

RavAGE 0.1-alpha

Bill of Materials

CPU.SchDoc

Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R1	3k3 Resistor 100mW 1% 0603	RC0603FR-073K3L	YAGEO (PHYCOMP)	9238549 (min order qty of 50)	50	\$0.008	\$0.400
R2, R3, R4, R5, R6	10k Resistor 100mW 1% 0603	RC0603FR-0710KL	YAGEO (PHYCOMP)	9238603 (min order qty of 50)	50	\$0.008	\$0.400
R7	2k4 Resistor 100mW 1% 0603	CRCW06032K40FKEA	VISHAY DRALORIC	1469766	1	\$0.050	\$0.050
R8	1k Resistor 100mW 1% 0603	RC0603FR-071KL	YAGEO (PHYCOMP)	9238484 (min order qty of 50)	50	\$0.008	\$0.400
C1, C2, C3, C4, C5, C6, C11, C12, C13	0.22uF Capacitor X7R Ceramic 10V 10% 0603	0603ZC224KAT2A	AVX	1327683 (min order qty of 10)	10	\$0.106	\$1.060
C7, C8	18pF Capacitor C0G/NP0 Ceramic 50V 5% 0603	C0603C180J5GACTU	KEMET	1414620 (min order qty of 10)	10	\$0.024	\$0.240
C9	6.8nF Capacitor C0G/NP0 Ceramic 50V 10% 0603	C0603C682K5RACTU	KEMET	1414649 (min order qty of 10)	10	\$0.026	\$0.260
C10	680pF Capacitor C0G/NP0 Ceramic 100V 5% 0603	C0603C681J1GACTU	KEMET	1813442 (min order qty of 10)	10	\$0.114	\$1.140
C14, C19	0.1uF Capacitor X7R Ceramic 10V 10% 0603	MCCA000255	MULTICOMP	1759122 (min order qty of 100)	100	\$0.016	\$1.600
C15, C16, C17, C18	10uF Capacitor MLCC 10V 10% 0805	100R15X106KV4E	JOHANSON DIELECTRICS	1886102 (min order qty of 10)	10	\$0.258	\$2.580
D1	LED 0603						\$0.000
J1	BDM Header 2x3 DIL						\$0.000
JP1	Firmware Load Jumper, Header 1x2 SIL						\$0.000
Y1	Crystal 16.0Mhz HC49/US	HCM49 16.000MABJ-UT	CITIZEN AMERICA	1611734	1	\$1.200	\$1.200
Y2	Crystal 32.768kHz SMD	ABS10-32.768KHZ-T	ABRACON	1633675	1	\$1.800	\$1.800
U1	IC, MICROCONTROLLER, LQFP-144	MC9S12XDP512MAG	FREESCALE	1579847	1	\$39.240	\$39.240
U2	IC, RTCC, SOIC-8	M41T56M6E	STMICROELECTRONICS	9882650	1	\$2.400	\$2.400

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Power Supplies.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R9	20k Resistor 100mW 1% 0603	ERJ3EKF2002V	PANASONIC	2059432 (min order qty of 50)	50	\$0.020	\$1.000
R10	29k4 Resistor 100mW 0.1% 0603	RP73D1J29K4BTDG	TE CONNECTIVITY	1752638 (min order qty of 5)	5	\$2.040	\$10.200
R11	330R Resistor 1W 1% 2512	RC2512FK-07330RL	YAGEO (PHYCOMP)	1283136 (min order qty of 5)	5	\$0.860	\$4.300
R12	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R13, R14, R16	10k Resistor 100mW 0.1% 0603	RG1608N-103-B-T1	SUSUMU	1653317	3	\$1.120	\$3.360
R15	604R Resistor 100mW 0.1% 0603	RP73D1J604RBTGD	TE CONNECTIVITY	1752458	5	\$0.992	\$4.960
C20	22uF Capacitor MLCC 10V 10% 1210	MCCA000576	MULTICOMP	1759459 (min order qty of 10)	10	\$0.376	\$3.760
C21	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C22	10uF Capacitor MLCC 35V 10% 1206	GMK316AB7106KL-TR	TAIYO YUDEN	2100124	1	\$1.160	\$1.160
C23	0.1uF Capacitor X7R Ceramic 50V 10% 0603	06035C104JAT2A	AVX	1740621 (min order qty of 10)	20	\$0.876	\$17.520
C24	470nF Capacitor X7R Ceramic 50V 10% 0805	C0805C474K5RACTU	KEMET	1907053 (min order qty of 10)	10	\$0.376	\$3.760
C25	47uF Capacitor MLCC 10V 20% 1210	MCCA000578	MULTICOMP	1759461 (min order qty of 10)	10	\$1.820	\$18.200
D2	LED 0603						\$0.000
F1, F2	POLYFUSE, 350mA, 30V, 1812	1812L035/30DR	LITTELFUSE	2119633	2	\$2.420	\$4.840
Q1	TRANSISTOR, PNP, MJD127, TO-252	MJD127G	ON SEMICONDUCTOR	9557083	1	\$0.382	\$0.382
U3	LDO REGULATOR, LM2937ES-5.0, TO-263-3	LM2937ES-5.0/NOPB	NATIONAL SEMI	1469067 (min order qty of 5)	5	\$1.800	\$9.000
U4	LDO REGULATOR, LM2941S, TO-263-5	LM2941S/NOPB	NATIONAL SEMI	1150164	1	\$3.520	\$3.520
U5	PRECISION ADJ ZENER, TL-431	TL431CDBZRG4	TEXAS INSTRUMENTS	1053415	1	\$0.836	\$0.836

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USB Comms.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R17	2k Resistor 100mW 1% 0603	MCMR06X2001FTL	MULTICOMP	2073418 (min order qty of 100)	100	\$0.020	\$2.000
R18, R19, R20	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C26	4.7uF Capacitor MLCC 10V 10% 0603	0603ZD475KAT2A	AVX	1833806 (min order qty of 10)	10	\$0.328	\$3.280
C27, C29	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C28	10nF Capacitor X7R Ceramic 50V 10% 0603	06035C103K4Z2A	AVX	1833842 (min order qty of 5)	5	\$0.090	\$0.450
FB1	FERRITE BEAD, 0.05R, 1A, 0603	BLM18PG300SN1D	MURATA	1515741 (min order qty of 5)	5	\$0.056	\$0.280
D3, D4, D5	LED 0603						\$0.000
U6	IC, USB TO UART, SSOP-28	FT232RL	FTDI	1146032	1	\$8.600	\$8.600
U7	ISOLATOR, DIGITAL, 150NS, SOIC-8	ADUM3201ARZ	ANALOG DEVICES	2102513	1	\$5.170	\$5.170
USB1	MICRO USB TYPE B, RECEPTACLE	TBA	TBA	TBA	1	\$0.000	\$0.000
CBUSIO1	Header 1x2 SIL						\$0.000

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RS232 Comms.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
C30, C31, C32, C33, C34	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
U8	IC, TRANSCEIVER, SOIC-16	MAX232ACWE	MAXIM	9724370	1	\$9.140	\$9.140
J2	SOCKET, 3.5MM, JACK, PCB, 3POLE	4832.232	SCHURTER	152204 (min order qty of 2)	2	\$5.480	\$10.960
JP2	Header 1x2 SIL						\$0.000

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VR Interfaces.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R21, R22, R29, R30, R36, R37	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R23, R28, R31, R34, R38, R42	10k Resistor 500mW 1% 200V 1210	ERJ-14NF1002U	PANASONIC	2281532	6	\$0.210	\$1.260
R24, R26, R40	10k Resistor 100mW 1% 0603	***refer to R2, R3, R4, R5, R6 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R25, R32, R41	5k1 Resistor 500mW 1% 200V+	ERJP14F5101U	PANASONIC	1894326 (min order qty of 25)	25	\$0.266	\$6.650
R27, R33, R35, R39	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C35, C41	10uF Capacitor MLCC 10V 10% 0805	***refer to C15, C16, C17, C18 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C36, C40, C42	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C37, C43	1uF Capacitor MLCC 10V 20% 0603	100X14X105MV4T	JOHANSON DIELECTRICS	1886135 (min order qty of 10)	10	\$0.782	\$7.820
C38, C39, C44	1nF Capacitor X7R Ceramic 200V 0603	06032C102KAT2A	AVX	1740637 (min order qty of 10)	10	\$0.110	\$1.100
D6, D7, D8, D9	LED 0603						\$0.000
U9, U11	IC, VR SENSOR INTERFACE, QSOP-16	MAX9926UAEE+	MAXIM	MOUSER # 700-MAX9926UAEE	2	\$4.820	\$9.640
U10	IC, LOGIC GATE, TSSOP-5	74AHCT1G08GW	NXP	1727698	1	\$0.290	\$0.290

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Core Analogue Inputs.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R43	3k9 Resistor 100mW 1% 0603	RT0603FRE073K9L	YAGEO (PHYCOMP)	1500630 (min order qty of 5)	5	\$0.878	\$4.390
R44, R49, R50	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R45, R46, R47, R51, R52, R53, R54, R55	470R Resistor 100mW 1% 0603	RC0603FR-07470RL	YAGEO (PHYCOMP)	9238441 (min order qty of 50)	50	\$0.010	\$0.500
R48	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C45, C47, C49, C53, C55, C57, C61, C63	0.22uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C1, C2, C3, C4, C5, C6, C11, C12, C13 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C46, C48, C50, C54, C56, C62	0.1uF Capacitor X7R Ceramic 50V 10% 0603	***refer to C23 on Power Supplies.SchDoc page of BOM***			0	\$0.000	\$0.000
C51, C59	0.33uF Capacitor X7R Ceramic 10V 10% 0603	C1608X7R1A334K	TDK	1844218	2	\$0.062	\$0.124
C52, C60	0.01uF Capacitor X7R Ceramic 10V 10% 0603	MCCA001116	MULTICOMP	1856300 (min order qty of 100)	100	\$0.036	\$3.600
C58, C64	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
D10, D11, D12, D13, D14, D15	Diode, Dual Schottky, SOT-23	BAT721S	NXP	1081200 (min order qty of 5)	10	\$1.280	\$12.800
MAP1	IC, PRESSURE SENSOR	MPXH6250AC6U	FREESCALE	1316092	1	\$13.540	\$13.540
AAP1	IC, PRESSURE SENSOR	MPXH6115A6U	FREESCALE	1457169	1	\$14.610	\$14.610

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Extra Analogue Inputs.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R56	3k9 Resistor 100mW 1% 0603	***refer to R43 on Core Analogue Inputs.SchDoc page of BOM***			0	\$0.000	\$0.000
R57, R63, R68	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R58, R59, R60, R64, R65, R66, R69, R70	470R Resistor 100mW 1% 0603	***refer to R45, R46, R47, R51.... on Core Analogue Inputs.SchDoc page of BOM***			0	\$0.000	\$0.000
R61	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R62	39k Resistor 100mW 1% 0603	RC0603FR-0739KL	YAGEO (PHYCOMP)	9238670 (min order qty of 50)	50	\$0.010	\$0.500
R67	10k Resistor 100mW 1% 0603	***refer to R2, R3, R4, R5, R6 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C65, C67, C69, C71, C74, C76	0.22uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C1, C2, C3, C4, C5, C6, C11, C12, C13 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C66, C68, C70, C72, C75, C77	0.1uF Capacitor X7R Ceramic 50V 10% 0603	***refer to C23 on Power Supplies.SchDoc page of BOM***			0	\$0.000	\$0.000
C73, C78	15nF Capacitor X7R Ceramic 10V 10% 0603	MCCA001117	MULTICOMP	1856301 (min order qty of 100)	100	\$0.052	\$5.200
D16, D17, D18, D19, D20, D21, D22, D23	Diode, Dual Schottky, SOT-23	BAT721S	NXP	1081200 (min order qty of 5)	10	\$1.280	\$12.800
RT1	NTC THERMISTOR, 10k	B57703M0103G040	EPCOS	2285468	1	\$7.380	\$7.380

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Digital Inputs.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R71, R72, R73, R74, R75, R76, R77	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R78, R79	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
D24, D25, D28	Diode, Dual Schottky, SOT-23	BAT721S	NXP	1081200 (min order qty of 5)	5	\$1.280	\$6.400
D26, D27, D29	Diode, Zener, 4V7, SMA	1SMA5917BT3G	ON SEMICONDUCTOR	1431139 (min order qty of 10)	10	\$0.760	\$7.600
U12	IC, LOGIC GATE, SOT23-5	74V1T04STR	STMICROELECTRONICS	1697253	1	\$0.278	\$0.278

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Knock Sensing.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R80, R82	68k Resistor 100mW 1% 0603	RC0603FR-0768KL	YAGEO (PHYCOMP)	9238700 (min order qty of 50)	50	\$0.010	\$0.500
R81, R83	10k Resistor 100mW 1% 0603	***refer to R2, R3, R4, R5, R6 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R84	1M Resistor 100mW 1% 0603	RC0603FR-071ML	YAGEO (PHYCOMP)	9238840RL (min order qty of 50)	50	\$0.010	\$0.500
C79	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C80	4.7uF Capacitor MLCC 10V 10% 0603	***refer to C26 on USB Comms.SchDoc page of BOM***			0	\$0.000	\$0.000
C81, C82	3.3nF Capacitor X7R Ceramic 50V 10% 0603	C0603C332K5RAC AUTO	KEMET	2070419 (min order qty of 10)	10	\$0.046	\$0.460
C83, C84	22pF Capacitor NP0 10V 1% 0603	MCCA000928	MULTICOMP	1856082 (min order qty of 100)	100	\$0.032	\$3.200
C85	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
Y3	Crystal 16.0Mhz HC49/US	XT49M-2016M	VISHAY DALE	1469641	1	\$2.480	\$2.480
U13	IC, KNOCK SENSOR INTERFACE, SOIC-20	TPIC8101DW	TEXAS INSTRUMENTS	1624395	1	\$14.240	\$14.240

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Ignitor Outputs.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R85, R86, R93, R94, R101, R102	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R87, R88, R95, R96, R103, R104	150R Resistor 2W 1% 2512	3521150RFT	TE CONNECTIVITY	2117481 (min order qty of 5)	5	\$0.326	\$1.630
R89, R90, R97, R98, R105, R106	100k Resistor 100mW 1% 0603	RC0603FR-07100KL	YAGEO (PHYCOMP)	9238727 (min order qty of 50)	50	\$0.010	\$0.500
R91, R92, R99, R100, R107, R108	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C86, C88, C90	0.1uF Capacitor X7R Ceramic 10V 10% 0603	***refer to C14, C19 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
C87, C89, C91	1uF Capacitor X6S 35V 10% 0805	GRM219C8YA105KA73D	MURATA	1889284 (min order qty of 10)	10	\$0.132	\$1.320
D31, D32, D33, D34, D35, D36	LED 0603						\$0.000
U14, U16, U18	IC, LOGIC GATE, US8	NC7WZ86K8X	FAIRCHILD SEMI	3393082	3	\$0.538	\$1.614
U15, U17, U19	IC, DRIVER MOSFET, 1.5A, DUAL, SOIC-8	TC4427AEOA	MICROCHIP	1292285	3	\$1.090	\$3.270
JP3, JP4	Jumper, Header 1x3 SIL						\$0.000

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Injectors.SchDoc							
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R109, R110, R111, R121, R122, R123	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R112, R113, R114, R115, R116, R117, R124, R125, R126, R127, R128, R129	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R118, R119, R120, R130, R131, R132	100k Resistor 100mW 1% 0603	***refer to R89, R90, R97, R98, R105, R106 on Ignitor Outputs.SchDoc page of BOM***			0	\$0.000	\$0.000
D40, D41, D42, D46, D47, D48	LED 0603						\$0.000
D37, D38, D39, D43, D44, D45	DIODE, SIGNAL, 100V, 0.5A, 0805	TS4148RY	TAIWAN SEMI	8150206 (min order qty of 10)	10	\$0.136	\$1.360
Q2, Q3, Q4, Q5, Q6, Q7	MOSFET, N, 40V, 12A, DPAK	VND14NV04-E	STMICROELECTRONICS	1739408	6	\$4.180	\$25.080

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Low Side Drivers.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R133, R134, R135, R142, R143	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R136, R137, R138, R144, R145	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R139, R140, R141, R146, R147	100k Resistor 100mW 1% 0603	***refer to R89, R90, R97, R98, R105, R106 on Ignitor Outputs.SchDoc page of BOM***			0	\$0.000	\$0.000
D52, D53, D54, D57, D58	LED 0603						\$0.000
D49, D50, D51, D55, D56	DIODE, SIGNAL, 100V, 0.5A, 0805	TS4148RY	TAIWAN SEMI	8150206 (min order qty of 10)	10	\$0.136	\$1.360
Q8, Q9, Q10, Q11, Q12	MOSFET, N, 40V, 12A, DPAK	VND14NV04-E	STMICROELECTRONICS	1739408	5	\$4.180	\$20.900

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3-Wire ISCV Driver.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
R148, R151	2k4 Resistor 100mW 1% 0603	***refer to R7 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R149, R152, R153, R154	1k Resistor 100mW 1% 0603	***refer to R8 on CPU.SchDoc page of BOM***			0	\$0.000	\$0.000
R150, R155	100k Resistor 100mW 1% 0603	***refer to R89, R90, R97, R98, R105, R106 on Ignitor Outputs.SchDoc page of BOM***			0	\$0.000	\$0.000
D60, D62	LED 0603						\$0.000
D59, D61	DIODE, SIGNAL, 100V, 0.5A, 0805	***refer to D49, D50, D51, D55, D56 on Low Side Drivers.SchDoc page of BOM***			0	\$0.000	\$0.000
Q13, Q14	MOSFET, N, 40V, 12A, DPAK	VND14NV04-E	STMICROELECTRONICS	1739408	5	\$4.180	\$20.900
U20	IC, LOGIC GATE, SOT23-5	74V1T04STR	STMICROELECTRONICS	1697253	1	\$0.278	\$0.278

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IO Expansion Header.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
IO EXPANSION HEADER	HEADER, 2x20 DIL						\$0.000

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Connector.SchDoc							
Designator	Description	Manufacturer Part No.	Manufacturer	Element14 Part No.	Qty	Price (ea)	Sub-Total
CON1	HEADER, MOLEX, 48WAY	36638-0002	MOLEX	1830389	1	\$31.440	\$31.440
CON2	SOCKET, BNC, LOW PROFILE, R/A	13-60-6 DGZ	MULTICOMP	1712355	1	\$10.560	\$10.560