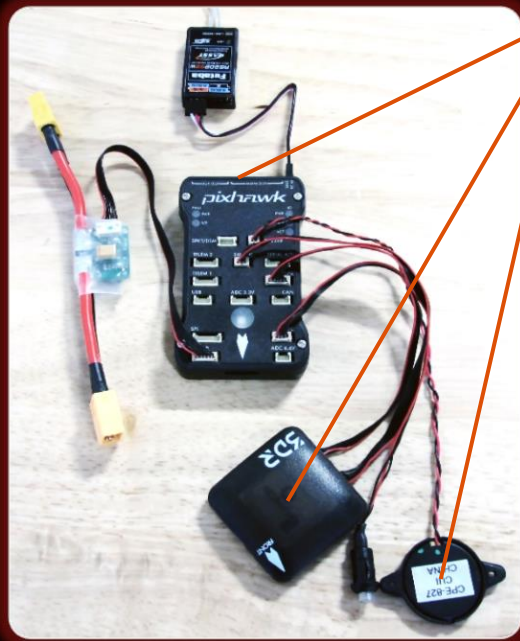


KDE DIRECT UAS ELECTRONIC SPEED CONTROLLER (ESC) INSTRUCTIONS

3D ROBOTICS™ PIXHAWK (PX4) SERIES

Please follow the instructions for proper installation, wiring, and programming of the KDE Direct UAS Electronic Speed Controller (ESC) series to the 3D Robotics™ Pixhawk and PX4 open-hardware project autopilot.



3DR™ PIXHAWK EQUIPMENT

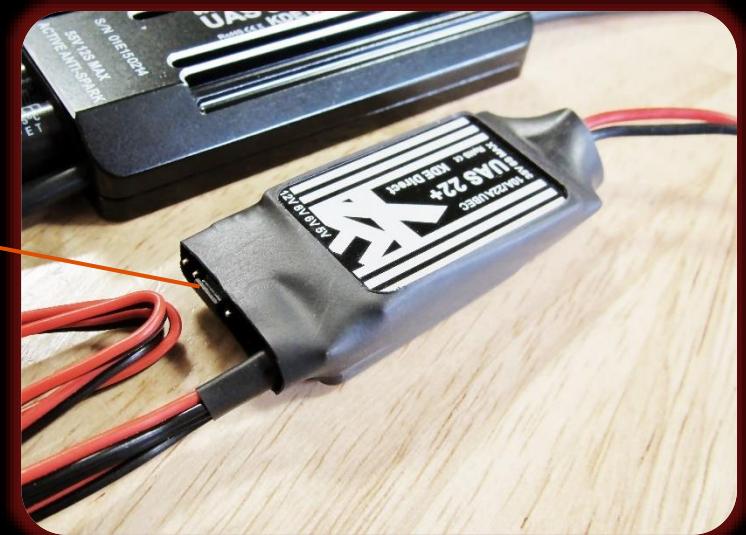
The Pixhawk autopilot is powered via the power module (PMU) included with the stock system for multi-platform autonomous vehicles. For additional information on the correct installation of the autopilot equipment, please reference the [Pixhawk Information Portal](#).

Due to the hardware design of the Pixhawk autopilot, power is NOT provided to the ESCs via the MAIN OUT control-lead signal ports.

The KDE Direct UAS ESCs are OPTO-Isolated and therefore, require a 5V or 6V external power-line to properly arm the internal circuitry critical for safe flight operation. As a reference, the UAS ESC OPTO-Isolation circuitry is compatible up to 35V maximum-input.

KDE DIRECT UBEC (UNIVERSAL BATTERY ELIMINATOR CIRCUIT)

To provide clean, voltage-regulated power for the KDE Direct UAS ESCs, the [KDEXF-UBEC22](#) is available for direct compatibility to the electronics. During assembly, set the voltage-selection jumper to 6V as shown – please review the Instruction Manual (included with purchase and found under the webpage Technical Media tab) for additional details on proper installation and wiring of the device.



KDE DIRECT UAS ELECTRONIC SPEED CONTROLLER (ESC) INSTRUCTIONS

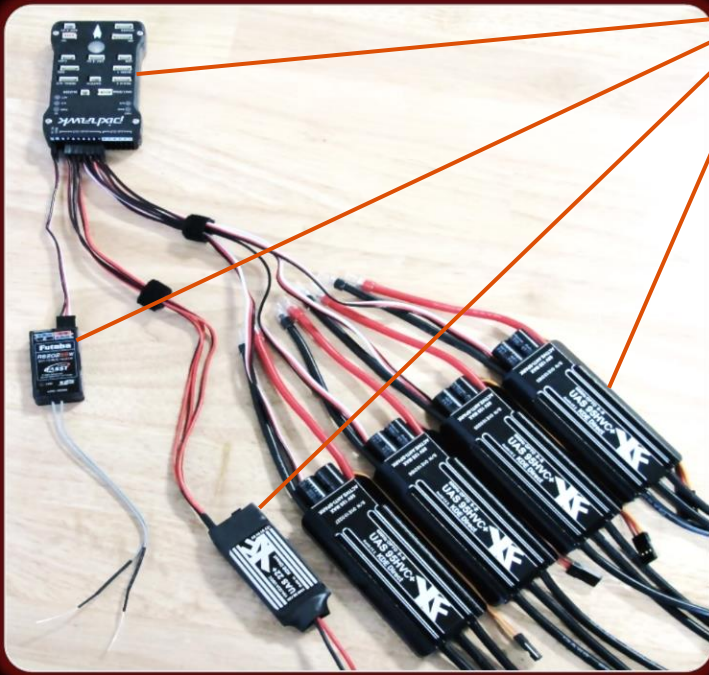
3D ROBOTICS™ PIXHAWK (PX4) SERIES

UBEC INSTALLATION AND ESC HARDWARE WIRING

For Quadcopter systems (X-4), please reference the image for proper installation of the control wiring. For the complete installation, the Pixhawk (PX4) autopilot, KDE Direct UAS UBEC, KDE Direct UAS ESCs, and Futaba™ Receiver (S.BUS RX) is shown for reference.

The KDE Direct KDEXF-UBEC22 incorporates three (3) power-output leads as standard, providing redundant power lines as desired to the MAIN OUT control-lead signal ports. In this configuration, three (3) of the power-output leads will be used for simplistic installation and triple-redundancy.

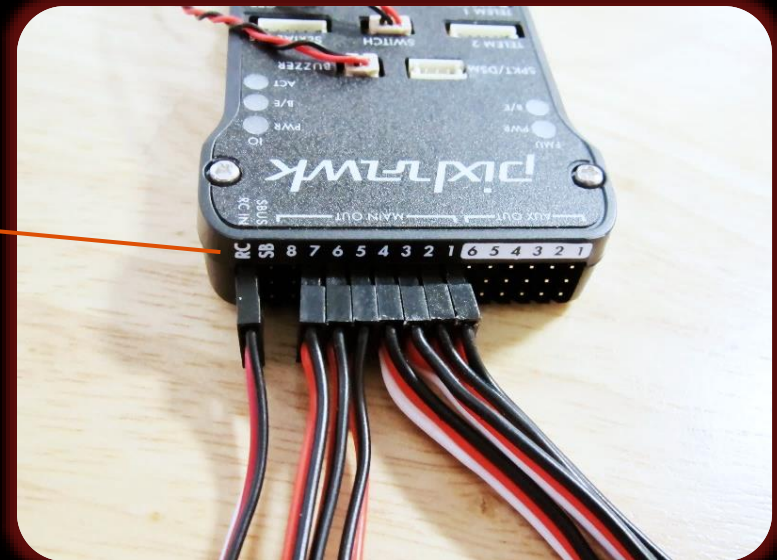
At a minimum, one (1) power-output lead is required to provide the necessary 5V or 6V power for proper operation of the KDE Direct UAS ESCs.



PIXHAWK CONNECTION OUTPUTS AND PORTS

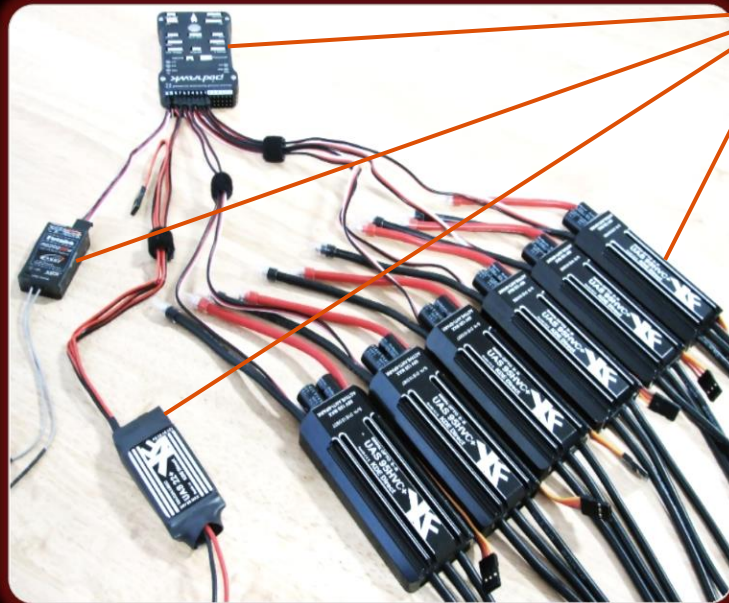
For Quadcopter systems, please reference the proper connection as:

- UAS ESC control-leads connected into ports “1 – 4”
- UAS UBEC power-leads connected into ports “5 – 7”
 - *(triple-redundant layout)*
- PPM/S.BUS (RX) connected into port “RC”



KDE DIRECT UAS ELECTRONIC SPEED CONTROLLER (ESC) INSTRUCTIONS

3D ROBOTICS™ PIXHAWK (PX4) SERIES



UBEC INSTALLATION AND ESC HARDWARE WIRING

For Hexacopter systems (including Y-6 Coaxial), please reference the image for proper installation of the control wiring. For the complete installation, the Pixhawk (PX4) autopilot, KDE Direct UAS UBEC, KDE Direct UAS ESCs, and Futaba™ Receiver (S.BUS RX) is shown for reference.

The KDE Direct KDEXF-UBEC22 incorporates three (3) power-output leads as standard, providing redundant power lines as desired to the MAIN OUT control-lead signal ports. In this configuration, two (2) of the power-output leads will be used for simplistic installation and dual-redundancy.

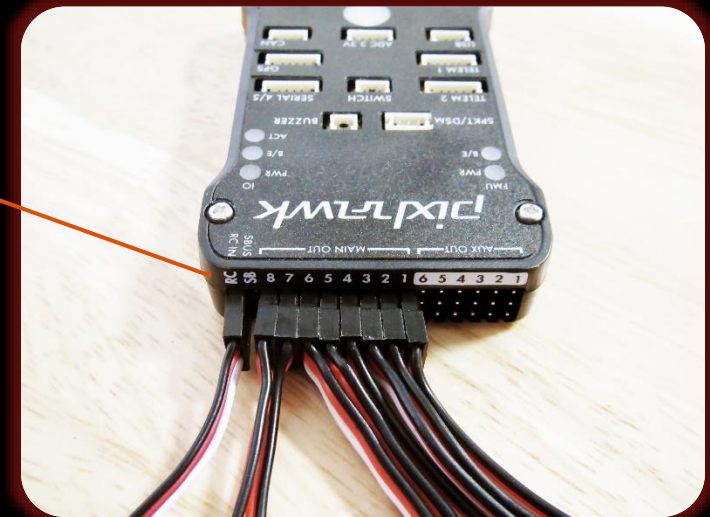
The additional third power-output lead can be connected via a Y-harness to any ESC control-lead if desired, or can be used for alternate electronics as needed (such as a 5V/6V camera or redundant power to the RX).

At a minimum, one (1) power-output lead is required to provide the necessary 5V or 6V power for proper operation of the KDE Direct UAS ESCs.

PIXHAWK CONNECTION OUTPUTS AND PORTS

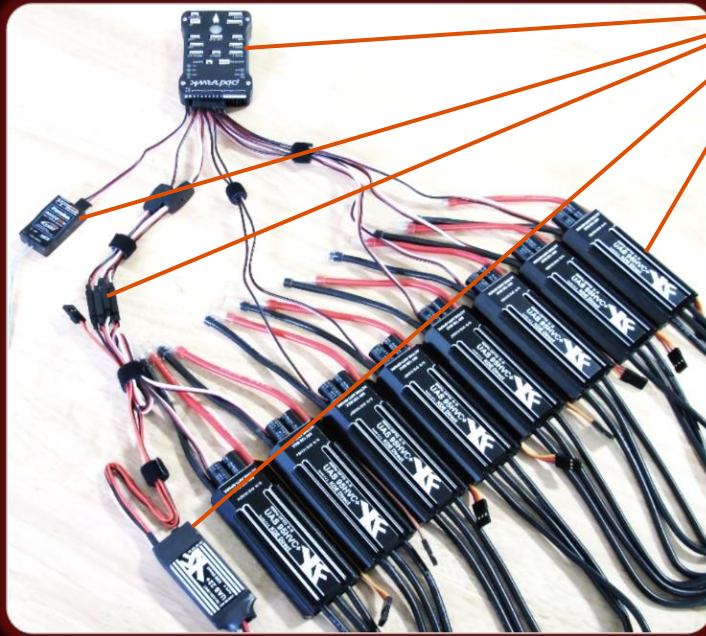
For Hexacopter systems, please reference the proper connection as:

- UAS ESC control-leads connected into ports “1 – 6”
- UAS UBEC power-leads connected into ports “7 – 8”
 - *(dual-redundant layout)*
- PPM/S.BUS (RX) connected into port “RC”



KDE DIRECT UAS ELECTRONIC SPEED CONTROLLER (ESC) INSTRUCTIONS

3D ROBOTICS™ PIXHAWK (PX4) SERIES



UBEC INSTALLATION AND ESC HARDWARE WIRING

For Octocopter systems (including X-8 Coaxial), please reference the image for proper installation of the control wiring. For the complete system, the Pixhawk (PX4) autopilot, KDE Direct UAS UBEC, KDE Direct ESCs, and Futaba™ Receiver (S.BUS RX) is shown for reference.

The KDE Direct KDEXF-UBEC22 incorporates three (3) power-output leads as standard, providing redundant power lines as desired to the MAIN OUT control-lead signal ports. In this configuration, two (2) of the power-output leads will be used for simplistic installation via dual Y-harness adapters to any ESC control-leads (ports 7 and 8 used in this example).

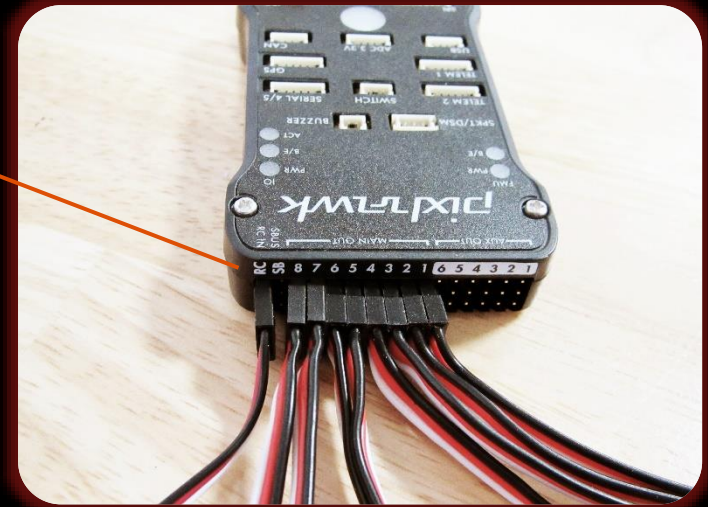
The additional third power-output lead can be connected via a Y-harness to any ESC control-lead if desired, or can be used for alternate electronics as needed (such as a 5V/6V camera or redundant power to the RX).

At a minimum, one (1) power-output lead is required to provide the necessary 5V or 6V power for proper operation of the KDE Direct UAS ESCs.

PIXHAWK CONNECTION OUTPUTS AND PORTS

For Octocopter systems, please reference the proper connection as:

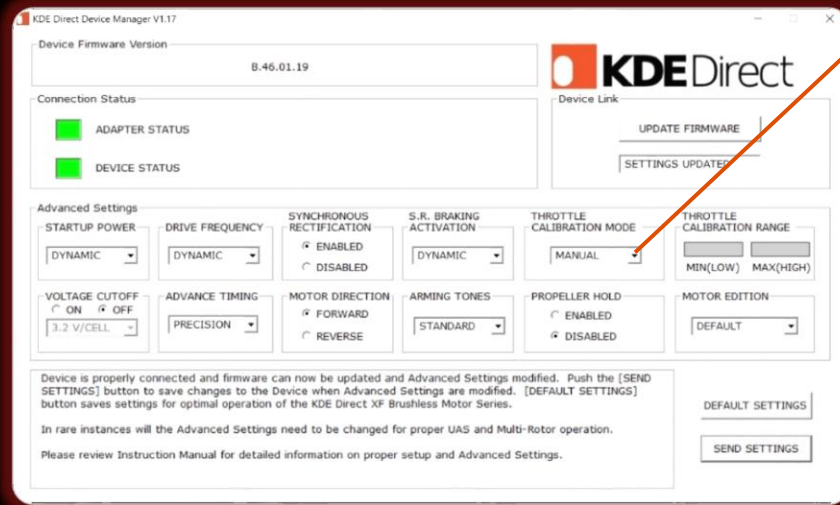
- UAS ESC control-leads connected into ports “1 – 8”
- UAS UBEC power-leads connected into ports “7 – 8”
 - *(dual-redundant layout, y-harness adapters)*
- PPM/S.BUS (RX) connected into port “RC”



KDE DIRECT UAS ELECTRONIC SPEED CONTROLLER (ESC) INSTRUCTIONS

3D ROBOTICS™ PIXHAWK (PX4) SERIES

The KDE Direct UAS Electronic Speed Controller (ESC) series is programmable via the [KDEXF-DMA Programming Kit](#) (available separately), providing the ability for updates to the latest firmware releases and customize advanced options. Please review the Instruction Manual (found under the webpage Specifications tab) for detailed information on proper setup and Advanced Settings.



KDE DIRECT DEVICE MANAGER SOFTWARE

For direct compatibility to the 3D Robotics™ Pixhawk autopilot, change the “Throttle Calibration Mode” to “Manual” via the selectable pull-down menu. This will allow for a manual (fixed) throttle calibration to the autopilot and transmitter, for simple programming via the ArduPilot Mission Planner software and Radio/ESC Calibration wizard.

ARDUPILOT MISSION PLANNER SOFTWARE

After programming all KDE Direct UAS ESCs to the “Manual” throttle calibration mode, setup of the Pixhawk via the Mission Planner software can proceed. Follow all instructions for the Radio Calibration and ESC Calibration steps to complete the ESC setup.

For additional information on the correct programming and operation of the Mission Planner software, please reference the [Pixhawk Information Portal](#).

