Voice Activated Door Control System
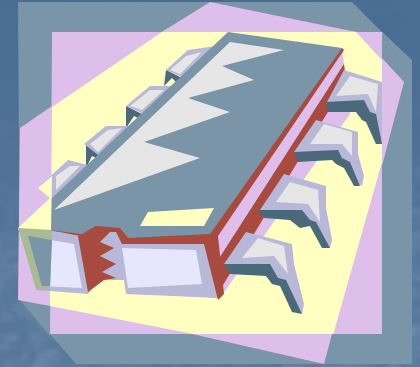
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Introduction

- Voice activated systems can be used to simplify every day tasks such as opening and closing doors.

- These systems can also be used to control a wide array of electrical devices and components.

- Can perform many functions based on the given command

Purpose

- To provide hands free and hassle free operation of a door (opening/closing) in a home or an office environment

- Other electronic devices can easily be adapted to work with the voice recognition system as well


3

Voice Recognition Systems

- Words are programmed and stored on the microprocessor of the voice recognition circuit

- While the circuit is powered on it constantly listens for external commands

- When a command is recognized it sends an appropriate signal to its output port to activate attached interface cards and/or devices
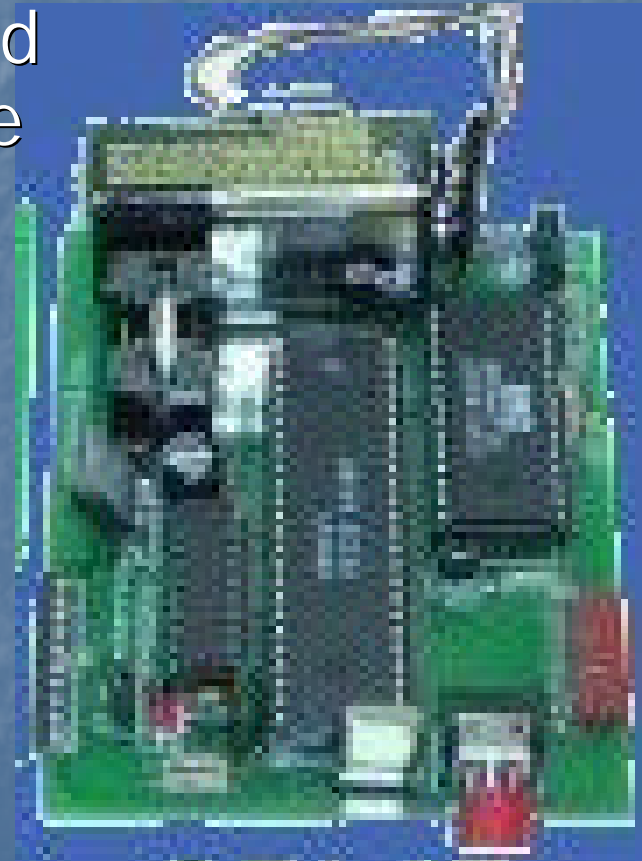
Relay Interface Board (SPDT Switches)
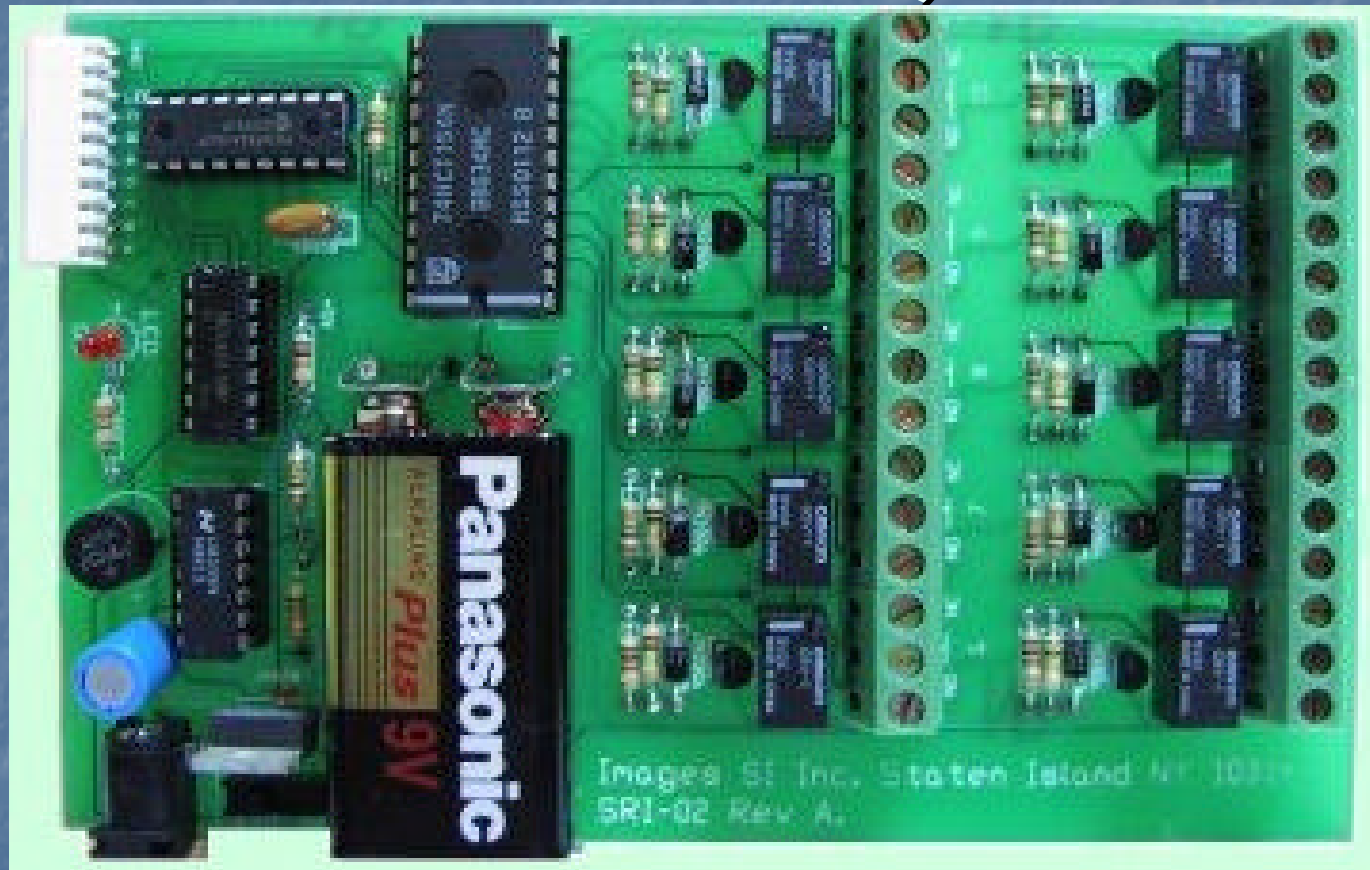
This is the relay interface circuit that connects to the voice recognition card. It contains 10 SPDT switches that can control up to 10 external devices

Future of Voice Recognition

- Although voice recognition systems have been out on the market for some time they have not yet fully developed to their full potential

- Voice recognition systems are not yet able to filter out a specific voices/commands in the presence of noise or cross talk. In the future these systems will be able to filter out a certain voice when many voices are present and heard all at once

- Voice recognition systems are not able to understand the true meaning of the command. In the future these systems will be able to understand the command spoken. Example: "Do what I mean, not what I say!"
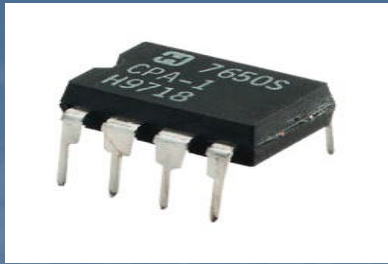
Specifications

- The system can operate on one 9 V alkaline battery or a DC adapter rated at 9-12V

- The system can recognize either forty .96 second words or twenty 1.92 second words

- For memory the circuit uses an 8K X 8 static RAM

- 2 modes of operation → CPU and Manual

- Controls up to 10 external devices using a relay interface card that utilizes SPDT switches or an interface card that produces TTL logic output
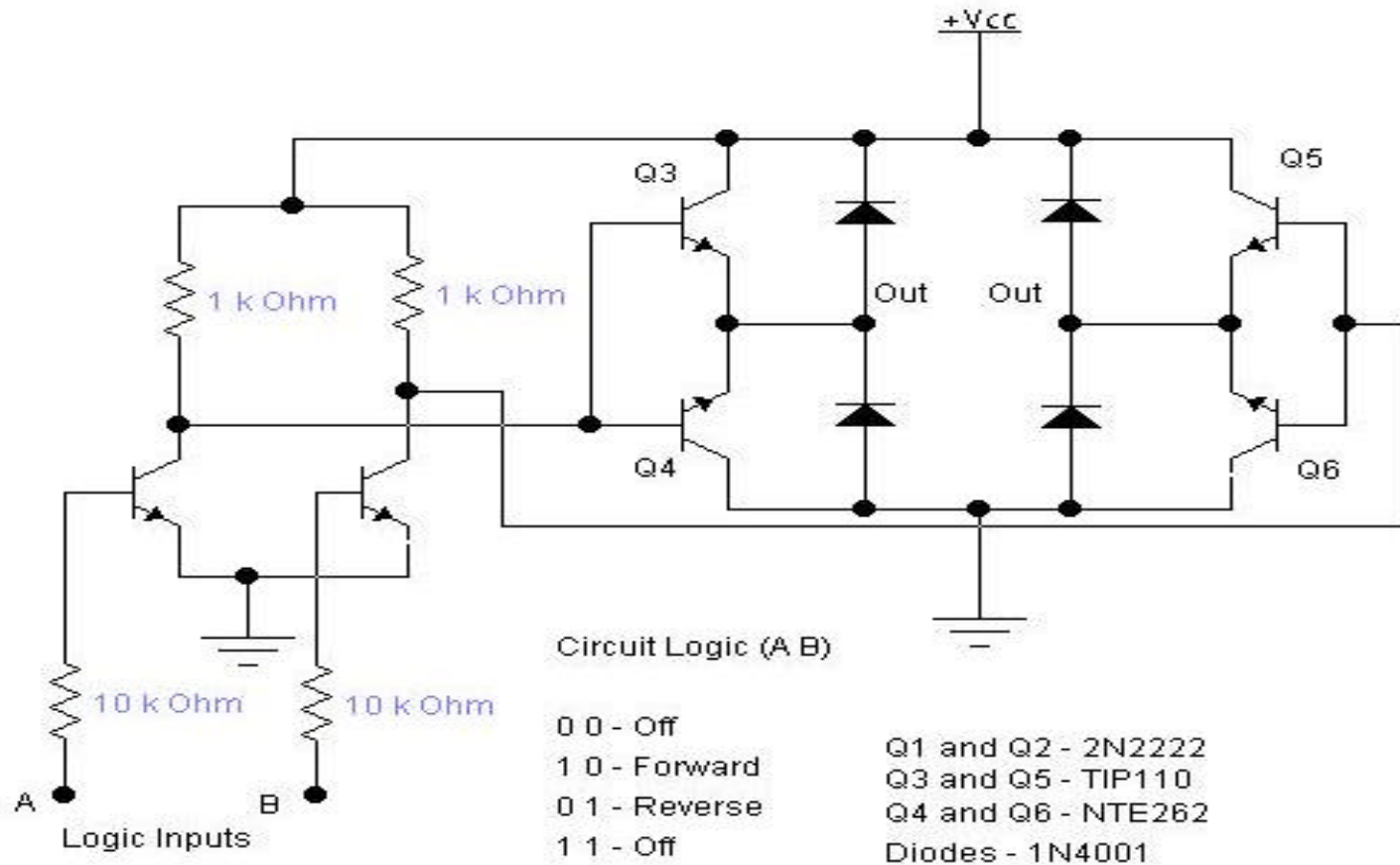
Key Components

- Voice Recognition Circuit
- Relay Interface Circuit (SPDT Switches)
- H-Bridge DC Motor Control Circuit
- 6 Speed Gear System & DC Motor
- SN74LS86 Quad 2-Input Exclusive OR Gate and LM555 Precision Timer - 8 Pin DIP (Used in conjunction with the H-Bridge for motor timing configuration)
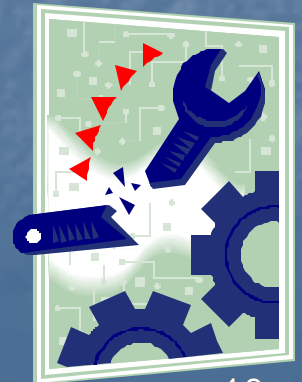
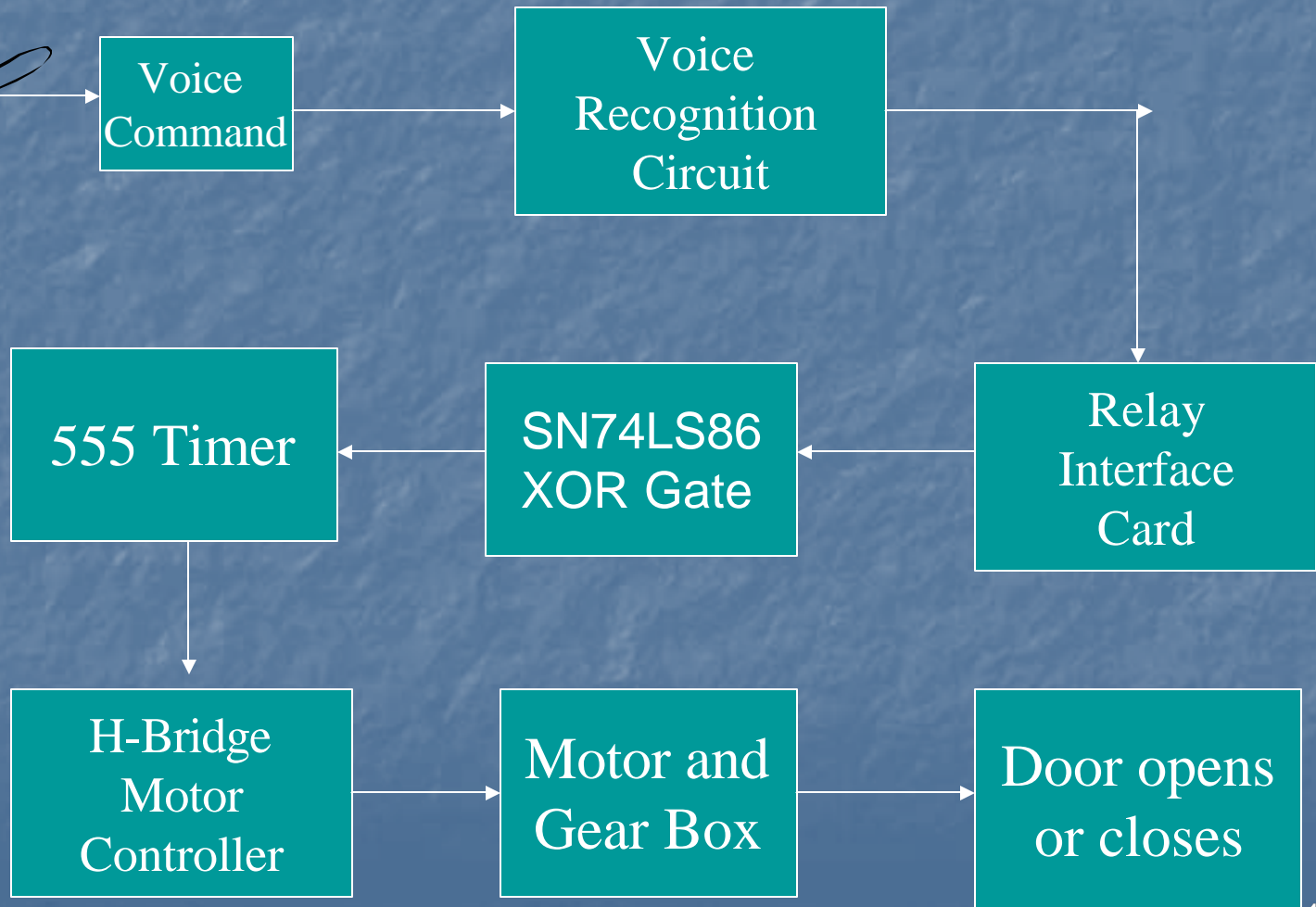# H-Bridge DC Motor Controller Circuit

H-Bridge circuit is the main component used in controlling the operation of the DC motor (forward and reverse operation)
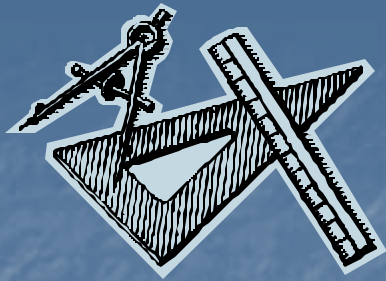
Practical Implications

- Mechanical aspects of designing the door opening mechanism and gear system
- Obtaining enough torque to successfully open and close a door using a 3 – 4.5 V DC motor
- Timing considerations of the motor operation

Product Operation Flowchart

Assembly Process

- Assemble and test the speech recognition system and the relay interface card
- Setup and test the H-Bridge motor control circuit
- Assemble the model door and the door frame
- Put together the logic and timing circuits that control the H-Bridge
- Assemble the gear system and the motor
- Interface all the various components and test the overall system

Design Alternatives

- Use a stepper motor and a stepper motor driver circuit instead of an H-Bridge and a DC motor

- Use switches instead of 555 timers to stop the door when it is fully opened or closed

- Use a pulley system instead of a gear system to open and close the door

13

Costs
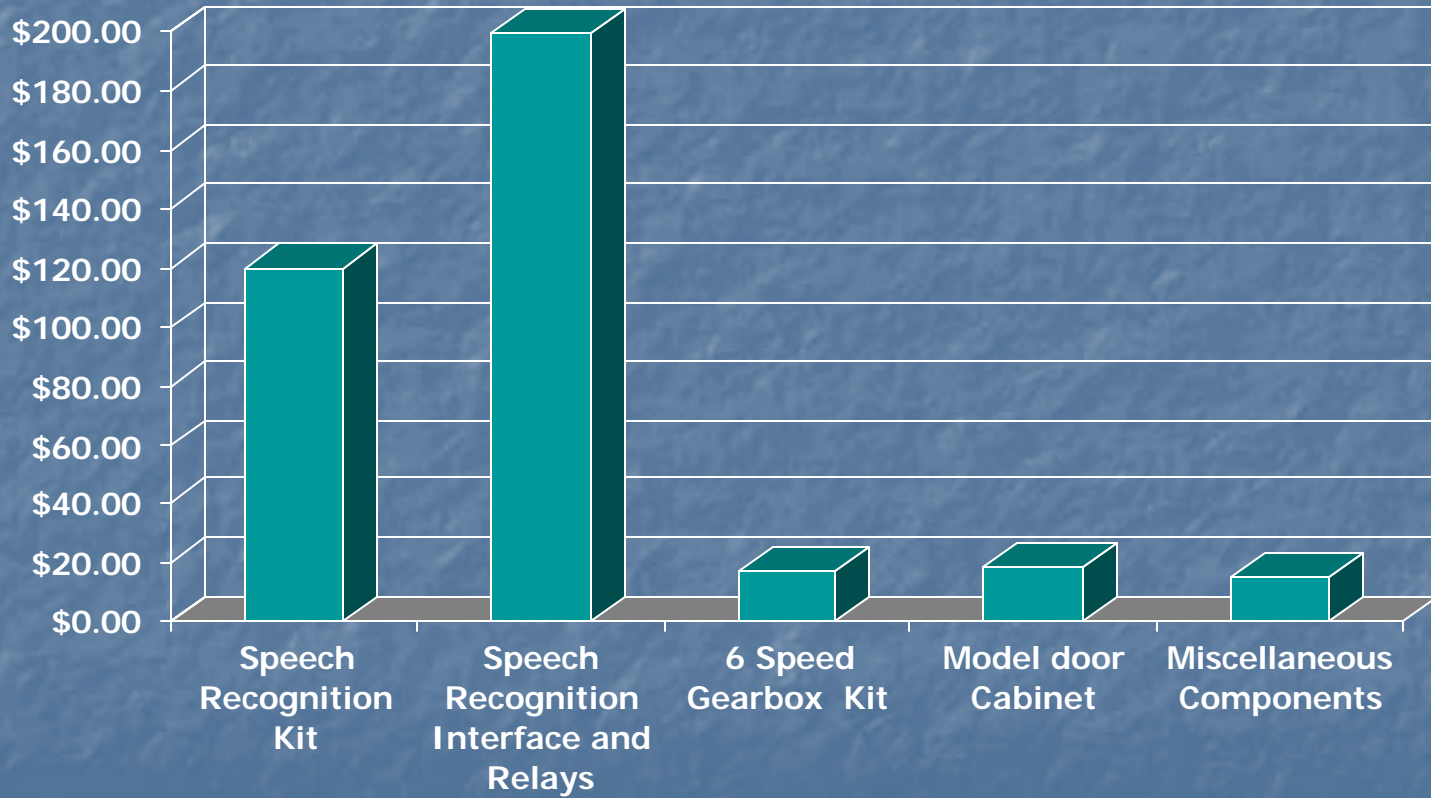
Product Demonstration

Questions ?