/RBO (22), RBI (23) work the circuit. Highlighted in red color is the normal configuration to work the circuit as normal.

As an example; If Test port shunt switched to the 1-2, 7 segment switched to the test config.

NOTE: The names and functions of TEST port (21), BI/RBO (22), RBI (23) are same as the data sheet.

BCD Inputs (20)

Pins should be connected as mentioned below to get the correct values.

Pin 1: Bit 1

Pin 2: Bit 2

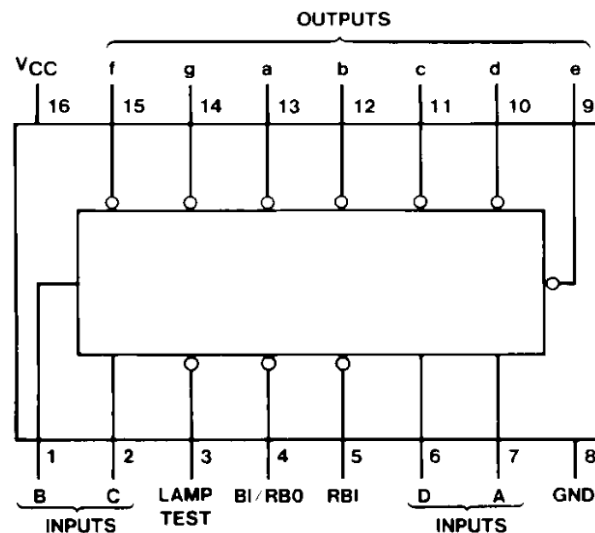
Pin 3: Bit 3

Pin 4: Bit 0

Pin 5: Decimal

NOTE: 7 segment module pre-configured for 7447 BCD to 7-Segment IC. 7-Segment display must be common anode display unit. This won't work with a common cathode.

6.3 Guideline to 7 Segment Module

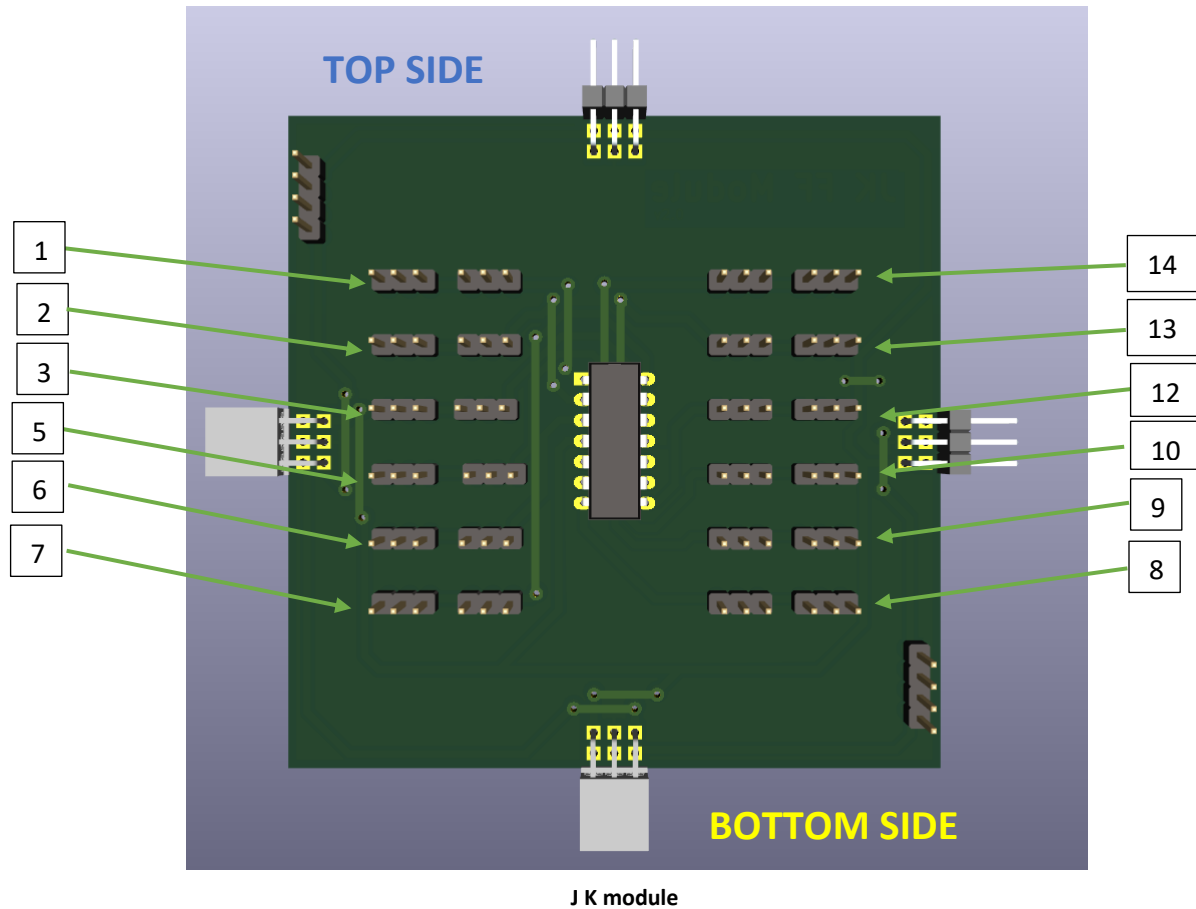


7 Segment Module easy Guideline

Pin Numbers 3,4,5 should be either 1 or 0. These pins are mentioned in 7 segment module as TEST port (21), BI/RBO (22), RBI (23).

7 J K MODULE

7.1 Components in the module



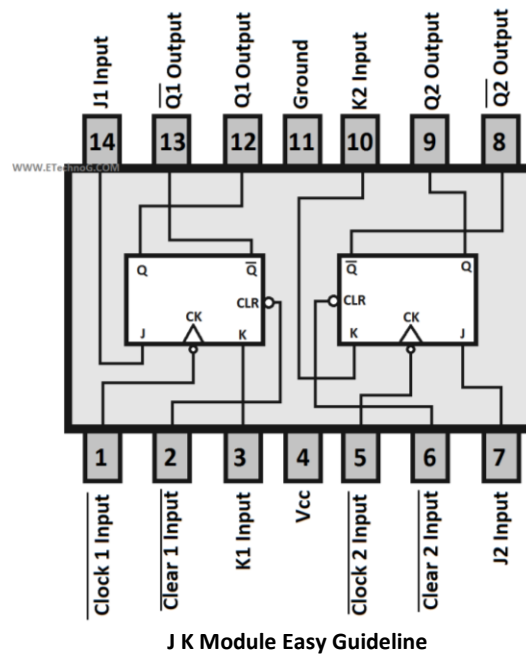
Pin positions of the J K Module.

- 1: Clock 1 Input
- 2: Clear 1 Input
- 3: K1 Input
- 5: Clock 2 Input
- 6: Clear 2 Input
- 7: J2 Input
- 8: Bar Q2 Output
- 9: Q2 Output
- 10: K2 Input
- 12: Q1 Output
- 13: Bar Q1 Output

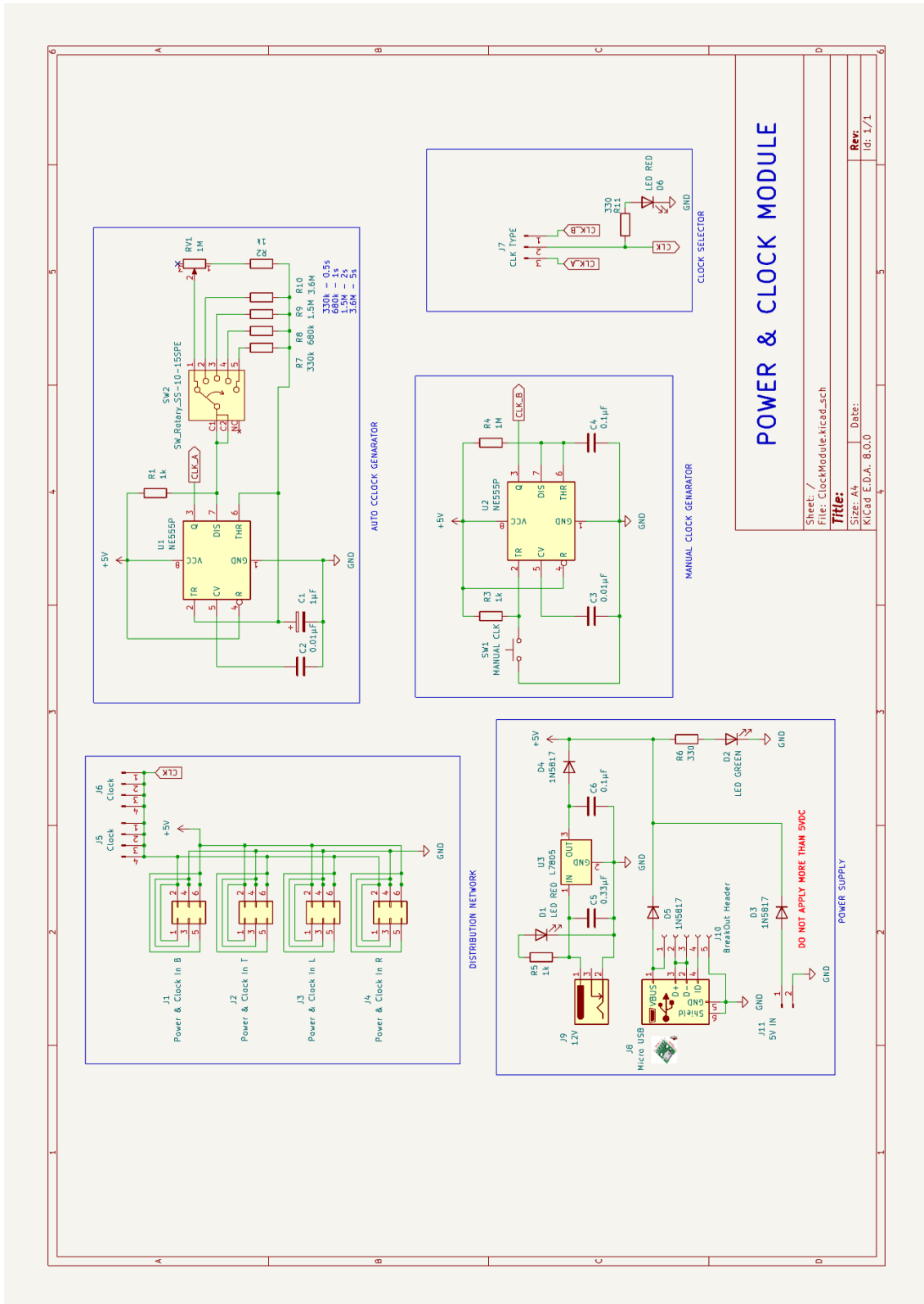
14: J1 Input

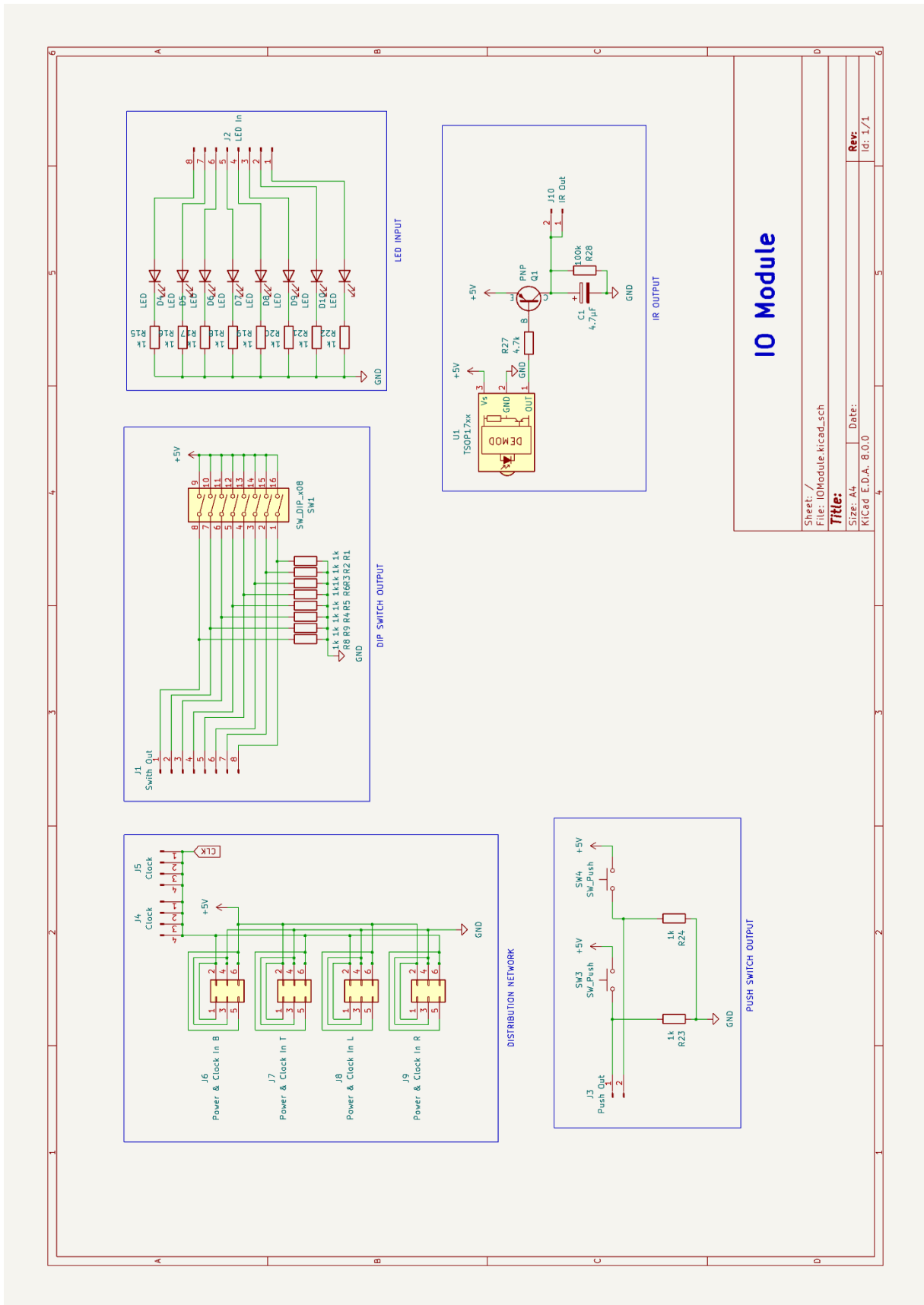
Pin 4 and pin 11 are power and ground lines correspondingly. So these are not mention in the module since these are hardwired.

7.2 Guideline to the JK module



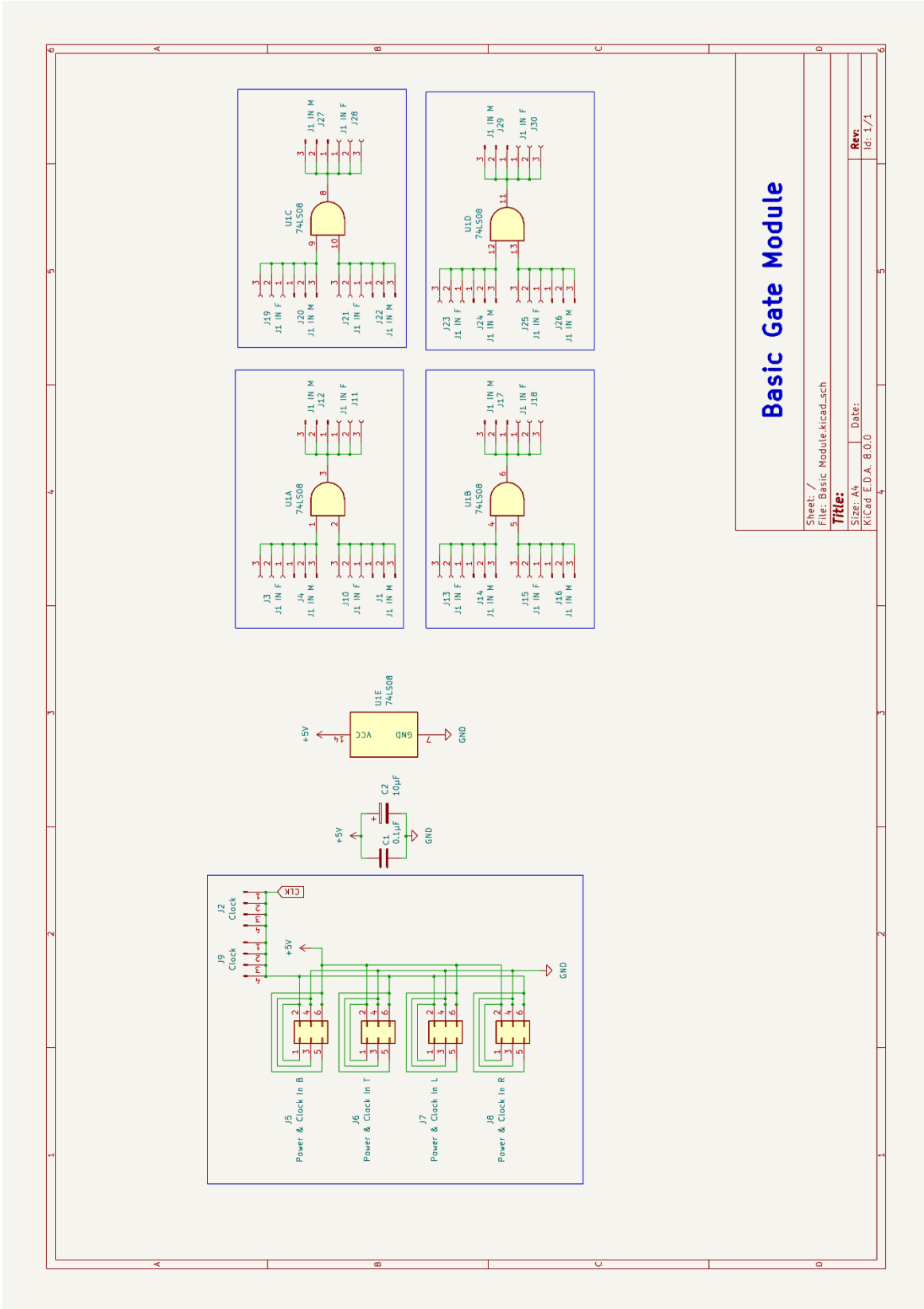
8 SCHEMATIC DIAGRAMS

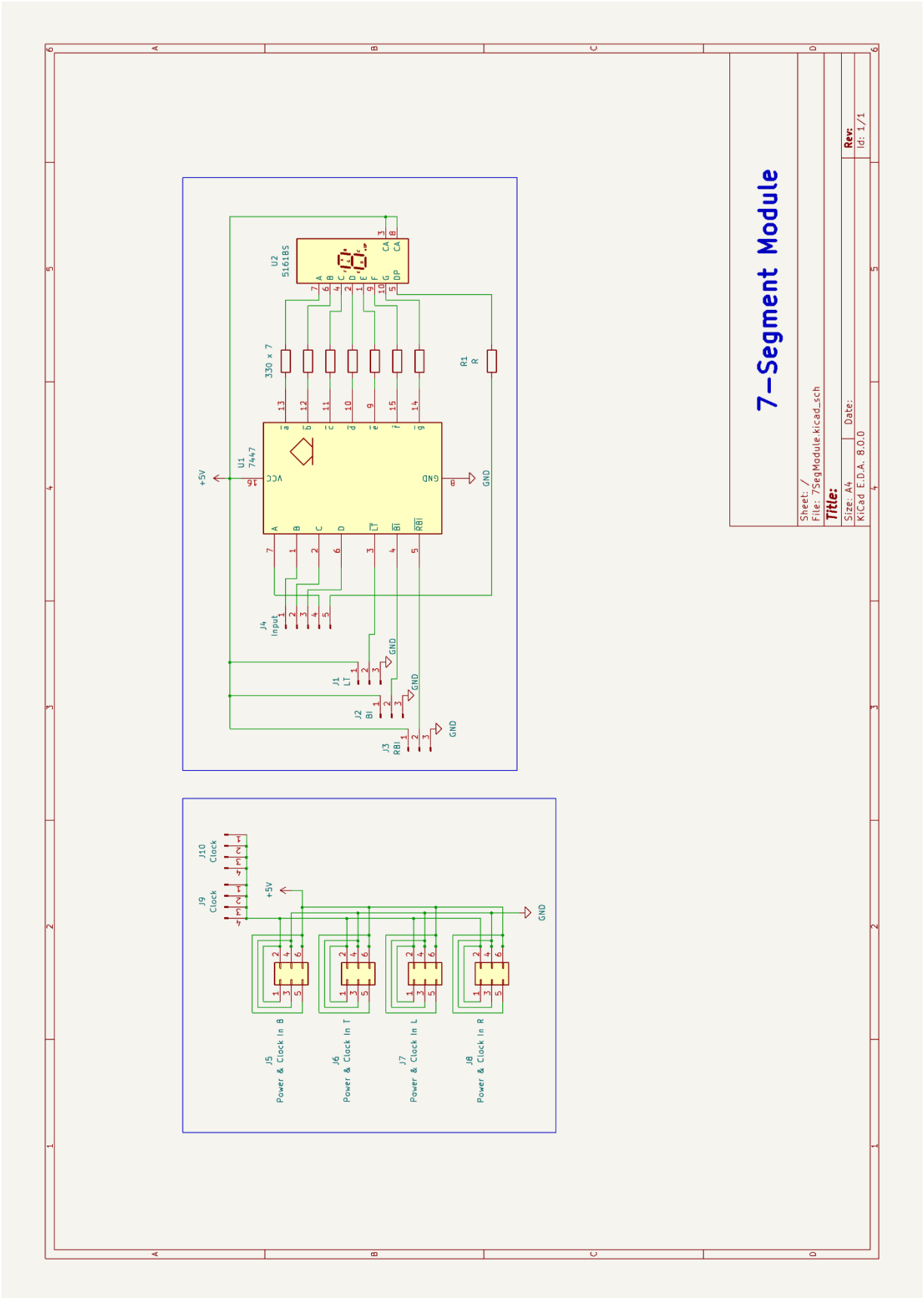




IO Module

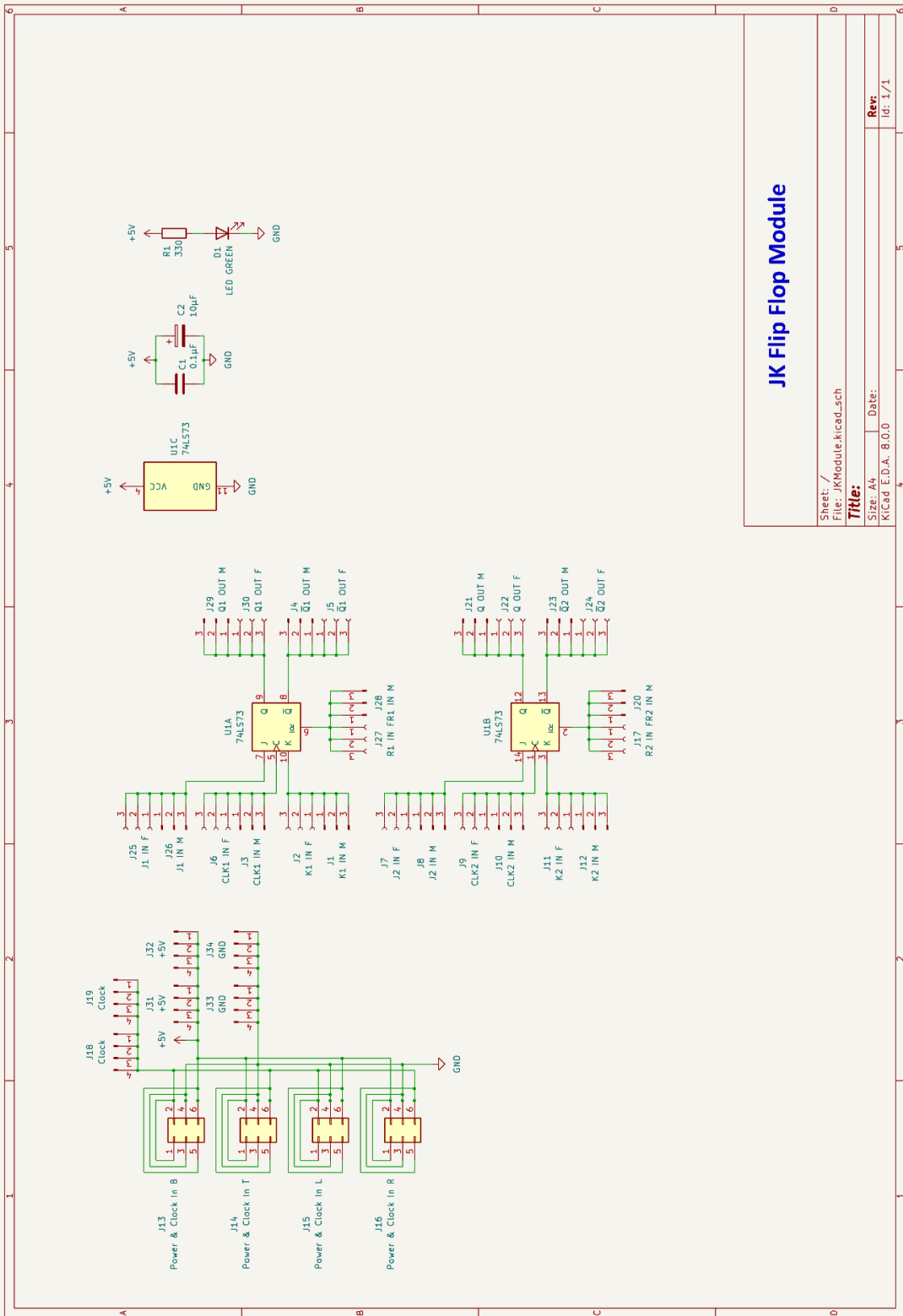
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Date:	
Rev:	1/1





7-Segment Module

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 Date:
Rev:
 Id: 1/1



JK Flip Flop Module

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Size: A4
Date:
KiCad E.D.A. B.0.0
Rev:
Id: 1/1

9 SUPPORT

When contacting customer support, provide details about the issue you're facing, steps you've taken, and any error codes or indicators displayed on any indications. This information will help our support team provide you with efficient assistance.

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