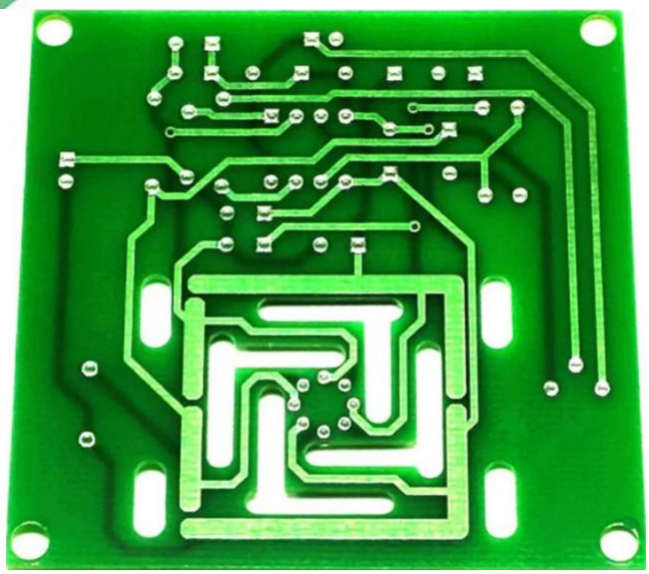
*Bahan Ajar*

**Modul Praktikum**

# DESAIN DAN SIMULASI RANGKAIAN ELEKTRONIKA

Kode Matakuliah: SKO21425



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**2023**

# Modul 14

## Create Up-Down Counter PCB Layout

### 1. 7 Segment Up Down Counter

#### Introduction

The method I use to make PC Boards, is called the "Heat Transfer" method, using Press-n-Peel transfer paper. After applying the Press-n-Peel to a blank PC Board, I use a standard A4 laminator to transfer the toner from the Press-n-Peel to the PC Board. With the laminator set to the 125ug temperature setting, passing the PC Board trough 10 times gives me the best results.

#### Why the Counter?

A simple task of counting the number of passes through the laminator proved to be confusing at times. Especially when I am "multi-tasking" (boiling the kettle for hot water, prepare the acid bowl, etc).

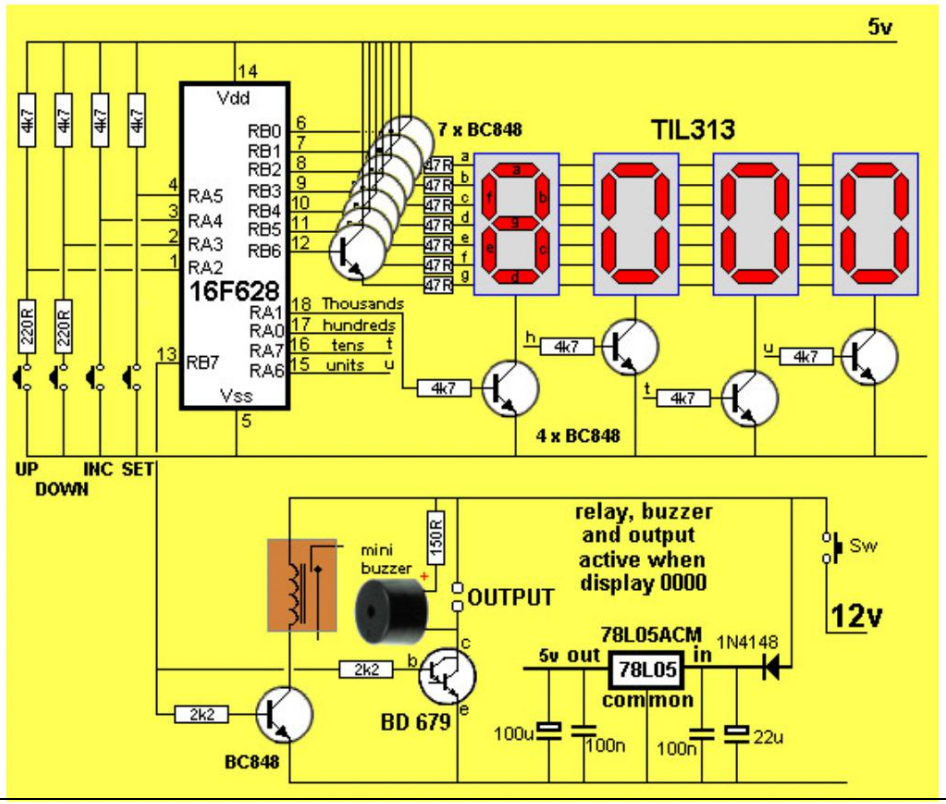
To ensure that I no longer miss a count, I decided to build a simple counter to keep track of the number of passes :) :) :)

#### Design Criteria

- The counter had to be build with components I had at hand
- Must be self-powered
- Self-contained PC Board design. I did not want to put the project inside an enclosure
- No loose wiring

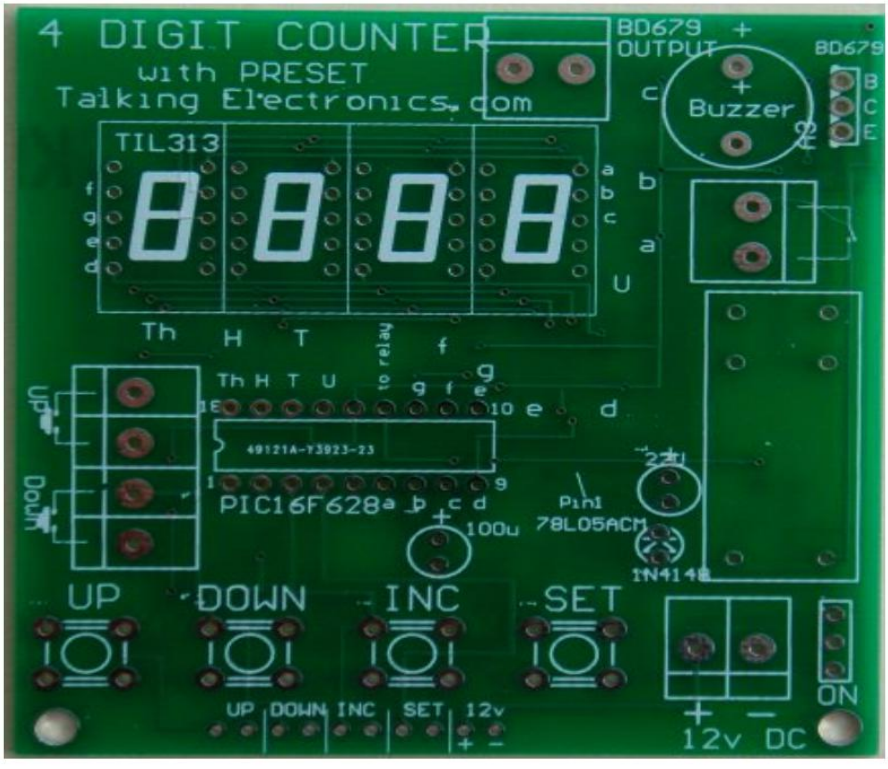
#### Component Selection

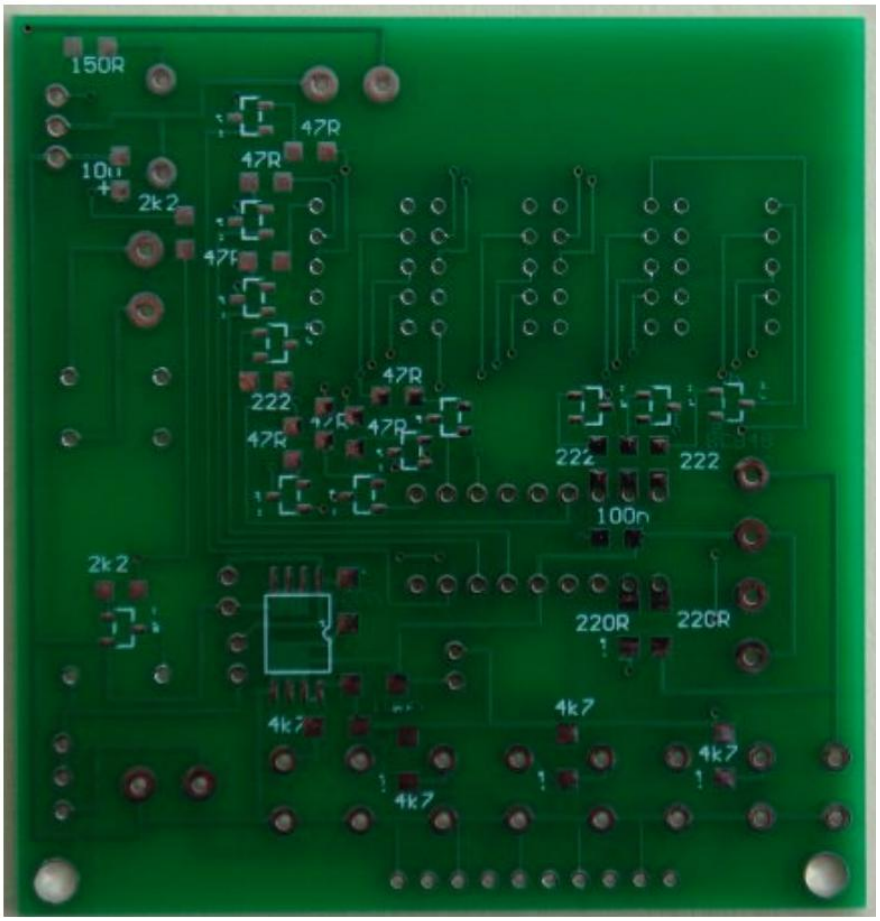
- The 7 Segment displays were salvaged from an old abandoned project. They are common cathode types.
- I decided to make use of surface mount components as much as possible. This was more for the practice of working with SMD components
- Chip selection was the ATMEGA8 or ATMEGA328p. I decided on the ATMEGA8 as I have several of these due to an incorrect order on eBay (my mistake). Code is compatible with both
- Buttons selected was 2 x 12mm tactile switches. Due to their larger size, they are easier to use

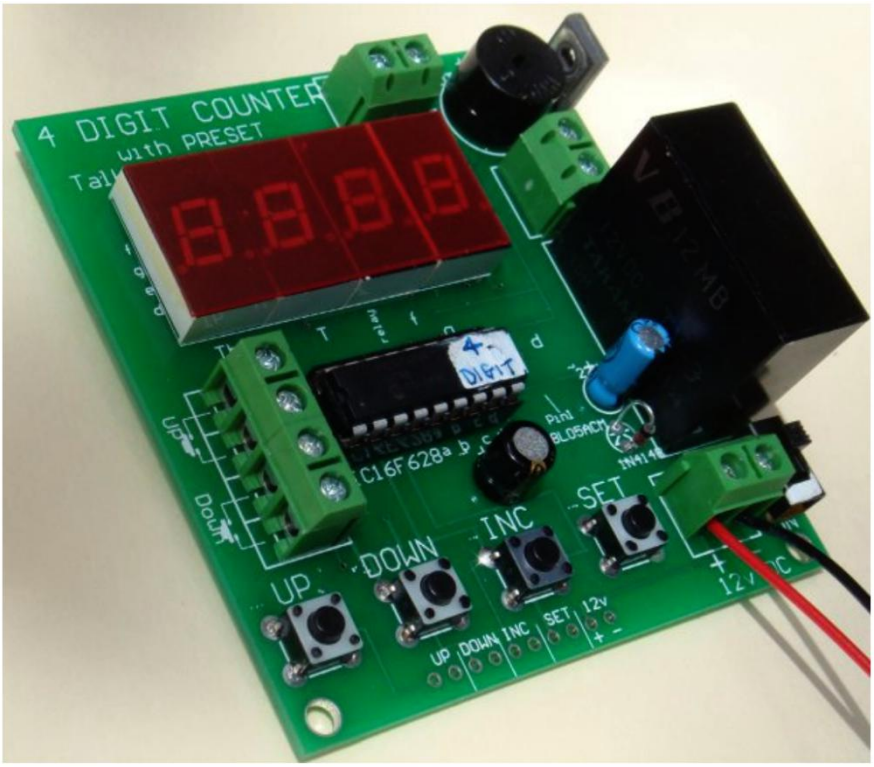



JOBSHEET 14

Lakukan pembuatan Skema Up Down Counter seperti pada gambar di bawah ini menggunakan software simulator dan jelaskan tahapan dan hasil simulasinya.




150R
47R
47R
2k2
47R
47R
222
47R
47R
222
222
100n
2k2
220R
220R
4k7
4k7
4k7
4k7


4 DIGIT COUNTER
with PRESET
8.8.8.8
4-DIGIT
UP
DOWN
INC
SET
UP DOWN INC SET 12v

LAPORAN HASIL PERCOBAAN: