Circuit Explanation

In this schematic, the Teensy 4.1 acts as the central microcontroller, coordinating and controlling various components. Here is how each component interacts with the Teensy 4.1

SPARK MAX Motor Controllers and Victor SPs:

- The Teensy 4.1 controls the SPARK MAX Motor Controllers using the CAN (Controller Area Network) protocol. It sends commands over the CAN bus to control the speed and direction of brushless DC (BLDC) and brushed DC motors connected to the SPARK MAXs.
- The Victor SPs, on the other hand, are controlled via PWM (Pulse Width Modulation) signals from the Teensy. Each Victor SP is connected to a specific pin on the Teensy for this purpose.

TJA1050 CAN Transceiver:

- This module acts as an interface for CAN communication between the Teensy 4.1 and other devices or modules like the SPARK MAX Motor Controllers.

MPU-6050 and BMP280 Sensors:

- These sensors are connected to the Teensy 4.1 using the I2C bus. The Teensy, as the master, communicates with these slave sensors to gather data like acceleration, gyroscope readings, temperature, and atmospheric pressure.

WS2812B LEDs:

- The Teensy 4.1 controls these LEDs using a one-wire interface (PWM), allowing LEDs to be controlled with a single pin.

LCD Module and SPI Communication:

- In the context of SPI (Serial Peripheral Interface), the Teensy uses MOSI (Master Out Slave In) to send data to peripherals like an LCD module. The SCLK (Serial Clock) synchronizes data transmission, and CS (Chip Select) enables the slave device, like an LCD module.

HC-SR04 Ultrasonic Sensor:

- The Teensy communicates with this sensor through serial communication to measure distances.

BOB-12009 Level Shifter:

- Since the Teensy operates at 3.3V and some modules require 5V, this device steps up and steps down the voltage levels between different components.

Arduino Microcontroller:

- The Teensy communicates directly with an Arduino microcontroller via a serial channel for additional processing or control tasks.

Ethernet Connection:

- The schematic indicates that the Teensy is equipped with a socket for Ethernet connectivity, allowing network communication.

In summary, the Teensy 4.1, leveraging its powerful ARM Cortex-M7 processor, acts as the central hub, managing and coordinating the various components in the system through various communication protocols like CAN, I2C.