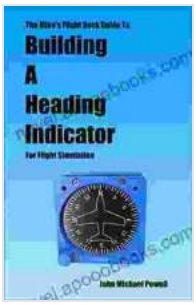
Build a Realistic Heading Indicator for Flight Simulation

If you're an aviation enthusiast or flight simulator hobbyist, you know that a realistic heading indicator is essential for immersive and accurate flight simulation. In this guide, we'll walk you through the step-by-step process of building your own custom heading indicator using an Arduino and Raspberry Pi.



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★★★★★ 5 out of 5

Language	: English
File size	: 7447 KB
Screen Reader	: Supported
Print length	: 74 pages
Lending	: Enabled

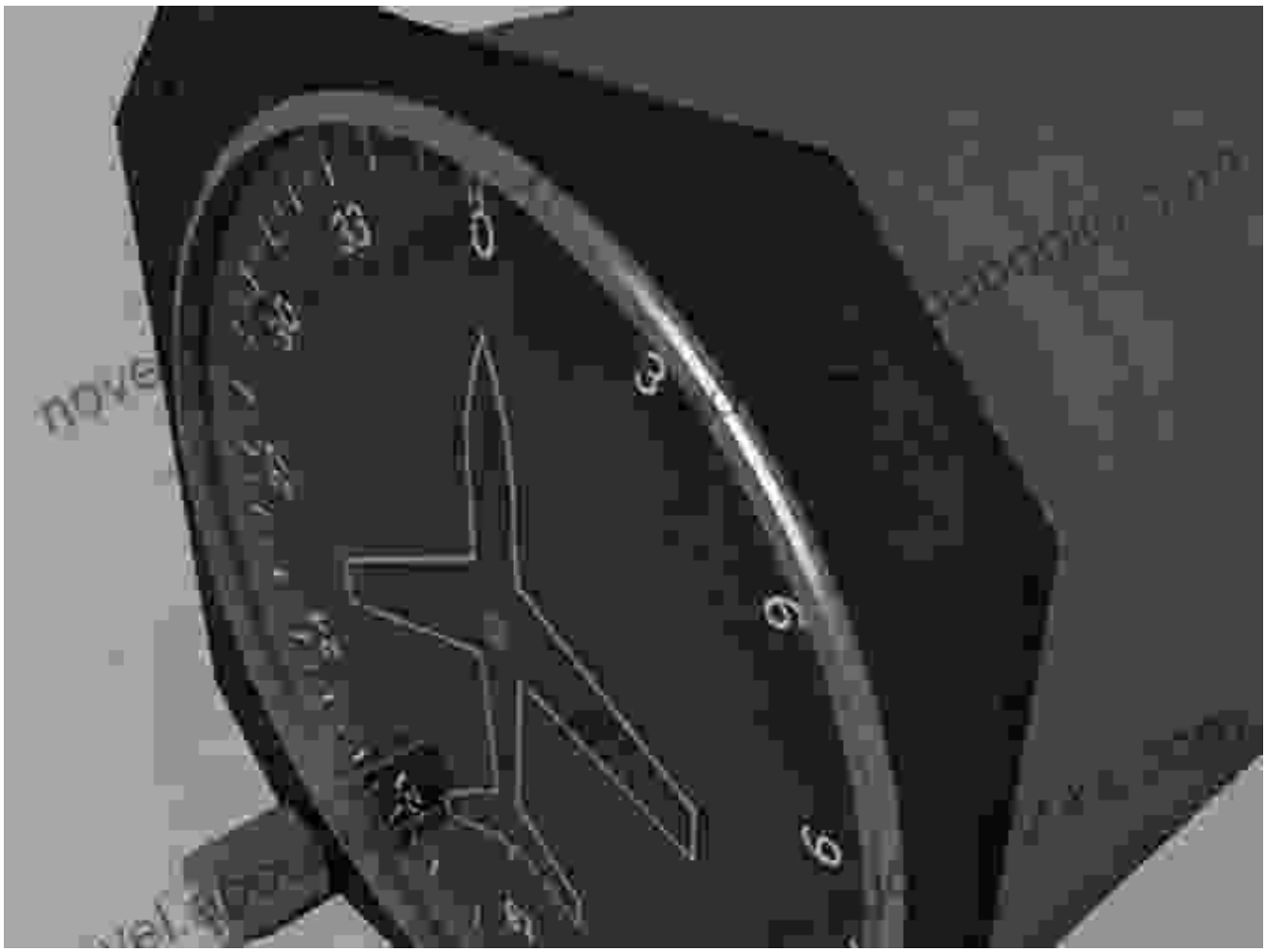
Materials and Tools

- Arduino Uno or compatible board
- Raspberry Pi 3 or later
- 7-segment LED display (common cathode)
- Resistors (10k Ohm, 1k Ohm)
- Breadboard
- Jumper wires

- Soldering iron and solder
- 3D printer or access to one

Step 1: Design and Print the Case

Start by designing a 3D model for the heading indicator case. The case should be large enough to house the Arduino, Raspberry Pi, LED display, and any additional components. You can find free 3D models online or create your own using software like Tinkercad.

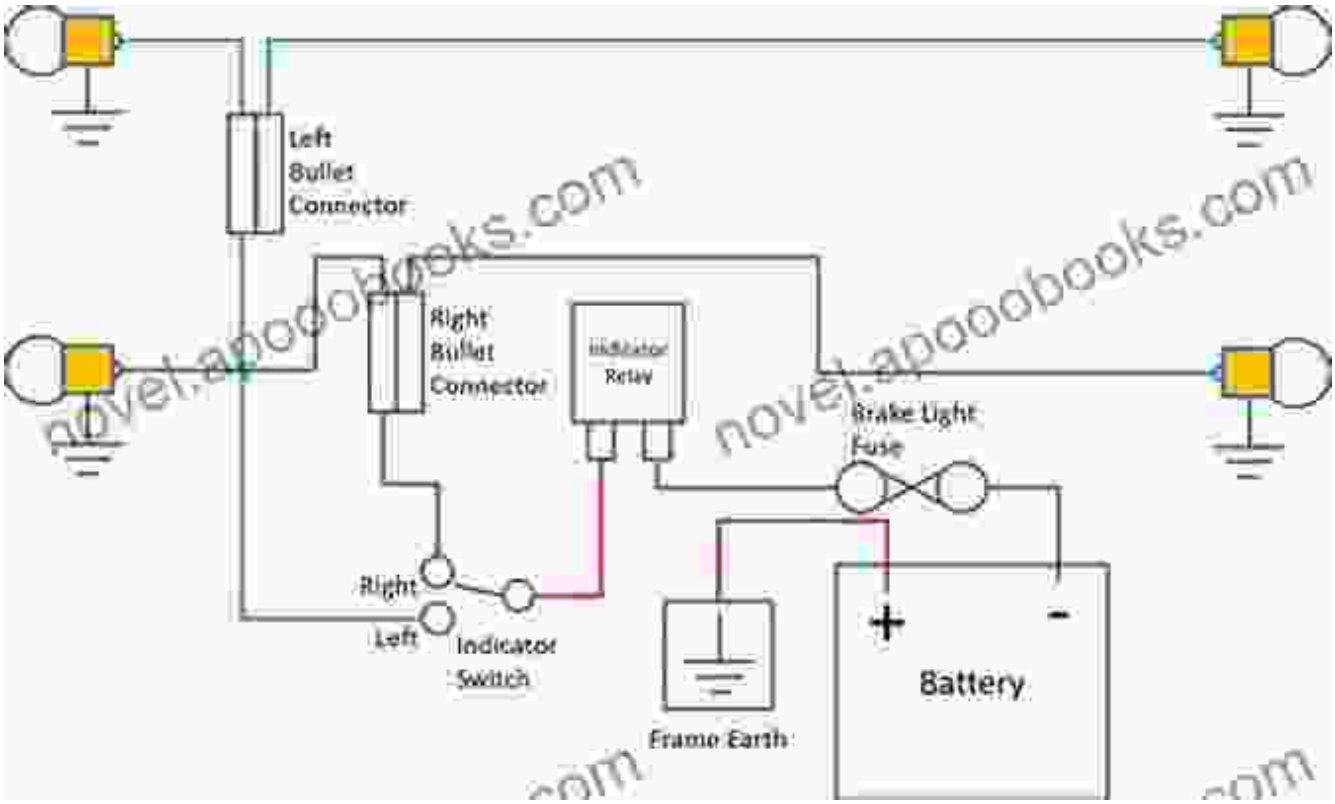


Step 2: Assemble the Circuit

Once you have the case printed, it's time to assemble the circuit. Connect the Arduino and Raspberry Pi to the breadboard using jumper wires.

Connect the 7-segment LED display to the Arduino as follows:

- Pin 1 (GND) to Arduino ground
- Pin 2 (A) to Arduino digital pin 2
- Pin 3 (B) to Arduino digital pin 3
- Pin 4 (C) to Arduino digital pin 4
- Pin 5 (D) to Arduino digital pin 5
- Pin 6 (E) to Arduino digital pin 6
- Pin 7 (F) to Arduino digital pin 7
- Pin 8 (DP) to Arduino digital pin 8



Step 3: Code the Arduino

The Arduino code controls the LED display and reads data from the Raspberry Pi.

arduino #include #include

const int LED_A = 2; const int LED_B = 3; const int LED_C = 4; const int LED_D = 5; const int LED_E = 6; const int LED_F = 7; const int LED_DP = 8;

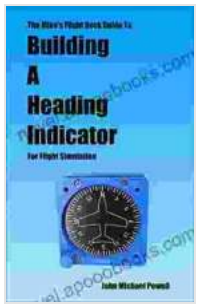
const int RASPBERRY_PI_MOSI = 11; const int RASPBERRY_PI_MISO = 12; const int RASPBERRY_PI_CLK = 13; const int RASPBERRY_PI_CS = 10;

int heading = 0;

void setup(){SPI.begin(); SPI.setBitFree Download(MSBFIRST); SPI.setDataMode(SPI_MODE0); SPI.setClockDivider(SPI_CLOCK_DIV2);

pinMode(LED_A, OUTPUT); pinMode(LED_B, OUTPUT); pinMode(LED_C, OUTPUT); pinMode(LED_D, OUTPUT); pinMode(LED_E, OUTPUT); pinMode(LED_F, OUTPUT); pinMode(LED_DP, OUTPUT); }

void loop(){SPI.transfer(0x00); heading = SPI.transfer(0x00); heading = (heading



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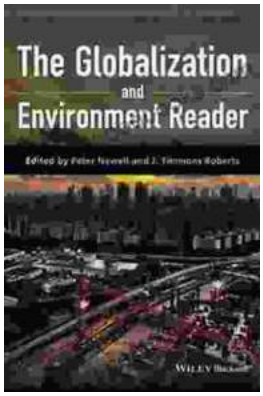

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