MicroBAR v.2 Bill of Materials

System	Board	Designator	Qty	Vendor	Part #	Mfg #	Description	Function	Unit Price (proto)	Unit Price (>5000)	Ext Price (proto)	Ext price (>5000)
ITO Heater	Top	U1	1	Digikey	CLA324-ND	LCA717S	RELAY OPTOMOS 2A SPST-NO 6-SMD	Heater Relay	6.18	2.575	6.18	2.575
ITO Heater	Top	U7	1	Digikey	296-23551-1-ND	TPS61085PWR	IC STEP-UP DC-DC CONV 8-TSSOP	Heater boost converter	3.33	1.283	3.33	1.283
ITO Heater	Top	C9,C11,C12	3	Digikey			10uF (1206)	input/output filter caps	0.15	0.02	0.45	0.06
ITO Heater	Top	C10	1	Digikey			1uF (1206)	output filter cap	0.15	0.02	0.15	0.02
ITO Heater	Top	C13	1	Digikey			100nF (1206)		0.15	0.02	0.15	0.02
ITO Heater	Top	C14	1	Digikey			2.2nF (1206)		0.15	0.02	0.15	0.02
ITO Heater	Top	R4	1	Digikey			150k (1206)		0.05	0.01	0.05	0.01
ITO Heater	Top	R5	1	Digikey			18.2k (1206)		0.05	0.01	0.05	0.01
ITO Heater	Top	R6	1	Digikey			15k (1206)		0.05	0.01	0.05	0.01
ITO Heater	Top	R7	1	Digikey			1k (1206)	Half bridge for thermistor	0.05	0.01	0.05	0.01
ITO Heater	Top	L3	1	Digikey	490-5270-1-ND	LQH55PN6R8NR	INDUCTOR POWER 6.8UH 1450MA 2220	6.8uH heater inductor	0.44	0.172	0.44	0.172
ITO Heater	Top	D97	1	Digikey	641-1255-1-ND	CDBA120SL-G	DIODE SCHOTTKY 1A 20V SMA	heater diode	0.82	0.209	0.82	0.209
ITO Heater	Top	RT1	1	Digikey	615-1043-ND	PPG102A1RD	DETECTOR RTD TF 1K OHM +/-0.06%	Thermistor	18.5	2.06	18.5	2.06
ITO Heater	Top	RT1	1	Digikey	455-1719-ND	S2B-PH-K-S(LF)(S	CONN HEADER PH SIDE 2POS 2MM	header for thermistor	0.1	0.047	0.1	0.047
ITO Heater	Top	RT1	1	Digikey	455-1165-ND	PHR-2	CONN HOUSING PH 2POS 2MM WHITE	2-pin housing for thermistor	0.05	0.024	0.05	0.024
ITO Heater	Top	RT1	2	Digikey	455-2148-1-ND	SPH-002T-P0.5L	CONN TERMINAL 28-24AWG TIN	JST PH pins	0.027	0.013	0.054	0.026
ITO Heater	Top	RT1	1	Digikey	MC06G-300-ND	3365/06 300SF	CABLE 6 COND 300FT FLAT GRAY	2-conductor ribbon cable (3 inches)	0.01	0.01	0.01	0.01
ITO Heater	Top		1	Delta Tech	CB-50IN-S205	CB-50IN-S205	5-15 ohm, 50x75x0.5mm ITO slides	Heater	20	5	20	5
ITO Heater	Top		1	Ace HW			Brass Bar Stock	Heater Contacts	0.5	0.25	0.5	0.25
ITO Heater	Top		1	Fry's			Electrically-conductive Epoxy	Heater Contacts	0.2	0.1	0.2	0.1
ITO Heater	Top		1	Ace HW			Thermally-conductive Epoxy	Glue for Thermistor	0.05		0.05	0
										TOTAL:	**51.334**	**11.916**
LED Driver	Top	U6	1	Digikey	576-3041-1-ND	MIC5289-24YD6	IC LED DRIVR WHITE BCKLGT TSOT-6	LED booster	1.9	0.975	1.9	0.975
LED Driver	Top	C6	1	Digikey			10uF (1206)		0.15	0.02	0.15	0.02
LED Driver	Top	C7	1	Digikey			1uF (1206)		0.15	0.02	0.15	0.02
LED Driver	Top	C8	1	Digikey	478-6028-1-ND	06033D334KAT2	CAP CER .33UF 25V X5R 0603 (sub w/ 1206)	0.33uF	0.45	0.126	0.45	0.126
LED Driver	Top	R3	1	Digikey	P12.4CCT-ND	ERJ-6ENF1294V	RES 12.4 OHM 1/8W 1% 0805 SMD	current sense resistor	0.07	0.005	0.07	0.005
LED Driver	Top	L2	1	Digikey	490-5271-1-ND	LQH55PN100MR	INDUCTOR POWER 10UH 1250MA 2220	10uH LED inductor	0.44	0.172	0.44	0.172
LED Driver	Top	P3	1	Digikey	455-1719-ND	S2B-PH-K-S(LF)(S	CONN HEADER PH SIDE 2POS 2MM	header for leds	0.1	0.047	0.1	0.047
LED Driver	Top	P3	1	Digikey	455-1165-ND	PHR-2	CONN HOUSING PH 2POS 2MM WHITE	2-pin housing for leds	0.05	0.024	0.05	0.024
LED Driver	Top	P3	2	Digikey	455-2148-1-ND	SPH-002T-P0.5L	CONN TERMINAL 28-24AWG TIN	JST PH pins	0.027	0.013	0.054	0.026
LED Driver	Top	P3	1	Digikey	MC06G-300-ND	3365/06 300SF	CABLE 6 COND 300FT FLAT GRAY	2-conductor ribbon cable (3 inches)	0.01	0.01	0.01	0.01
LED Driver	Top	P3	3	Digikey	P14150CT-ND	LN1923W8CRA1	LED BLUE SIDE VIEW SMD	Blue LEDs	0.57	0.229	1.71	0.687
LED Driver	Top		1	Ace HW			Liquid Electrical Tape	Optical shielding	0.05	0.02	0.05	0.02
										TOTAL:	**5.134**	**2.15**
Phototransistor Array	Top	D1-D96	96	Digikey	475-1268-1-ND	SFH 3710-3/4-Z	PHOTOTRANSISTOR ALS SMD CHIPLED	Phototransistors	0.563	0.483	54.048	46.368
Phototransistor Array	Top	U2,U4,U5	3	Digikey	AD67328SUZ-ND	AD67328SUZ	IC MULTIPLEXER 32X1 48TQFP	MUXes	12.13	6.062	36.39	18.186
Phototransistor Array	Top	U3	1	Digikey	AD8603AUJ2REEL7CT-ND	AD8603AUJZ-REE	IC OPAMP GP R-R CMOS TSOT23-5	transimpedance opamp	2.07	0.797	2.07	0.797
Phototransistor Array	Top	C4	1	Digikey			10pF	fb capacitor	0.15	0.02	0.15	0.02
Phototransistor Array	Top	C5	1	Digikey			10pF - not necessary?	input capacitor	0	0	0	0
Phototransistor Array	Top	R1	1	Digikey			1M	fb resistor	0.1	0.01	0.1	0.01
Phototransistor Array	Top	R2	1	Digikey			1G - not necessary?	input resistor	0	0	0	0
Phototransistor Array	Top	R100-101	2	Digikey			1M	bias resistors	0.1	0.01	0.2	0.02
Phototransistor Array	Top		1	McMaster	8647K108		Neoprene/EPDM/SBR, Soft, 1/16" Thick, 42" Width	black foam	0.04	0.04	0.04	0.04
Phototransistor Array	Top		1	McMaster	7769T88 (#89)		Light Filters 20" X 24" Sheet	"Moss Green" gel #89	0.16	0.16	0.16	0.16
										TOTAL:	**93.158**	**65.601**
Microcontroller	Bot	U1	1	Digikey	ATMEGA2560-16AU-ND	ATMEGA2560-16	IC AVR MCU 256K 16MHZ 100TQFP	microcontroller	17.97	11.251	17.97	11.251
Microcontroller	Bot	C1	1	Digikey			22pF (1206)	cap on reset line	0.15	0.02	0.15	0.02
Microcontroller	Bot	C2-3	2	Digikey	478-3735-1-ND	08051A200JAT2/	CAP CERM 20PF 5% 100V NPO 0805	xtal caps	0.23	0.038	0.46	0.076
Microcontroller	Bot	C4-7	4	Digikey			100nF (1206)	decoupling caps	0.15	0.02	0.6	0.08
Microcontroller	Bot	R4	1	Digikey			10k (1206)	res on reset line	0.1	0.01	0.1	0.01
Microcontroller	Bot	R8	1	Digikey			1M (1206)	res on xtal	0.1	0.01	0.1	0.01
Microcontroller	Bot	R11	1	Digikey			27 ohm (1206)	res on xtal	0.1	0.01	0.1	0.01
Microcontroller	Bot	Y1	1	Digikey	XC1282CT-ND	ECS-160-20-5PX-	CRYSTAL 16.00MHZ 20PF SMD	xtal	0.56	0.25	0.56	0.25
Microcontroller	Bot	R9-10	2	Digikey			10k (1206)	pullups on PD1/PD0	0.1	0.01	0.2	0.02
Microcontroller	Bot	P1	1	Digikey	609-3218-ND	67996-406HLF	CONN HEADER 6POS .100 STR TIN	ICSP1 header	0.43	0	0.43	0
										TOTAL:	**20.57**	**11.727**
USB Interface	Bot	U5	1	Digikey	ATMEGA8U2-AU-ND	ATMega8U2-AU	MCU AVR 8K FLASH 16MHZ 32TQFP	usb controller	3.7	2.352	3.7	2.352
USB Interface	Bot	C16-17	2	Digikey	478-3735-1-ND	08051A200JAT2/	CAP CERM 20PF 5% 100V NPO 0805	xtal caps	0.23	0.038	0.46	0.076
USB Interface	Bot	R25	1	Digikey			1M (1206)	res on xtal	0.1	0.01	0.1	0.01
USB Interface	Bot	R26	1	Digikey			27 ohm (1206)	res on xtal	0.1	0.01	0.1	0.01
USB Interface	Bot	Y2	1	Digikey	XC1282CT-ND	ECS-160-20-5PX-	CRYSTAL 16.00MHZ 20PF SMD	xtal	0.56	0.25	0.56	0.25
USB Interface	Bot	R24	1	Digikey			10k (1206)	pullup on reset line	0.1	0.01	0.1	0.01
USB Interface	Bot	R29-30	2	Digikey			22 ohm (1206)	USB data line resistors	0.1	0.01	0.2	0.02
USB Interface	Bot	Z1-2	2	Digikey	F2594CT-ND	PGB1010603MR	SUPPRESSOR ESD 24VDC 0603 SMD	USB data line ESD protection	0.74	0.196	1.48	0.392
USB Interface	Bot	L2	1	Digikey	490-1038-1-ND	BLM21AG121SN	FERRITE CHIP 120 OHM 200MA 0805	ESD protection inductor	0.33	0.039	0.33	0.039
USB Interface	Bot	P10	1	Digikey	609-1039-ND	61729-0010BLF	CONN RCPT USB TYPE B R/A PCB	USB-B port	1.29	0.474	1.29	0.474
USB Interface	Bot	C18	1	Digikey			100nF (1206)		0.15	0.01	0.15	0.01
USB Interface	Bot	C19	1	Digikey			1uF (1206)		0.15	0.01	0.15	0.01
USB Interface	Bot	R27-28	2	Digikey			1k (1206)	TX/RX pullups	0.1	0	0.2	0
USB Interface	Bot	D7-8	2	Digikey	67-1046-ND	SSL-LX2573GD	LED 2X5MM RECTANGULAR GREEN DIFF	TX/RX LEDs	0.37	0	0.74	0
USB Interface	Bot	R31-32	2	Digikey			1k (1206)	data line resistors	0.1	0.01	0.2	0.02
USB Interface	Bot	C20	1	Digikey			100nF (1206)	reset DTR line cap	0.15	0.02	0.15	0.02
USB Interface	Bot	P8	1	Digikey	609-3218-ND	67996-406HLF	CONN HEADER 6POS .100 STR TIN	ICSP2 header	0.43	0	0.43	0
USB Interface			1	Digikey	Q361-ND	3021001-03	CBL USB A-B CON 3' 28/28 AWG	3' USB cable	3.15	1.23	3.15	1.23
										TOTAL:	**13.49**	**4.925**
SD Card Reader	Bot	P9	1	Digikey	478-5063-1-ND	1457380093028	CONNECTOR SD CARD W/BOSS	SD card slot	4.7	2.916	4.7	2.916
SD Card Reader	Bot	R33-34	2	Digikey			10k (1206)	card detect / write protect pullups	0.1	0.01	0.2	0.02
SD Card Reader	Bot	R1-3	3	Digikey			1.8k (1206)	SD level shifter res	0.1	0.01	0.3	0.03
SD Card Reader	Bot	R5-7	3	Digikey			3.3k (1206)	SD level shifter res	0.1	0.01	0.3	0.03
SD Card Reader	Bot	U3	1	Digikey	296-18479-1-ND	LP2985A-33DBV	IC LDO REG 3.3V 150MA SOT23-5	3.3V regulator	0.84	0.276	0.84	0.276
SD Card Reader	Bot	C12	1	Digikey			1uF (1206)	input cap for 3.3v reg	0.15	0.02	0.15	0.02
SD Card Reader	Bot	C13	1	Digikey			2.2uF(1206)	output cap for 3.3v reg	0.15	0.02	0.15	0.02
SD Card Reader			1	Amazon				512MB SD Card	6	3	6	3
										TOTAL:	**12.64**	**6.312**
Cell Module	Bot	P11	1	Digikey	255-2997-1-ND	AXK5F60547YG	CONN SOCKET BRD/BRD .5MM 60POS	60-pin socket for cell module	6.79	3.514	6.79	3.514
Cell Module	Bot	P12	1	Digikey	WM3291CT-ND	473880001	1.90MM SIM CARD READER CONN	SIM card socket	1.51	0.986	1.51	0.986
Cell Module	Bot	U6	1	Digikey	1016-1243-5-ND	SPX29302T5-L	IC REG LDO ADJ 3A TO263-5	3.8V 3A regulator	2.68	1.123	2.68	1.123
Cell Module	Bot	R15	1	Digikey			22k	3.8V voltage set res	0.1	0.01	0.1	0.01
Cell Module	Bot	R16	1	Digikey			10k	3.8V voltage set res	0.1	0.01	0.1	0.01
Cell Module	Bot	C8	1	Digikey	478-1777-1-ND	TPSD107K010R0	CAP TANT LOESR 100UF 10V 10% SMD	output cap for 3.8V reg	1.13	0.36	1.13	0.36
Cell Module	Bot	C9	1	Digikey			0.1uF	output cap for 3.8V reg	0.15	0.02	0.15	0.02
Cell Module	Bot	R17	1	Digikey			10k	pullup for boot res	0.1	0.01	0.1	0.01
Cell Module	Bot	P7	1	Digikey	455-1722-ND	SSB-PH-K-S(LF)(S	CONN HEADER PH SIDE 5POS 2MM	5-pin JST PH header for cell phone spkr/mic	0.2	0	0.2	0
Cell Module	Bot		1	Digikey	455-1163-ND	PHR-5	CONN HOUSING PH 5POS 2MM WHITE	5-pin housing - for mic/spkr cable	0.07	0	0.07	0
Cell Module	Bot		1	Sparkfun	CEL-09533		GSM/GPRS Module - SM5100B	SM5100B Cell Module	59.95	47.96	59.95	47.96
Cell Module	Bot		1	Sparkfun	CEL-00675		Quad-band Cellular Duck Antenna SMA	Cell Antenna	7.95	6.39	7.95	6.39
Cell Module	Bot		1					Prepay SIM card	0	0	0	0
										TOTAL:	**80.79**	**60.383**
GPS Module	Bot	P4	1	Digikey	455-1721-ND	S4B-PH-K-S(LF)(S	CONN HEADER PH SIDE 4POS 2MM	6-pin JST header for GPS	0.17	0.076	0.17	0.076
GPS Module	Bot	P4	1	Digikey	455-1396-ND	SHR-06V-S	CONN HOUSING SH 6POS 1MM WHITE	housing for GPS connector	0.11	0.049	0.11	0.049
GPS Module	Bot	P4	6	Digikey	455-2148-1-ND	SPH-002T-P0.5L	CONN TERMINAL 28-24AWG TIN	JST PH pins	0.027	0.013	0.162	0.078
GPS Module	Bot	P4	1	Digikey	MC06G-300-ND	3365/06 300SF	CABLE 6 COND 300FT FLAT GRAY	6-cond 28 awg ribbon (3 inches)	0.03	0.03	0.03	0.03
GPS Module	Bot	P4	1	Digikey	455-1396-ND	SHR-06V-S	CONN HOUSING SH 6POS 1MM WHITE	6-pin JST housing - GPS end	0.11	0.049	0.11	0.049
GPS Module	Bot	P4	1	Digikey	455-1561-1-ND	SSH-003T-P0.2	CONN TERM SH CRIMP 28-32AWG TIN	JST SH pins	0.049	0.032	0.049	0.032
GPS Module			1	Sparkfun	GPS-00465		20 Channel EM-406A SiRF III Receiver with Antenna	GPS module	59.95	47.96	59.95	47.96
										TOTAL:	**60.581**	**48.274**
5V Power Supply	Bot	U4	1	Digikey	LT1308ACS8#PBF-ND	LT1308ACS8#PBF	IC DC/DC CONV SINGLE CELL 8-SOIC	5V, 1A regulator	6.5	3.634	6.5	3.634
5V Power Supply	Bot	C11	1	Digikey	478-3911-1-ND	TAJC476M010RN	CAP TANTALUM 47UF 10V 20% SMD	5V booster input cap	0.46	0.147	0.46	0.147
5V Power Supply	Bot	C15	1	Digikey			22nF (1206)		0.15	0.02	0.15	0.02
5V Power Supply	Bot	C14	1	Digikey	478-3061-1-ND	TPSD227M006R	CAP TANT LOESR 220UF 6.3V 20%SMD	5V booster output cap	1.12	3.5	1.12	0.35
5V Power Supply	Bot	R23	1	Digikey			47k (1206)		0.1	0.01	0.1	0.01
5V Power Supply	Bot	R21	1	Digikey			309k (1206)		0.1	0.01	0.1	0.01
5V Power Supply	Bot	R22	1	Digikey			100k (1206)		0.1	0.01	0.1	0.01
5V Power Supply	Bot	L1	1	Digikey	490-5269-1-ND	LQH55PN4R7NR	INDUCTOR POWER 4.7UH 1750MA 2220	5V booster inductor	0.44	0.172	0.44	0.172
5V Power Supply	Bot	D6	1	Digikey	10BQ015PBFCT-ND	10BQ015TRPBF	DIODE SCHOTTKY 15V 1A SMB	5V booster diode	1.02	0.336	1.02	0.336
										TOTAL:	**12.37**	**5.459**
LiPo Battery/USB Charger	Bot	U2	1	Digikey	MCP73831T-2ATI/OTCT	MCP73831T-2AT	IC CONTROLLR LI-ION 4.2V SOT23-5	lipo charger	0.68	0.42	0.68	0.42
LiPo Battery/USB Charger	Bot	D4	1	Digikey	67-1050-ND	SSL-LX2573YD	LED 2X5MM RECTANGULAR YEL DIFF	charging LED (yellow)	0.28	0.08	0.28	0.08
LiPo Battery/USB Charger	Bot	R19	1	Digikey			1k (1206)	charging LED res	0.1	0.01	0.1	0.01
LiPo Battery/USB Charger	Bot	R18	1	Digikey			2k (1206)	current selector for charging IC	0.1	0.01	0.1	0.01
LiPo Battery/USB Charger	Bot	F1	1	Digikey	507-1075-1-ND	C1Q 500	FUSE 500MA 125V 1206 FAST C1Q	500mA USB charging fuse	0.55	0.142	0.55	0.142
LiPo Battery/USB Charger	Bot	F2	1	Digikey	507-1082-1-ND	C1Q 3	3A fuse	3A battery fuse	0.55	0.142	0.55	0.142
LiPo Battery/USB Charger	Bot	C10	1	Digikey	478-3934-1-ND	TAJD475M035R	CAP TANTALUM 4.7UF 35V 20% SMD	lipo charger cap	0.97	0.35	0.97	0.35
LiPo Battery/USB Charger	Bot	P2	1	Digikey	455-1704-ND	B2B-PH-K-S(LF)(S	CONN HEADER PH TOP 2POS 2MM	battery connector	0.1	0.0476	0.1	0.0476
LiPo Battery/USB Charger	Bot	P2	1	Sparkfun	PRT-08484		6Ah LiPo battery w/ JST connector	battery (many options for this)	39.95	31.96	39.95	31.96
LiPo Battery/USB Charger	Bot		2					screws/brackets for mounting battery	0.1	0.1	0.2	0.2
										TOTAL:	**43.48**	**33.3015**
Touchscreen LCD		P3	1	Digikey	455-1721-ND	S4B-PH-K-S(LF)(S	CONN HEADER PH SIDE 4POS 2MM	header for LCD	0.17	0.076	0.17	0.076
Touchscreen LCD		P3	1	Digikey	455-1164-ND	PHR-4	CONN HOUSING PH 4POS 2MM WHITE	4-pin housing	0.07	0.03	0.07	0.03
Touchscreen LCD		P3	4	Digikey	455-2148-1-ND	SPH-002T-P0.5L	CONN TERMINAL 28-24AWG TIN	JST PH pins	0.027	0.013	0.108	0.052
Touchscreen LCD		P3	1	Digikey	MC06G-300-ND	3365/06 300SF	CABLE 6 COND 300FT FLAT GRAY	4-cond 28 awg ribbon	0.02	0.02	0.02	0.02
Touchscreen LCD			1	Digikey	681-1018-ND	MK-480272C	KIT COLOR MODULE 480X272 TFT	4.3" Color LCD Touchscreen	223.44	50	223.44	50
										TOTAL:	**223.808**	**50.178**
General	Bot	D1,D2	2	Digikey	67-1047-ND	SSL-LX2573ID	LED 2X5MM RECTANGULAR RED DIFF	Status LEDs (red)	0.37	0.079	0.74	0.158
General	Bot	D5	1	Digikey	67-1046-ND	SSL-LX2573GD	LED 2X5MM RECTANGULAR GREEN DIFF	power LED (grn)	0.37	0.074	0.37	0.074
General	Bot	R12,R13,R20	3	Digikey			1k (1206)	Resistors for status/power LEDs	0.1	0.01	0.3	0.03
General	Bot	S1	1	Digikey	401-1223-ND	F2UEE	SWITCH PB DPDT ALT ACT SILVER	power switch	2.32	1.036	2.32	1.036
General	Bot	S1	1	Digikey	401-1221-ND	F12D4	SW CAP RECT GREY 5.5MM ACT	power switch gray cap	1.05	0.355	1.05	0.355
General	Bot	B1	1	Digikey	458-1066-ND	PK-12N40PQ	BUZZER PIEZO 4.1KHZ 14MM PC MT	Buzzer	2.43	1.978	2.43	1.978
General	Bot	P6	1	Digikey	WM8129-ND	90131-0131	CONN HEADER 22POS .100" STR TIN	2x11 expansion header	2.36	0	2.36	0
General	Top	P1	1	Digikey	609-3220-ND	67996-416HLF	CONN HEADER 16POS .100 STR TIN	2x8 male board 2 board header	0.83	0.277	0.83	0.277
General	Bot	P5	1	Digikey	WM4241-ND	901512116	C-GRID PCB CONN DR VT TN-A 16CKT	2x8 female board 2 board header	3.24	1.484	3.24	1.484
General			4				standoff	standoffs between boards	0.3	0.1	1.2	0.4
General			8				screws for enclosure		0.02	0.005	0.16	0.04
General			1				black foam for optical shielding in lid		0.04	0.04	0.04	0.04
										TOTAL:	**15.04**	**5.872**
Manufacturing			1	Adv. Ckits			PCB Fabrication		66	10	66	10
Manufacturing			1	Adv. Ckits			PCB Assembly (SMT soldering)		130.6	53.96	130.6	53.96
Manufacturing			1				3D printed enclosure (low quant)		10		10	0
Manufacturing			1	QuickParts			Injection molded enclosure (high quant)			2.5	0	2.5
Manufacturing			1				Assembly & Testing (low quant, 4 hr @ $20/hr)		80		80	0
Manufacturing			1				Assembly & Testing (high quant, 2hr @ $5/hr)			10	0	10
										TOTAL:	**286.6**	**76.45**

Manufacturing Totals		
	Prototype	>5000
FULL BOX TOTAL	**919.035**	**382.5965**
NO LCD/GPS/CELL	**553.916**	**223.7616**