بسم الله الرحمن الرحيم

وَقُلِ اعْمَلُواْ فَسَيَرَى اللّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ وَسَتُرَدُّونَ إِلَى عَالِمِ الْغَيْبِ وَالشَّهَادَةِ فَيُنَبِّئُكُم بِمَا كُنتُمْ تَعْمَلُونَ [التوبة : ١٠٥]

Innovation design of four axis router machine module

Graduation Project Report

Mechanical Engineering Department,

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Under the supervision

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OUTLINES

1 Introduction

2 CNC Router

3 Control system

4 Programming & software

5 Conclusion

1 Introduction

2 CNC Router

3 Control system

4 Programming & software

5 Conclusions

Introduction

- Numerical control is a method of automatically operating a manufacturing machine based on a code of letters, numbers, and special characters.
- The numerical data required to produce a part is provided to a machine in the form of a program, called *part program or CNC program*.
- The program is translated into the appropriate electrical signals for input to motors that run the machine.

Why Use CNC Machines?

- Increase production throughput
- Improve the quality and accuracy of manufactured parts
- Stabilize manufacturing costs
- Manufacture complex or otherwise impossible jobs -2D and 3D contours

1 Introduction

2 CNC Router

3 Control system

4 Programming & software

5 Conclusions

CNC Router

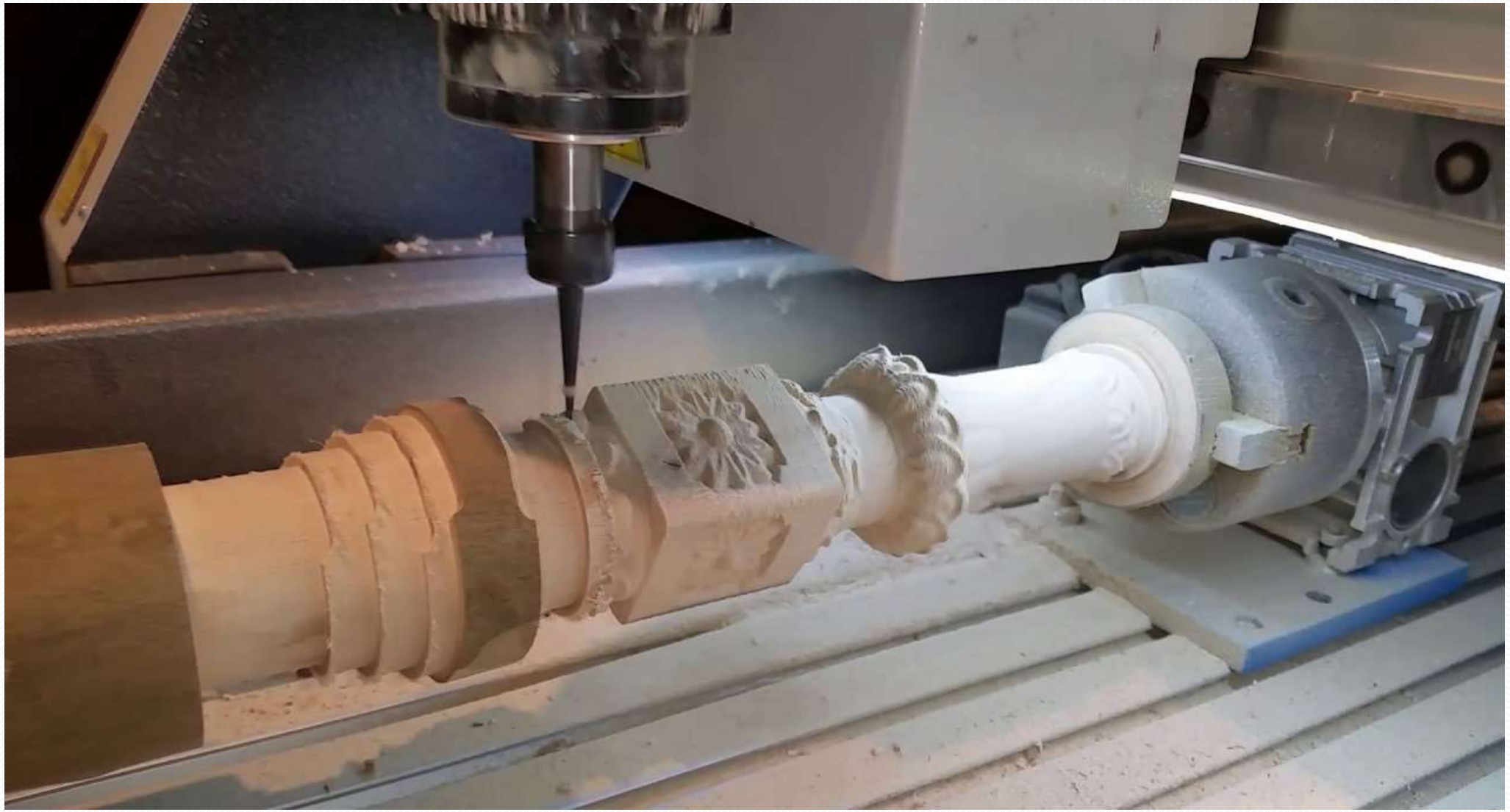
A CNC router is very similar in concept to a CNC milling machine. Instead of routing by hand, tool paths are controlled via computer numerical control. The CNC router is one of many kinds of tools that have CNC variants.

A CNC router typically produces consistent and high-quality work and improves factory productivity. Unlike a jig router, the CNC router can produce a one-off as effectively as repeated identical production. Automation and precision are the key benefits of CNC router tables.

CNC Router

CNC Router

CNC Router



1 Introduction

2 CNC Router

3 **Control system**

4 Programming & software

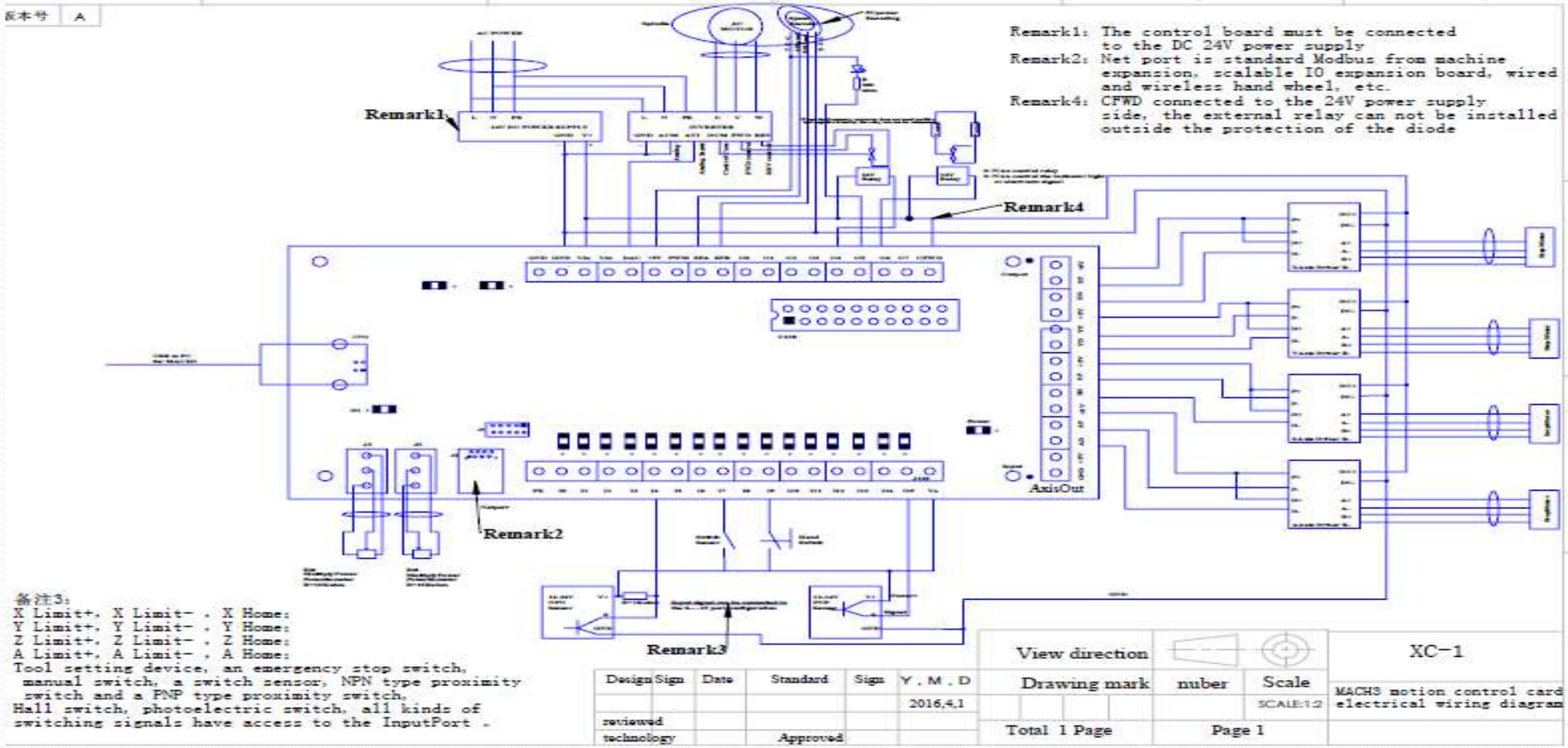
5 Conclusions

The motors

Stepper Motors

The motors are the heart of any CNC machine. The size and type of motor can define a CNC routers precision, speed, and accuracy. There are two primary classes of motors used on CNC machines, stepper motors and servo motors. Within these two classes there are several types.

The drivers


版本号 A
Remark1: The control board must be connected to the DC 24V power supply
Remark2: Net port is standard Modbus from machine expansion, scalable IO expansion board, wired and wireless hand wheel, etc.
Remark4: CFWD connected to the 24V power supply side, the external relay can not be installed outside the protection of the diode
Remark1
Remark4
Remark2
Remark3
AxisOut
备注3:
X Limit+, X Limit- , X Home;
Y Limit+, Y Limit- , Y Home;
Z Limit+, Z Limit- , Z Home;
A Limit+, A Limit- , A Home;
Tool setting device, an emergency stop switch, manual switch, a switch sensor, NPN type proximity switch and a PNP type proximity switch, Hall switch, photoelectric switch, all kinds of switching signals have access to the InputPort .
Design Sign
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Standard
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2016,4,1
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XC-1
MACH3 motion control card electrical wiring diagram

This Step motor controller uses the L297 and L298N driver combination; it can be used as standalone or controlled by microcontroller. It is designed to accept step pulses at up to 25,000 per second.

1 Introduction

2 CNC Router

3 Control system

4 Programming & software

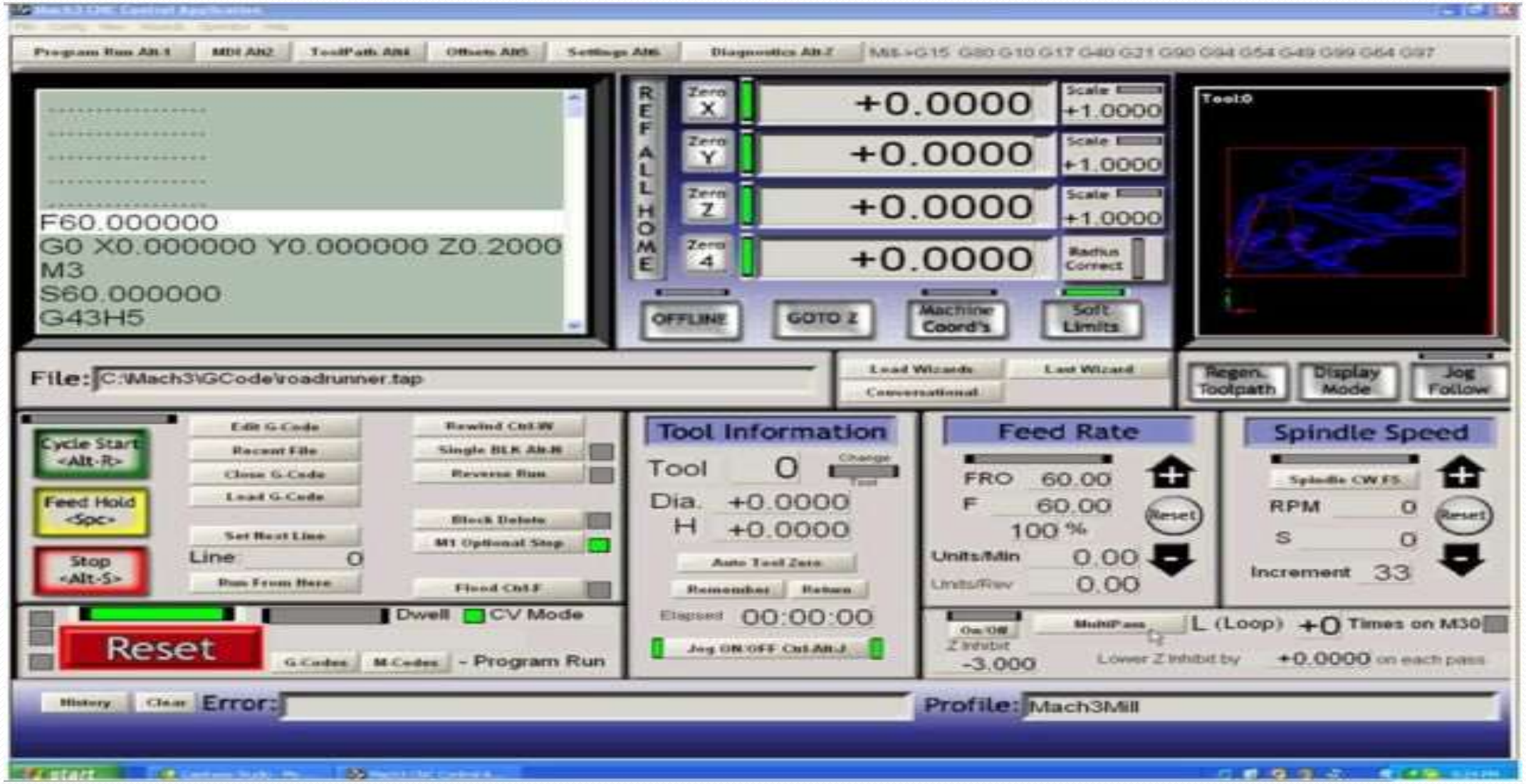
5 Conclusions

G Code

The "instructions" read by CNC machines are usually a human readable format called G-Code. The machine is set up with a base unit, like Inch or mm, and a command of G01 X500 Y200 Z100 on a metric mm setup tells the machine it needs to move

500 units on the X axis and 200 units on the Y axis and 100 on z axis.

Software-mach3



1 Introduction

2 CNC Router

3 Control system

4 Programming & software

5 Conclusions

Conclusions

CNC means computer numerical control machine it’s a form of programmable automation drill drawings on wood and metal use

G- coding consist of 4 motors and their drivers and mach3 with its basic circuit and body made of wood and metal hold on motors , drill and the materials we want to draw on them.

We tried to make cheap fast safety cnc machine that drill on material piece according to any drawing we draw to it.

Thanks for your Attention