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Securing your Future with your own Hands

Welcome to:

Nettur Technical Training Foundation

"We Build Skills that Shape our Nation"

Securing your Future with your own Hands

MSD PROJECT 2017-2020

FOAM PVC SHEET CUTTING MACHINE

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ABSTRACT

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- Our project is based on the Embedded System. It will work with the help of intelligent microcontroller (ATmega328P).
- This project will provide the foam PVC sheet to be cut by using the circular cutters.

INTRODUCTION

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- Our project is based on the Embedded System. It will work with the help of intelligent microcontroller (ATmega328P) .
- This project will provide the user to cut the foam PVC sheet into circular shape.
- The ultimate aim of our project is to make the circular sheets and to reduce the human effort.
- To make the process automated.

PROJECT BREIF

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AIM

The aim of the project is to build foam pvc sheet cutting machine using ATmega328 microcontroller.

OBJECTIVES

- In older days manual power is required to cut any object for industry purpose to overcome that automatic disc cutting machine is helpful.
- It reduces time.
- It has more accuracy.

PROJECT TARGET

- The target of the project is to reduce the human effort and to increase mass production and for better accuracy.

BLOCK DIAGRAM(EXISTING)

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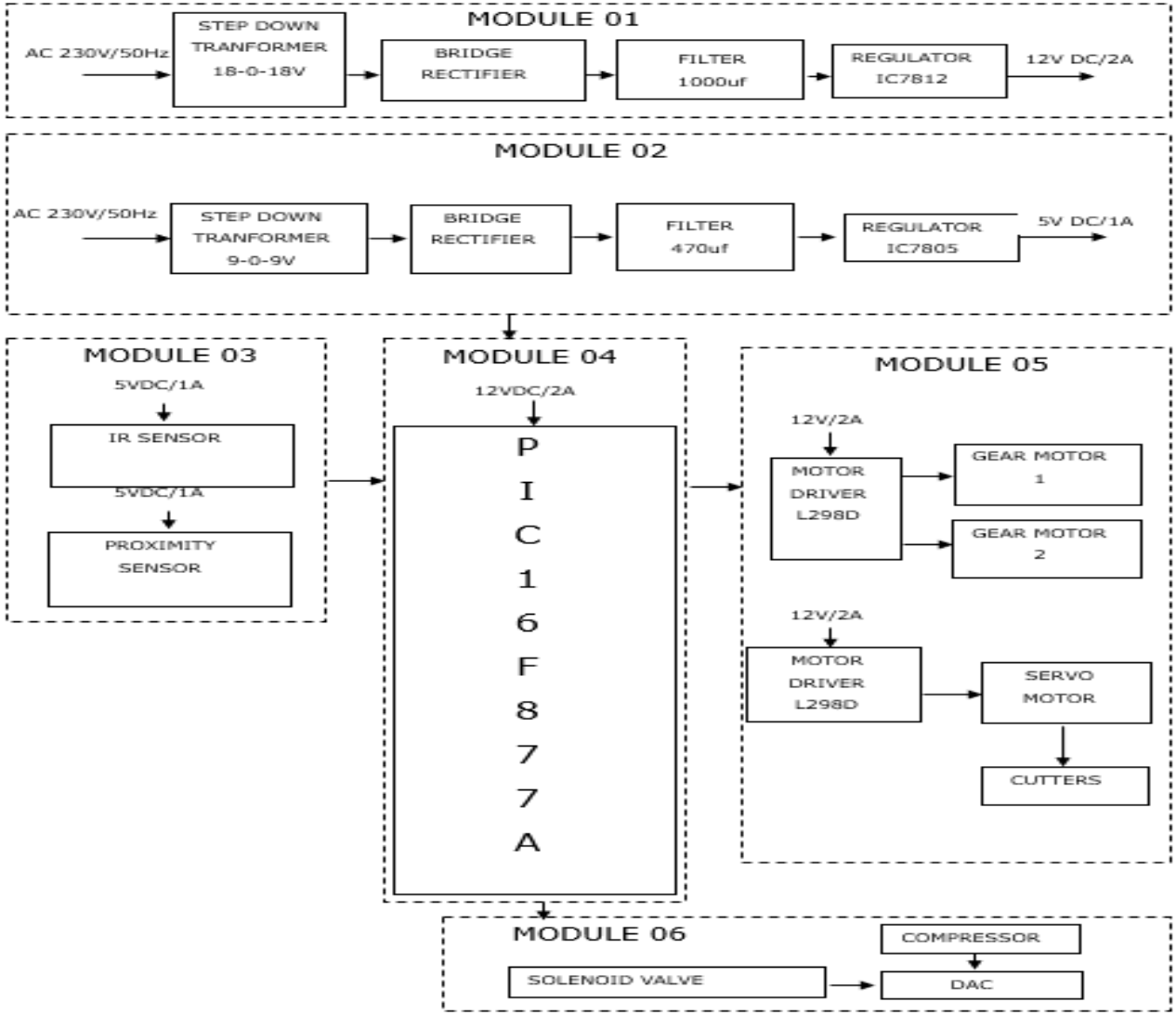

BLOCK DIAGRAM(IMPROVISED)

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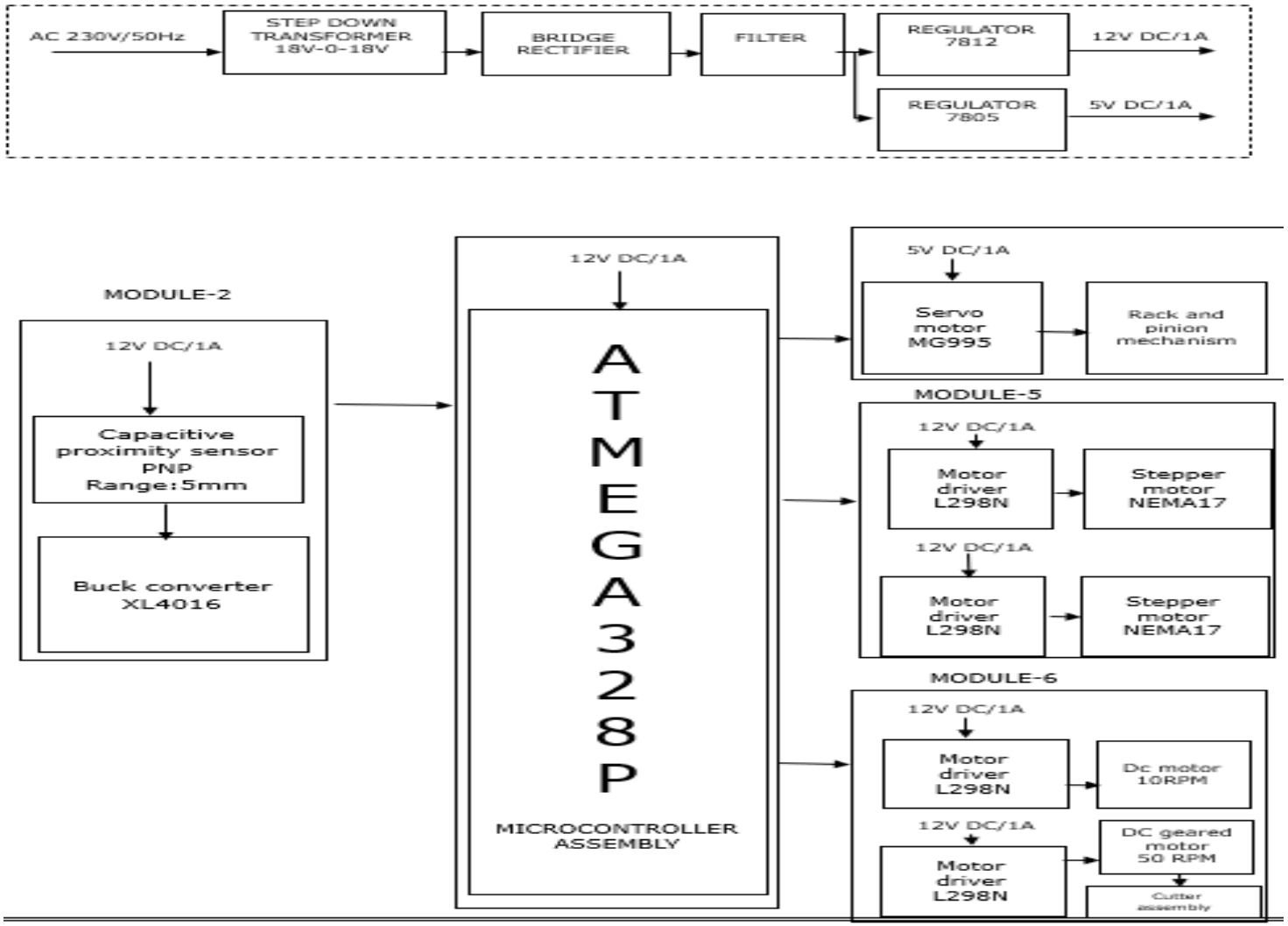

EXISTING VS IMPROVISED

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EXISTING	IMPROVISED
1)In this separate regulator for separate modules has placed.	1)In this the regulators are placed in same module.
2)The Ir sensor to detect the foam pvc is placed in module 03 and not placed the buck converter to pic micro controller.	2)Instead of using ir sensor that has been replaced with Capacitive proximity sensor and buck converter Is placed to pic micro controller.
3)Instead of solenoid valve placed rack and pinion to separate the required piece.	3)Placed rack and pinion to separate the workpiece.
4)Not used Stepper motor to send the cutter down.	4)Used stepper motor and lead screw to send the cutter assembly to cut the foam pvc.
5)Not used rollers to push the foam pvc to the cutters.	5)Used rollers to push the foam pvc to the cutter.

CIRCUIT DIAGRAM

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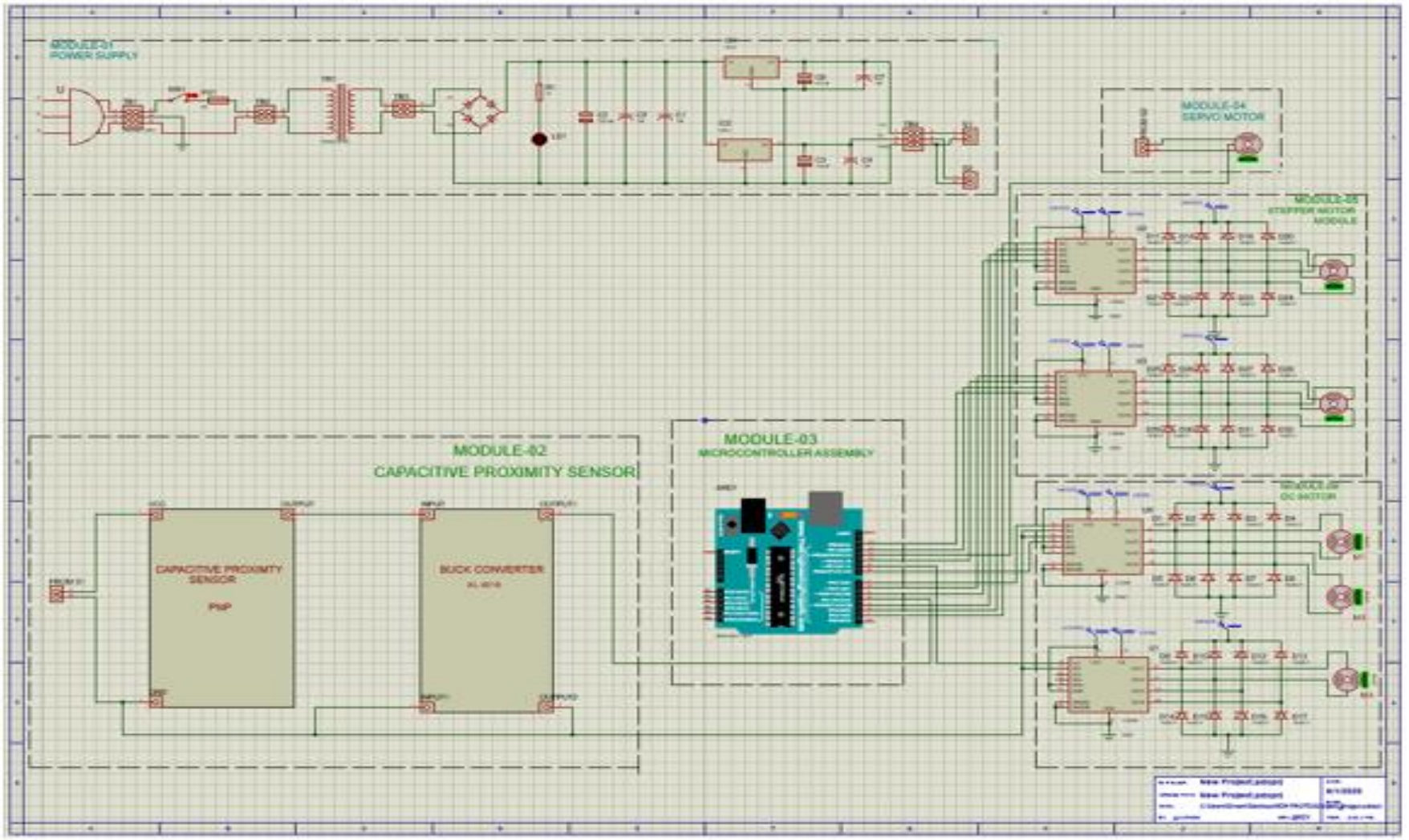

SCHEMATIC

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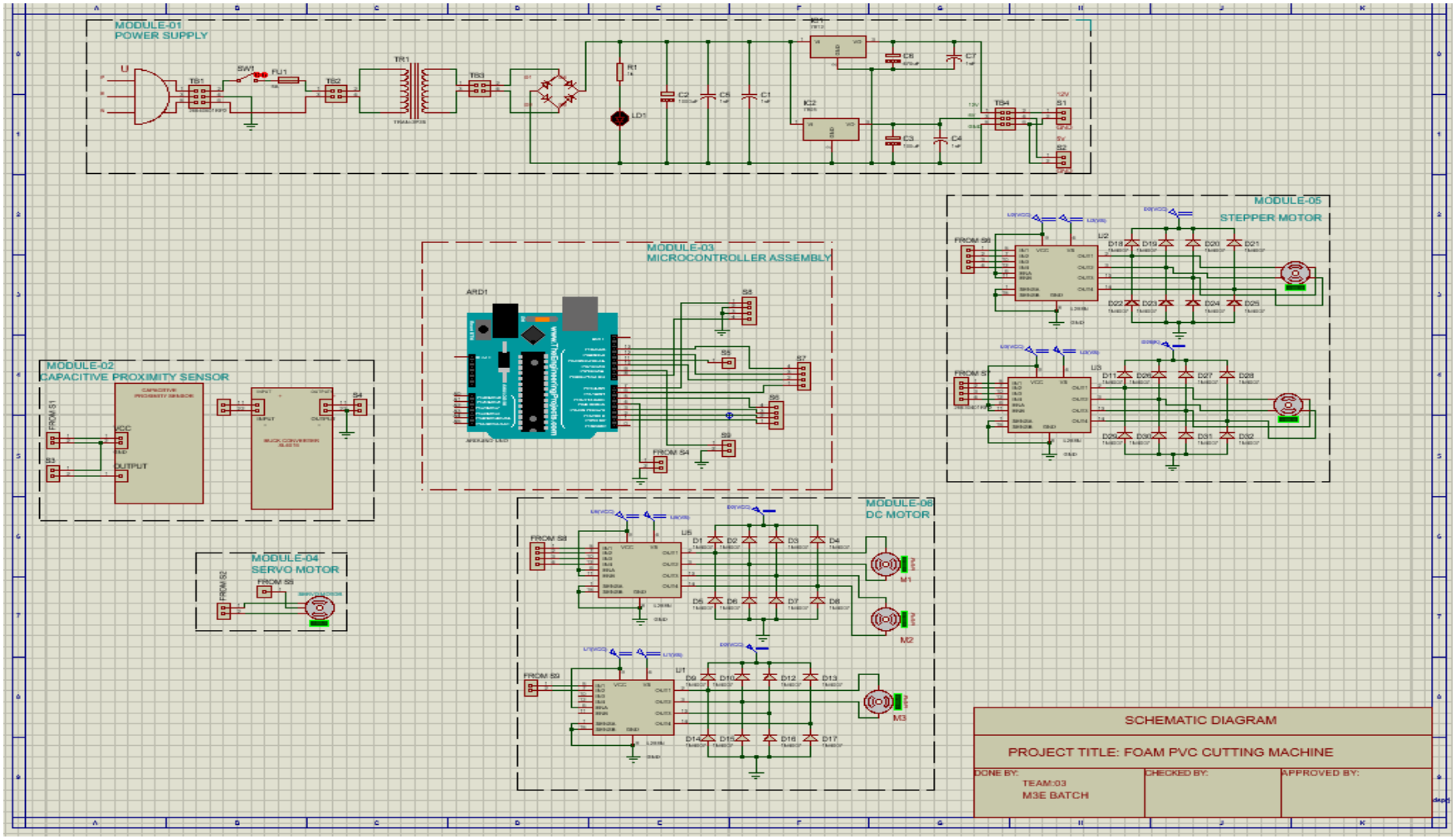

INTER CONNECTION

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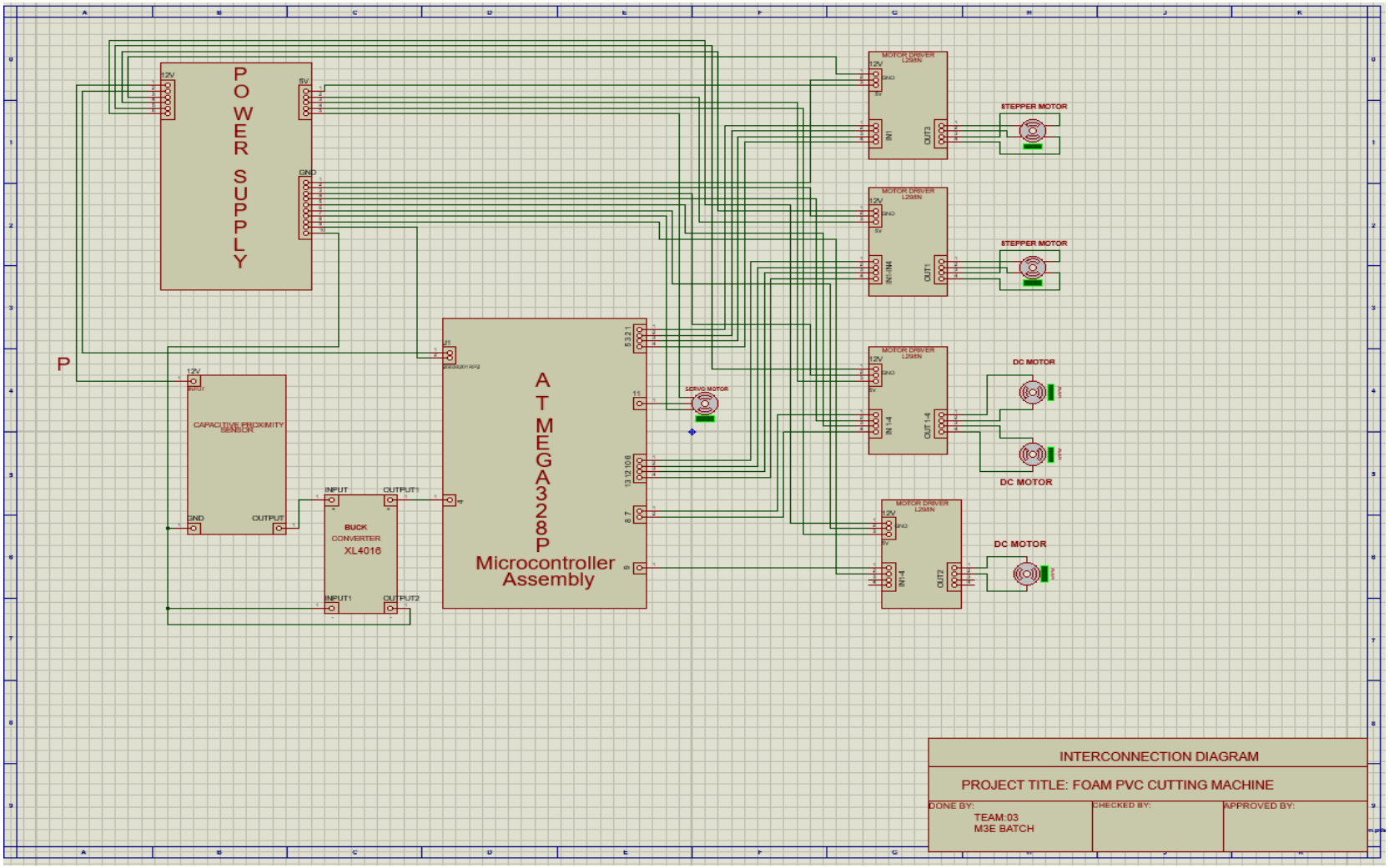

12VDC/1A AND 5V DC/1A POWER SUPPLY

This module consists of both 12V and 5V power supply. We are converting 230V ac to 18V ac by using transformer. We are converting ac to dc by using bridge rectifier. We are getting 12V DC output by connecting LM7812 regulator, We are getting 5V output by connecting LM7805. Which gives 12V DC and 5v DC.

12V DC/1A is given to the sensor, Micro controller assembly, and motor drivers. 5V DC/1A is given to the servo motor.

SCHEMATIC DIAGRAM

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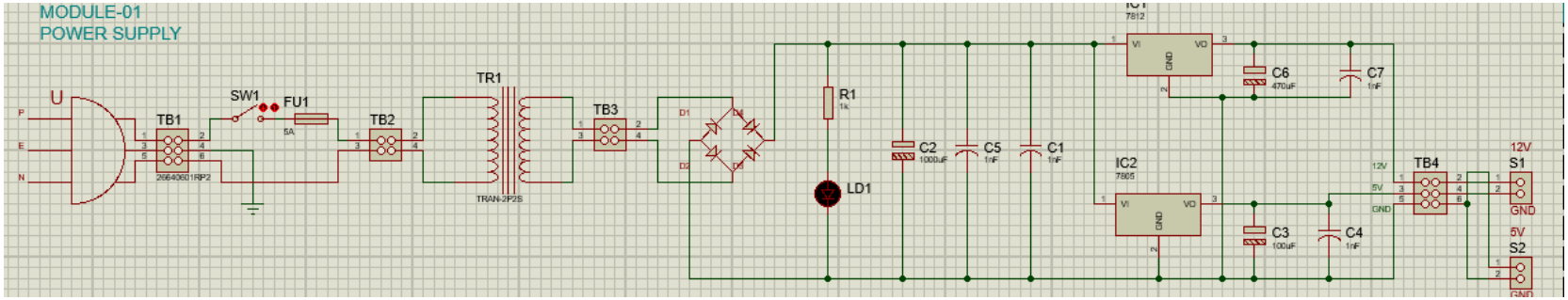

CAPACITIVE PROXIMITY SENSOR

Capacitive proximity sensor is used to sense/check the arrival of foam pvc. when the foam pvc came to the sensor, the sensor will sense and become high, then the output of the sensor is given to the buck converter.

Buck converter is used to reduce the voltage to 5v,1A.The output of the buck converter is given to the AT mega328p microcontroller.

MODULE 3

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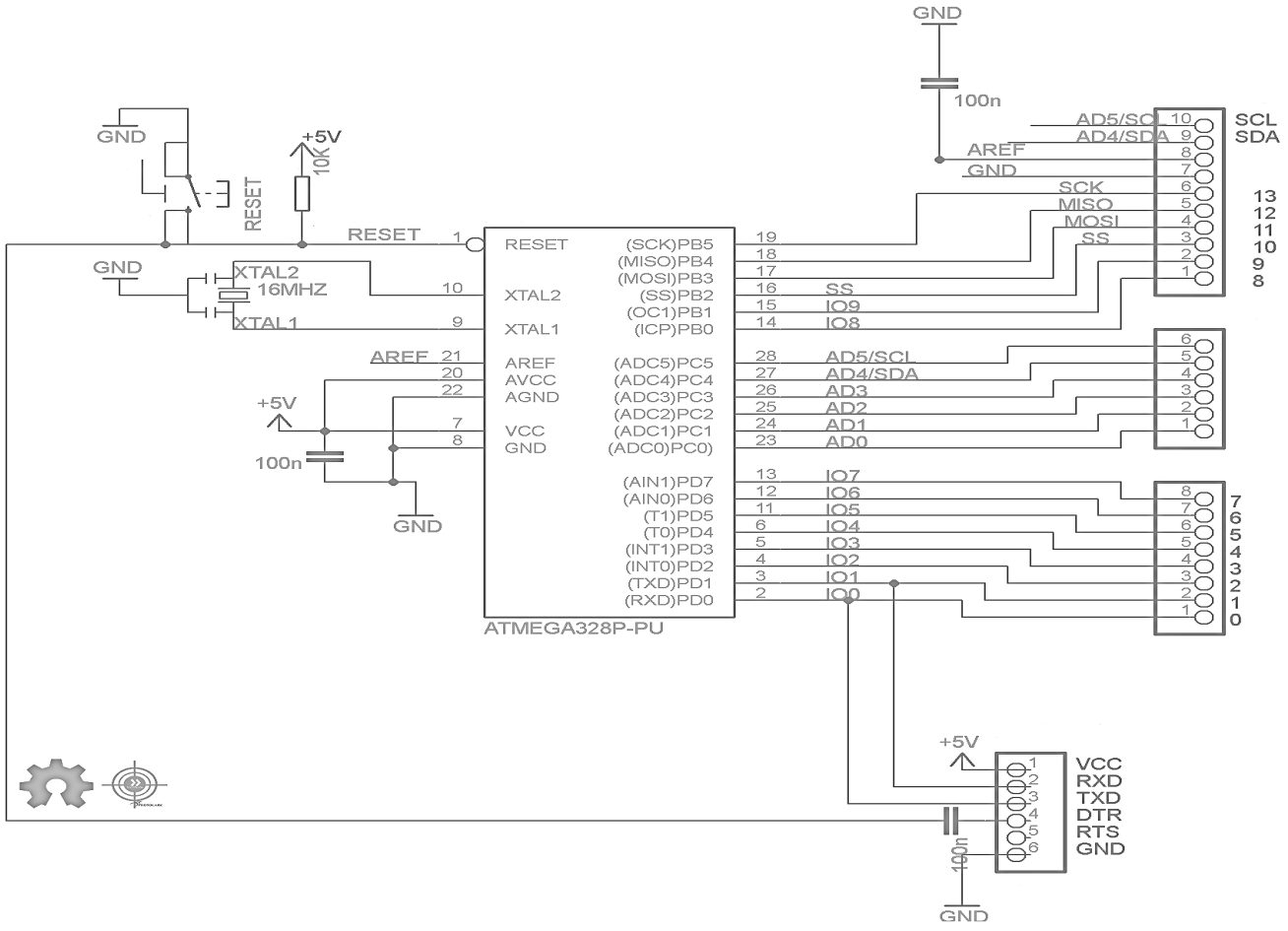
- **MICROCONTROLLER (ATMEGA328P, 12V DC/5A)**
- We are using Arduino for control ling the actions of Vslot actuators, cutter assembly, rollers and the rack and pinion mechanism.

CIRCUIT DIAGRAM OF ARDUINO



SERVO MOTOR

Servo motor is used to set the position of the rack and pinion. After completion of cutting operation conveyor moves to the rack and pinion placement. Through rack and pinion process we are giving some mechanical pressure to the workpiece to come out from the PVC sheet and make it place in a box or a tray.

MODULE 5

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STEPPER MOTOR (NEMA17,12V/5A)

Stepper motors are used to control th e position of the lead screw. For step angl e rotations of the stepper motors78 the le ad screw helps the cutters to move up and down.

SCHEMATIC DIAGRAM

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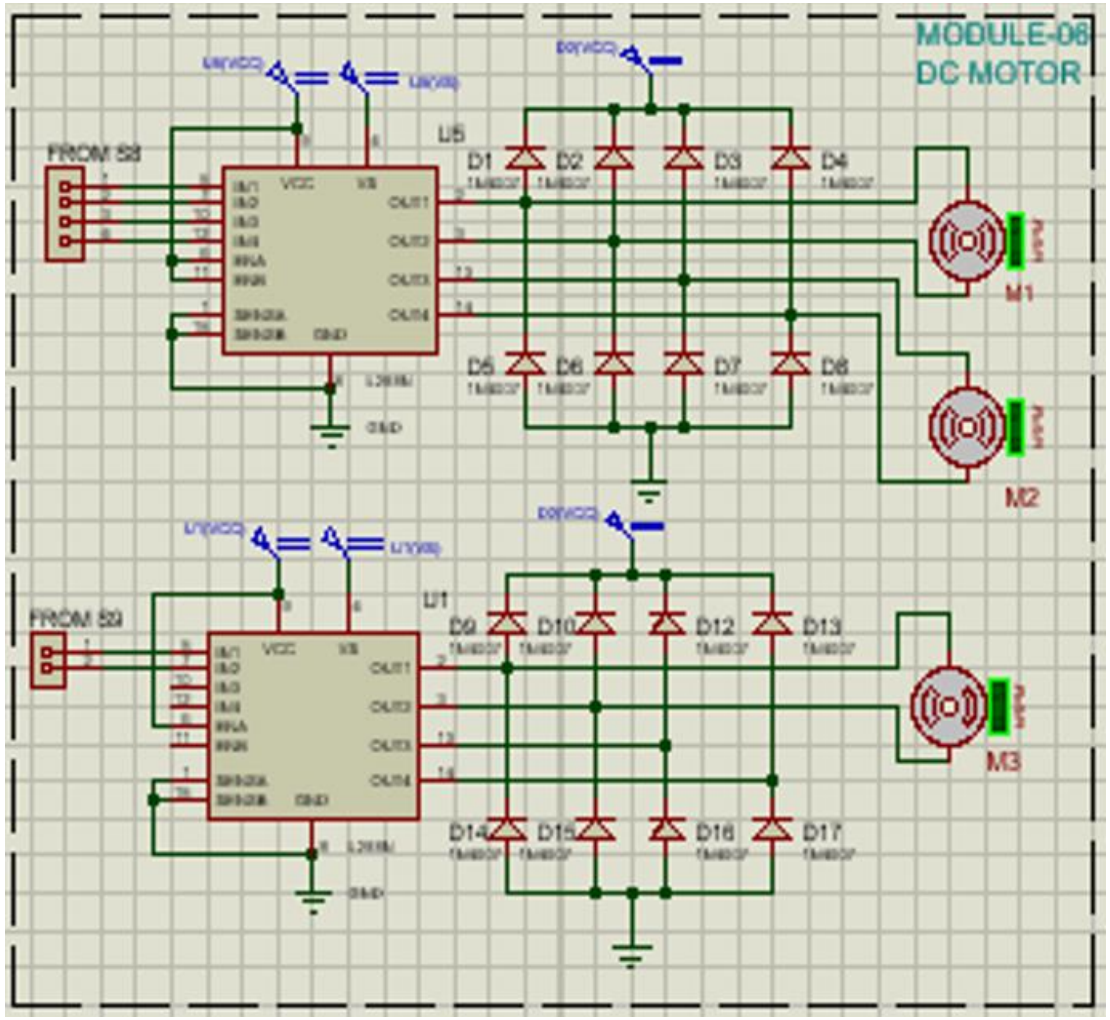

DC MOTORS

- There are 3 DC motors in the project
- DC motor 1 and 2 are connected to the conveyor. To move the PVC sheet to the desired position.
- DC motor 3 is connected to the cutter assembly to the work piece.

SCHEMATIC DIAGRAM

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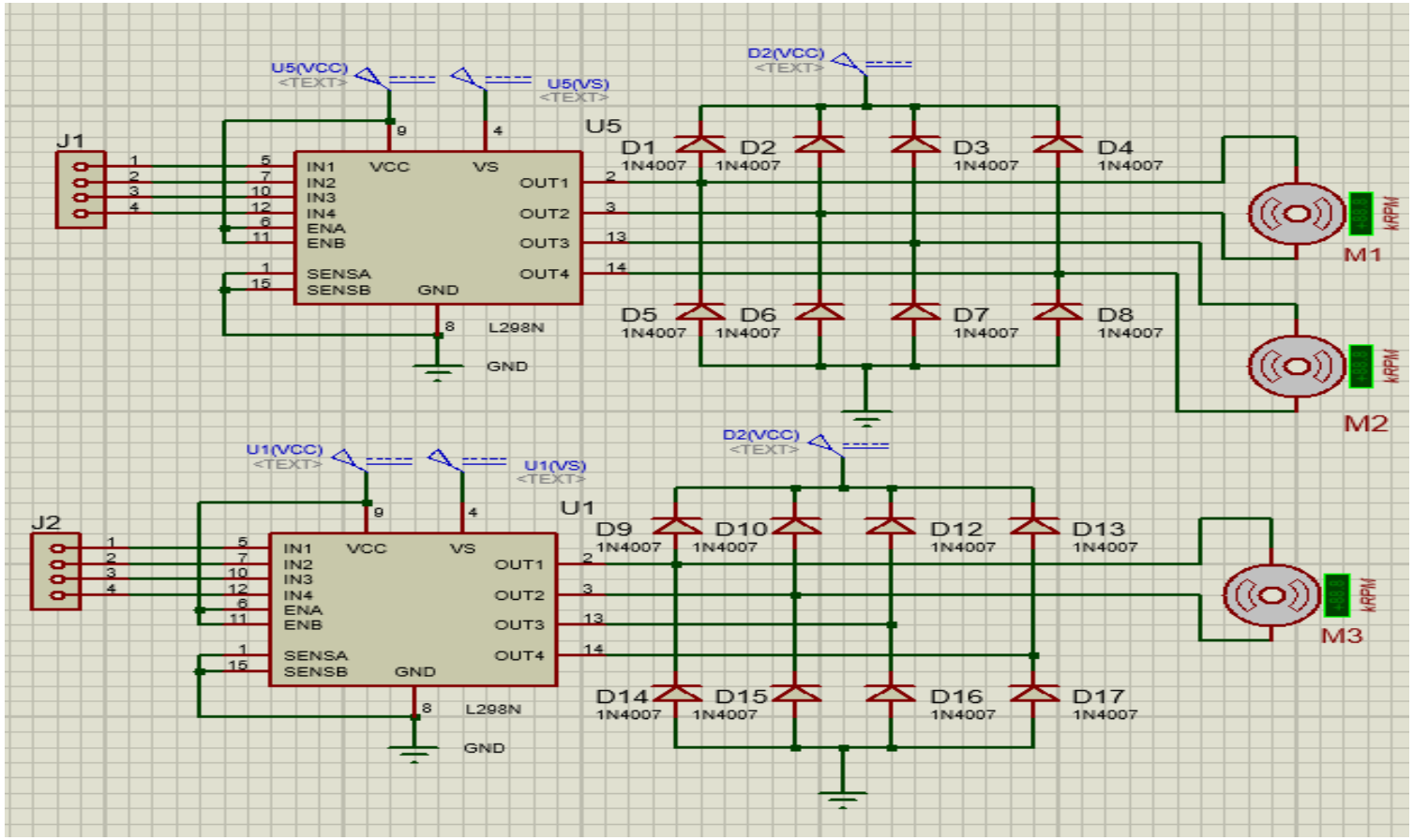

ISOMETRIC VIEW

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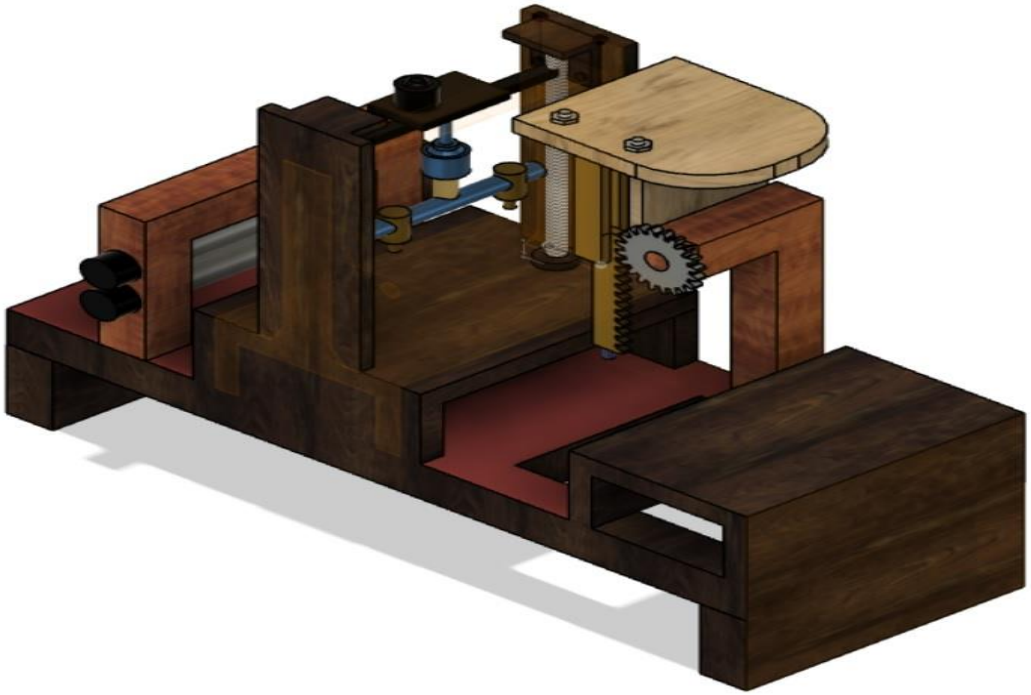

- DC MOTOR
- ROLLERS
- BENCH
- RACK AND PINION
- DC MOTOR CUTTER
- LEAD SCREW

FRONT VIEW

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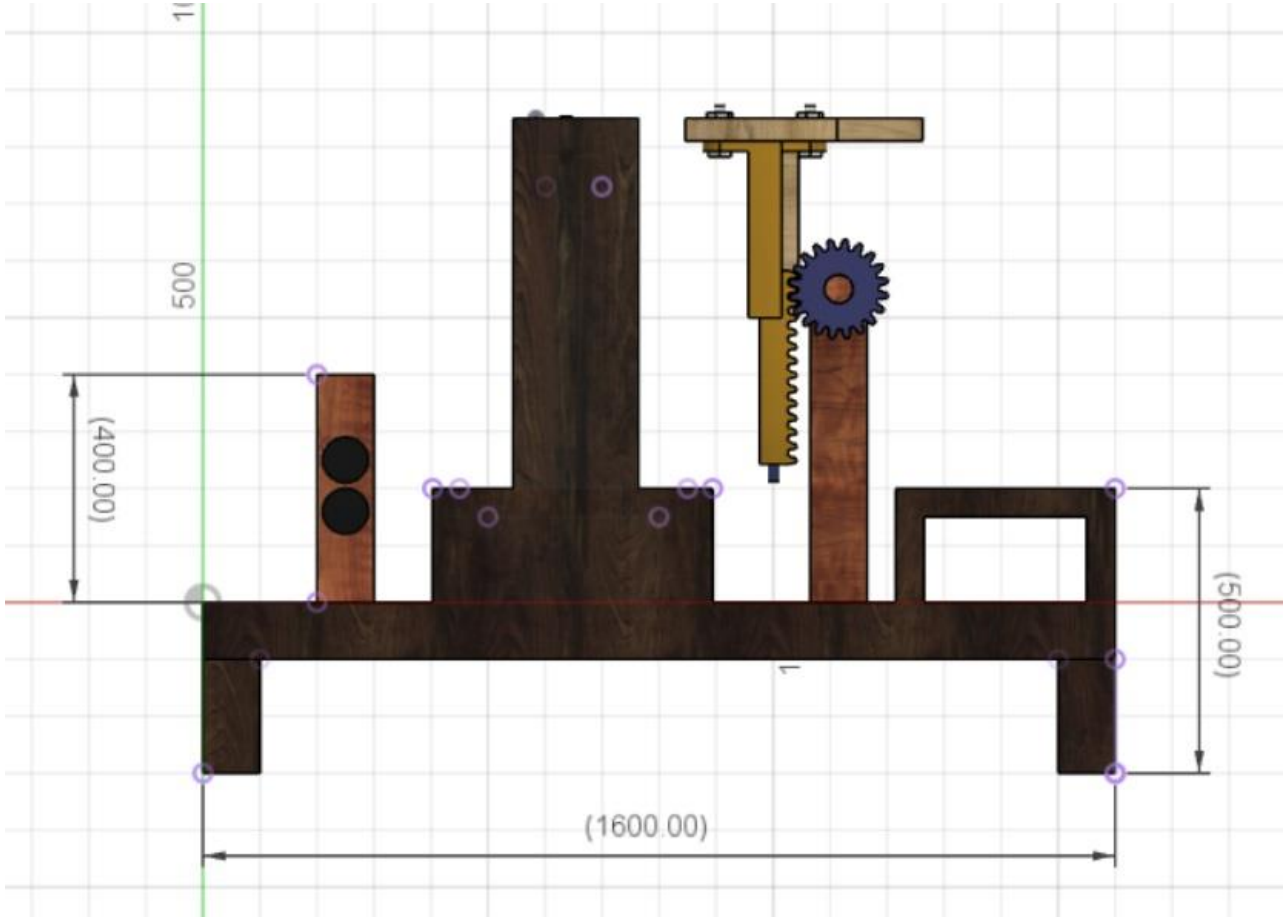

TOP VIEW

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SIDE VIEW

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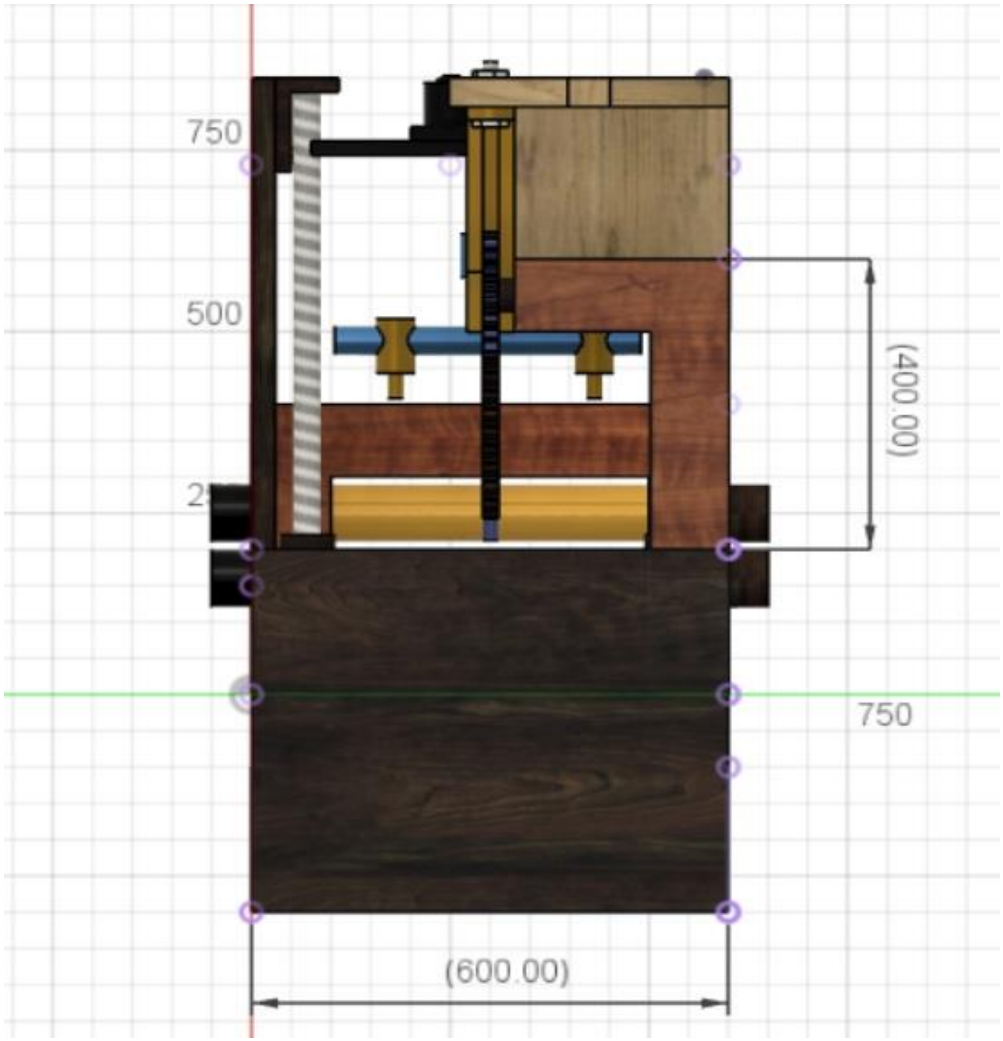

MAIN BODY OF THE PROJECT

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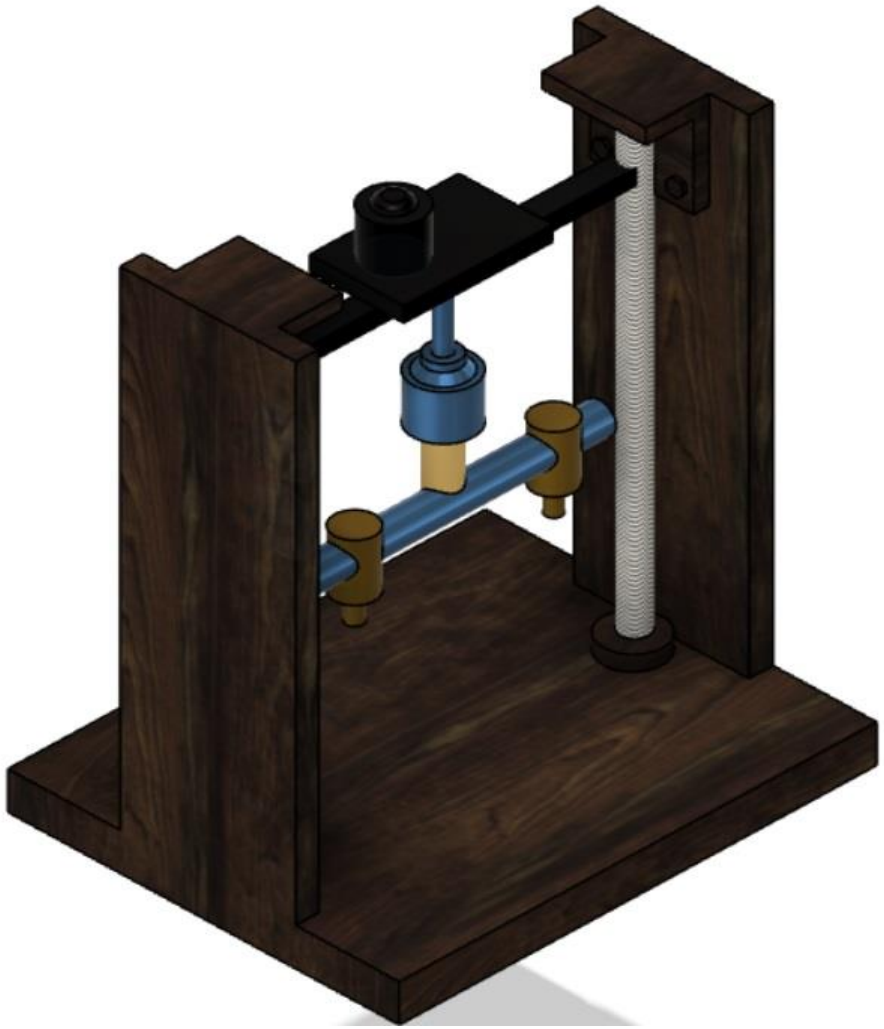

ADVANTAGES

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- Labor cost can be reduced.
- Time reduction.
- Fast operation and high accuracy.
- changeable dimension of the cutter according to our requirement

DISADVANTAGES

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- Could not able to cut the metal.
- Can’t able to change the cutting tool.

APPLICATION

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- CD manufacturing.
- Infrastructure facilities.
- Interior designs

BILL OF MATERIALS

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SL.NO	MODULES	PRICE
1.	POWER SUPPLY (12V DC/1A, 5V DC,1A)	510
2.	CAPACITIVE PROXIMTY SENSOR(PNP,12V/1A)	325
3.	MICROCONTROLLER ASSEMBLY (PIC16F877A,12V DC/1A)	255
4.	SERVO MOTOR (MG995,5V DC/1A)	90
5.	STEPPER MOTOR (17HS4401,12V DC/1A)	465
6.	DC MOTORS (12V DC/1A)	1375
TOTAL		3020

MECHANICAL BILL OF MATEIALS

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SL.NO	ITEMS	SPECIFICATION	QUANTITY	PRICE
1.	ROLLERS	80mm DIA	2	200
2.	NUTS	M3	10	30
3.	SCREWS	M3*15	10	30
4.	WASHERS	M3	10	30
5.	TUNGSTEN CARBIDE CUTTERS	60mm DIA	2	600
6	FOAM PVC SHEET	8*4	1	200
7	RACK & PINION	-	1	250
			TOTAL	1340

CONCLUSION

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- By our project we made the disc shaped sheet by cutting the foam PVC sheet.