BOM (Bill of Materials)

Designator(s)	Value	Description	Manufacturer	Manufacturer Part	Supplier	Supplier Part No.	QTY (1)	QTY(4)	Price (Unit)	Units	Total Cost	Link	Notes
C1, C2, C3, C4, C5, C6, C	0.1uF	CAP CER 0.1UF 50V X7	Samsung Electro-Mecha	CL21B104KBCWP	Digikey	1276-6557-1-ND	27	108	$0.03	100	$3.23	https://www.digikey.com/pro	Buy two sets of 200?
R1, R2, R33, R35	4.7K	RES SMD 4.7K OHM 1%	Yageo	RC0805FR-074K7	Digikey	311-4.70KCRCT-ND	4	10	$0.10	1	$1.00	https://www.digikey.com/pro	I2C pullups: only populate one module
U2, U4, U5	LV8548MC	IC MOTOR DRIVER PAF	ON Semiconductor	LV8548MC-AH	Digikey	869-1287-1-ND	3	12	$1.33	1	$15.96	https://www.digikey.com/en/on-semiconductor/LV8548MC-AH/869-1287-1-ND/2851531	
U1	ATMEGA3209	IC MCU 8BIT 32KB FLA	Microchip Technology	ATMEGA3209-AFF	Digikey	ATMEGA3209-AFRCT-ND	1	4	$1.47	1	$5.88	https://www.digikey.com/product-detail/en/microchip-technology/ATMEGA3209-AFR/ATMEGA3209-AFRCT-ND/9342200	
R18, R19, R25, R26, R30,	16K	RES 16K OHM 5% 1/8W	Stackpole Electronics	RMCF0805JT16K0	Digikey	RMCF0805JT16K0CT-ND	8	32	$0.02	10	$0.64	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RMCF0805JT16K0/RMCF0805JT16K0CT-ND/5049818	
R3, R4, R5, R6, R8, R11,	10K	RES 10K OHM 1% 1/8W	Stackpole Electronics	RMCF0805FT10K	Digikey	RMCF0805FT10K0	14	56	$0.03	10	$1.51	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RMCF0805FT10K0/RMCF0805FT10K0CT-ND/1942435	
R17, R21, R29, R22, R38,	75R	RES 75 OHM 1% 1/4W	Stackpole Electronics	RNCP0805FTD75	Digikey	RNCP0805FTD75R0CT-ND	8	32	$0.10	1	$3.20	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RNCP0805FTD75R0/RNCP0805FTD75R0CT-ND/2240546	
Q3, Q4, Q5, Q6, Q7, Q8,	2N3904	TRANS NPN 40V 0.2A S	Stackpole Electronics	MMBT3904-TP	Digikey	MMBT3904TPMSCT-ND	8	32	$0.10	1	$3.20	https://www.digikey.com/product-detail/en/micro-commercial-co/MMBT3904-TP/MMBT3904TPMSCT-ND/717395	
C17, C20 C22, C25, C30	10uF	CAP ALUM 10UF 20% 5	Wurth Electronics Inc	860020672010	Digikey	732-8856-1-ND	5	20	$0.10	1	$2.00	https://www.digikey.com/product-detail/en/wurth-electronics-inc/860020672010/732-8856-1-ND/5728801	
U7	LM2931	IC REG LIN POS ADJ 1	ON Semiconductor	LM2931CDR2GOS	Digikey	LM2931CDR2GOSCT-ND	1	4	$0.64	1	$2.56	https://www.digikey.com/en/on-semiconductor/LM2931CDR2G/LM2931CDR2GOSCT-ND/917935	
R32	27K	RES SMD 27K OHM 1%	Yageo	RC0805FR-0727K	Digikey	311-27.0KCRCT-ND	1	4	$0.10	1	$0.40	https://www.digikey.com/product-detail/en/yageo/RC0805FR-0727KL/311-27.0KCRCT-ND/730727	
R34	487K	RES SMD 487K OHM 19	Yageo	RC0805FR-07487	Digikey	311-487KCRCT-ND	1	4	$0.10	1	$0.40	https://www.digikey.com/product-detail/en/yageo/RC0805FR-07487KL/311-487KCRCT-ND/730930	
U8	L7805CV	IC REG LINEAR 5V 1.5A	STMicroelectronics	L7805CV	Digikey	497-1443-5-ND	1	4	$0.52	1	$2.08	https://www.digikey.com/product-detail/en/stmicroelectronics/L7805CV/497-1443-5-ND/585964	
C8, C9, C26	0.022uF	CAP FILM 0.022UF 10%	KEMET	R82EC2220AA50K	Digikey	399-19328-ND	3	12	$0.24	1	$2.88	https://www.digikey.com/product-detail/en/kemet/R82EC2220AA50K/399-19328-ND/9685232	
R7, R9, R10	1M	RES SMD 1M OHM 1%	Yageo	RT0805FRE071M	Digikey	YAG3361CT-ND	3	12	$0.11	1	$1.32	https://www.digikey.com/product-detail/en/yageo/RT0805FRE071ML/YAG3361CT-ND/5418066	
U3	OPA1679	IC AUDIO AMP 4 CIRCL	Texas Instruments	OPA1679IDR	Digikey	296-46621-1-ND	1	4	$1.20	1	$4.80	https://www.digikey.com/product-detail/en/texas-instruments/OPA1679IDR/296-46621-1-ND/7219057	
Q1, Q2	7002	MOSFET N-CH 60V TO-	Nexperia	NX7002AK,215	Digikey	1727-1289-1-ND	2	8	$0.16	1	$1.28	https://www.digikey.com/en/nexperia-usa-inc/NX7002AK215/1727-1289-1-ND/4386095	
R12	240R	RES 240 OHM 5% 1/8W	Stackpole Electronics	RMCF0805JT240F	Digikey	RMCF0805JT240RCT-ND	2	8	$0.10	1	$0.80	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RMCF0805JT240R/RMCF0805JT240RCT-ND/1942545	
R13	2.8K	RES SMD 2.8K OHM 1%	Yageo	RC0805FR-072K8	Digikey	311-2.80KCRCT-ND	2	8	$0.10	1	$0.80	https://www.digikey.com/product-detail/en/yageo/RC0805FR-072K8L/311-2.80KCRCT-ND/730658	
R14	5.6K	RES 5.6K OHM 5% 1/8W	Stackpole Electronics	RMCF0805JT5K6C	Digikey	RMCF0805JT5K60DKR-ND	2	8	$0.10	1	$0.80	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RMCF0805JT5K60/RMCF0805JT5K60DKR-ND/1943478	
R15	3.3K	RES 3.3K OHM 1% 1/8W	Stackpole Electronics	RMCF0805FT3K3C	Digikey	RMCF0805FT3K30CT-ND	2	8	$0.10	1	$0.80	https://www.digikey.com/product-detail/en/stackpole-electronics-inc/RMCF0805FT3K30/RMCF0805FT3K30CT-ND/1942399	
U6	LM317	IC REG LIN POS ADJ 1.	Texas Instruments	LM317KCT	Digikey	296-35739-5-ND	2	8	$0.58	1	$4.64	https://www.digikey.com/product-detail/en/texas-instruments/LM317KCT/296-35739-5-ND/3829530	
	Pogo Pin	CONTACT SPRING LOA	Mill Max Manufacturing	0906-1-15-20-75-1	Digikey	ED8181-ND	10	60	$0.52	10	$31.02	https://www.digikey.com/pro	Need 6 sets for 6 receivers
	DIP SW 2	SWITCH SLIDE DIP SP	CTS Electrocomponent	210-2MS	Digikey	CT2102MS-ND	1	10	$0.43	10	$4.26	https://www.digikey.com/pro	Need 10 sets for 10 plates
	Terminal Block Screw	TERM BLK 2POS SIDE	Pheonix Contact	1935161	Digikey	277-1667-ND	5	50	$0.39	50	$19.64	https://www.digikey.com/pro	Need minimum 3 each for 10 plates, though 5 will allow for greater flexibility
K1, K2, K3, K4, K5a, K5b	DPDT Relay		KEMET	UD2 5SNU			6	25	$1.84	25	$46.00		
	Mini Butt Hinge	HOODDEAL 30pcs Mi	HOODDEAL		Amazon Prime		1	1	$5.98	30	$5.98	https://www.amazon.com/dp	Comes in a set of 30

Please do your best to fill in the following details on your budget	Total $		Exact or estimated?		If you had to use CNS space and equipment please answer the following quesitons:								
Total Development cost: everything that was spent on your project including prototypes, transportation to research locations, renting of equipment, orders from a lab you worked at, your own money etc...?etc...	$223.85 + $50 for final build, plus about $100 for		Estimated		Why did your project require the use of CNS facilites?								
What is the minimum cost to make one prototype of your project ($0 is an option)?	$223.85	...sted is exact cost, but likely an additional $50 brings total cost closer			Roughly much time did you spend using CNS facilities? [specify hours or days]								
Total cost of items purchased through the Active Learning Labs (ALL), if any	Same as total development cost.		Estimated		What equipment did you need to use?								
Total cost covered by the Harvard Research Lab(s) you are affiliated with, if any	0		Exact		Who did you interact with at CNS and how?								

Total cost of items purchase personally, if any	0		Exact		If you are affiliated with a research lab that arranged for your use of CNS facilities, please specify which lab (and resarch administrat or who arranged your access, if you know)														
Total cost covered by a *non-Harvard lab* **and/or company, if any**	0		Exact		If you didn't work through a research lab directly, did the Active Learning Lab sponsor/arr ange your use of CNS resources?														
					What could we have done better to make your CNS experience more productive?														
Please list below all material used in **ALL** that were **not** accounted for in your budget / made available to you at no cost, for e.g.:																			
~1/2 Sheet 1/4" acrylic																			
~6 sqft 3/8" MDF																			
Machine Screws ~100																			
~8ft 80-20																			
Hook up wire																			