

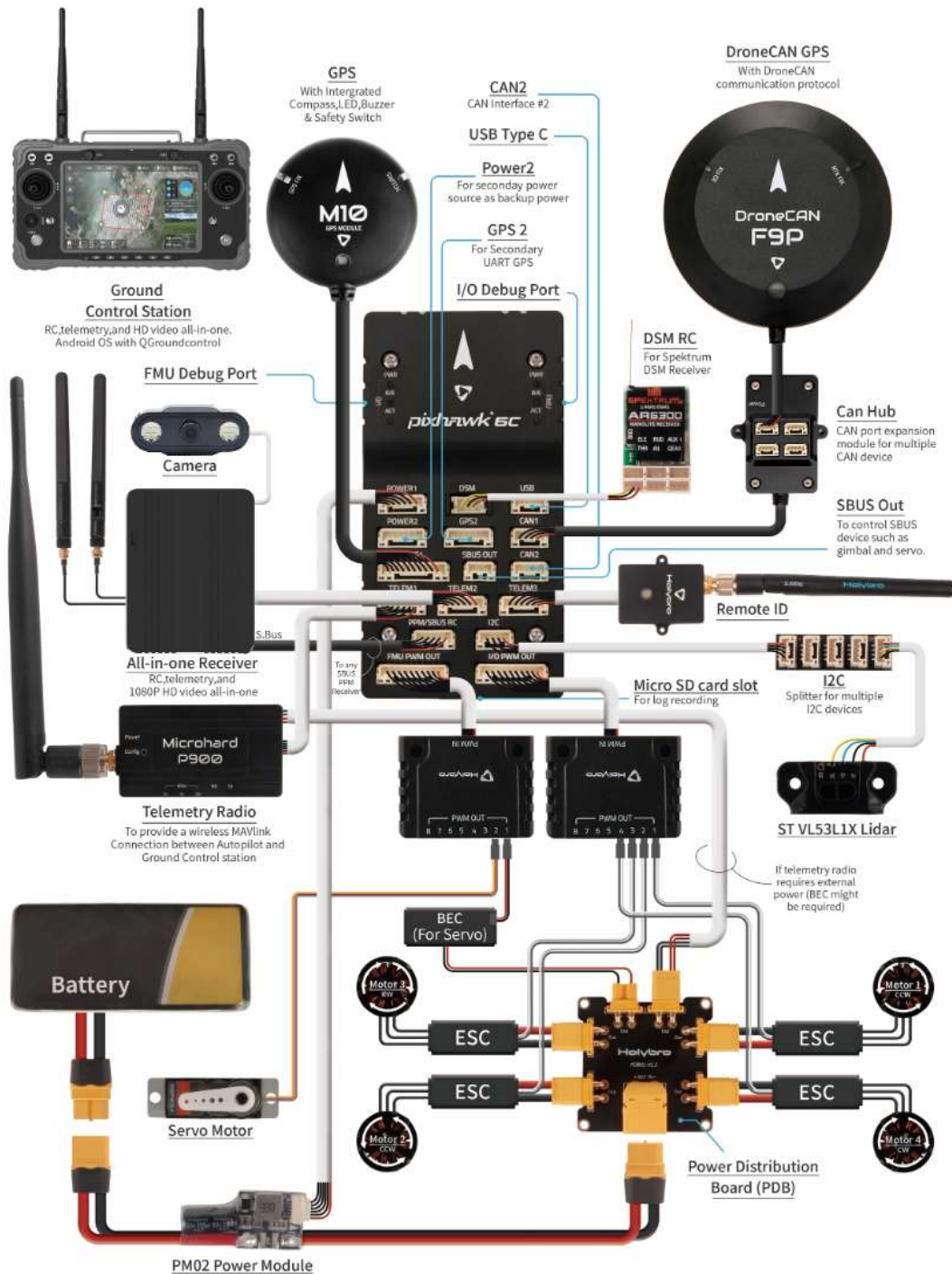
Task 31

Deep Das

Pixhawk 6c



pixhawk 6c



Central Components:

1. **Pixhawk 6C:**

- The Pixhawk 6C is the central flight controller that serves as the brain of the drone. It runs the flight control firmware (such as PX4 or ArduPilot), which processes inputs from sensors, executes flight algorithms, and sends control signals to the motors and other actuators. It handles tasks like stabilization, navigation, and communication with ground control systems.

Power and Distribution:

2. **Battery:**

- Typically a Lithium Polymer (LiPo) battery, it provides the necessary electrical power for the entire drone. The battery's capacity and voltage rating determine the flight time and power available to the drone.

3. **PM02 Power Module:**

- This module steps down the high voltage from the battery to a stable voltage suitable for the Pixhawk 6C and other components. It also provides current sensing and voltage monitoring, which are fed back to the flight controller for power management and monitoring.

4. **Power Distribution Board (PDB):**

- The PDB distributes the battery power to various components like the ESCs and the BEC. It often includes power filtering to reduce noise and ensure clean power delivery to sensitive electronics.

Motor Control:

5. **ESC (Electronic Speed Controller):**

- Each ESC regulates the power delivered to a brushless DC motor based on control signals from the Pixhawk 6C. It converts DC power from the battery into a three-phase AC current needed to drive the motors and controls the motor speed by adjusting the frequency and amplitude of this current.

6. **Motors:**

- Brushless DC motors provide the thrust needed for flight. They are controlled by the ESCs and are responsible for propelling the drone and enabling maneuvers.

Communication and Control:

7. **Ground Control Station:**

- An Android-based device with QGroundControl software, used to monitor and control the drone remotely. It provides a user interface for mission planning, real-time telemetry, and video feed display.

8. **All-in-one Receiver:**

- This device integrates RC signal reception, telemetry, and HD video transmission, allowing the ground control station to communicate with the drone seamlessly.

9. **Telemetry Radio (Microhard P900):**

- Provides a long-range, robust wireless data link using the MAVLink protocol. This link is crucial for real-time telemetry data exchange between the drone and the ground control station, enabling remote monitoring and control.

Sensors and Input/Output:

10. GPS (M10 and DroneCAN GPS):

- The M10 GPS and DroneCAN GPS modules provide precise location data using GNSS (Global Navigation Satellite System). These modules often include additional sensors like compasses (magnetometers) and barometers to aid in navigation and positioning.

11. Camera:

- Captures high-definition video and images for various applications such as aerial photography, surveillance, and mapping. It can also provide video feed for FPV (First Person View) flying.

12. ST VL53L1X Lidar:

- A time-of-flight (ToF) distance sensor that measures the distance to the ground or obstacles. It is used for altitude hold, terrain following, and obstacle avoidance by providing precise distance measurements.

13. DSM RC (for Spektrum DSM Receiver):

- A digital serial interface for connecting a Spektrum DSM receiver, which allows the drone to receive RC control signals from a Spektrum transmitter.

14. Remote ID:

- This module provides compliance with regulations requiring drones to broadcast identification and location information. It helps authorities and other drones to identify and track the drone.

15. I2C Splitter:

- Allows multiple I2C devices to be connected to a single I2C bus on the Pixhawk 6C. I2C is a communication protocol used for connecting low-speed peripherals.

16. Micro SD Card Slot:

- Used for logging flight data, which can be analyzed post-flight for performance evaluation and troubleshooting. The data includes telemetry, sensor readings, and error logs.

17. SBUS Out:

- Provides a serial bus output for controlling additional devices such as gimbals and servos. SBUS is a communication protocol that allows multiple channels of control signals to be transmitted over a single wire.

18. I/O Debug Port:

- Used for connecting debugging tools to troubleshoot and diagnose issues with the Pixhawk 6C. It allows access to internal signals and data for in-depth analysis.

19. FMU Debug Port:

- A specific debug port for the Flight Management Unit (FMU) of the Pixhawk 6C. It is used for firmware development and debugging, providing access to the FMU's internal operations.

Connectivity:

20. USB Type C:

- Allows the Pixhawk 6C to be connected to a computer for firmware updates, configuration, and data transfer. It supports high-speed data communication and provides power for the device during setup.

21. CAN2 (CAN Interface #2):

- A Controller Area Network (CAN) interface used for connecting CAN-enabled devices like the DroneCAN GPS. CAN is a robust communication protocol used in automotive and industrial applications for reliable, high-speed data transfer.

Additional Components:

22. **BEC (For Servo):**

- A Battery Eliminator Circuit (BEC) provides a regulated voltage output for servo motors. It steps down the battery voltage to a level suitable for servos, ensuring stable operation.

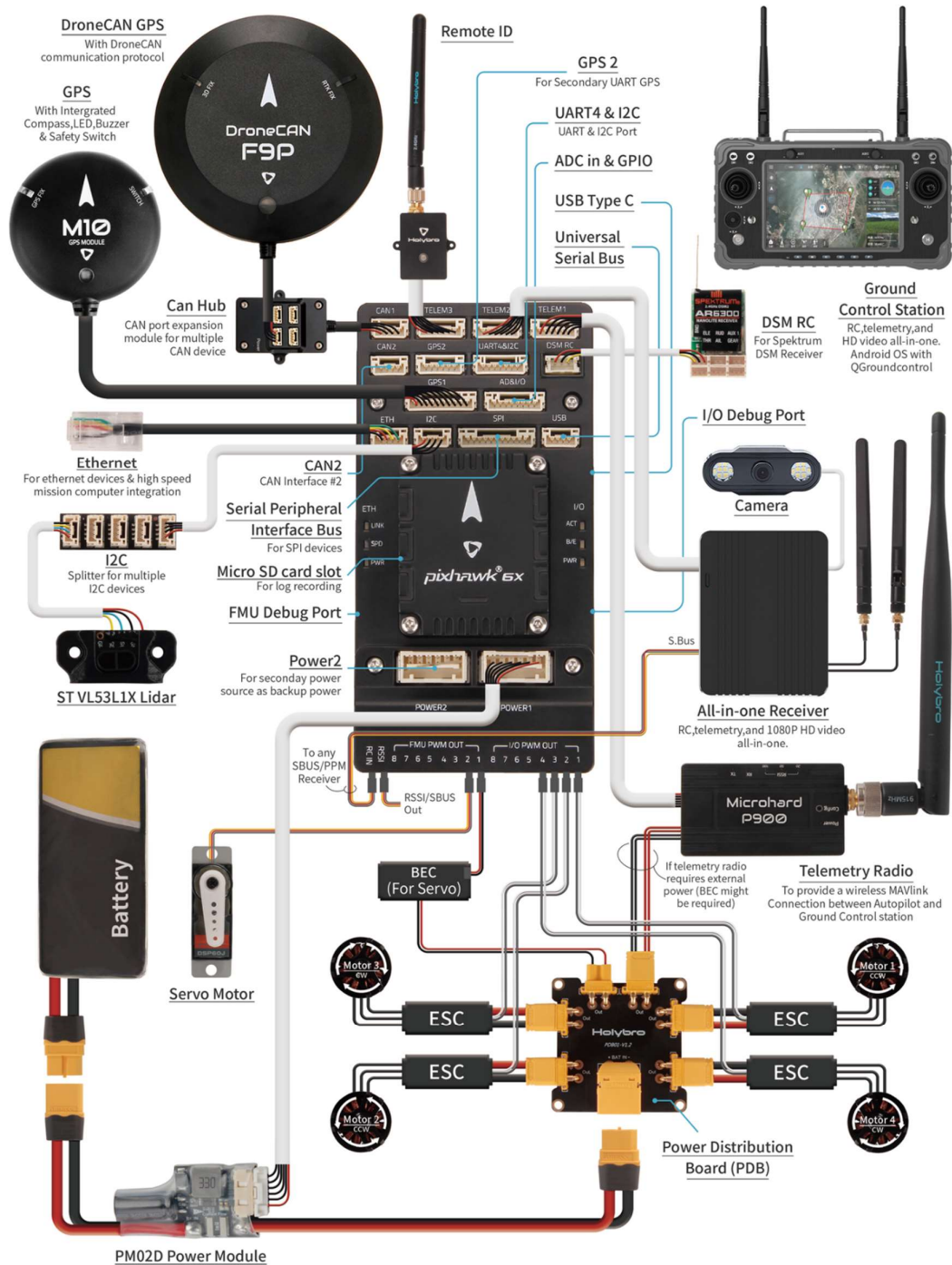
23. **Servo Motor:**

- Used for mechanical actuation, such as controlling a gimbal or other moving parts on the drone. Servos receive PWM signals from the Pixhawk 6C to move to specific positions.

PIXHAWK 6X



pixhawk® 6X



Central Components:

1. Pixhawk 6X:

- The Pixhawk 6X is the main flight controller that manages and controls all the drone's functions. It runs flight control firmware like PX4 or ArduPilot, which processes inputs from various sensors, executes flight algorithms, and sends control signals to motors and other actuators. It handles tasks such as stabilization, navigation, and communication with ground control systems.

Power and Distribution:

2. **Battery:**
 - Typically a Lithium Polymer (LiPo) battery, it provides the necessary electrical power for the entire drone. The battery's capacity and voltage rating determine the flight time and the power available to the drone.
3. **PM02D Power Module:**
 - This module steps down the high voltage from the battery to a stable voltage suitable for the Pixhawk 6X and other components. It also provides current sensing and voltage monitoring, which are fed back to the flight controller for power management and monitoring.
4. **Power Distribution Board (PDB):**
 - The PDB distributes the battery power to various components like the ESCs and the BEC. It often includes power filtering to reduce noise and ensure clean power delivery to sensitive electronics.

Motor Control:

5. **ESC (Electronic Speed Controller):**
 - Each ESC regulates the power delivered to a brushless DC motor based on control signals from the Pixhawk 6X. It converts DC power from the battery into a three-phase AC current needed to drive the motors and controls the motor speed by adjusting the frequency and amplitude of this current.
6. **Motors:**
 - Brushless DC motors provide the thrust needed for flight. They are controlled by the ESCs and are responsible for propelling the drone and enabling maneuvers.

Communication and Control:

7. **Ground Control Station:**
 - An Android-based device with QGroundControl software, used to monitor and control the drone remotely. It provides a user interface for mission planning, real-time telemetry, and video feed display.
8. **All-in-one Receiver:**
 - This device integrates RC signal reception, telemetry, and HD video transmission, allowing the ground control station to communicate with the drone seamlessly.
9. **Telemetry Radio (Microhard P900):**
 - Provides a long-range, robust wireless data link using the MAVLink protocol. This link is crucial for real-time telemetry data exchange between the drone and the ground control station, enabling remote monitoring and control.

Sensors and Input/Output:

10. **GPS (M10 and DroneCAN GPS):**

- The M10 GPS and DroneCAN GPS modules provide precise location data using GNSS (Global Navigation Satellite System). These modules often include additional sensors like compasses (magnetometers) and barometers to aid in navigation and positioning.
11. **Camera:**
 - Captures high-definition video and images for various applications such as aerial photography, surveillance, and mapping. It can also provide video feed for FPV (First Person View) flying.
 12. **ST VL53L1X Lidar:**
 - A time-of-flight (ToF) distance sensor that measures the distance to the ground or obstacles. It is used for altitude hold, terrain following, and obstacle avoidance by providing precise distance measurements.
 13. **DSM RC (for Spektrum DSM Receiver):**
 - A digital serial interface for connecting a Spektrum DSM receiver, which allows the drone to receive RC control signals from a Spektrum transmitter.
 14. **Remote ID:**
 - This module provides compliance with regulations requiring drones to broadcast identification and location information. It helps authorities and other drones to identify and track the drone.
 15. **I2C Splitter:**
 - Allows multiple I2C devices to be connected to a single I2C bus on the Pixhawk 6X. I2C is a communication protocol used for connecting low-speed peripherals.
 16. **Micro SD Card Slot:**
 - Used for logging flight data, which can be analyzed post-flight for performance evaluation and troubleshooting. The data includes telemetry, sensor readings, and error logs.
 17. **SBUS Out:**
 - Provides a serial bus output for controlling additional devices such as gimbals and servos. SBUS is a communication protocol that allows multiple channels of control signals to be transmitted over a single wire.
 18. **I/O Debug Port:**
 - Used for connecting debugging tools to troubleshoot and diagnose issues with the Pixhawk 6X. It allows access to internal signals and data for in-depth analysis.
 19. **FMU Debug Port:**
 - A specific debug port for the Flight Management Unit (FMU) of the Pixhawk 6X. It is used for firmware development and debugging, providing access to the FMU's internal operations.

Connectivity:

20. **USB Type C:**
 - Allows the Pixhawk 6X to be connected to a computer for firmware updates, configuration, and data transfer. It supports high-speed data communication and provides power for the device during setup.
21. **CAN2 (CAN Interface #2):**
 - A Controller Area Network (CAN) interface used for connecting CAN-enabled devices like the DroneCAN GPS. CAN is a robust communication protocol used in automotive and industrial applications for reliable, high-speed data transfer.
22. **Ethernet:**

- Provides a high-speed wired communication interface for connecting to a mission computer or other ethernet devices. This is useful for applications that require high data transfer rates, such as real-time video streaming.

Additional Components:

23. **BEC (For Servo):**

- A Battery Eliminator Circuit (BEC) provides a regulated voltage output for servo motors. It steps down the battery voltage to a level suitable for servos, ensuring stable operation.

24. **Servo Motor:**

- Used for mechanical actuation, such as controlling a gimbal or other moving parts on the drone. Servos receive PWM signals from the Pixhawk 6X to move to specific positions.