

Interface Name	Interface Definition
battery_input	$V_{\min} = +6\text{VDC}$ $V_{\max} = +12\text{VDC}$ $I_{\text{peak}} = 4\text{A}$ $I_{\text{nominal}} = \sim 200\text{mA}$
edge_ground_data	<ul style="list-style-type: none"> - The ring detection sensor on the corners of the Sumobot. - Outputs analog signal based on reflective surface.
touch_data_inputs	<ul style="list-style-type: none"> -Environmental action to press on touch sensor -Quantity: 4
enemy_distance_data	<ul style="list-style-type: none"> - Lidar mapping of the opposing Sumo bot's position. - Will sweep 360° around the robot and send distance data to the microcontroller.
user_debug_output	<ul style="list-style-type: none"> - Sensor Data sent to user for debugging of the Sumobot. - Data will include: <ul style="list-style-type: none"> - Binary IR reading - Battery life within $\pm 5\%$ - Distance measurements $\pm 3\text{cm}$ - Binary touch sensor measurements - Acceleration - Encoder values - Motor speed
robot_accel_data	<ul style="list-style-type: none"> - Change of robot position based on acceleration - Calculates position of the robot in relation to other robots
5V_VCC	$V_{\text{nom}} = +5\text{VDC}$ $I_{\text{peak}} = 40\text{mA}$
14V_VCC	$V_{\text{nom}} = +14\text{VDC}$ $I_{\text{peak}} = 2\text{A}$
IR_DIG_OUT	<ul style="list-style-type: none"> - Output digital from IR to microcontroller. - Digital data between 0 and 3000. - Measures time it takes for internal capacitor to charge/discharge based on reflected color.
TOUCH_DATA_LOGIC	<ul style="list-style-type: none"> -Debounced digital logic of touch sensor trigger -$V_{\text{high}} = 5\text{V}$ -$V_{\text{low}} = 0\text{V}$ -$t_{\text{r,f}} \leq 10\text{ms}$

MOTOR_POS_LEFT	<ul style="list-style-type: none"> - Output I2C signal from the left encoder to microcontroller. - Data about the left motor's current position.
MOTOR_POS_RIGHT	<ul style="list-style-type: none"> - Output I2C signal from the right encoder to microcontroller. - Data about the right motor's current position.
TOF_SCL	<ul style="list-style-type: none"> - 3.3V digital signal - Clock signal from Raspberry Pi to the Time of Flight sensor
TOF_SDA	<ul style="list-style-type: none"> - 3.3V digital signal - Data signal from Time of Flight sensor to the Raspberry Pi (15% error)
IMU_SCL	<ul style="list-style-type: none"> - 3.3V digital signal - Clock signal from Raspberry Pi to the IMU sensor
IMU_SDA	<ul style="list-style-type: none"> - 3.3V digital signal - Data signal from IMU sensor to the Raspberry Pi (15% error)
MCU_PWM_SIGA	<ul style="list-style-type: none"> - PWM signal from the microcontroller to the left motor controller. - Controls speed of left motor.
MCU_PWM_SIGB	<ul style="list-style-type: none"> - PWM signal from the microcontroller to the right motor controller. - Controls speed of right motor.
MCU_PI_COMM	<ul style="list-style-type: none"> - Serial communication between the ATmega32 to Raspberry Pi - CMOS 5V Logic - Baud of 38400
PI_MCU_COMM	<ul style="list-style-type: none"> - Serial communication between the Raspberry Pi to ATmega32 - CMOS 5V Logic - Baud of 38400
DEBUG_DATA	<ul style="list-style-type: none"> - Data values from every sensor on robot. - Sends data using serial communication from microcontroller to bluetooth module.
DEBUG_DISPLAY	<ul style="list-style-type: none"> - Serial communication method to send data values of every sensor on robot. - Displays debuggable data to the user.