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

System Bill of Materials

Document Number: DRONE-000-BOM

Revision A

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Prepared by: Omar Sameh

Category	Part Name	Part Number / Spec	Quantity	Unit Cost (EGP)	Total (EGP)	Link
Mechanical	FDM-Printed F450 Frame	Villamany F450	1 set	1425	1425	https://www.thingiverse.com/thing:1206960
Mechanical	Propeller Guards 1045	–	4	Included	–	https://www.thingiverse.com/thing:6434234
Mechanical	M3×10 Screws	–	16	0	0	
Mechanical	M3×20 Screws	–	8	0	0	
Mechanical	M3 Brass Insert	M3×4×5	28	4	112	https://ampere-electronics.com/product/m3-knurled-brass-threaded-insert-nut/
Power	DXF Battery 3S 5200mAh 80C	DXF 3S-5200-80C	2	2000	4000	https://dxf-hobby.store/products/frdxf-lipo-battery-3s-11-1v-5200mah-80c-blue-series-lipo-hardcase-w-3
Power	BBX1 LiPo Tester	BBX1-8S	1	125	125	https://makerselectronics.com/product/bbx1-8s-li-po-li-ion-voltage-tester/
Power	T-Type Connector	–	4	25	100	https://makerselectronics.com/product/t-type-battery-connector-male-female/
Power	Mini-360 Buck	Mini-360	1	30	30	https://makerselectronics.com/product/dc-dc-step-down-converter-3a-ultra-mini-360-4-75v23vdc-to-1v17vdc/
Power	MP1584EN Buck	MP1584EN	1	45	45	https://makerselectronics.com/product/mp1584en-mini-dc-dc-buck-step-down-module-4-5v-28v-input/
Power	NTC Thermistor 10k	IP65 10kΩ	2	5	10	https://makerselectronics.com/product/ntc-thermistor-waterproof-ip65-10k%cf%89/
Power	Imax B6 Mini Charger	SkyRC B6 Mini	1	3000	3000	https://www.ram-e-shop.com/shop/imax-b6-mini-skyrc-imax-b6mini-professional-balance-charger-discharger-7673
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	https://ampere-electronics.com/product/a2212-brushless-motor-1400kv/
Propulsion	Simonk ESC 30A	Simonk-30A	4	435	1740	https://makerselectronics.com/product/simonk-esc-speed-controller-for-brushless-motor-30a-with-t-type-connector-motor-connectors/
Propulsion	8045 Propeller Pair	8045 GF	2 pairs	200	400	https://microohm-eg.com/product/1pair-8045-8x4-5-inch-cw-propeller-ccw-prop-for-rc-multicopter-f450-quadcopter-black/
Flight Controller	ATmega328P-PU	ATmega328P-PU	1	285	285	https://makerselectronics.com/product/atmega328p-pu-microchip-avr-microcontroller/
Flight Controller	ZIF Socket	28-pin	1	30	30	https://makerselectronics.com/product/universal-zif-socket-28-pins/
Flight Controller	IC Socket	28-pin	1	3	3	https://makerselectronics.com/product/ic-socket-1414-base-28-pin/
Flight Controller	PL2303 USB-TTL	PL2303	1	60	60	https://makerselectronics.com/product/pl2303-usb-ttl-converter-module/
Flight Controller	Female Headers	40-pin	2	5	10	https://makerselectronics.com/product/pin-headers-female-2-54mm-40-pin/
Flight Controller	BNO055 IMU	BNO055	1	3100	3100	https://devboardsmarket.com/products/adafruit-9-dof-absolute-orientation-imu-fusion-breakout-bno055
Flight Controller	MS5611 Barometer	MS5611	1	450	450	https://makerselectronics.com/product/gy-63-ms5611-01ba03-barometer-pressure-sensor-module/
Flight Controller	ISP Connector	10-pin	2	20	40	https://makerselectronics.com/product/avr-isp-10pin-to-icsp-6pin-converter2/
Flight Controller	20 MHz Crystal	HC-49S	2	6	6	https://makerselectronics.com/product/crystal-20-000mhz-hc-49s-20ppm/
Flight Controller	470µF Capacitor	35V	4	12	12	https://makerselectronics.com/product/capacitor-470uf-35v-1016mm/
Flight Controller	22pF Capacitor	50V	8	4	4	https://makerselectronics.com/product/ceramic-capacitor-22pf-50v/

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.

This prototype is built from whatever solid, reliable modules could be grabbed off the shelf to get a functional airframe in the sky fast. It's a testbed, a sandbox, a place to beat on ideas before committing to real hardware. Once this platform proves itself, the temporary parts get retired and the serious gear comes in: a custom battery-management system, our own ESCs, an ARM-based flight controller, a dedicated processor for graphics and heavy computation, and a long list of features that turn the whole machine into something far beyond this early version. This is just the warm-up; the real machine comes next.