

ULTIMATE BRUTUSBOT

Principle of Design

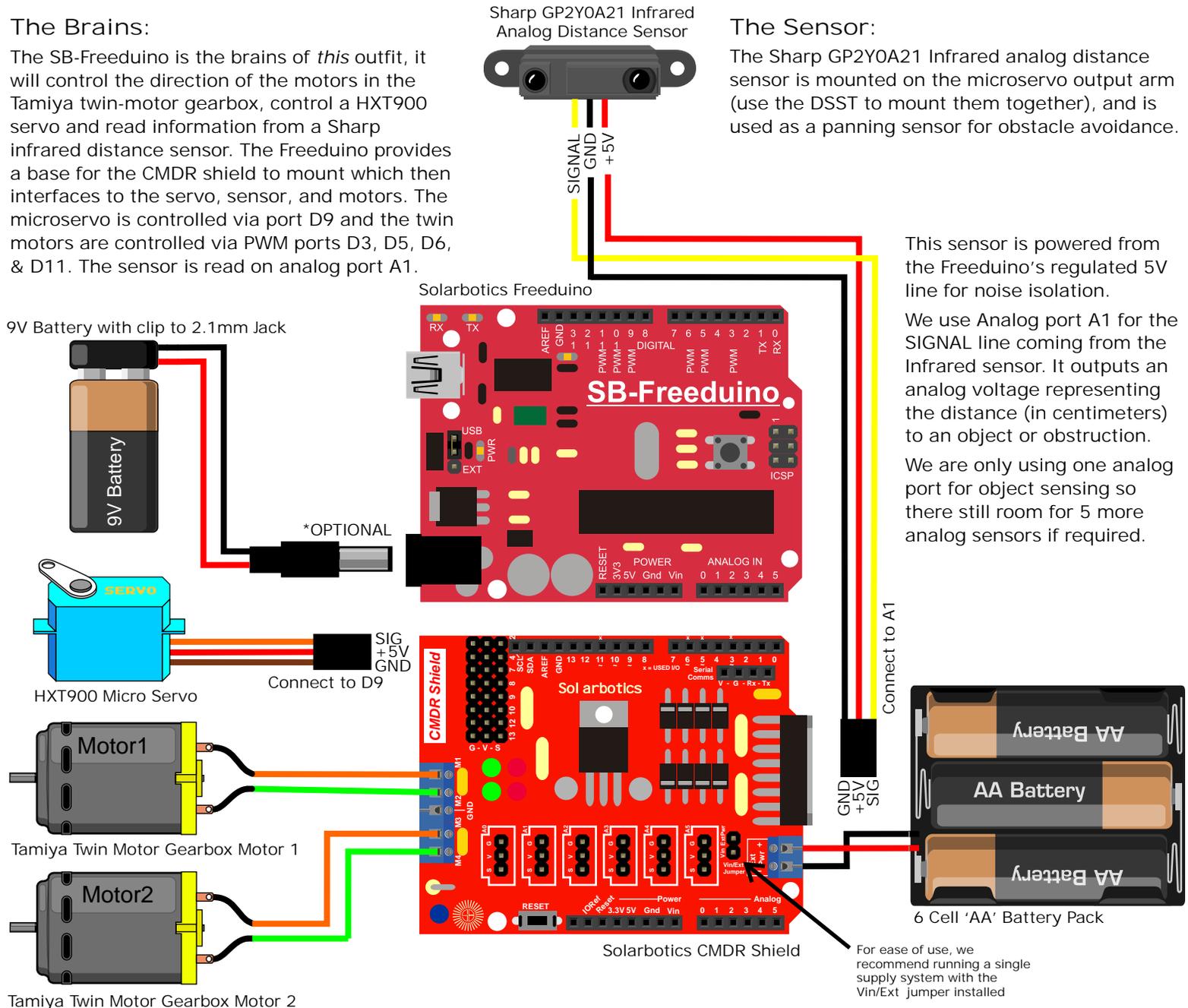
Our example Brutusbot was designed using the following components and wired as shown:

The Brains:

The SB-Freeduino is the brains of *this* outfit, it will control the direction of the motors in the Tamiya twin-motor gearbox, control a HXT900 servo and read information from a Sharp infrared distance sensor. The Freeduino provides a base for the CMDR shield to mount which then interfaces to the servo, sensor, and motors. The microservo is controlled via port D9 and the twin motors are controlled via PWM ports D3, D5, D6, & D11. The sensor is read on analog port A1.

The Sensor:

The Sharp GP2Y0A21 Infrared analog distance sensor is mounted on the microservo output arm (use the DSST to mount them together), and is used as a panning sensor for obstacle avoidance.



This sensor is powered from the Freeduino's regulated 5V line for noise isolation.

We use Analog port A1 for the SIGNAL line coming from the Infrared sensor. It outputs an analog voltage representing the distance (in centimeters) to an object or obstruction.

We are only using one analog port for object sensing so there still room for 5 more analog sensors if required.

For ease of use, we recommend running a single supply system with the Vin/Ext jumper installed

The Brawn:

The CMDR shield is the muscle of the system, it mounts on top of the Freeduino and can transfer up to 2 amperes of current to each motor via the L298 driver chip.

We are using M1, M2, M3, & M4 to drive the Tamiya twin motor gearbox, and only one of eight servo ports for the panning servo. The CMDR shield still has many open ports for you to add extra functions to your Brutusbot.

The Juice:

For powering the Ultimate Brutusbot, the 9V battery is optional. It does give us a dual battery setup which provides clean power to the Freeduino and sensors, and protects them from noise on the power rails introduced by the motors, but it doesn't really give us that many benefits since the Servo lines are driven from the regulated 5V on the CMDR shield.

We recommend just using the beefier 6xAA battery pack power to provide power through the Ext Pwr terminal block. This setup can meet the heavier demands of the motors in the gearbox and power the entire electronic system when the ExtPwr Jumper is installed.

Troubles?

If the panning servo seems to twitch while in operation, we recommend rebuilding the Tamiya Twin motor gear box and adding more grease to the gears, especially the crown gear. Another option is to add a larger electrolytic tank cap on the 5V rail to ground on the servo headers to suppress the noise effecting the servo.

Unresponsive? Check your battery voltage and make sure it's over 6.5V or see if the code uploaded properly to your Freeduino.