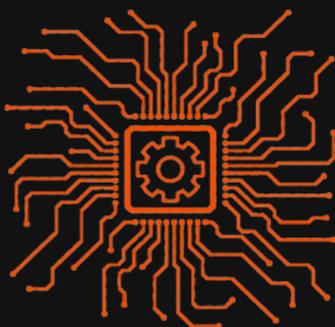


Photostat Machine

System Controller



GROUP ONE



GROUP MEMBERS

GAAFAR - A21MJ4002

lena - A21MJ9143

Lauweizhe - A20MJ8020

Ahmed anwar - A21MJ4001

RASHEADUZZAMAN - A21MJ0160



UTM



TABLE OF CONTENT



- **INTRODUCTION**
- **WHAT IS SYSTEM CONTROLLER**
- **OUR OBJECTIVE**
- **OUR IDEA**
- **COMPONENTS USED**
- **PASSWORD SYSTEM**
- **THE PROPERTIES**
- **ASYNCHRONOUS COUNTER**



INTRODUCTION

First, what is a photostat machine? The Photostat machine, or Photostat, was an early projection photocopier developed by the Commercial Camera Company, which later became the Photostat Corporation, in the decade of the 1900s. The name "Photostat," which was initially a business trademark, became genericized and was frequently used to refer to comparable machines manufactured by the Rectigraph Company. Now, After having a brief idea about the photostat machine, what is the goal of designing a System Controller for? How it is going to work? what is more special about our System Controller than others?

WHAT IS SYSTEM CONTROLLER

Using digital circuits, a control system manages, commands, directs or regulates the behavior of other devices or systems. It can range from a single home heating controller that uses a thermostat to operate a domestic boiler to massive industrial control systems that control processes or machinery. The same concept can be applied to our photostat machine control system.

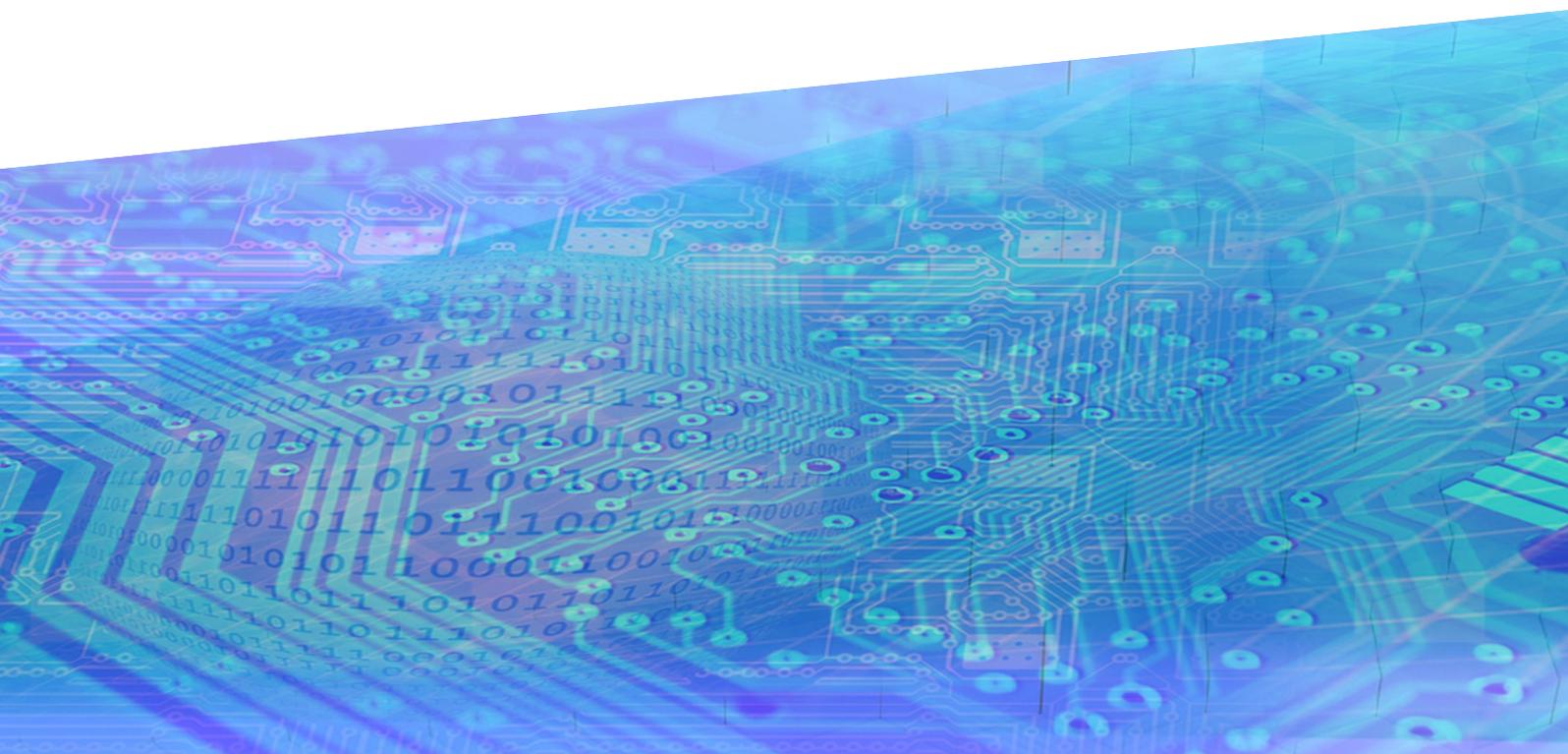
OUR OBJECTIVE

So, our goal is to create a complete photostat machine system that can interact with human inputs. We also want to give the user a system that has good functionality and is simple to use. In addition, we intend to create a security solution to keep the machine safe.

OUR IDEA

As a result, our goal is to create a complete photostat machine system that can interact with human inputs. We also want to offer the consumer a solution that is practical and simple to use. In addition, we want to provide a security solution to keep the machine safe. But, how will this system function and what will it look like? Briefly, the system will

prompt the user for a password, after which the user will be able to select some printing characteristics and the number of copies that he desires. This is our overarching concept, which will be expanded upon in the following parts.



COMPONENTS USED

1 4-bits input switch(Hex)

In our circuit, we used nine of them to let the user enter many different inputs in a comfortable way

2 8-bits output LED array switch

in our circuit, we use 4 of them in the password system to display the numbers that the user has entered in a binary form.

3 4-bits output LED array switch

In our circuit, we use 4 of them in the properties system to display the numbers that the user has entered in a binary form.

4 AND gates

Overall we used 18 AND gates in our circuit in all the systems. They will be explained in detail in the following sections

5 Multiplexer 2 --> 1

In our circuit, we just used one 2 --> 1 Multiplexer in the properties system.

6 Demultiplexer 1 --> 2

In our circuit, we just used one 1 --> 2 Demultiplexer in the properties system.

COMPONENTS USED

7 Multiplexer 4 --> 1

In our circuit, we used three 4 --> 1 Multiplexer in the properties system.

8 DEmultiplexer 1 --> 4

In our circuit, we used three 1 --> 4 DEmultiplexer in the properties system.

9 Clock generator

In our circuit, we used a one Clock generator in the asynchronous system.

10 3-bit Comparator

In our circuit, we used one 3-bit Comparator in the asynchronous system.

11 7-Segment Display

In our circuit, we used six 7-Segment Displays in all the systems in the circuit.

12 flip-flop JK pet

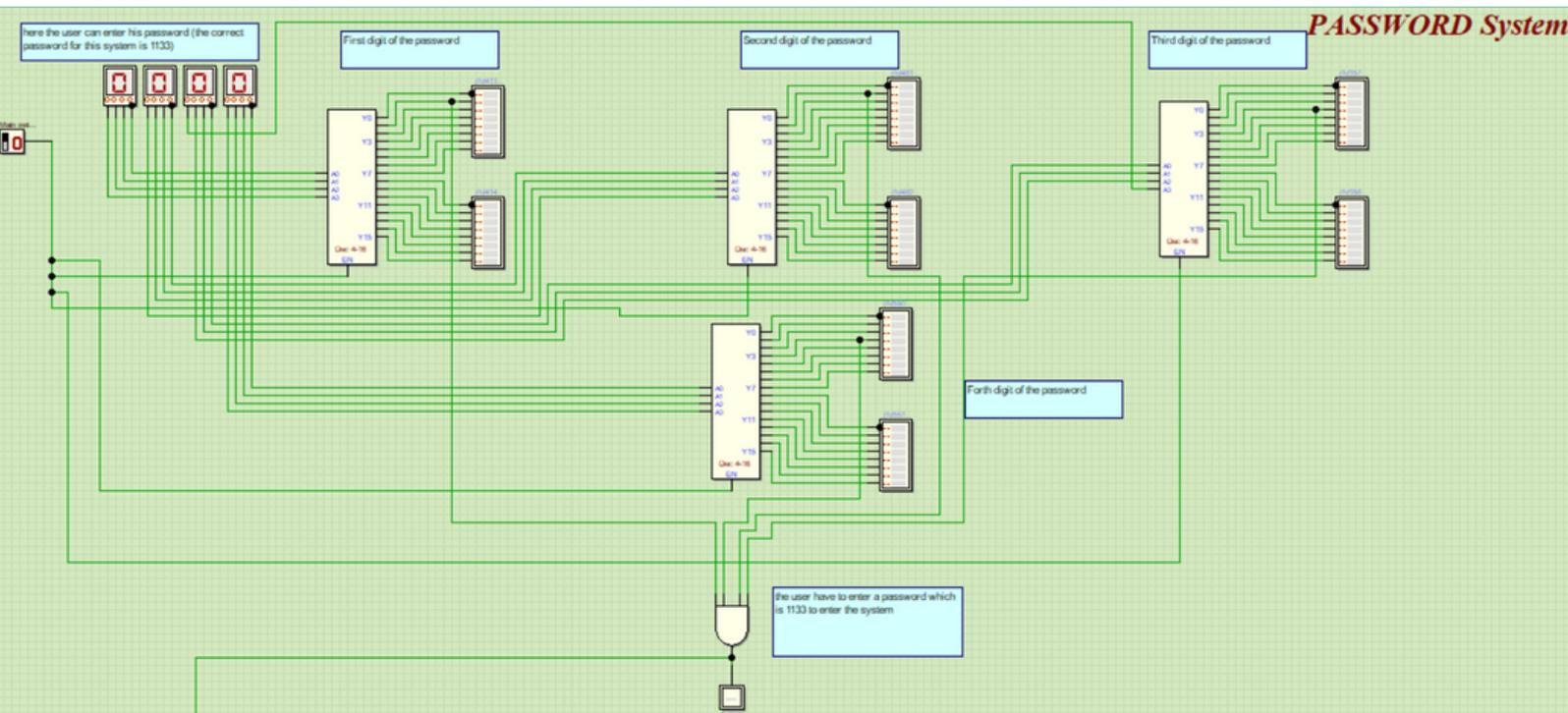
In our circuit, we used four flip-flop JK pet in the asynchronous system.



PASSWORD SYSTEM

The first step for the user is to open the machine is by clicking on the main switcher, after that the user will have to enter a password that is contained with 4 digits, each digit of them will contain 4 binary numbers. There are 65536 possible combinations for the password, for the sake of security. We used 4 to 16 decoders instead of using 1 to 4 decoders because it helps if we want to change the password. (the password for this system is 1133)

The figure of the password system is shown be bellow.



The whole system file is provided is submission.

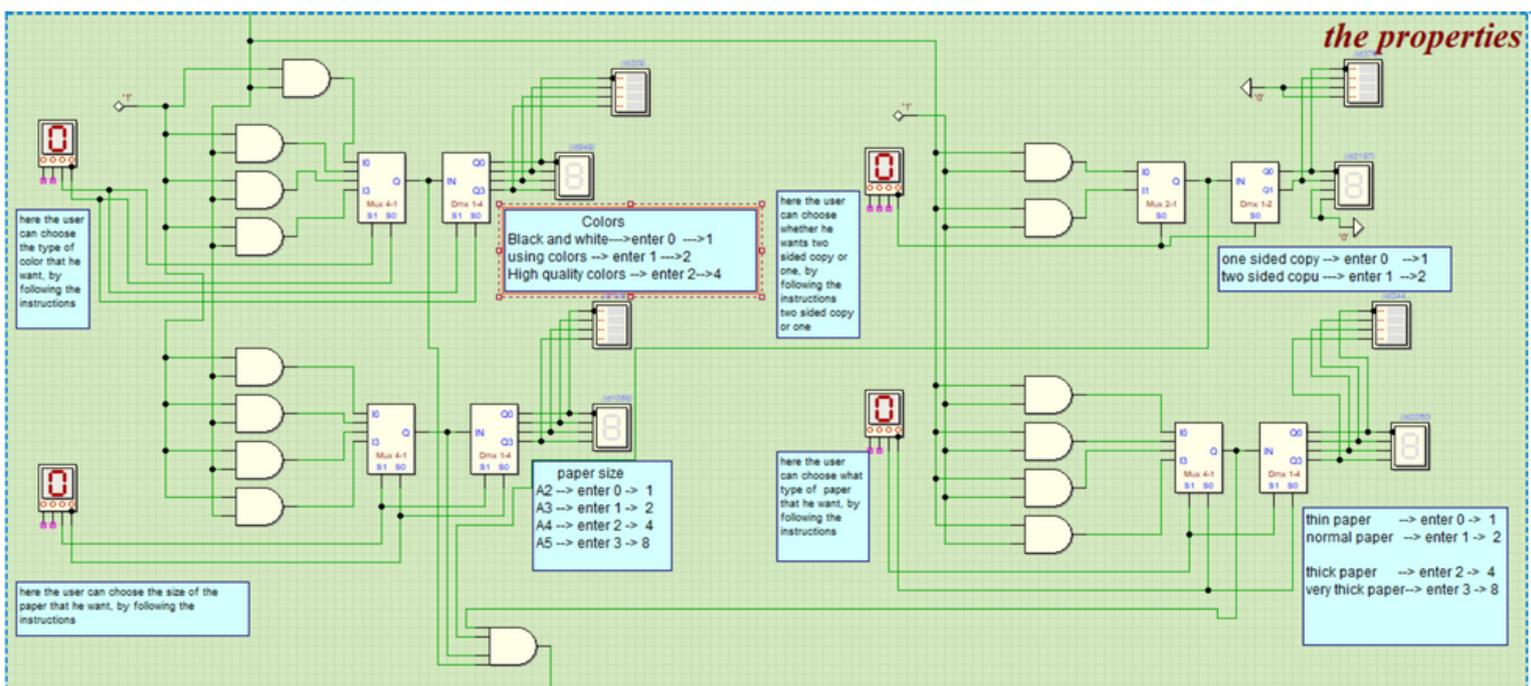
THE PROPERTIES

Once the user has entered the password correctly. It comes to the next step when the user can choose the properties of the printing. But, how the circuits are working, there are two main components of these circuits Multiplexer and Demultiplexer.

A multiplexer is used to allow the user to select the printing qualities that he or she desires. In terms of color, it only accepts two-bit input; if the user enters (0), it will select black and white. If the user enters (1), the paper will be printed with all the colors. If the user enters (2) the paper will be printed with High-quality colors. In terms of the size of the paper, it accepts two-bit input, giving the user a range of options. If the user enters (3), the size will be A5, if the user enters (2), the size will be A4, if the user enters (1), the size will be A3, and if the user enters (0), the size will be A2.

After that, the user will be given another two opinions, if the user wants the printed paper to be a one-sided copy he can enter (0), and two-sided copy he can enter (1) Finally, the user will be given another four opinions either if he wants the printed paper to be thin he can enter (0). If he wants the printed paper to be the normal size he can enter (1). And if the user wants the printed page to be a thick paper he can enter (2) and he can enter three in a case he wanted it to be very thick

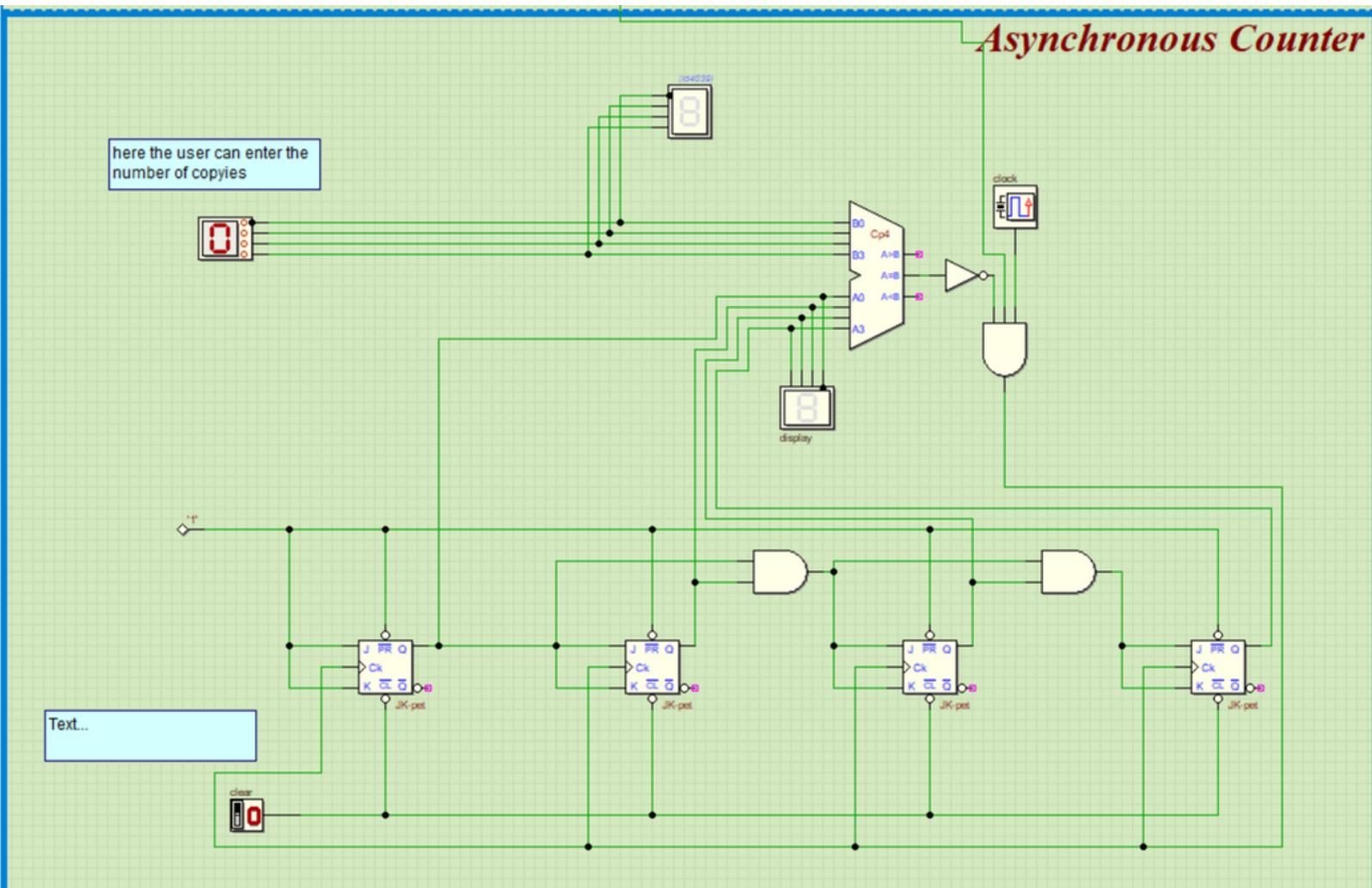
Overall, the demultiplexer is connected to the multiplexer's output, so this component is used to determine the properties that the user has selected.



The whole system file is provided is submission.

SYNCHRONOUS COUNTER

Overall, We use a 4-bit j k flipflop to build a counter to count the number of copies the counter will start counting based on a clock, we connect j and k to high input and the counter will be activated when the user enters the correct password and the number of printed copies doesn't reach the number of copies, but when they are equal the counter will stop counting and will start from zero by using the reset button. A 3-input AND gate are used to configure the clock enabler. The clock source, a signal supplied by the properties, and a signal sent by the comparator are all sent to the AND gate's input. When all three inputs are high, the enabler becomes active. It used to halt the counter's functioning when the number of copies and printed copies was reached.



The whole system file is provided is submission.