



Quantity	Comment	Designator	Description	Footprint
2	Motor connector 89400-0220	B1, B2	Motor, General Kind	BAT-2
1	Battery connector 89400-0220	BT1	Multicell Battery	BAT-2
38	100nF	C1, C3, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C22, C23, C24, C25, C26, C27, C28, C29, C30, C33, C35, C36, C37, C38, C39, C55, C62, C65, C66, C67, C68, C69, C70, C71, C74, C75	Capacitor	CAPC1608X08L
8	10uF	C2, C4, C31, C40, C46, C51, C52, C73	Capacitor	CAPC1608X08L
7	4.7nF	C15, C16, C17, C18, C19, C20, C21	Capacitor	CAPC1608X08L
9	4.7uF	C32, C43, C44, C45, C47, C48, C49, C50, C72	Capacitor	CAPC1608X08L
1	10uF X5R	C34	Capacitor	CAPC1608X08L
2	18pF	C41, C42		CAPC1608X08L
2	1nF	C53, C54	Capacitor	CAPC1608X08L
3	1uF	C56, C61, C63	Capacitor	CAPC1608X08L
1	1.5nF	C57	Capacitor	CAPC1608X08L
3	47nF	C58, C59, C60	Capacitor	CAPC1608X08L
1	51pF	C64	Capacitor	CAPC1608X08L
4	19-21SURC/S530-A3/TR8	D1, D3, D4, D5	SMD Red 0603 2V@20ma 56 mcd	DIOC1608X08N
4	BT5050RGB-C-T180	D2, D6, D27, D38	\$0.027/2000k	LED5MD5
12	27-21SURC/S530-A3	D7, D9, D10, D11, D12, D17, D18, D25, D26, D32, D35, D36	SMD Red led right angle mount 2V@20ma 57mcd	27-21 EVERLIGHT
3	27-21/BHC-AN1P2/3C	D8, D31, D37	SMD Blue led right angle mount 3.3V@20ma 28mcd	27-21 Everlight Blue
8	APTDL608SYCK	D13, D14, D15, D16, D21, D22, D23, D24	LED standard - CMS Helios SMD Yellow 590nm 480mcd	DIOC1608X08N
2	WP7104SRC/D	D19, D20	Red led 2V@20ma 57mcd	LED_TH_3MM_20MM
3	APTDL608CGCK	D28, D29, D30	LED standard - CMS Helios SMD Green 570nm 230mcd	DIOC1608X08N
2	BAT54S	D33, D34	Schottky Barrier Double Diode	SOT23_N
4	MLP2520S3R3S	L1, L2, L3, L4	Inductors for Power Circuits Multilayer/STD Magnetic Shielded	INDC2520X12L
1	Speaker	LS1	Loudspeaker	PN2
1	TD4015BPN	MC1	Omnidirectional Back Electret Condenser Microphone	MICRO_TD4015BPN
48	BC817-40	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45, Q46, Q47, Q48	NPN General-purpose Transistor	SOT23_N
20	4.7K	R1, R2, R57, R59, R61, R63, R64, R65, R67, R92, R93, R94, R111, R112, R113, R114, R142, R144, R145, R146	Resistor	RESC1608X06L
16	33	R3, R5, R68, R69, R70, R71, R72, R73, R98, R99, R100, R135, R147, R148, R149, R150	120, Resistor, 120, 120, 120, 120, 120, 120, 120, Resistor, 120, 120, 120, Resistor	RESC1608X06L
2	2.7K	R4, R6	Resistor	RESC1608X06L
8	22K	R7, R8, R9, R10, R11, R42, R43, R130	120, 120, 120, 120, 120, 120, 120, Resistor	RESC1608X06L
17	2.2K	R12, R13, R14, R15, R16, R32, R33, R34, R35, R41, R44, R45, R52, R53, R103, R104, R126	120, 120, 120, 120, 120, Resistor, Resistor, Resistor, Resistor, 120, 120, Resistor, Resistor, Resistor, Resistor, Resistor	RESC1608X06L
7	1.5K	R17, R18, R19, R20, R26, R46, R47	120	RESC1608X06L
8	1K	R21, R22, R23, R24, R25, R48, R49, R108	120, 120, 120, 120, 120, 120, 120, Resistor	RESC1608X06L
16	10K	R27, R28, R29, R30, R31, R50, R51, R101, R102, R109, R110, R117, R118, R128, R129, R136	120, 120, 120, 120, 120, 120, 120, Resistor, Resistor, Resistor, Resistor, Resistor, Resistor, Resistor, Resistor, Resistor	RESC1608X06L
7	6.2	R36, R37, R38, R39, R40, R54, R55	120	RESC1608X06L
14	56	R56, R58, R60, R62, R74, R75, R76, R77, R78, R79, R80, R81, R90, R91	Resistor	RESC1608X06L
14	39	R66, R82, R83, R84, R85, R86, R87, R88, R89, R95, R96, R97, R133, R134	Resistor	RESC1608X06L
2	100	R105, R106	Resistance	RESC1608X06N
2	180	R107, R137	Resistor	RESC1608X06L
2	5.6K	R115, R116	Resistor	RESC1608X06L
15	100K	R119, R120, R121, R122, R123, R124, R138, R139, R141, R143, R155, R156, R157, R158, R159	Resistor	RESC1608X06L
1	680K	R125	Resistor	RESC1608X06L
1	6.8K	R127	Resistor	RESC1608X06L
5	820	R131, R151, R152, R153, R154	Resistor	RESC1608X06L
1	47K	R132	Resistor	RESC1608X06L
1	270K	R140	Resistor	RESC1608X06L
1	NCP15XH103F03RC	RT1	Thermistors - NTC 10K OHM 1% 0402	RESC1005X04L
1	MicroSD-Astron 5190008-XA4-R	S1	MicroSD Card connector 5190008-XA4-R	Astron 5190008-XA4-R
1	SW-PB	S2	Switch	FSMRA2JH
4	DMP21DOUT-7	T1, T2, T3, T4	Transistor MOSFET 1 x P Pining : 1=G, 2=S, 3=D	SOT50P160X80-3N
4	DMG1012T	T5, T6, T7, T8	Transistor MOSFET 1 x N, Pining : 1=G, 2=S, 3=D	SOT50P160X80-3N
1	MMA7660FC	U1	MMA7660FC: XYZ-AXIS ACCELEROMETER ±1.5 g	DFN50P300X300X100-12N
2	ITR9909	U2, U3	Everlight Opto Interrupter	ITR9909_LONG
2	MCP6L04T-E/ST	U4, U5	1 MHz, 85 µA Quad Op Amp, 14-Pin TSSOP, Extended Temperature Range, Tape and Reel	TSSOP-ST14_N
7	ITR9909	U6, U7, U8, U9, U10, U11, U12	Everlight Opto Interrupter	ITR9909_EDGE
5	MC74HC595ADTR2	U13, U14, U15, U16, U17	8-Bit Serial-Input/Serial or Prallel-Output Shift Register with Latched 3-State Outputs	948F-01_N
4	AP7331-33WG-7	U18, U22, U24, U26	300mA, Low Quiescent Current, Fast Transient LDO	SOT95P285X100-5N
1	PI2C4FJ128GB106-U/PT	U19	General Purpose 16-Bit Flash Microcontroller with USB On-The-Go, 128KB Flash, 16KB SRAM, 64-Pin TQFP, Industrial Temperature	TQFP-PT64_N
1	IRM-3638T	U20	IR Receiver Module (38 kHz) for Remote Control Systems	IR-receiver
1	MCP73871-2CAI/ML	U21	Stand-Alone System Load Sharing and Li-Ion/Li-Polymer Battery Charge Management Controller, 4.2V, 20-Pin QFN, Industrial Temperature	QFN-ML20_N
1	FAN3988	U23	USB/Charger and Over Voltage Detection Device	MLP 1.45X1MM
1	LM4819M	U25	350mW Audio Power Amplifier with Shutdown Mode	M08A_N
1	Con1x6	X2	1 x 6 pins connector	MHDR1X6
1	Alstron R3190005-021-R	X3	USB connector Micro B	ASTRON 3190005-X21-R
1	815-ABLS-8-B2	Y1	Surface Mount Quartz Crystal 8Mhz	HC49/4H_SMX

Quantity	Comment	Designator	Description	Footprint	Layer
1	100	R105	Resistance	RESC1608X06N	Bottom
1	1uF	C63	Capacitor	CAPC1608X08L	Bottom
1	6.2	R38	120	RESC1608X06L	Bottom
1	815-ABLS-8-B2	V1	Surface Mount Quartz Crystal 8Mhz	HC49/4H_SMX	Bottom
1	AP7331-33WG-17	U26	300mA, Low Quiescent Current, Fast Transient LDO	SOT95P285X100-5N	Bottom
1	Battery connector 89400-0220	BT1	Multicell Battery	BAT-2	Bottom
1	MCP6L04T-E/ST	U4	1 MHz, 85 µA Quad Op Amp, 14-Pin TSSOP, Extended Temperature Range, Tape and Reel	TSSOP-ST14_N	Bottom
10	100K	R119, R120, R121, R122, R123, R124, R155, R156, R157, R158	Resistor	RESC1608X06L	Bottom
12	4.7K	R1, R2, R57, R59, R61, R63, R64, R65, R111, R112, R113, R114	Resistor	RESC1608X06L	Bottom
17	100nF	C5, C7, C8, C9, C14, C22, C25, C26, C28, C30, C55, C68, C69, C70, C71, C74, C75	Capacitor	CAPC1608X08L	Bottom
2	18pf	C41, C42		CAPC1608X08L	Bottom
2	2.7K	R4, R6	Resistor	RESC1608X06L	Bottom
2	4.7uF	C43, C72	Capacitor	CAPC1608X08L	Bottom
2	BT5050RGC-T180	D2, D6	\$0.027/2000k	LED5MDS	Bottom
2	ITR9909	U2, U3	Everlight Opto Interrupter	ITR9909_LONG	Bottom
2	Motor connector 89400-0220	B1, B2	Motor, General Kind	BAT-2	Bottom
2	WP7104SRC/D	D19, D20	Red led 2V@20ma 57mcd	LED_TH_3MM_20MM	Bottom
20	BC817-40	Q1, Q2, Q3, Q4, Q7, Q12, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q47, Q48	NPN General-purpose Transistor	SOT23_N	Bottom
3	MC74HC595A DTR2	U13, U15, U17	8-Bit Serial-Input/Serial or Parallel-Output Shift Register with Latched 3-State Outputs	948F-01_N	Bottom
4	1.5K	R17, R18, R19, R20	120	RESC1608X06L	Bottom
4	10uF	C40, C51, C52, C73	Capacitor	CAPC1608X08L	Bottom
4	1K	R21, R22, R23, R24	120	RESC1608X06L	Bottom
4	22K	R7, R8, R9, R10	120	RESC1608X06L	Bottom
4	820	R151, R152, R153, R154	Resistor	RESC1608X06L	Bottom
4	DMG1012T	T5, T6, T7, T8	Transistor MOSFET 1 x N, Pining : 1=G, 2=S, 3=D	SOT50P160X80-3N	Bottom
4	DMP21DOUT-17	T1, T2, T3, T4	Transistor MOSFET 1 x P Pining : 1=G, 2=S, 3=D	SOT50P160X80-3N	Bottom
4	MLP2520S3R3	L1, L2, L3, L4	Inductors for Power Circuits Multilayer/STD Magnetic Shielded	INDC2520X12L	Bottom
6	56	R74, R75, R76, R77, R90, R91	Resistor	RESC1608X06L	Bottom
7	4.7nF	C15, C16, C17, C18, C19, C20, C21	Capacitor	CAPC1608X08L	Bottom
8	10K	R27, R28, R29, R30, R31, R50, R51, R136	120, 120, 120, 120, 120, 120, 120, Resistor	RESC1608X06L	Bottom
8	2.2K	R12, R13, R14, R15, R16, R33, R44, R45	120, 120, 120, 120, 120, Resistor	RESC1608X06L	Bottom
8	33	R3, R5, R68, R69, R70, R71, R72, R73	120, Resistor, 120, 120, 120, 120, 120	RESC1608X06L	Bottom
8	39	R82, R83, R84, R85, R95, R96, R97, R133	Resistor	RESC1608X06L	Bottom
9	27-21SURC/S530-A3	D9, D10, D11, D12, D17, D18, D25, D26, D35	SMD Red led right angle mount. 2V@20ma 57mcd	27-21 EVERLIGHT	Bottom
1	1.5nF	C57	Capacitor	CAPC1608X08L	Top
1	100	R106	Resistance	RESC1608X06N	Top
1	10uF XSR	C34	Capacitor	CAPC1608X08L	Top
1	270K	R140	Resistor	RESC1608X06L	Top
1	47K	R132	Resistor	RESC1608X06L	Top
1	51pF	C64	Capacitor	CAPC1608X08L	Top
1	6.8K	R127	Resistor	RESC1608X06L	Top
1	680K	R125	Resistor	RESC1608X06L	Top
1	820	R131	Resistor	RESC1608X06L	Top
1	Aktron R3190005-021-R	X3	USB connector Micro B	ASTRON 3190005-X21-R	Top
1	Con1x6	X2	1 x 6 pins connector	MHDR1X6	Top
1	FAN3988	U23	USB/Charger and Over Voltage Detection Device	MLP 1.45X1MM	Top
1	IRM-3638T	U20	IR Receiver Module (38 kHz) for Remote Control Systems	IR-receiver	Top
1	LM4819M	U25	350mW Audio Power Amplifier with Shutdown Mode	M08A_N	Top
			1 MHz, 85 µA Quad Op Amp, 14-Pin TSSOP,		

	1 LM4819M	U25	Power Amplifier with Shutdown Mode	M08A_N	Top
	MCP6L04T-1 E/ST	U5	1 MHz, 85 µA Quad Op Amp, 14-Pin TSSOP, Extended Temperature Range, Tape and Reel	TSSOP-ST14_N	Top
	MCP73871-1 2CAI/ML	U21	Stand-Alone System Load Sharing and Li-Ion/Li-Polymer Battery Charge Management Controller, 4.2V, 20 Pin QFN, Industrial Temperature	QFN-ML20_N	Top
	MicroSD-Astron 5190008-XA4-1 R	S1	MicroSD Card connector 5190008-XA4-R	Astron 5190008-XA4-R	Top
	1 MMA7660FC	U1	MMA7660FC: XYZ-AXIS ACCELEROMETER ±1.5 g	DFN50P300X300 X100-12N	Top
	NCP15XH103F1 03RC	RT1	Thermistors - NTC 10K OHM 1% 0402	RESC1005X04L	Top
	PIC24FJ128GB1 06-L/PT	U19	General Purpose 16-Bit Flash Microcontroller with USB On-The-Go, 128KB Flash, 16KB SRAM, 64-Pin TQFP, Industrial Temperature	TQFP-PT64_N	Top
	1 Speaker	LS1	Loudspeaker	PN2	Top
	1 SW-PB	S2	Switch	FSMRA2JH	Top
	1 TD4015BPN	MC1	Omnidirectional Back Electret Condenser Microphone	MICRO_TD4015B PN	Top
	2 180	R107, R137	Resistor	RESC1608X06L	Top
	2 1nF	C53, C54	Capacitor	CAPC1608X08L	Top
	2 1uF	C56, C61	Capacitor	CAPC1608X08L	Top
	2 5.6K	R115, R116	Resistor	RESC1608X06L	Top
	2 BAT54S	D33, D34	Schottky Barrier Double Diode	SOT23_N	Top
	BT5050RGCBC-2 T180	D27, D38	\$0.027/2000k	LEDSMD5	Top
	MC74HC595A 2 DTR2	U14, U16	8-Bit Serial-Input/Serial or Parallel-Output Shift Register with Latched 3-State Outputs	948F-01_N	Top
	21 100nF	C1, C3, C6, C10, C11, C12, C13, C23, C24, C27, C29, C33, C35, C36, C37, C38, C39, C62, C65, C66, C67	Capacitor	CAPC1608X08L	Top
	28 BC817-40	Q5, Q6, Q8, Q9, Q10, Q11, Q13, Q14, Q15, Q16, Q17, Q18, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45, Q46	NPN General-purpose Transistor	SOT23_N	Top
	3 1.5K	R26, R46, R47	120	RESC1608X06L	Top
	27-21/BHC-3 AN1P2/3C	D8, D31, D37	SMD Blue led right angle mount 3.3V@20ma 28mcd	27-21 Everlight Blue	Top
	27-21SURC/SS30-3 A3	D7, D32, D36	SMD Red led right angle mount 2V@20ma 57mcd	27-21 EVERLIGHT	Top
	3 47nF	C58, C59, C60	Capacitor	CAPC1608X08L	Top
	AP7331-33WG-3 7	U18, U22, U24	300mA, Low Quiescent Current, Fast Transient LDO	SOT95P285X100-5N	Top
	APTD1608CGC 3 K	D28, D29, D30	LED standard - CMS Helios SMD Green 570nm 230mcd	DIOC1608X08N	Top
	4 10uF	C2, C4, C31, C46	Capacitor	CAPC1608X08L	Top
	19-21SURC/SS30-4 A3/TR8	D1, D3, D4, D5	SMD Red 0603 2V@20ma 56 mcd	DIOC1608X08N	Top
	4 1K	R25, R48, R49, R108	120, 120, 120, Resistor	RESC1608X06L	Top
	4 22K	R11, R42, R43, R130	120, 120, 120, Resistor	RESC1608X06L	Top
	5 100K	R138, R139, R141, R143, R159	Resistor	RESC1608X06L	Top
	6 39	R66, R86, R87, R88, R89, R134	Resistor	RESC1608X06L	Top
	6 6.2	R36, R37, R39, R40, R54, R55	120	RESC1608X06L	Top
	7 4.7uF	C32, C44, C45, C47, C48, C49, C50	Capacitor	CAPC1608X08L	Top
	7 ITR9909	U6, U7, U8, U9, U10, U11, U12	Everlight Opto Interrupter	ITR9909_EDGE	Top
	8 10K	R101, R102, R109, R110, R117, R118, R128, R129	Resistor	RESC1608X06L	Top
	8 33	R98, R99, R100, R135, R147, R148, R149, R150	120, 120, 120, Resistor	RESC1608X06L	Top
	8 4.7K	R67, R92, R93, R94, R142, R144, R145, R146	Resistor	RESC1608X06L	Top
	8 56	R56, R58, R60, R62, R78, R79, R80, R81	Resistor	RESC1608X06L	Top
	APTD1608SYC 8 K	D13, D14, D15, D16, D21, D22, D23, D24	LED standard - CMS Helios SMD Yellow 590nm 480mcd	DIOC1608X08N	Top
	9 2.2K	R32, R34, R35, R41, R52, R53, R103, R104, R126	Resistor	RESC1608X06L	Top

