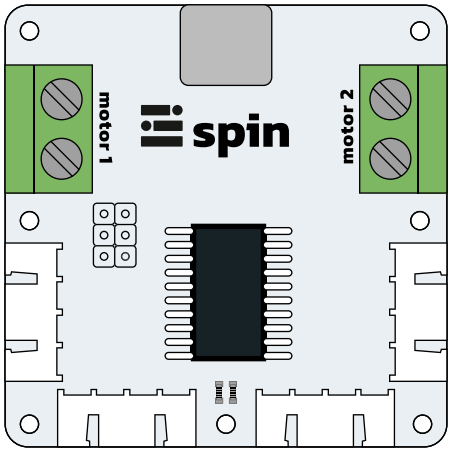
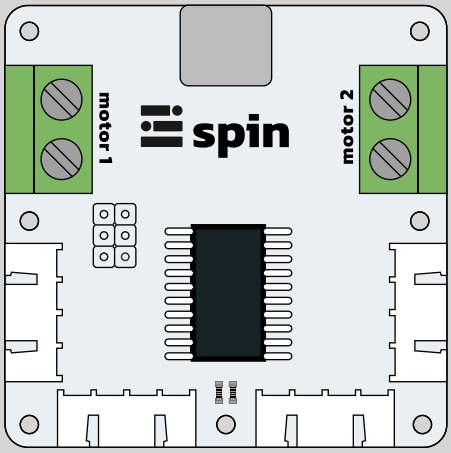


amomii Spin

DATASHEET



Description

The amomii Spin module is a powerful and versatile motor driver that controls two DC motors and two servo motors. Its core is a dedicated motor driver chip that allows for independent control of each motor's direction and speed. With its own USB-C port, the Spin module can power itself and the connected motors, making it a robust solution for projects requiring substantial power. This module is an essential component for bringing motion and mechanical action to life in your creations.

Key Features

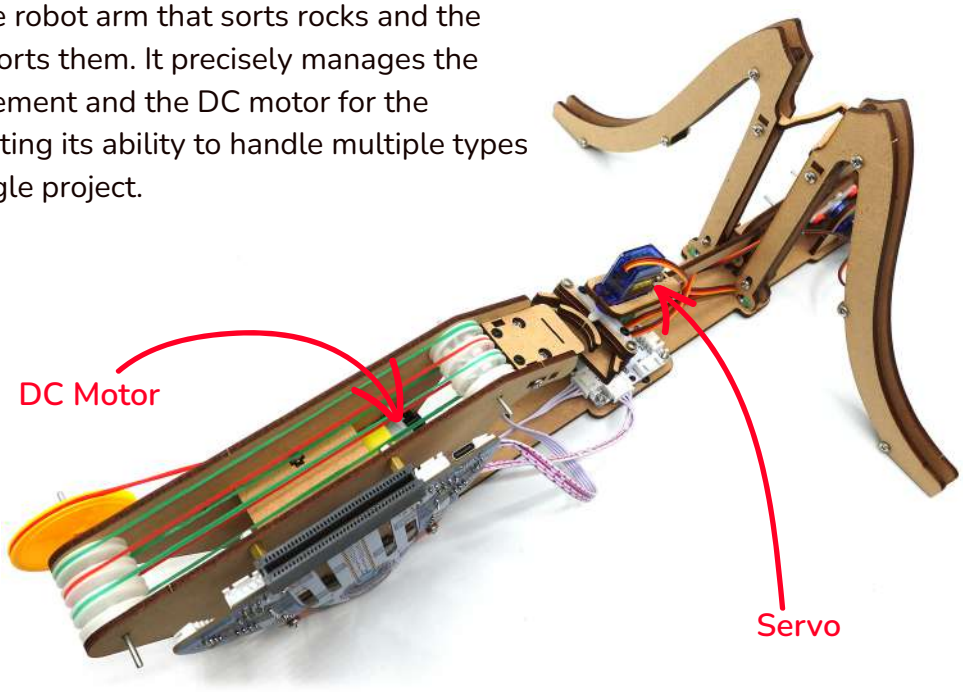
- **Motor Driver:** Capable of independently controlling two DC motors and two servo motors simultaneously.
- **Integrated Power:** Features a USB-C port that can both power the module and supply the necessary voltage for the connected motors.
- **Individual Control:** Provides precise control over the direction and speed of each DC motor.
- **Dedicated Connections:** Includes dedicated screw terminals for DC motors and standard pin headers for SG90 servo motors, ensuring a secure and easy connection.

Example Applications

The Spin module is a fundamental component in projects that rely on mechanical movement.

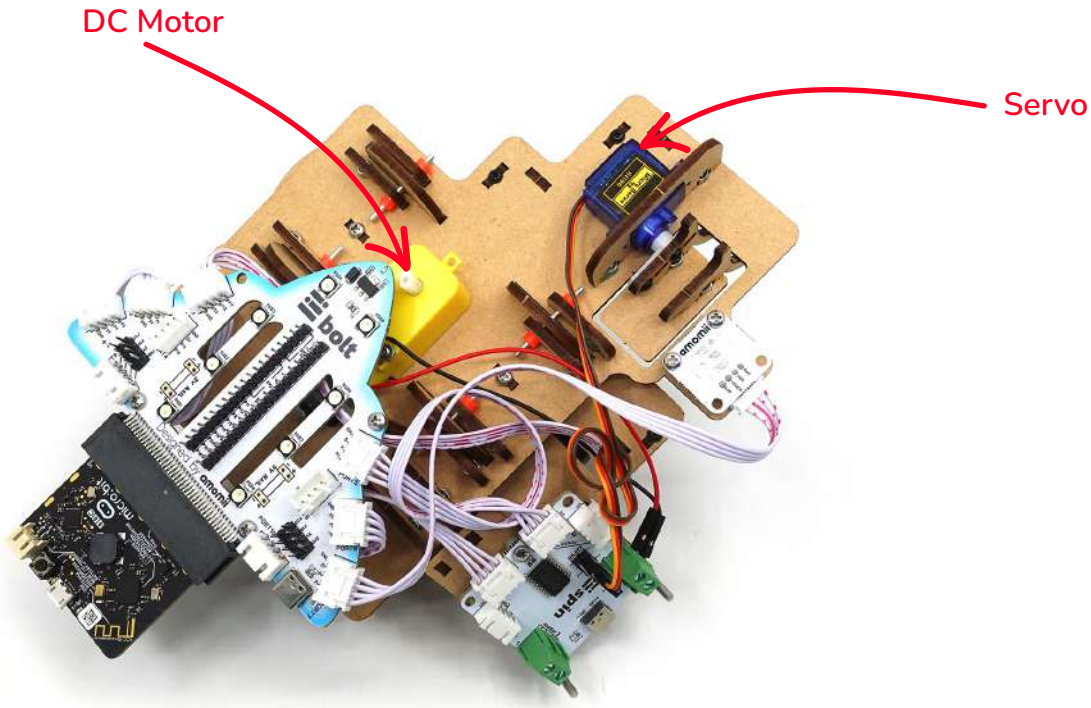
● Rock 'n' Roller

In the Rock 'n' Roller project, the Spin module powers and controls the motion of the robot arm that sorts rocks and the conveyor belt that transports them. It precisely manages the servos for the arm's movement and the DC motor for the conveyor belt, demonstrating its ability to handle multiple types of motion control in a single project.



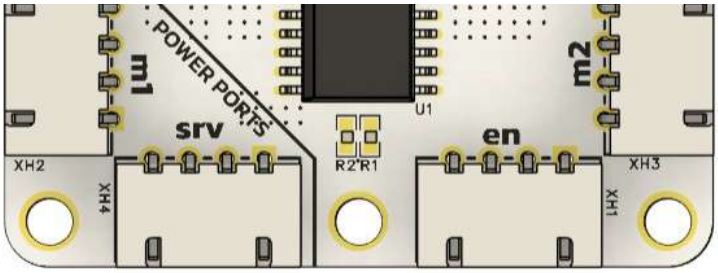
● Amazing Mine

The Amazing Mine project utilizes the Spin module to drive both the trapdoor ramp and the scotch yoke mechanism. The module's ability to control both DC motors and servos is crucial for the complex, coordinated movements required to make this project work.



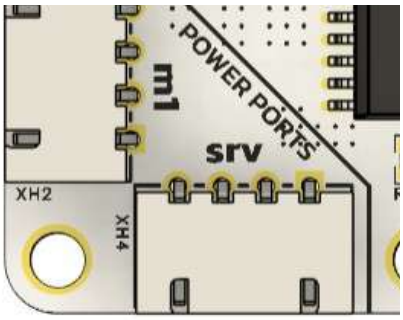
Ports and Connections

The Spin module has four ports, **m1, srv, en**, and **m2**.



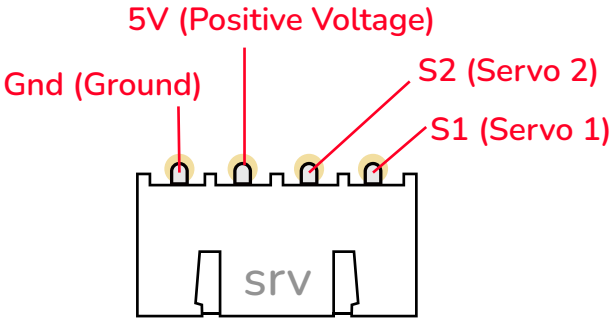
- **Power Ports**

The two ports in the bottom left corner, **m1** and **srv**, are power ports. This means that they can be used to receive or send power from the Bolt Board. **At least one of these ports must be used** for the Spin module to function correctly.



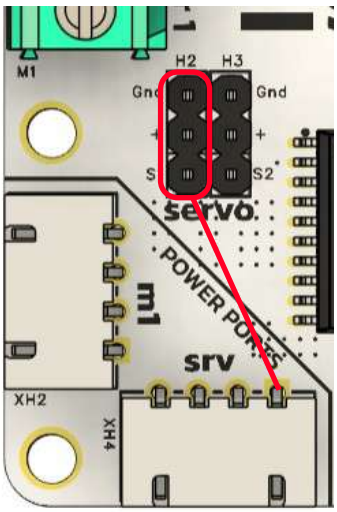
- **Servo Port**

Port **srv** is used for controlling servos. Its pinout is as follows:

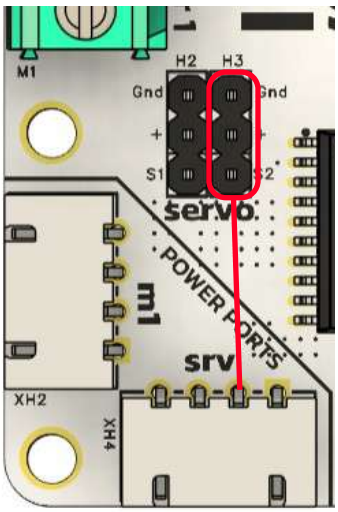


Gnd, and **5V** are used for power, while **S1** and **S2** are signal pins for controlling the servos (receiving and sending signals).

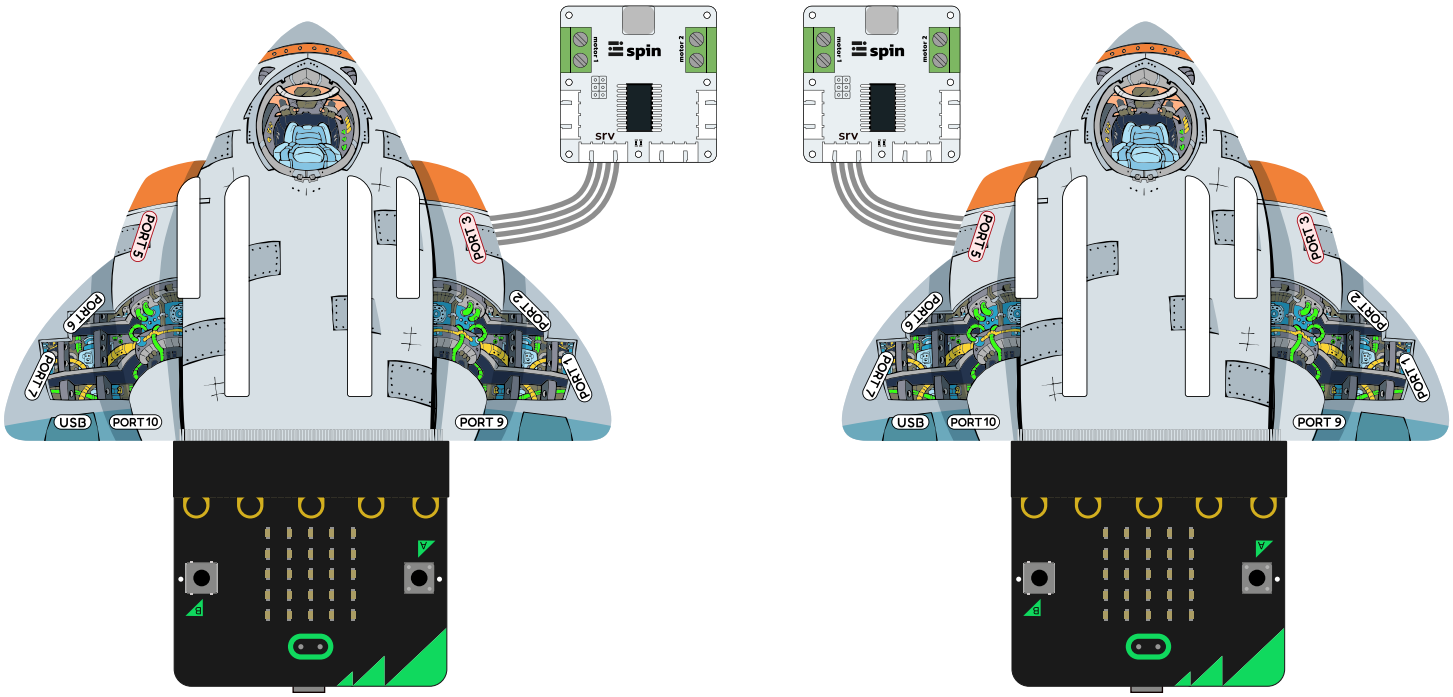
S1 controls the servo connected to the left column.



S2 controls the servo connected to the left column.



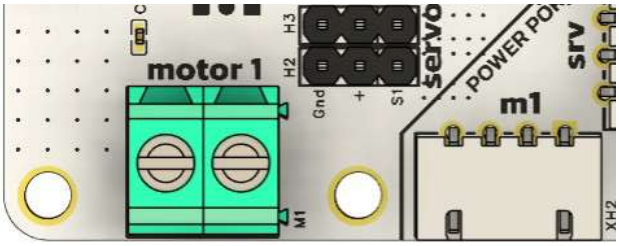
The **srv** port must connect to one of the Bolt Board's power ports (**Port 3**, or **Port 5**).



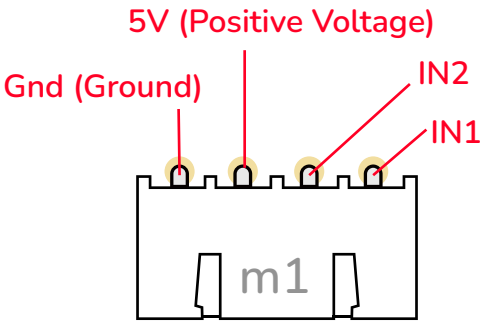
• Motor Ports

m1

Port **m1** is used to control a DC motor connected to screw terminal motor 1.



Its pinout is as follows:



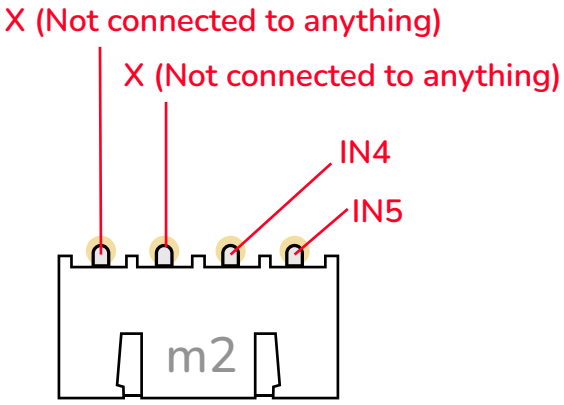
The **Gnd** and **5V** pins provide power, while **IN1** and **IN2** are signal pins that control the DC motor. By setting **IN1** and **IN2** to **HIGH (1)** or **LOW (0)** in your code, you can dictate the motor's movement and spin direction.

The table to the right illustrates how different combinations of HIGH or LOW states for these pins alter the DC motor's behavior:

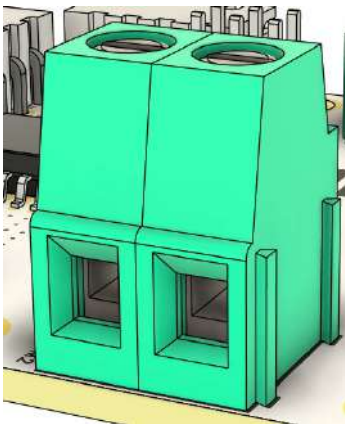
IN1	IN2	DC Motor
1	1	STOP (no movement)
1	0	Spin clockwise
0	1	Spin counterclockwise
0	0	STOP (no movement)

m2

Port **m2** is just like port **m1**, but it uses **IN4** and **IN5** to control the motor connected to screw terminal **motor 2.** Unlike **m1**, port **m2** doesn't have power pins, so it can't send or get power from the Bolt Board on its own. Therefore, if only one motor is to be used, it must be **m1**. You can see how **m2**'s pins are set up below:



Screw Terminals

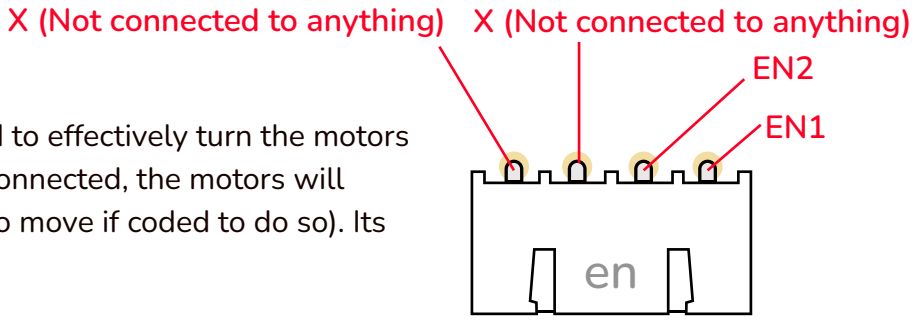


Here's how to use the screw terminal:

- **Open it:** Turn the screw counterclockwise (to the left) until the opening is wide enough.
  - First time? The screw might be a bit tight when you first try to open it. Just keep turning it counterclockwise!
- **Put the wire in:** Gently push the metal end of your wire into the open hole.
- **Close it:** Turn the screw clockwise (to the right) to make it tight.
  - Check it: Make sure the wire is held tightly by the top part of the terminal's mouth, not the bottom.

en

The **en** port (enable) is used to effectively turn the motors on or off. If this port is not connected, the motors will always be turned on (able to move if coded to do so). Its pinout is as follows:



The **EN1** pin is used to turn motor 1 on or off. When **EN1** is set to LOW (0), motor 1 cannot be controlled, no matter what commands are sent to port **m1**. When **EN1** is set to HIGH (1), motor 1 can be controlled. The same applies to the **EN2** pin for motor 2.

This feature is useful for both turning the motors on and off, and for controlling their speeds. By using the 'analog write' block, you can quickly turn the motor on and off at different rates. This makes it seem like the voltage is changing, which in turn changes the motor's speed. This method is called pulse width modulation (PWM).

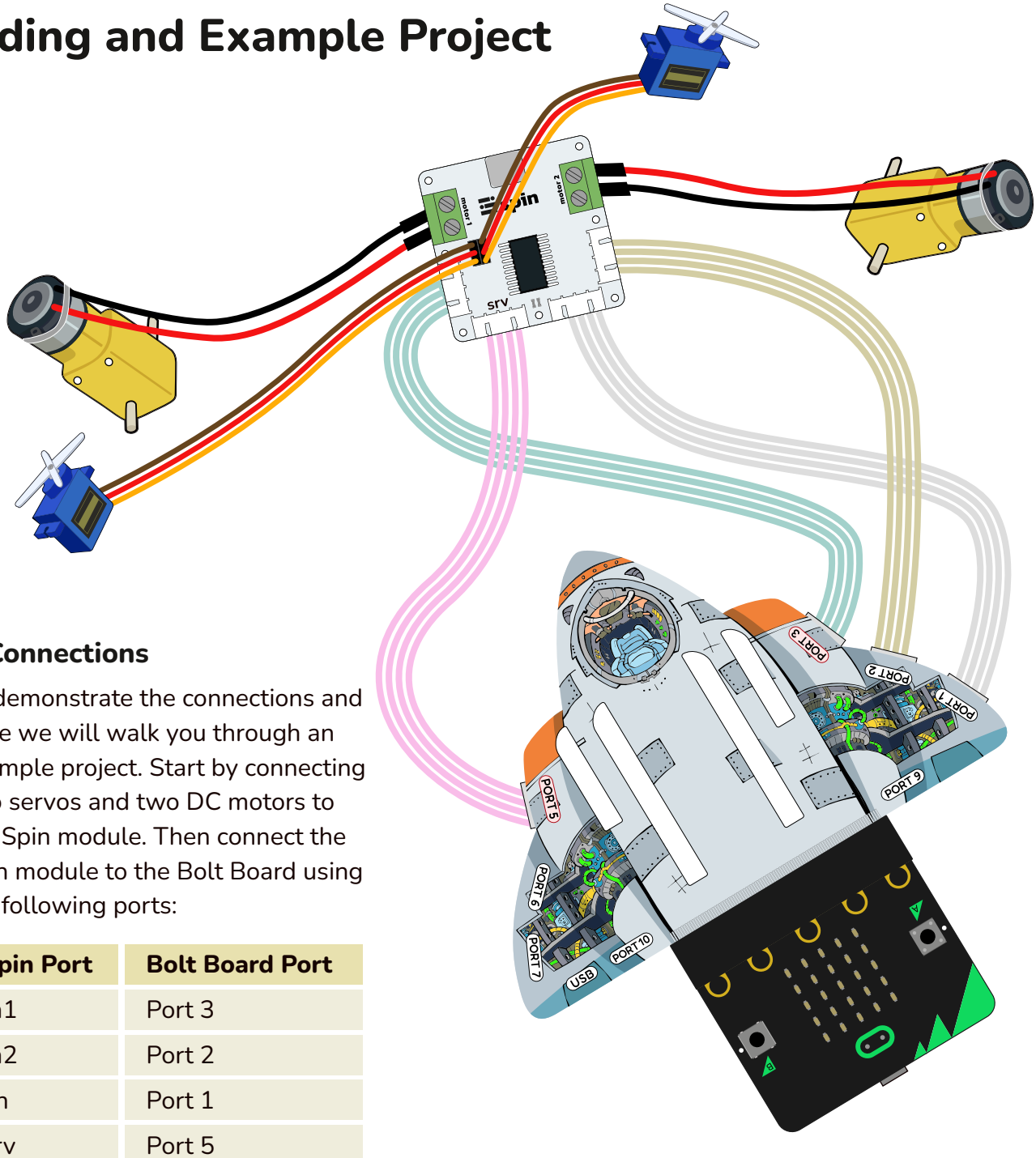
Note: Ports m2 and en do not have power pins. This means you can connect them to any port on the Bolt Board. However, ports m1 and srv have power pins, so they can only be connected to the power pins on the Bolt Board.

USB-C Port

The USB-C port on the Spin module is a power input, designed to provide the higher current required to power DC motors. It can be used to power the Spin module, the connected motors, and the Bolt Board.

WARNING: Never use two power sources at the same time. Only power a project by either the Spin module's USB-C port or the Bolt Board's USB-C port, not both. Using two power sources can cause damage to the board and other components.

Coding and Example Project



- **Connections**

To demonstrate the connections and code we will walk you through an example project. Start by connecting two servos and two DC motors to the Spin module. Then connect the Spin module to the Bolt Board using the following ports:

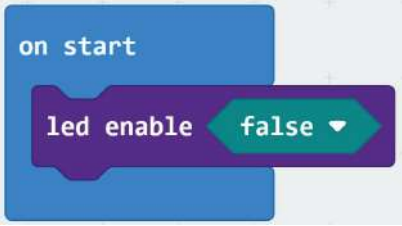
Spin Port	Bolt Board Port
m1	Port 3
m2	Port 2
en	Port 1
srv	Port 5

- **Code**

The Bolt Board's orientation dictates the behavior of its DC motors and servos. When tilted left, the DC motors spin in opposing directions, one at full speed and the other at half speed, while the servos point oppositely (one at 180 degrees, the other at 0). When flat, all DC motors cease movement, and both servos align at 90 degrees. Conversely, tilting the board to the right reverses the left-tilt behavior for both DC motors and servos.

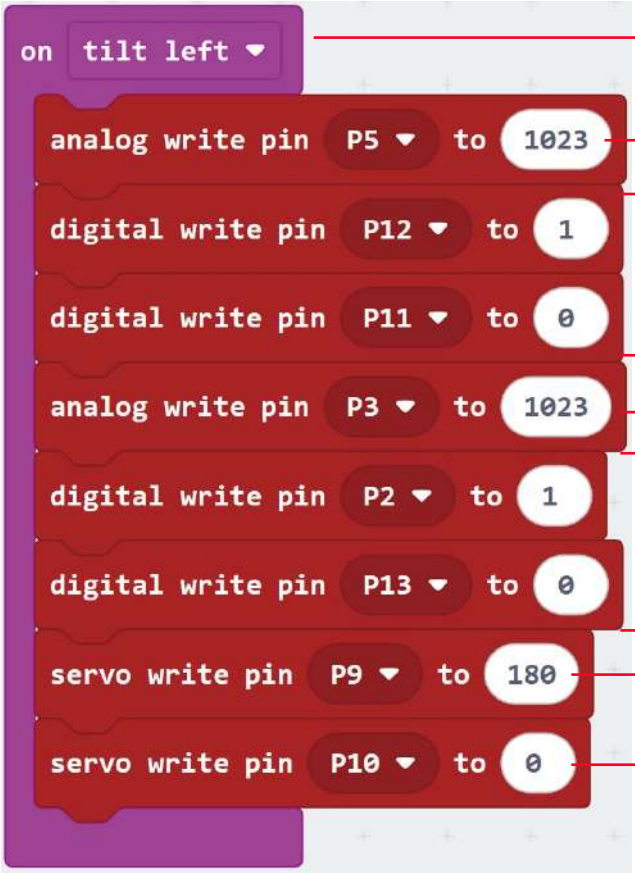
This example project offers a step-by-step guide to controlling DC motors and servos, allowing you to adapt the code and observed behavior to your specific project needs. Tilt sensors were chosen for this example due to the unreliable functionality encountered when using buttons, as they share data pins with some ports.

When using the 'analog write' function to control motor speed, values should range from 0 (no speed) to 1023 (full speed). While 511.5 represents true half speed, 500 is used in our example as an approximate integer value.



When the project starts:

- Disable the LED matrix
  - This is done because the LED matrix uses micro:bit
  - data pins that we need for the project.



When the Bolt Board is tilted left:

Set motor 1 to full speed

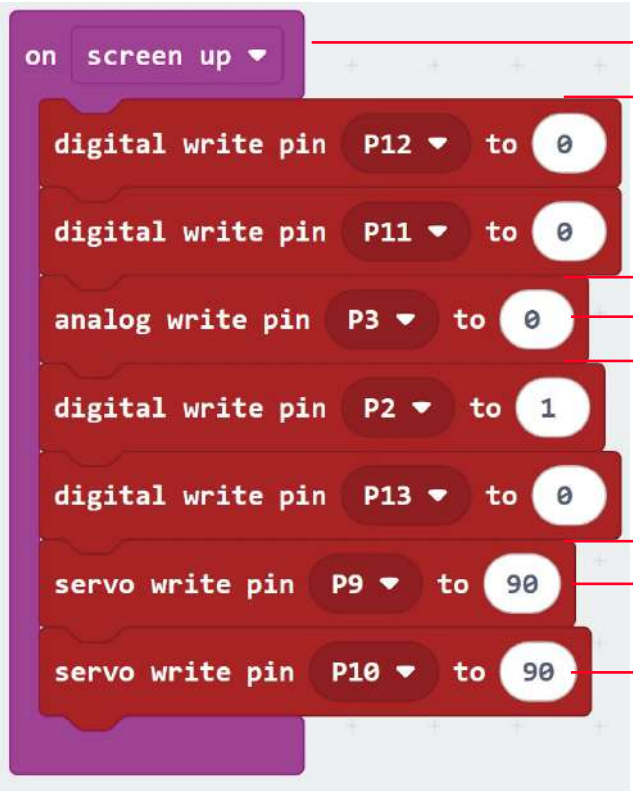
Spin motor 1 clockwise

Set motor 2 to half speed

Spin motor 2 counterclockwise

Set servo 2 to 180 degrees

Set servo 1 to 0 degrees



When the Bolt Board is flat on table:

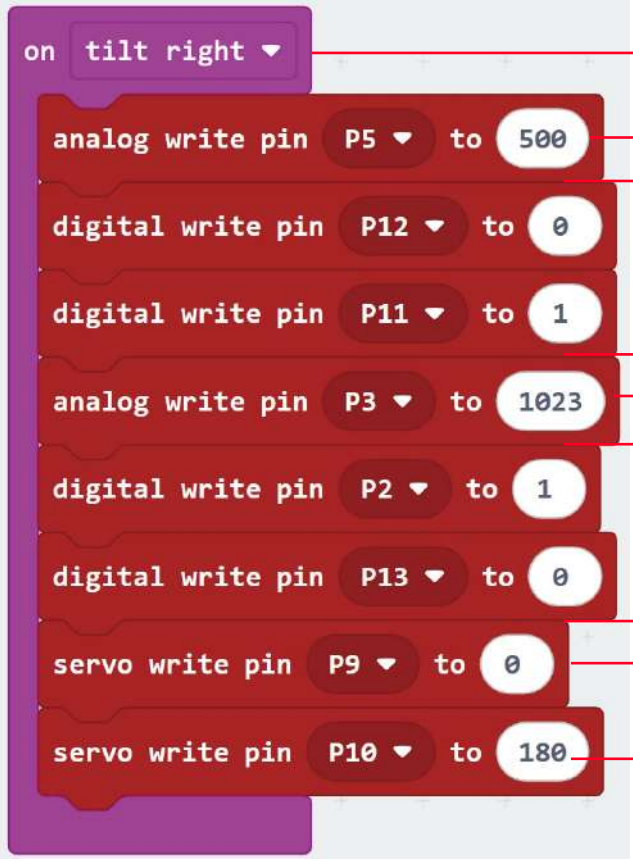
Stop motor 1

Stop motor 2 by setting speed to 0

This code is now irrelevant as the motor is set to a speed of 0

Set servo 2 to 90 degrees

Set servo 1 to 90 degrees



When the Bolt Board is tilted right:

Set motor 1 to half speed

Spin motor 1 counterclockwise

Set motor 2 to full speed

Spin motor 2 clockwise

Set servo 2 to 0 degrees

Set servo 1 to 180 degrees

Safety and Best Practices

The Spin module is a powerful tool for controlling motors. To ensure a safe and positive learning experience, please follow these best practices:

- **Compatibility:** The Spin module was designed specifically for use with the amomii Bolt Board. While it can be used with other microcontrollers, it is crucial to verify that the voltage and pin requirements are compatible to avoid damage. Incorrect connections can cause irreversible harm to the components.
- **Power:** Always ensure the module is receiving the correct voltage. The USB-C port on the Spin module is designed to provide the necessary power for the motors.
- **Wiring:** Always double-check your motor wiring before powering on your project to avoid short circuits.

By following these simple guidelines, you can ensure a safe and enjoyable experience with the Spin module.

Revision History

Date	Revision	Changes
September. 01. 2025	1	First release