

A detailed photograph of a custom-built electronic circuit. The circuit is mounted on a green printed circuit board (PCB) and a blue perfboard. It features several electrolytic capacitors, including two large yellow ones labeled '35V', and a blue microcontroller unit. A black motor with a rubber tire is connected to the circuit via a black cable. The entire assembly is held together by wooden skewers. The text 'AC_TEAM_X' is overlaid in white on a semi-transparent black background.

AC_TEAM_X

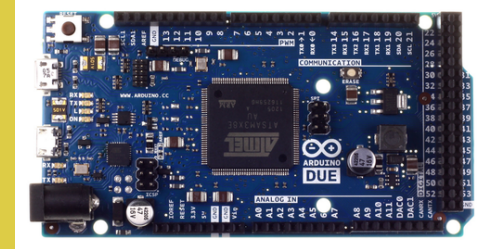
**POWER & SENSE
MANAGEMENT**

SENSORS AND BOARD

1.

ARDUINO DUE

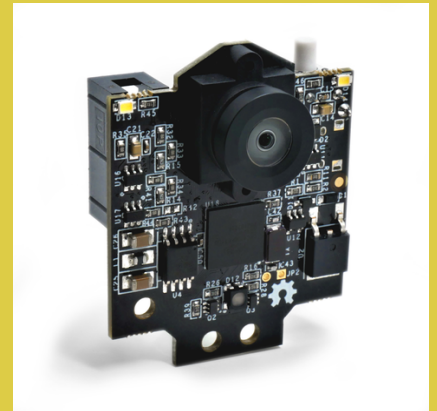
Instead of using Arduino mega, we have preferred using Arduino Due because of its performance. The RAM and ROM of Arduino Due is way ahead than Arduino mega . The processor of due is also good than Arduino mega . So using Arduino due will give us a good result.



2.

PIXY CAMERA

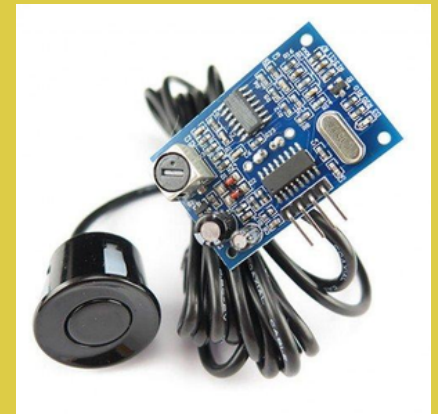
Pixy Camera, is a compact and versatile vision system primarily used for object recognition and tracking in robotics and automation. Its primary function revolves around efficient object detection and recognition, making it a popular choice for obstacle detection applications . The best thing about pixy is that we can train the models easily and it is a flexible camera . We are detecting green and red colors and sending signal to Arduino . We may use it for detecting blue color and making a U-turn.



7.

JSN SR04T Water Proof Ultrasonic Sensor

"Jason Waterproof Sonar Sensors" are cutting-edge sensors engineered for obstacle avoidance in autonomous vehicles, renowned for their precision and reliability. These sensors, utilizing sonar technology, offer accurate distance measurement and object detection. Resilient and durable, they ensure consistent and precise readings in varied conditions. We are using 3 of these sensors and we have made a sensor holder too .



8

HC-SR04 Ultrasonic Sensor

If necessary , we will use this sonar sensor for our critical turns like where the distance is less than 10cm and we have to avoid the robot from hitting walls . The JSON sonar can't measure distance below 20cm. So, after testing we will final whether or not we are using the simple sonar sensors .



9.

Lipo Battery

We are using one 2200mAh battery and one 1300mAh battery in our robot .
we faced so many issues of servo motor noise so we are giving power to our servo motor with a separate lipo battery now. The big lipo battery is dedicated for our drive motor , arduino due and all the sensors .



11.

Buck Boost Converter 4A Module With LCD Display

We are using a 4A buck-boost convertor with LCD display for our drive motor and Arduino Due. It is amazing convertor as we can run our motor at high and low speeds whenever it is required. Also, we are giving 7-12V to Arduino due. If we want to run our at the fastest speed then we will increase the voltage to 15V and give power to Arduino separately with other buck convertor.



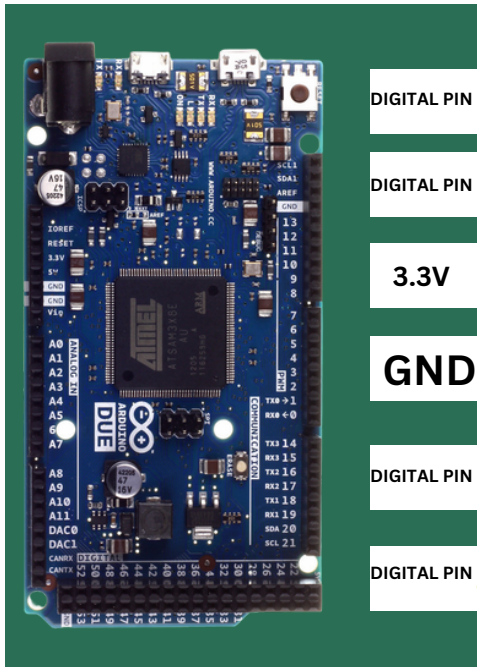
12.

LM2596 Step Down buck converter

We are using LM2596 Step Down buck convertor to power our sensors and servo motor . We are using 2 convertors , 1 for servo alone and one for sensors . We have connected our one buck convertor to the main battery and used parallel connections with 4A buck-boost convertor , so two convertors and connected to one battery and our third buck convertor is connected to a separate battery for servo motor for reducing noise.



Arduino Due and Logic Level Shifter



DIGITAL PIN

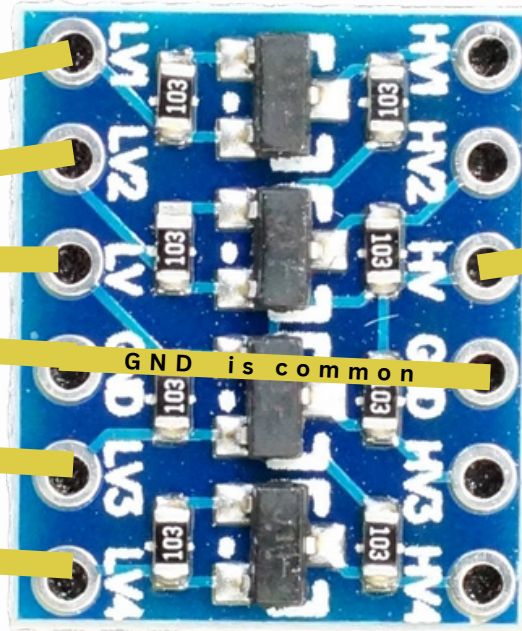
DIGITAL PIN

3.3V

GND

DIGITAL PIN

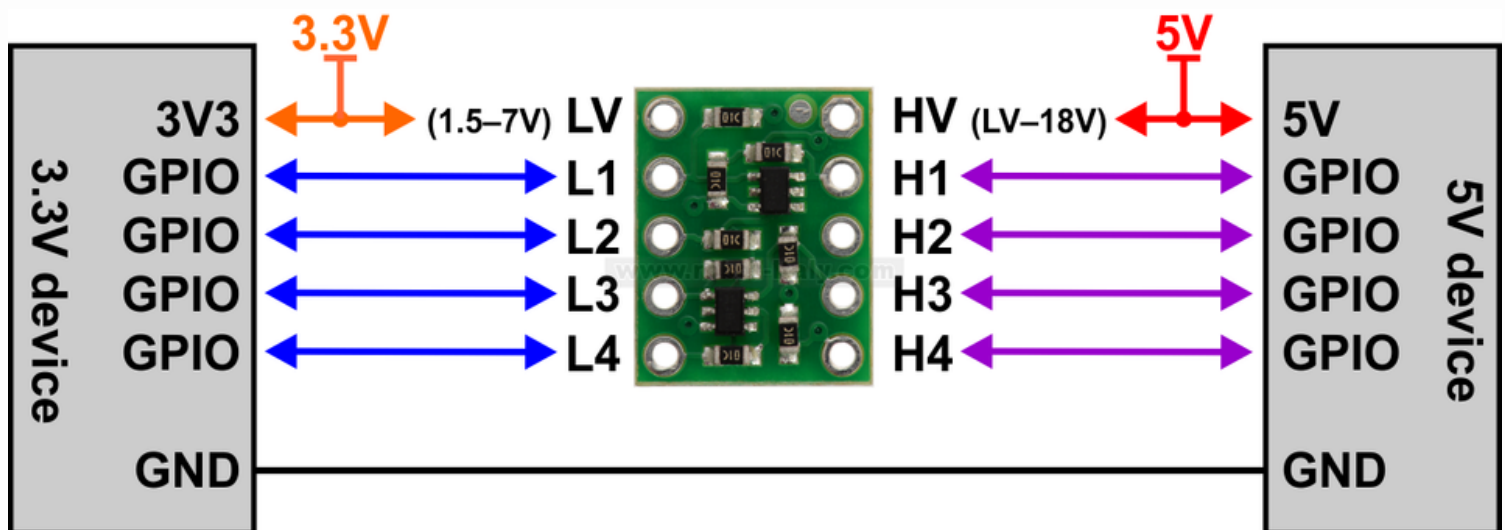
DIGITAL PIN



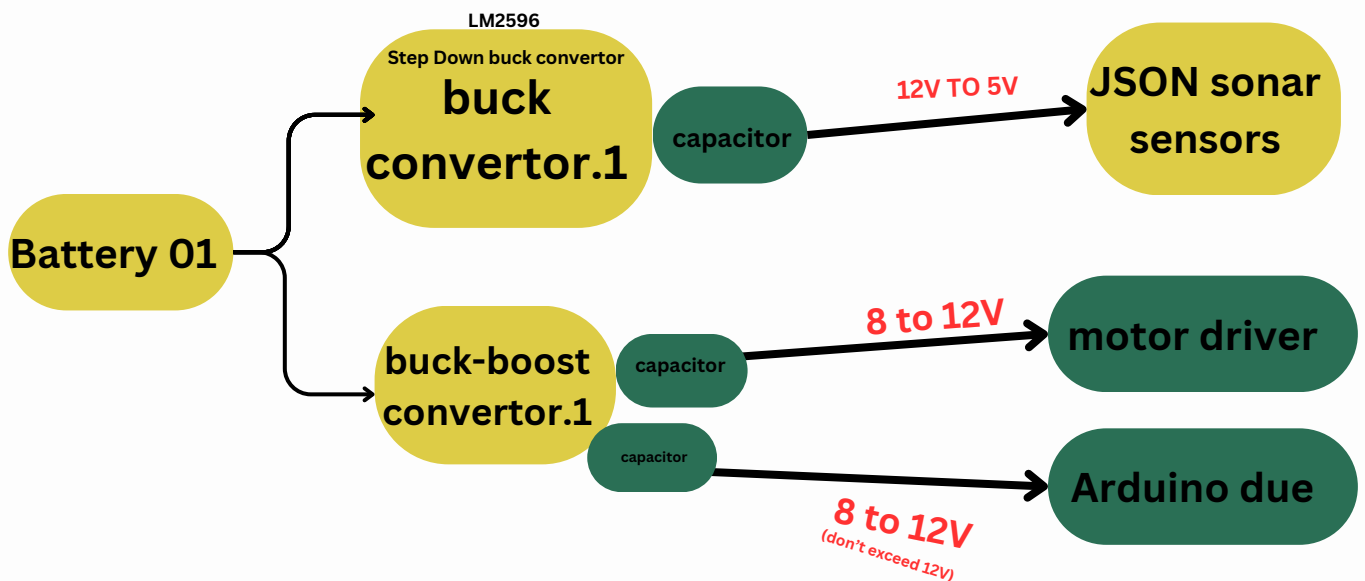
5V

Remaining HW pins will be connected in the desired HW pins

Example 02

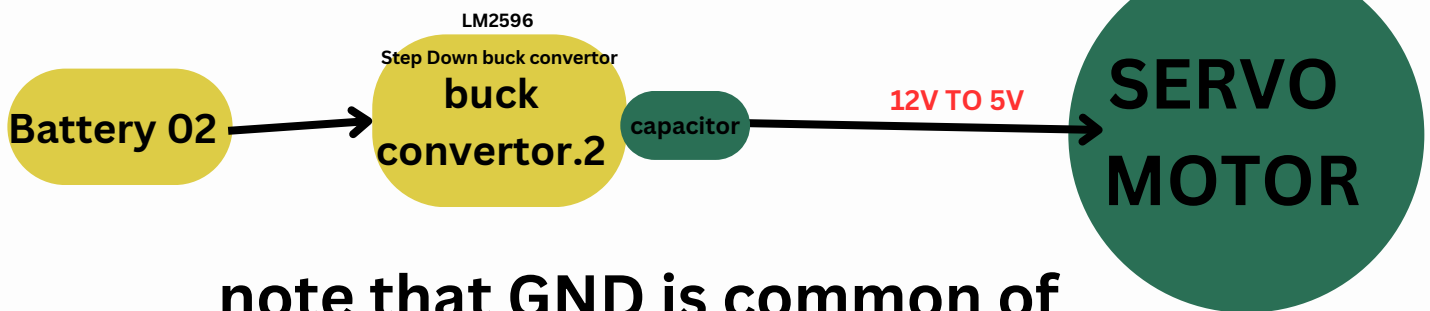


1.Parallel power to both convertors from one battery



AT FIRST , we have used only one battery for all the components and using buck boost for sensors and motors but then we faced too much noise in sonar sensors due to servo motor movements so we have used one separate battery for servo motor.

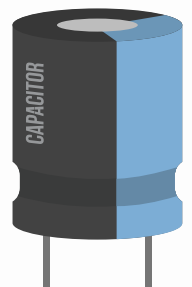
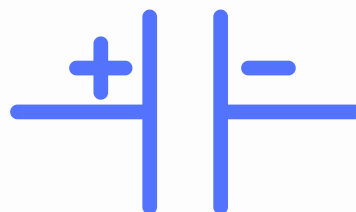
2. separate power to servo motor



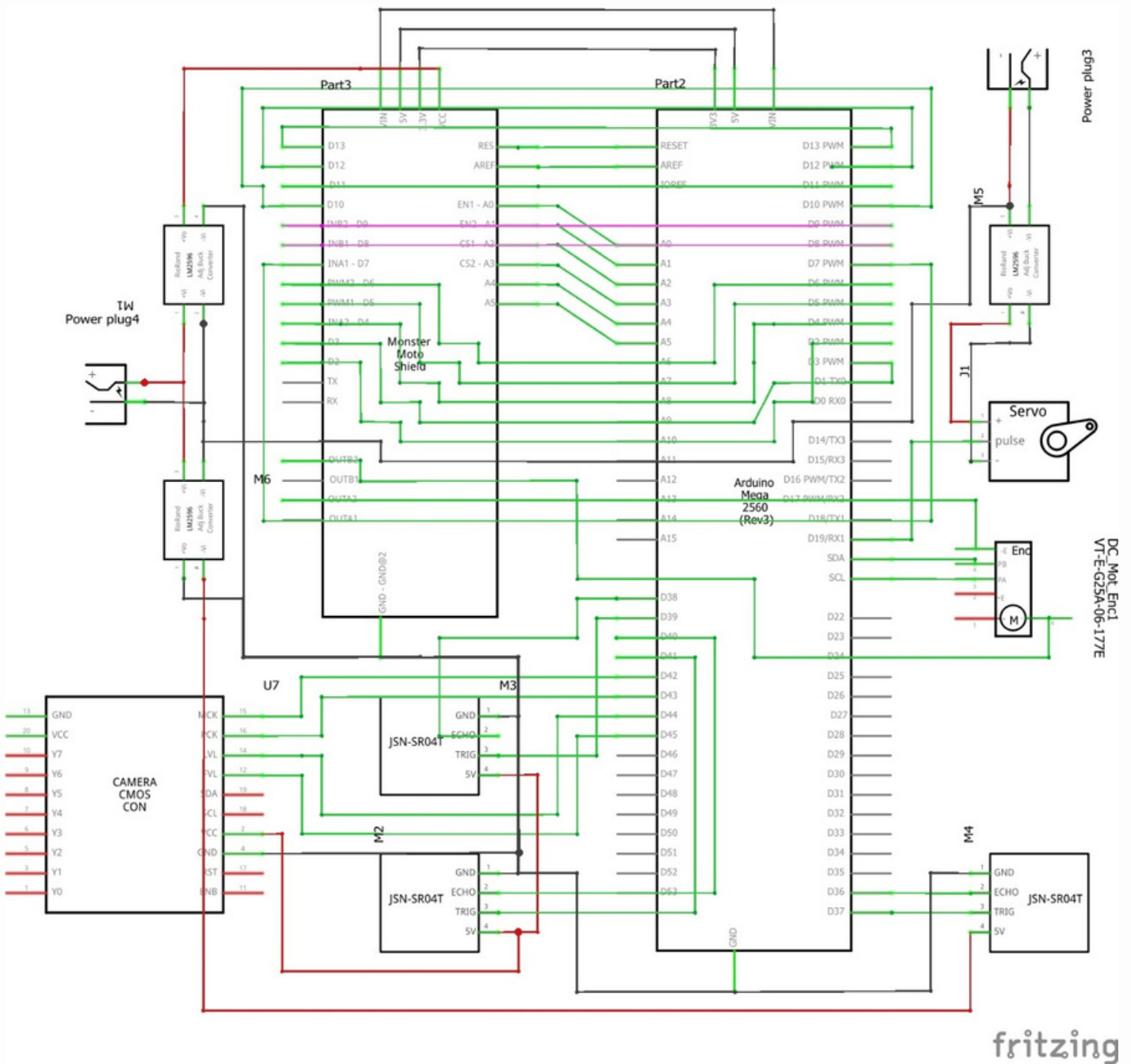
note that GND is common of the components

MAKING OUTPUT SMOOTH

we have used some capacitors at the output of every buck or boost convertor for making the output smooth and ensuring there is no external noise , if there is then capacitors can resolve it. Capacitors have the ability to smooth out electrical signals when placed between a power source (such as a battery) and sensors or electronic components. This smoothing effect is primarily due to the capacitor's ability to store and release electrical energy.



Schematics 1.0



Schematics 1.1

