FLIGHT CONTROLLER:

- I have tried to designed an F4 flight controller, the design uses STM32F4 microcontroller, which offers a significant amount of processing power, allowing for more complex algorithm, sensor fusion, and real -time data analysis.
- I have shown basic schematic diagram, and then constituting components as different section.

USB PORT:

- The USB ports used a micro-USB port used any sort of storage device, or wireless communication devices, or can be connected to a computer in order to enter a code to the controller.
- The port is connected via two 22-ohm resistors, with the controller, The specific values have been taken from the data sheet of the controller. The resistors help to protect the equipment connected via the USB port from sudden voltage and current spikes, due to static electricity discharge.

RESONATOR:

- Ceramic resonator has been used in the controller.
- The resonator has been installed to provide accurate clock signals, which will synchronize the operations of microcontroller and other circuitry. They are important for computations, communications, sensor readings and control algorithm.
- Accurate clock signals are required to take split second decisions, in order to achieve stability. Further the rate at which the data is required to be transmitted and read is decided by the clock signals.

INTERNAL VOLTAGE REGULATOR:

- A 3.3V voltage regulator has been installed in the flight controller.
- The voltage regulator is required to well-regulated power supply needed for the controller to function properly.
- The regulator takes in the input voltage and compare it with the reference voltage (VDD in the case of the presented design), and if there are any differences between the desired and real voltage the regulator takes corrective measures.
- The regulator also provides protections against over voltage and over current, like fluctuations.

GYRO SENSORS:

- The gyro sensors are installed to check upon the position of the aircraft and provide it with stability.
- The gyro sensors are utilizing SPI and I2C communication protocol. The GYRO_SDO is the signal that the gyroscope uses to send data to the microcontroller.
- GYRO_SCL refers to the serial clock signal, helping in ensuring that the sensor and the microcontroller operates at the same clock rate during data transfers.
- GYRO_CS: This duct is the one which the microcontroller uses to send data back to the gyroscope when it chooses it.