Designator	Q-ty	Value	Footprint	Description	Supplier	Part Number	Remark	Unit Price*	Price
C1	1	2.2n	C0805	Capacitor					
C2	1	33n	C0805	Capacitor					
C3	1	10n	C0805	Capacitor			Adjust to tune low-pass filtering		
C4	1	220p	C0805	Capacitor					
C5, C34	2	1u	C0805	Capacitor					
C7, C9, C11, C13, C14, C17, C20, C29, C31, C37, C39, C40, C43, C48, C52, C53, C66, C71	18	100n	C0805	Capacitor					
C8, C24, C32, C36, C38, C49, C50, C51, C56, C60, C61	11	10n	C0805	Capacitor					
C10, C25, C26, C54, C65, C67, C69, C70, C72	9	220n	C0805	Capacitor					
C12, C19, C42, C57, C58, C59, C64, C73	8	2.2u	C0805	Capacitor					
C15	1	33n	C0805	Capacitor					
C16, C55	2	22n	C0805	Capacitor					
C18, C21	2	3.3n	C0805	Capacitor					
C22, C23, C27, C28	4	10p	C0805	Capacitor					
C30, C41, C62, C68	4	1n	C0805	Capacitor					
C33	1	100uF x 10	CAP R2.0-5.0 X 11	Polar Electrolytic Capacitor	Digi-Key	565-1899-ND	LowESR	$0.32	$0.32
C35	1	220uF x 50	CAP R5.0-10.0 X 16	Polar Electrolytic Capacitor	Digi-Key	565-2017-ND	LowESR	$0.73	$0.73
C44, C46	2	220uF x 16	TANT-D	Polar Tantalum SMT Capacitor		399-10429-1-ND	LowESR	$1.97	$3.94
C45	1	220uF x 16	CAP R2.5-6.3 X 11.5	Polar Electrolytic Capacitor	Digi-Key	565-1927-ND	LowESR	$0.40	$0.40
C47	1	1n	C0805	Capacitor			(optional for ADJ-regulator)		
C63	1	10uFx10	TANT-A	Polar Tantalum SMT Capacitor	Digi-Key	478-4086-1-ND	or put TVS (ESD5Z5.0T1G) instead	$0.50	$0.50
C74	1	100n	C0805	Capacitor					
C75	1	1u	C0805	Capacitor					
C76	1	10n	C0805	Capacitor					
D1, D9, D13, D14, D15, D16, D19, D20	8	S1M	SMA	Small Signal Fast Switching Diode	Digi-Key	S1MFSCT-ND		$0.31	$2.48
D2	1	LED	LED-SM1	Typical YELLOW 1206 LED	Digi-Key	754-1174-1-ND	Vf<3V	$0.48	$0.48
D3, D7, D22, D23, D26	5	1N4148W	SOD123	Small Signal Fast Switching Diode	Digi-Key	1N4148WTPMSCT-ND	Alternative: LL4148 (SOD-80)	$0.14	$0.70
D4	1	NUP2105LT1G	SOT-23	Dual Line CAN Bus Protector, 3-Pin	Digi-Key	NUP2105LT1GOSCT-ND		$0.44	$0.44
D5, D6, D11, D12, D17, D18, D24, D25	8	BAS70-04	SOT-23	Silicon Schottky Diode, -55 to 125 degC	Digi-Key	BAS70-04-FDICT-ND		$0.26	$2.08
D8	1	MBRS340	SMC	Schottky Diode	Digi-Key	MBRS340FSCT-ND		$0.59	$0.59
D10	1	P6KE22A	DO-15V	Transient Voltage Suppressor Diode	Digi-Key	P6KE22AFSCT-ND		$0.43	$0.43
D21	1	SMAJ22A	SMA	Transient Voltage Suppressor Diode	Digi-Key	SMAJ22A-FDICT-ND		$0.41	$0.41
D27	1	SM2T3V3A	DO-216AA	Transient Voltage Suppressor Diode	Digi-Key	497-7878-1-ND		$0.64	$0.64
D28	1	BT	LED-SM1	Typical ORANGE 1206 LED	Digi-Key	754-1943-1-ND	Vf<3V, Bluetooth LED	$0.61	$0.61
D29	1	SP0503BAHT	SOT-143	SMT TVS Avalanche Diode Array	Digi-Key	F2715CT-ND		$0.88	$0.88
D30	1	ESD5Z5	SOD-523	Transient Voltage Suppressor Diode	Digi-Key	ESD5Z5.0T1GOSCT-ND		$0.29	$0.29
J1	1	DM3AT-SF-PEJM5	CONN-MICROSD-PUS	Secure Digital Card Connector, SMT, 9p	Digi-Key	HR1964CT-ND		$2.88	$2.88
J7	1	USB-B	CONN-USB-B	USB Connector Type B	Digi-Key	ED2982-ND		$0.58	$0.58
L1, L2, L5	3	BLM21PG331	L2012	Chip Inductor	Digi-Key	490-5988-1-ND		$0.12	$0.36
L3, L4	2	CDRH104RNP-330	L-CDRH104R	Inductor with Ferrite Core	Digi-Key	308-1433-1-ND		$1.67	$3.34
P3	1	BS-5 (CR2032)	BATTERY-HOLDER-20	Battery Holder BS-5	Digi-Key	BS-5-ND		$0.86	$0.86
Q1, Q2, Q3, Q4, Q5	5	VND14NV04	DPAK	OMNIFET Protected Power MOSFET	Digi-Key	497-11687-1-ND		$2.11	$10.55
Q6, Q7, Q8, Q9, Q10, Q11, Q12	7	VND5N07	DPAK	OMNIFET Protected Power MOSFET	Digi-Key	497-2481-5-ND	Alternative: VND14NV04	$1.85	$12.95
Q13	1	MJD340TF	DPAK	NPN General-purpose Transistor	Digi-Key	MJD340TFCT-ND		$0.55	$0.55
Q14	1	BC817	SOT-23	NPN General-purpose Transistor	Digi-Key	BC817-40LT3GOSCT-ND		$0.12	$0.12
Q15, Q16, Q17, Q18	4	BIP373	TO-220AB-2	Ignition Coil Protected Driver	Bosch	0271130115	Bosch 30115	$3.15	$12.60
R1	1	1k	R0805	Resistor			Adjust to set LED brightness		

R2, R23, R38, R43, R71, R89, R90, R91, R92, R97, R117, R119, R121, R124	14	68k	R0805	Resistor					
R3	1	220	R0805	Resistor					
R4, R73, R93, R94, R95, R96, R120, R122, R125	9	1k	R1206	Resistor					
R5	1	0	R0805	Resistor					
R6, R13	2	100k	R0805	Resistor					
R7, R9, R10, R17, R19, R21, R24, R26, R31, R37, R41, R42, R83, R102, R139, R140	16	10k	R0805	Resistor					
R8	1	0	R0805	Resistor			SD card EMI filtering resistor		
R11, R48, R59, R72, R77, R88, R105	7	100	R0805	Resistor					
R12	1	120	R1206	Resistor			CAN bus terminator (optional)		
R14	1	61.9	R0805	Resistor					
R15	1	1k	R0805	Resistor			Adjust to tune low-pass filtering		
R16	1	0	R1206	Resistor					
R18	1	4.7k	R0805	Resistor					
R20, R22	2	6.8k	R0805	Resistor					
R25	1	5.1k	R0805	Resistor					
R27, R35, R47, R57, R138, R144, R145, R147	8	330	R1206	Resistor					
R28, R36, R46, R52	4	68k	R1206	Resistor					
R29	1	82.5	R0805	Resistor			82.5 for LSU4.2 or 200 for LSU4.9		
R30	1	10k	R0805	Resistor			10k for LSU4.2 or 31.6k for LSU4.9		
R32, R34, R45	3	470k	R0805	Resistor					
R33, R115, R116	4	1k	R0805	Resistor					
R39, R40, R61, R62, R64, R66, R98, R103, R106, R107, R108, R118	12	1k	R0805	Resistor	Digi-Key	P1.0KDACT-ND	0.1% precise series <50ppm	$0.41	$4.92
R44, R58, R74, R101	4	510k	R0805	Resistor					
R49, R60, R69, R76, R78, R87, R104, R133, R134	9	10k	R1206	Resistor					
R50	1	0.1	R0805	Resistor			NetTie: Can be 0		
R51, R63, R67, R79, R85, R109	6	2.7k	R1206	Resistor			(optional pull-up)		
R53, R55, R56	3	10k	R0805	Resistor			(optional)		
R54	1	1M	R0805	Resistor			(optional for osc stability)		
R65, R80, R81, R84, R110, R111	6	510	R0805	Resistor					
R68	1	0	R0805	Resistor			0 for 5.0V fixed regulator; 3.16k 1% for ADJ		
R70	1	1.02k	R0805	Resistor			1% (optional - only for ADJ regulator)		
R75, R100, R131, R132	4	510k	R1206	Resistor					
R82	1	510	R0805	Resistor					
R86	1	1MO	R0805	Resistor					
R99, R112	2	0.1	R0805	Resistor					
R113, R114, R142, R143	4	100	R1206	Resistor					
R123	1	5.1	R0805	Resistor					
R126, R128	2	0	R1206	Resistor			Set non-zero for voltage divider		
R127	1	2k	R0805	Resistor			1%		
R129, R130	2	10k	R1206	Resistor			(optional pull-up)		
R135	1	33k	R0805	Resistor					
R136	1	51k	R0805	Resistor					
R137	1	10k	R0805	Resistor			1%		
R141, R146	2	5k	R0805	Resistor			(optional)		
R148	1	220	R0805	Resistor			Adjust to set LED brightness		
R149, R150, R151, R152, R155, R156, R159, R160	8	5k	R1206	Resistor					

Reference	Qty	Value	Package	Description	Supplier	Part Number	Notes	Unit	Ext
R153	1	0	R1206	Resistor			NetTie or EMI filter		
R154, R162, R163	3	1k	R1206	Resistor			(optional pull-down)		
R157, R158, R161	3	1k	R1206	Resistor			(optional pull-up)		
R164	1	47	R0805	Resistor					
R165	1	1k	R0805	Resistor			(optional)		
U1	1	SN65HVD230D	SO8	3.3V CAN Transceiver with Standby Mode, 17 mA, -40 to 85 degC, 8-pin SIC	Digi-Key	SN65HVD230D-ND		$2.66	$2.66
U2	1	CJ125	SOIC24	Lambda Probe Interface IC	Bosch	1267379259	Bosch 30481	$3.00	$3.00
U3	1	TPIC8101	SOIC20	Engine Knock Signal Processor	Digi-Key	296-34575-5-ND		$5.61	$5.61
U4, U9	2	MCP6004T-I/ST	TSSOP14	1 MHz, Low-Power Op Amp	Digi-Key	MCP6004T-I/STCT-ND		$0.45	$0.90
U5	1	STM32F405RGT6	LQFP64	ARM Cortex-M4 32-bit MCU+FPU, 210 DMIPS, 1024 kB Flash, 192 kB RAM, 51 I/Os, 64-pin LQFP, -40 to 85 degC	Digi-Key	497-11767-ND	(Optional, populate instead of U5_2 (F469))		
U5_2	1	STM32F469VIT6	LQFP100	ARM Cortex-M4 32-bit MCU+FPU, 210 DMIPS, 1024 kB Flash, 192 kB RAM, 51 I/Os, 64-pin LQFP, -40 to 85 degC	Digi-Key	497-16782-ND		$9.76	$9.76
U6	1	NCV4274ADT33	DPAK	Series of Micropower Voltage Regulators, 3-pin TO-252	Digi-Key	NCV4274ADT33RKGOSCT-ND		$1.79	$1.79
U7	1	NCV4274ADT50	DPAK	Series of Micropower Voltage Regulators, 3-pin TO-252	Digi-Key	NCV4274ADT50RKGOSCT-ND	(Optional, populate instead of U8)		
U8	1	MIC4576-5.0	D2PAK-5	Step-Down Voltage Regulator, 3A, 200 kHz, 5-pin TO-263	Digi-Key	576-1800-5-ND	Alternatives: LM25x6-5.0/ADJ, MIC4576WU	$3.20	$3.20
U10	1	DRV8825	HTSSOP28	Stepper Motor Controller IC	Digi-Key	296-29503-1-ND		$3.93	$3.93
U11	1	74HCT04	SOIC14	6 Hex Inverters	Digi-Key	296-1205-1-ND		$0.48	$0.48
U12	1	MAX9926UAEE	QSOP16	Dual-Channel, Variable Reluctance Sensor Interface, 4.5 to 5.5 V, -40 to 125 degC, 16-Pin SOP	Digi-Key	MAX9926UAEE+-ND		$9.27	$9.27
U13	1	CP2102-GM	QFN28	Single-Chip USB to UART Bridge, 1024 Bytes EEPROM, -40 to 85 degC, 28-pin QFN, Tube	Digi-Key	336-1160-5-ND		$2.91	$2.91
U14	1	ADUM1201ARZ	SO8	Dual Channel Digital Isolator, 2.5 KV rms Insulation Rating, 1 Mbps Data Rate, 150 ns Delay, Industrial, 8-pin SOIC (R-8)	Digi-Key	ADUM1201ARZ-ND		$3.02	$3.02
U15	1	HC-06	HC-06	Bluetooth module	Olimex	BLUETOOTH-SERIAL-HC-06		$2.70	$2.70
Y1, Y2	2	ABM3B-8.0MHz	QUARTZ-ABM3B-HC	Crystal Oscillator (SMD, TH)	Digi-Key	535-9721-1-ND	ABM3B-8.000MHZ-10-1-U-T or HC-49	$0.69	$1.38

$116.24