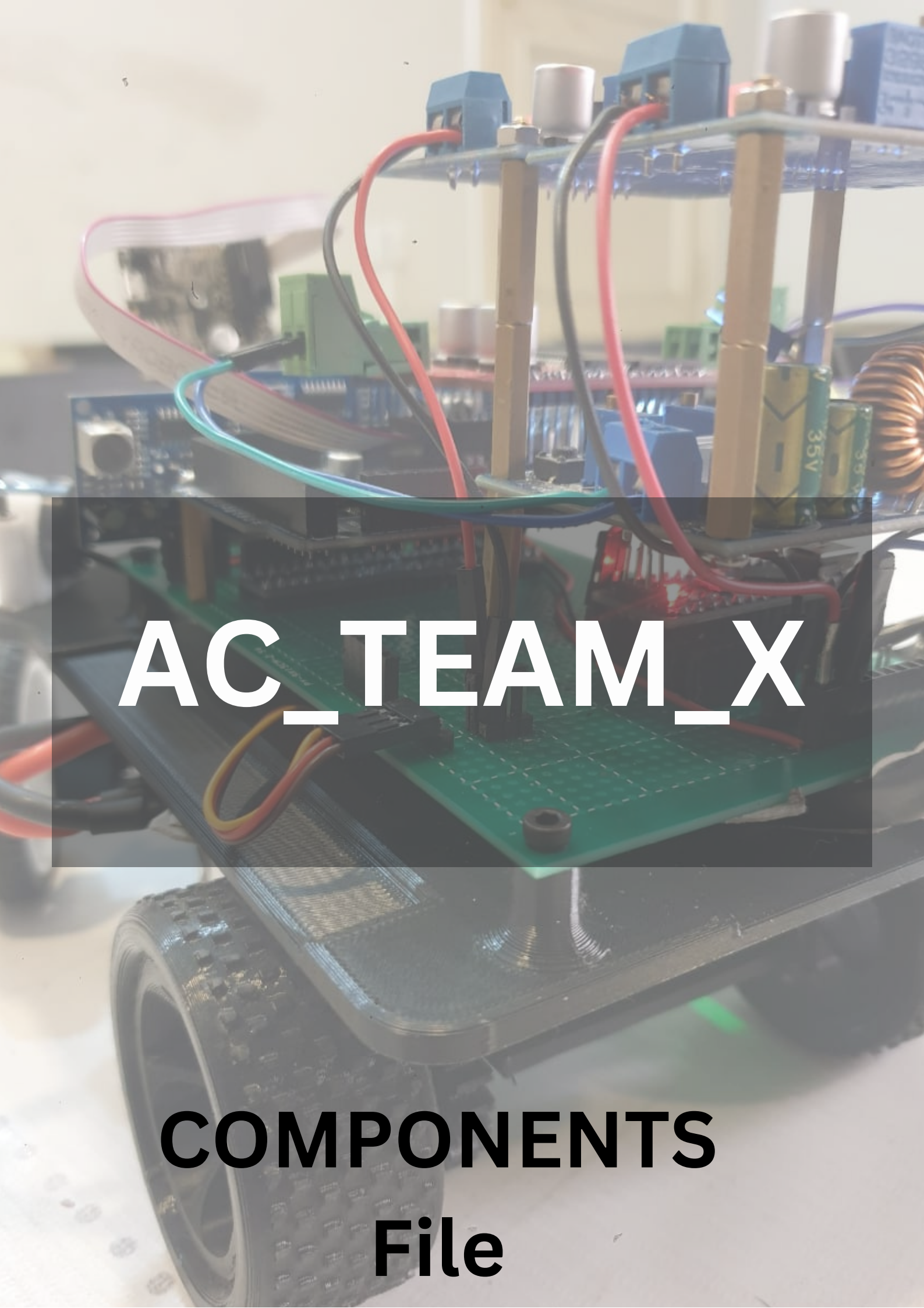


AC_TEAM_X

COMPONENTS File

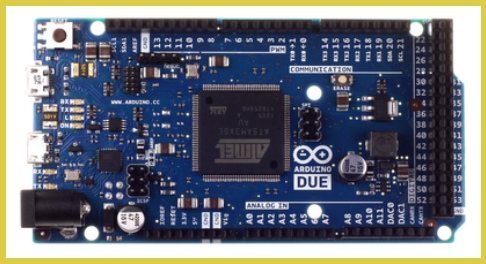
Components Used

1. Arduino Due
2. Monster Motor Driver Shield
3. 25GA370 DC gear motor with encoder
4. PIXY CAMERA
5. Adafruit RGB color sensor
6. MG90S Metal Gear Micro Servo Motor
7. JSN SR04T Water Proof Ultrasonic Sensor
8. Sonar Sensors simple
9. Lipo Battery
10. MPU-9250 Gyroscope
11. 4A Buck-Boost convertor
12. LM2596 Step Down buck convertor

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.

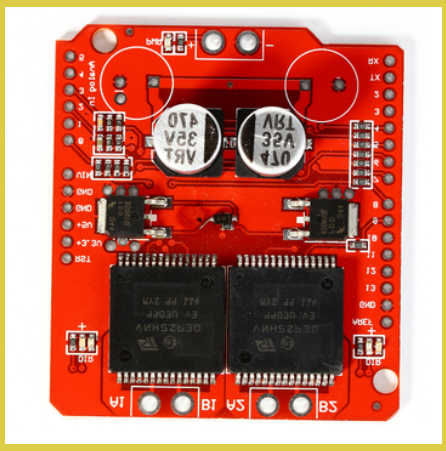


2.

Monster Motor Driver Shield

(VNH2SP30 chip)

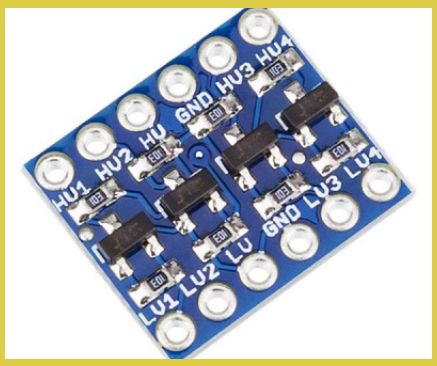
We are using VNH2SP30 chip Monster Motor driver shield and pasting it over Arduino Due .
The reason of using VNH is that it is compact and does not occupy much space and also it's performance is far better than other motor drivers. It has vast applications and very easy to use above all it has no heating effects over large values of current.



3.

Bi-directional Logic Level shifter

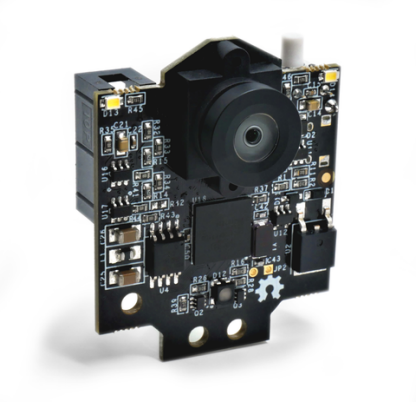
As we know that, Arduino Due gives the 3.3V logic level output so have to use logic level shifters with Arduino Due . Logic level shifters are converting 3.3V of Arduino due to 5V logics required for sensors and motors.
We have connected the digital pins of Arduino Due to LV side of logic level and connected HV side to sensors and motors and making ground common .



4.

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.



5.

Adafruit RGB color sensor

We have used Adafruit RGB color sensor for detecting orange and blue lines. we are detecting the blue and orange lines for making corner turn and for making a U-turn .

WE HAVE BACKUP PLAN IF OUR COLOR SENSOR DIDN'T WORK DURING COMPETITION

6.

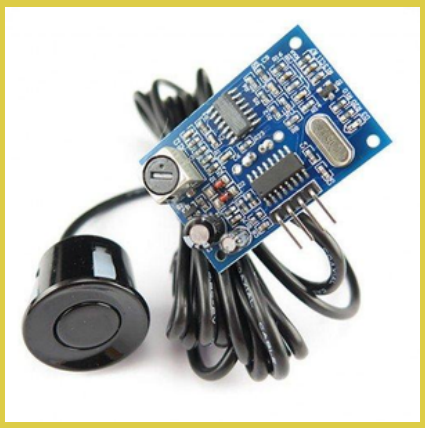
MG90S Metal Gear Micro Servo Motor

For the steering control, we have used metal gear micro servo motor mg90s. We ae moving our robot left and right using this servo motor . we have made specially designed servo holder in our car that we can replace it easily if it is damaged.It is an Analog Servo motor.

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

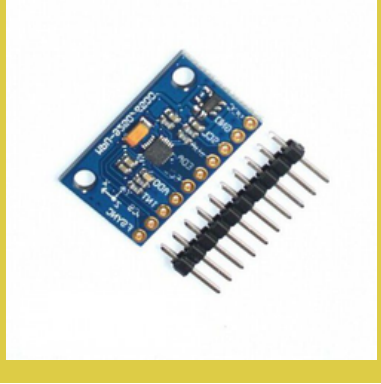
We are using one 2200mAh battery and one 1300mAh battery in our robot .
we faced so many issues of servo motor noise so we are giving power to our servo motor with a separate lipo battery now. The big lipo battery is dedicated for our drive motor , arduino due and all the sensors .

10.

MPU9250 GY-9250 9 Axis Gyroscope

not using it but we have tried it many times

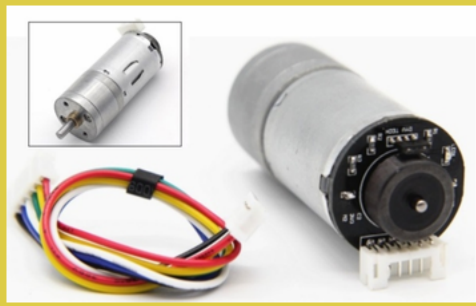
We have tried using the gyroscope in our robot , but the thing is there are not good gyroscopes available in Pakistan, all give inaccurate reading , we tried really hard on it , tried different approaches like kalman filter etc but still it is not working well and giving us some fluctuations



11.

25GA370 DC gear motor with encoder

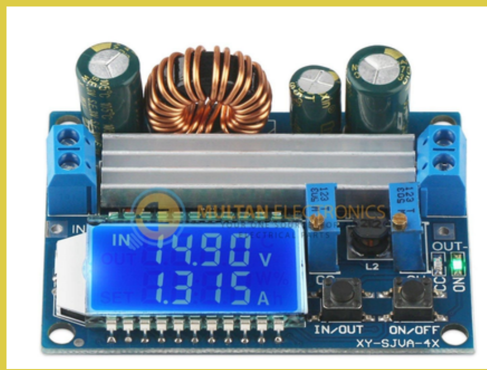
We have used 25GA370 DC gear motor with built-in encoder. The best advantage of this motor is that we don't need to buy external encoder for pulse count .Operating at 12V, the motor's speed ranges from 280 RPM at 12V, 210 RPM at 9V, to 325 RPM at 14V. This motor can be operated at lower speeds as well .it has 6 pins 2 for motor , 2 encoder +,- and two encoder pulse count signal pins



12.

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.



13.

LM2596 Step Down buck convertor

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.