
	Category	Component	Use	#	Qty	Cost Each	Total Cost	Specs	 Required
	Compute	Raspberry Pi 4 Model B	Main onboard computer (hotspot host + web control server)		1	63	\$63.00	Broadcom BCM2711 quad-core Cortex-A72 1.5 GHz; 2 GB RAM; Wi-Fi 802.11ac + BT 5.0; 2xUSB3, 2xUSB2; dual micro-HDMI (4Kp60)	n
	Compute	MicroSD Card (128 GB A2/U3)	System storage for Raspberry Pi OS and data		1	12	\$12.00	Amazon Basics MicroSDXC A2 U3 Class 10; Read 100 MB/s, Write 60 MB/s; Shock/Water/Temp/X-ray proof	n
	Compute	Arduino UNO R3	Serial command receiver and motor control bridge		1	17	\$17.00	ATmega328P MCU; USB interface (16U2 serial); Arduino-compatible board (5 V logic)	y
	Compute	7" Touchscreen Display	Monitor connected to Raspberry Pi for local control UI		1	40	\$40.00	7" IPS capacitive touch; 800x480 pixels; MIPI DSI interface (driver-free); PWM backlight; Raspberry Pi compatible	n
	Drive	RS-555 Gear Motors + Gearboxes	Main drive motors and gear reduction units		2	17	\$34.00	24 V DC; ~35 000 RPM motor; 1:100 gear ratio; ~200 W @ 24 V; steel middle gear; composite housing	y
	Drive	BTS7960 Motor Drivers	Dual H-bridge drivers for DC motors		2	6	\$12.00	5.5–27 V supply; up to 43 A continuous; logic 5 V isolation; thermal/over-current protection	y
	Drive	10" Pneumatic Tires w/ Hubs	Drive wheels for traction and support		2	9	\$18.00	10" pneumatic utility tires; steel hub; inflatable tube design	y
	Drive	8" Solid Rubber Caster Wheel	Rear caster for stability and turning		1	8	\$8.00	8" solid rubber tire; PVC hub; puncture-proof	y
	Drive	Plywood Frame & Wood Screws	Frame and base plate for mounting all hardware	0.5 sheet		40	\$20.00	¾" plywood panel with wood screw assembly	y
	Drive	½" All-Thread Axles (modified to 12 mm)	Shaft connecting wheels, gearboxes & frame		2	8	\$16.00	½"-13 UNC steel rod (16" length); threads partially ground to ~12 mm for fit with 12 mm bushings	y
	Power	12 V 7 Ah SLA Batteries	Main drive power pack (series or parallel config)		2	21	\$42.00	Lead-acid sealed batteries (F1 terminals); maintenance-free; 7 Ah capacity	y
	Power	12 V SLA Charger (1.3 A)	Bench charger for SLA pack maintenance		1	10	\$10.00	Output 14.5 V @ 1.3 A; short-circuit protection; LED status (red/green)	n
	Power	USB Battery Pack (5 V)	Power source for Pi and Arduino electronics		1	60	\$60.00	Portable 5 V USB output bank for low-voltage logic power	y
	Power	XT60 Connectors (FymuSing)	Power connectors for batteries and motor drivers	4 pairs		0.6	\$3.00	XT60H male/female pairs; rated 60 A; nylon shell; anti-short sheath	y
	Power	LED Rocker Switches (12 V 20 A)	Main on/off switches for power distribution		2	1	\$2.00	SPST ON-OFF; 12 V 20 A rated; blue LED indicator; 3-pin surface mount	y
	Sensors	GPS + Compass Module	GNSS receiver for navigation and heading data		1	25	\$25.00	SEQUIRE M10-25Q w/ QMC5883L; 10 Hz output; GPS/GLONASS/BDS/Galileo support; 72 channels	n
	Sensors	Time-of-Flight Sensor	Short-range distance and edge detection		5	2	\$10.00	VL53L0X ToF sensor; I²C interface; 2.8 V logic; ~150 mA; compact module	n
	Sensors	Waterproof Ultrasonic Sensor	Mid-range obstacle detection (outdoor tolerant)		3	6	\$18.00	JSN-SR04T sensor; 3–5.5 V; range 25 cm–4 m (±2 mm); 75° FOV; sealed probe	n
	Sensors	9-Axis IMU (BNO085/ICM-20948)	Orientation and stabilization sensor		1	15	\$15.00	9-DOF digital output (accel/gyro/mag); multi-interface support	n
Grand Total:							\$423.92	Grand Total (Required):	\$232.00