

# Baremetal Bird – Open-Source Quadcopter Platform (From-Scratch Design)

## System Bill of Materials

Document Number: DRONE-000-BOM

Revision A

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Category	Part Name	Part Number / Spec	Quantity	Unit Cost (EGP)	Total (EGP)	Link
Mechanical	FDM-Printed F450 Frame	Villamany F450	1 set	1425	1425	<a href="https://www.thingiverse.com/thing:1206960">https://www.thingiverse.com/thing:1206960</a>
Mechanical	Propeller Guards 1045	–	4	Included	–	<a href="https://www.thingiverse.com/thing:6434234">https://www.thingiverse.com/thing:6434234</a>
Mechanical	M3×10 Screws	–	16	0	0	
Mechanical	M3×20 Screws	–	8	0	0	
Mechanical	M3 Brass Insert	M3×4×5	28	4	112	<a href="https://ampere-electronics.com/product/m3-knurled-brass-threaded-insert-nut/">https://ampere-electronics.com/product/m3-knurled-brass-threaded-insert-nut/</a>
Power	DXF Battery 3S 5200mAh 80C	DXF 3S-5200-80C	2	2000	4000	<a href="https://dxf-hobby.store/products/frdx-f-lipo-battery-3s-11v-5200mah-80c-blue-series-lipo-hardcase-w-3">https://dxf-hobby.store/products/frdx-f-lipo-battery-3s-11v-5200mah-80c-blue-series-lipo-hardcase-w-3</a>
Power	BBX1 LiPo Tester	BBX1-8S	1	125	125	<a href="https://makerselectronics.com/product/bbx1-8s-li-po-li-ion-voltage-tester/">https://makerselectronics.com/product/bbx1-8s-li-po-li-ion-voltage-tester/</a>
Power	T-Type Connector	–	4	25	100	<a href="https://makerselectronics.com/product/t-type-battery-connector-male-female/">https://makerselectronics.com/product/t-type-battery-connector-male-female/</a>
Power	Mini-360 Buck	Mini-360	1	30	30	<a href="https://makerselectronics.com/product/dc-dc-step-down-converter-3a-ultra-mini-360-4-75v23vdc-to-1v17vdc/">https://makerselectronics.com/product/dc-dc-step-down-converter-3a-ultra-mini-360-4-75v23vdc-to-1v17vdc/</a>
Power	MP1584EN Buck	MP1584EN	1	45	45	<a href="https://makerselectronics.com/product/mp1584en-mini-dc-dc-buck-step-down-module-4-5v-28v-input/">https://makerselectronics.com/product/mp1584en-mini-dc-dc-buck-step-down-module-4-5v-28v-input/</a>
Power	NTC Thermistor 10k	IP65 10kΩ	2	5	10	<a href="https://makerselectronics.com/product/ntc-thermistor-waterproof-ip65-10k%cf%89/">https://makerselectronics.com/product/ntc-thermistor-waterproof-ip65-10k%cf%89/</a>
Power	Imax B6 Mini Charger	SkyRC B6 Mini	1	3000	3000	<a href="https://www.ram-e-shop.com/shop/imax-b6-mini-skyrc-imax-b6mini-professional-balance-charger-discharger-7673">https://www.ram-e-shop.com/shop/imax-b6-mini-skyrc-imax-b6mini-professional-balance-charger-discharger-7673</a>
Power	10AWG Cu Wire	For the battery Power distribution	10cm	–	–	

Power	14AWG Cu Wire	For ESCs power distribution	40cm	—	—	
Propulsion	Brushless Motor	A2212-1400KV	4	340	1360	<a href="https://ampere-electronics.com/product/a2212-brushless-motor-1400kv/">https://ampere-electronics.com/product/a2212-brushless-motor-1400kv/</a>
Propulsion	Simonk ESC 30A	Simonk-30A	4	435	1740	<a href="https://makerselectronics.com/product/simonk-esc-speed-controller-for-brushless-motor-30a-with-t-type-connector-motor-connectors/">https://makerselectronics.com/product/simonk-esc-speed-controller-for-brushless-motor-30a-with-t-type-connector-motor-connectors/</a>
Propulsion	8045 Propeller Pair	8045 GF	2 pairs	200	400	<a href="https://microohm-eg.com/product/1pair-8045-8x4-5-inch-cw-propeller-ccw-prop-for-rc-multicopter-f450-quadcopter-black/">https://microohm-eg.com/product/1pair-8045-8x4-5-inch-cw-propeller-ccw-prop-for-rc-multicopter-f450-quadcopter-black/</a>
Flight Controller	ATmega328P-PU	ATmega328P-PU	1	285	285	<a href="https://makerselectronics.com/product/atmega328pu-microchip-avr-microcontroller/">https://makerselectronics.com/product/atmega328pu-microchip-avr-microcontroller/</a>
Flight Controller	ZIF Socket	28-pin	1	30	30	<a href="https://makerselectronics.com/product/universal-zif-socket-28-pins/">https://makerselectronics.com/product/universal-zif-socket-28-pins/</a>
Flight Controller	IC Socket	28-pin	1	3	3	<a href="https://makerselectronics.com/product/ic-socket-1414-base-28-pin/">https://makerselectronics.com/product/ic-socket-1414-base-28-pin/</a>
Flight Controller	PL2303 USB-TTL	PL2303	1	60	60	<a href="https://makerselectronics.com/product/pl2303-usb-ttl-converter-module/">https://makerselectronics.com/product/pl2303-usb-ttl-converter-module/</a>
Flight Controller	Female Headers	40-pin	2	5	10	<a href="https://makerselectronics.com/product/pin-headers-female-2-54mm-40-pin/">https://makerselectronics.com/product/pin-headers-female-2-54mm-40-pin/</a>
Flight Controller	BNO055 IMU	BNO055	1	3100	3100	<a href="https://devboardsmarket.com/products/adafruit-9-dof-absolute-orientation-imu-fusion-breakout-bno055">https://devboardsmarket.com/products/adafruit-9-dof-absolute-orientation-imu-fusion-breakout-bno055</a>
Flight Controller	MS5611 Barometer	MS5611	1	450	450	<a href="https://makerselectronics.com/product/gy-63-ms5611-01ba03-barometer-pressure-sensor-module/">https://makerselectronics.com/product/gy-63-ms5611-01ba03-barometer-pressure-sensor-module/</a>
Flight Controller	ISP Connector	10-pin	2	20	40	<a href="https://makerselectronics.com/product/avr-ispi-10pin-to-icsp-6pin-converter2/">https://makerselectronics.com/product/avr-ispi-10pin-to-icsp-6pin-converter2/</a>
Flight Controller	20 MHz Crystal	HC-49S	2	6	6	<a href="https://makerselectronics.com/product/crystal-20-000mhz-hc-49s-20ppm/">https://makerselectronics.com/product/crystal-20-000mhz-hc-49s-20ppm/</a>
Flight Controller	470µF Capacitor	35V	4	12	12	<a href="https://makerselectronics.com/product/capacitor-470uf-35v-1016mm/">https://makerselectronics.com/product/capacitor-470uf-35v-1016mm/</a>
Flight Controller	22pF Capacitor	50V	8	4	4	<a href="https://makerselectronics.com/product/ceramic-capacitor-22pf-50v/">https://makerselectronics.com/product/ceramic-capacitor-22pf-50v/</a>

## **Custom BMS**

The battery-management system isn't defined yet. Before it can be designed or priced, the battery configuration needs to be fixed, along with the balancing method, protection thresholds, and the MOSFET/shunt arrangement. None of these parameters have been decided, so the BMS is still open.

## **Power Distribution Board**

The PDB layout is not specified. The copper weight, trace or busbar dimensions, connector type, and mounting pattern all need to be set. Without these, a board design or cost estimate can't be produced. We will use the wires (10AWG and 14AWG) in the prototype phase.

## **Flight Controller PCB**

Only the components are listed. The actual schematic, power-regulation layout, grounding strategy, and connector placement are not defined. Layer count, board size, and sensor routing are also missing. The PCB can't proceed until those details are locked down.

## **Bearing and Rod Assembly (Thrust Stand)**

The thrust stand requires defined rod diameter and material, bearing dimensions, and mounting geometry. None of these values have been chosen, so the assembly remains undefined.

## **Prop-Guard Printing**

All printed mechanical parts, including the prop guards, are already accounted for in the 1425 EGP total. No additional cost or work is pending here.

## **RC Control Link**

The radio link will use a standard 2.4 GHz quadcopter controller such as FlySky. The receiver will output PWM or iBUS/PPM signals for throttle, pitch, roll, and yaw. No custom communication protocol is required.