Instructions

The beginner H-bridge option has the choice of 2 different power reversing circuits that you can attempt. Each circuit has its own construction obstacles, advantages, and disadvantages in how it operates. Your task is to select one circuit design, built it, test it, and then explain how the circuit works.

The first option is the "*Simple SPDT H-Bridge*" circuit and uses *2 SPDT* (*Single Pole Double Throw*) switches. The second circuit option is the "*Simple DPDT H-Bridge*" circuit which uses a single *DPDT* (*Double Pole Double Throw*) switch.

Questions

1. What is the difference between a *SPST* and a *DPDT* switch?

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2. Compare and contrast the design of both circuits. What are the advantages and disadvantages of each circuit

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3. Which circuit did you build? Can you explain how and why it works.

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Power Reversing Circuits (Beginner Option)

Name: _____   Date: _____

Introduction:

A power reversing circuit is used to control which direction a DC motor turns. Power reversing circuits are incredibly versatile circuits and can be used for a wide variety of applications. For instance, these simple circuits can be used to control simple devices such as a crane winch; however, if you have two or more power reversing circuits you can control advanced robotic devices such as a battle-bots.

In the field of electoral engineering power reversing circuits are commonly referred to as an "*H-Bridge*". This is because the most basic *H-Bridge* design contains four switching element, with the load at the centre, in an H-like configuration:

H-Bridge: Noun
A simple circuit that lets you control a DC motor to go backward or forward.
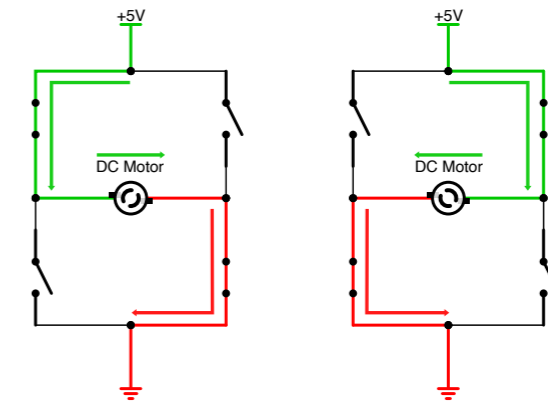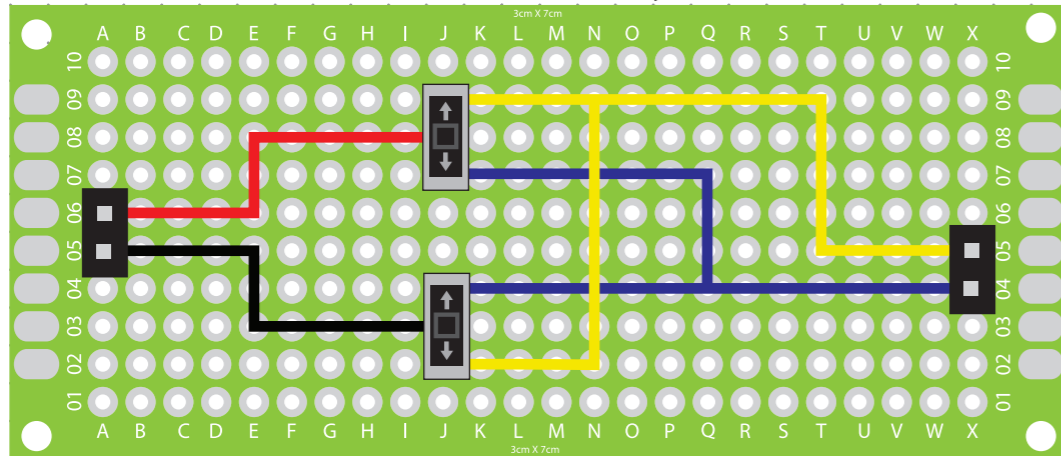

A simple H-Bridge using 4 simple switches.
The flow of electricity is marked with arrows.

More advanced H-Bridge designs build on this one simple circuit design. A slightly more efficient design will replace the 4 one way switches with 2 SPDT (single pole double throw) switches, or with 1 DPDT (double through double pole) switch. However the most popular H-bridge design uses transistors and can be controlled using a simple control circuit or computerized microcontroller.
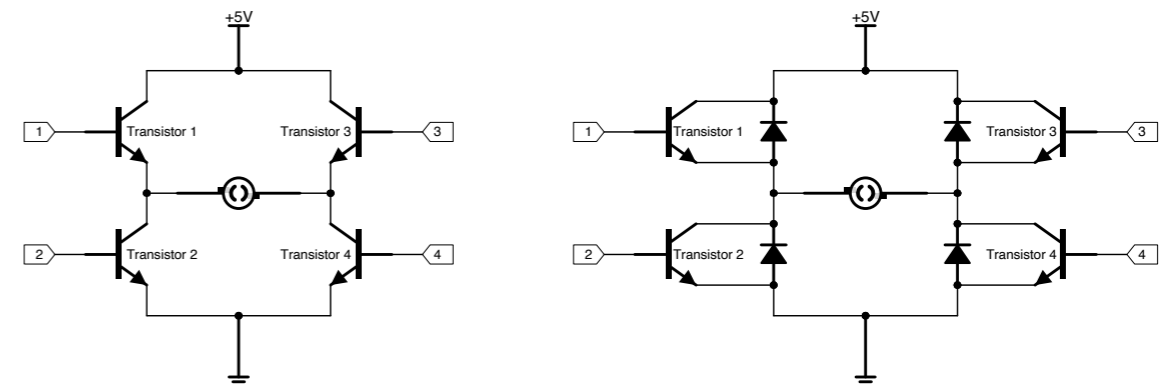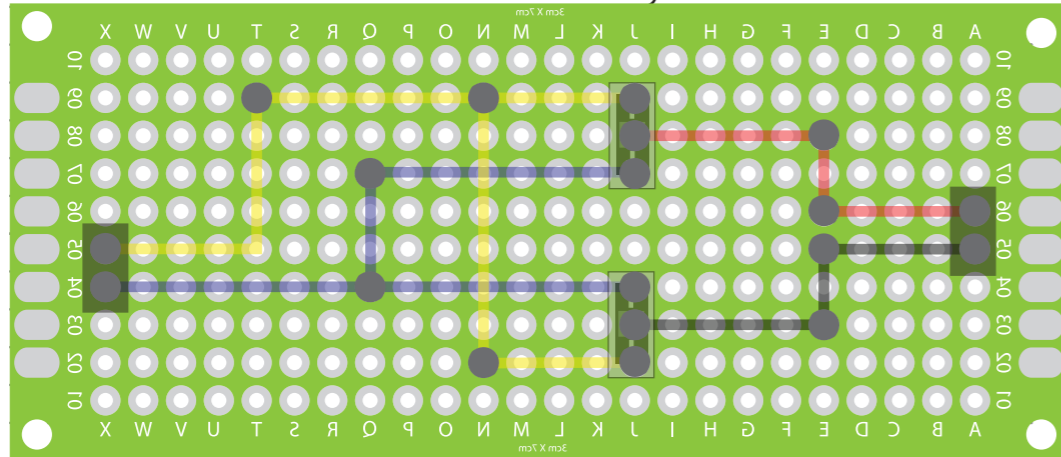

*H-Bridge designs using transistors [**NOTE**: although the circuit can work using only transistors, diodes are usually added to protect the transistors from power surges that are caused by the motor].*
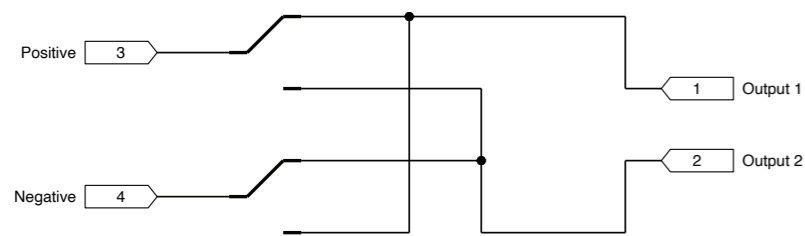
Left Panel:

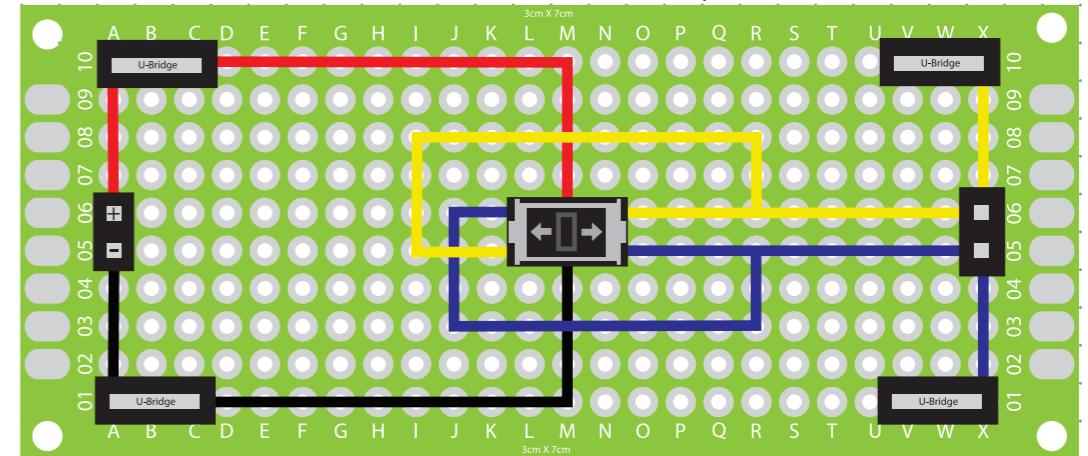Front View: Circuit Board Layout

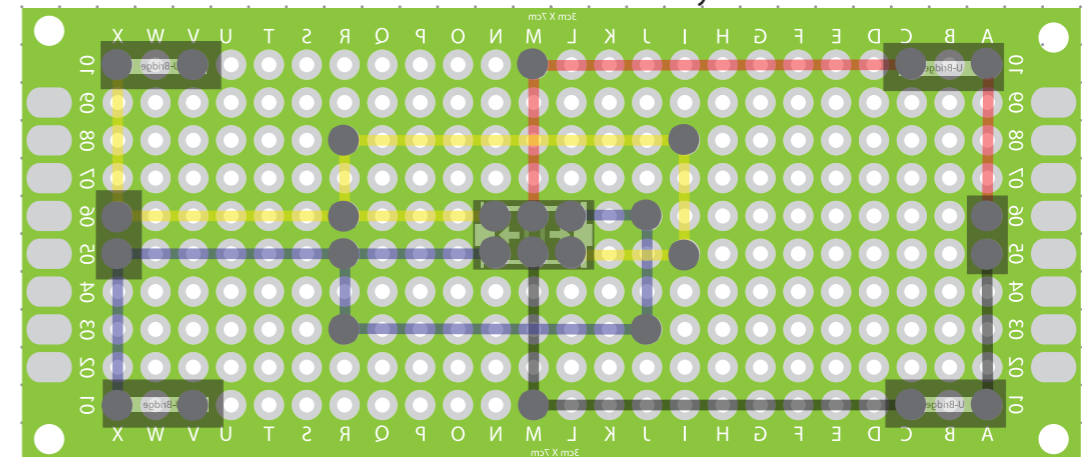Back View: Circuit Board Layout

Electrical Schematics

Positive | 3
Negative | 4
Output 1 | 1
Output 2 | 2

Materials:

1	3x7cm Circuit Board
2	Bridge Pins
1	2-Pin Female Bridge
2	SPST switches
1	50 cm Assorted Wires

Project: Simple SPDT Power Reversing Circuit

Client:

Designer: Scott A. Campbell

Builder:

5mm Dot Grid
Scale:
2:1

Right Panel:

Front View: Circuit Board Layout

U-Bridge

Back View: Circuit Board Layout

Electrical Schematics

DPDT Switch

Positive | 1
Negative | 2
Output 1 | 3
Output 2 | 4

Materials:

1	3x7cm Circuit Board
4	Bridge Pins
4	U-Bridges
1	DPDT Switch
4	Colors of Assorted Wires

Project: Simple DPDT H-Bridge

Client:

Designer: Scott A. Campbell

Builder:

5mm Dot Grid
Scale:
2:1