

Qty	Part ID	Description	Manufacturer P/N	Digi-Key P/N (or other source)	Price	Ext
CV-NUC+ MAIN BOARD (required)						
1	CV-NUC+ MAIN PCB V1.5	114.3MM x 114.3MM 4-LAYER 1.6MM PCB	JLC (Minimum Order 5 pieces)	N.A.	\$7.50	\$7.50
3	C3,C10,C27	CAP CERAMIC 47PF 200V AXIAL	C410C470J1G5TA7200	399-4472-1-ND	\$0.29	\$0.87
1	C32	CAP CERAMIC 68PF 50V RADIAL	MC1-0603N680J500BF3	4491-MC1-0603N680J500BF3-ND	\$0.25	\$0.25
1	C37	CAP CERAMIC 82PF 50V RADIAL	K820J15C0GF5TH5	BC1041CT-ND	\$0.27	\$0.27
2	C26,C31	CAP CERAMIC 100PF 100V AXIAL	C410C101J1G5TA7200	399-4447-1-ND	\$0.29	\$0.58
1	C29	CAP CERAMIC 150PF 100V RADIAL	K151J15C0GF5TH5	BC1043CT-ND	\$0.26	\$0.26
1	C11	CAP CERAMIC 4700PF 50V RADIAL	K472K10X7RF5UH5	BC2683CT-ND	\$0.22	\$0.22
3	C22,C23,C30	CAP CERAMIC 0.01UF 50V RADIAL	C317C103K5R5TA	399-4206-ND	\$0.24	\$0.72
16	C1,C2,C4,C8,C9,C12,C15,C18,C19,C20,C24,C25,C28,C33,C34,C35	CAP CERAMIC 0.1UF 50V RADIAL	C322C104K5R5TA	399-4329-ND	\$0.21	\$3.36
1	C38	CAP CERAMIC 1UF 50V RADIAL	C330C105K5R5TA	399-4389-ND	\$0.48	\$0.48
2	C13,C21	CAP CERAMIC 10UF 25V RADIAL	C322C106K3R5TA	399-13968-ND	\$0.79	\$1.58
4	C7,C16,C36,C39	CAP ELECTROLYTIC 10UF 16V RADIAL	ECA-1CM100I	P19513CT-ND	\$0.28	\$1.12
1	C14	CAP ELECTROLYTIC 47UF 16V RADIAL	860160372007	732-9460-1-ND	\$0.14	\$0.14
1	C17	CAP ELECTROLYTIC 1000UF 6.3V RADIAL	ECA-0JHG102	P5509-ND	\$0.57	\$0.57
1	R22	RES 47 OHM 1/8W 5% CF AXIAL	CF18JT47R0	CF18JT47R0CT-ND	\$0.10	\$0.10
5	R9,R12,R13,R14,R15	RES 75 OHM 1/8W 5% CF AXIAL	CF18JT75R0	CF18JT75R0CT-ND	\$0.10	\$0.50
4	R20,R21,R33,R37	RES 120 OHM 1/8W 5% CF AXIAL	CF18JT120R	CF18JT120RCT-ND	\$0.10	\$0.40
1	R30	RES 180 OHM 1/8W 5% CF AXIAL	CF18JT180R	CF18JT180RCT-ND	\$0.10	\$0.10
2	R16,R17	RES 220 OHM 1/8W 5% CF AXIAL	CF18JT220R	CF18JT220RCT-ND	\$0.10	\$0.20
1	R29	RES 270 OHM 1/8W 5% CF AXIAL	CF18JT270R	CF18JT270RCT-ND	\$0.10	\$0.10
5	R1,R2,R4,R42,R43	RES 390 OHM 1/8W 5% CF AXIAL	CF18JT390R	CF18JT390RCT-ND	\$0.10	\$0.50
6	R3,R24,R25,R27,R28,R32	RES 1K OHM 1/8W 5% CF AXIAL	CF18JT1K00	CF18JT1K00CT-ND	\$0.10	\$0.60
1	R31	RES 1.1K OHM 1/8W 5% CF AXIAL	CF18JT1K10	CF18JT1K10CT-ND	\$0.10	\$0.10
2	R5,R34	RES 1.8K OHM 1/8W 5% CF AXIAL	CF18JT1K80	CF18JT1K80CT-ND	\$0.10	\$0.20
4	R23,R26,R38,R39	RES 3K OHM 1/8W 5% CF AXIAL	CF18JT3K00	CF18JT3K00CT-ND	\$0.10	\$0.40
1	R11	RES 4.7K OHM 1/8W 5% CF AXIAL	CF18JT4K70	CF18JT4K70CT-ND	\$0.10	\$0.10
6	R7,R10,R36,R40,*RXa,RXb	RES 10K OHM 1/8W 5% CF AXIAL	CF18JT10K0	CF18JT10K0CT-ND	\$0.10	\$0.60
1	R8	RES 47K OHM 1/8W 5% CF AXIAL	CF18JT47K0	CF18JT47K0CT-ND	\$0.10	\$0.10
2	R35,R41	RES 100K OHM 1/8W 5% CF AXIAL	CF18JT100K	CF18JT100KCT-ND	\$0.10	\$0.20
1	R6	RES 470K OHM 1/8W 5% CF AXIAL	CF18JT470K	CF18JT470KTR-ND	\$0.10	\$0.10
2	RN1,RN2	RES ARRAY 7 RES 22K OHM 8SIP	4608X-101-223LF	4608X-101-223LF-ND	\$0.63	\$1.26
1	L1	FIXED IND 2.7UH 595MA 280MOHM TH	78F2R7K-RC	78F2R7K-RC-ND	\$0.28	\$0.28
1	D1	DIODE SCHOTTKY 40V 2A DO-204AC	SB240-E3/54	SB240-E3/54GICT-ND	\$0.52	\$0.52
1	D2	DIODE ZENER 6.2V 400MW DO-35	BZX79-C6V2,133	1727-6150-1-ND	\$0.16	\$0.16
2	D3,D4	DIODE GEN PURP 100V 200MA DO-35	1N4148	1N4148FS-ND	\$0.10	\$0.20
1	D5	LED 3MM 2-HIGH YELLOW/YELLOW	SSF-LXH2103YYD/4	67-1256-ND	\$1.16	\$1.16
2	Q3,Q4	TRANS NPN 40V 1A TO92-3	PN2222A	2368-PN2222A-ND	\$0.11	\$0.22
3	Q1,Q2,Q5	TRANS PNP 60V 0.6A TO92-3	PN2907A	2368-PN2907A-ND	\$0.11	\$0.33
2	Q6,Q7	MOSFET N-CH 60V 200MA TO92-3	2N7000	2N7000FS-ND	\$0.51	\$1.02
1	J1 (PWR)	CONN R/A COAXIAL PWR JACK 2.5x5.5MM	CUI PJ-059B	CP-059B-ND	\$0.89	\$0.89
1	J2 (AV)	CONN RECEPTACLE FEMALE DIN 5POS	B-1001-R	Jameco.com P/N: 29399	\$1.25	\$1.25
1	J3 (CART)	CONN EDGE DUAL FEMALE 30POS 2.54MM	5530841-2	5530841-2-ND	\$4.73	\$4.73
2	J4,J5 (JOYSTICKS)	CONN D-SUB JACK MALE 9POS R/A	A-DS 09 A/KG-T4S	AE10970-ND	\$0.79	\$1.58
2	J6 (MSX Module)	CONN RCPT VERT 14POS 2.54MM DIP	PPPC072LFBN-RC	S7110-ND	\$0.97	\$1.94
1	J6 (MSX Module)	CONN HDR SOCKET 14POS 2.54MM SIP	PPPC141LFBN-RC	S7047-ND	\$0.95	\$0.95
1	J7 (KEYPAD)	CONN PIN HEADER VERT 7POS 2.54MM SIP	PH1-07-UA	2057-PH1-07-UA-ND	\$0.15	\$0.15
1	J8 (QUAD A)	CONN HDR SOCKET 11POS 2.54MM SIP	PPPC111LFBN-RC	S7044-ND	\$0.74	\$0.74

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1	J9 (QUAD B)	CONN HDR SOCKET 4POS 2.54MM SIP	PPPC041LFBN-RC	S7037-ND	\$0.47	\$0.47
1	J10 (QUAD C)	CONN HDR SOCKET 2POS 2.54MM SIP	PPTC021LFBN-RC	S7000-ND	\$0.32	\$0.32
1	SW1	SWITCH TOGGLE SPDT 6A 125V (modified)	M2012SA2W40	360-2837-ND	\$5.47	\$5.47
2	SW2,SW3	SWITCH TACTILE SPST-NO 0.05A 24V	1-1825027-1	450-1658-ND	\$0.31	\$0.62
1	U1	DC-DC LOW NOISE REG 5V 1AMP TO220	PSU2-5	EZSBC.com	\$6.95	\$6.95
1	U3	IC TV VIDEO MODULATOR/ENCODER 18DIP	LM1889N	AliExpress/eBay (estimated cost)	\$3.00	\$3.00
1	U4	IC CMOS BILATERAL SWITCH x 4 14DIP	CD4066BE	296-2061-5-ND	\$0.56	\$0.56
1	U5	IC BUFFER VIDEO 3-CHAN 8SOIC	FMS6400CS1	AliExpress/eBay (estimated cost)	\$1.50	\$1.50
2	U6,U7	IC SMOS DRAM 64K-Bit (16Kx4) 120ns 18DIP	TMS4416-12NL/MB81416-10	Jameco.com P/N: 2288023	\$3.59	\$7.18
1	U8	IC VIDEO DISPLAY PROCESSOR 40DIP	TMS9128NL	AliExpress/eBay (estimated cost)	\$8.00	\$8.00
1	U9 (Programmable Device)	IC EEPROM 64KBIT PARALLEL 28DIP	AT28C64B-15PU	AT28C64B-15PU-ND	\$5.55	\$5.55
1	U10	IC GATE NAND 4CH 2-INP 14DIP	SN74HCT00N	296-1603-5-ND	\$0.68	\$0.68
1	U11	IC CMOS CPU Z80 8MHZ 40DIP	Z84C0008PEG	269-3895-ND	\$9.66	\$9.66
1	U12	IC DECODER/DEMUX 1X3:8 16DIP	SN74HCT138N	296-1608-5-ND	\$0.78	\$0.78
2	U13,U14	IC FF D-TYPE DUAL 1BIT 14DIP	SN74HCT74N	296-1625-5-ND	\$0.60	\$1.20
2	U15,U16	IC BUFFER x 8 NON-INVERT 20DIP	SN74LS541N	296-1666-5-ND	\$1.50	\$3.00
1	U17	IC INVERT SCHMITT 6CH 1-IN 14DIP	SN74HC14N	296-1577-5-ND	\$0.99	\$0.99
1	U18	IC OSC SINGLE TIMER 100KHZ 8DIP	NE555P	296-NE555P-ND	\$0.48	\$0.48
1	U19	XTAL OSC 14.31818MHZ HCMOS	ACH-14.31818MHZ-EK	535-9170-5-ND	\$1.77	\$1.77
1	U18	CONN IC DUAL LEAF DIP SOCKET 8POS	ED08DT	ED3044-5-ND	\$0.21	\$0.21
5	U4,U10,U13,U14,U17	CONN IC DUAL LEAF DIP SOCKET 14POS	ED14DT	ED3045-5-ND	\$0.19	\$0.95
1	U12	CONN IC DUAL LEAF DIP SOCKET 16POS	ED16DT	ED3046-5-ND	\$0.26	\$0.26
3	U3,U6,U7	CONN IC DUAL LEAF DIP SOCKET 18POS	ED18DT	ED3047-5-ND	\$0.22	\$0.66
2	U15,U16	CONN IC DUAL LEAF DIP SOCKET 20POS	ED20DT	ED3054-5-ND	\$0.31	\$0.62
1	U9	CONN IC DUAL LEAF DIP SOCKET 28POS	ED28DT	ED3052-5-ND	\$0.34	\$0.34
2	U8,U11	CONN IC DUAL LEAF DIP SOCKET 40POS	ED40DT	ED3048-5-ND	\$0.48	\$0.96
3	U8	RASPBERRY PI COPPER HEATSINK	FIT0367	1738-1006-ND	\$0.99	\$2.97
1	PSU	AC/DC WALL ADAPTER 2.5x5.5MM 12V 24W	KSA-24W-120200VU(ROHS)	Jameco.com P/N: 2295471	\$10.95	\$10.95

Shipping Not Included

Total= \$115.70

Components U2,C5,C6,R18,R19 DO NOT EXIST on the CV-NUC+ MAIN PCB (*RXa & RXb are tacked to the bottom of the PCB)

CV-NUC+MSX BOARD (required)

1	CV-NUC+MSX PCB V1.5	94MM x 45MM 4-LAYER 1.6MM PCB	JLC (Minimum Order 5 pieces)	N.A.	\$1.40	\$1.40
6	C1,C2,C3,C5,C6,C7	CAP CERAMIC 0.1UF 50V RADIAL	C322C104K5R5TA	399-4329-ND	\$0.21	\$1.26
1	C4	CAP CERAMIC 10UF 25V RADIAL	C322C106K3R5TA	399-13968-ND	\$0.86	\$0.86
1	R5	RES 390 OHM 1/8W 5% CF AXIAL	CF18JT390R	CF18JT390RCT-ND	\$0.10	\$0.20
1	R6	RES 1K OHM 1/8W 5% CF AXIAL	CF18JT1K00	CF18JT1K00CT-ND	\$0.10	\$0.10
2	R1,R2	RES 3K OHM 1/8W 5% CF AXIAL	CF18JT3K00	CF18JT3K00CT-ND	\$0.10	\$0.20
1	R4	RES 4.7K OHM 1/8W 5% CF AXIAL	CF18JT4K70	CF18JT4K70CT-ND	\$0.10	\$0.10
1	R3	RES 10K OHM 1/8W 5% CF AXIAL	CF18JT10K0	CF18JT10K0CT-ND	\$0.10	\$0.10
1	Q1	TRANS NPN 40V 1A TO92-3	PN2222A	2368-PN2222A-ND	\$0.11	\$0.11
2	J1 (MSX)	CONN PIN HDR VERT 14POS 2.54MM DIP	G800LW589018EU	664-G800LW589018EU-ND	\$0.35	\$0.70
1	J1 (MSX)	CONN PIN HEADER R/A 14POS 2.54MM SIP	PRPC014SBAN-M71RC	S1111EC-14-ND	\$0.43	\$0.43
1	J2 (JTAG) ATF1502AS ONLY	CONN PIN HDR VERT 10POS 2.54MM DIP	PH2-10-UA	2057-PH2-10-UA-ND	\$0.17	\$0.17
1	U1 (Programmable Device)	IC CPLD 32MC 10NS 44PLCC	ATF1500A-10JU	ATF1500A-10JU-ND	\$3.82	\$3.82
1	U2	IC 256Kbit Parallel 25 ns SRAM 28DIP (0.3")	71256SA25TPG	800-1433-5-ND <small>Last Time Buy 7/31/2023</small>	\$3.92	\$3.92
1	U3	IC TEXAS INSTRUMENTS PSG 16DIP	SN76489AN	AliExpress/eBay (estimated cost)	\$1.00	\$1.00
1	U4	IC YAMAHA PSG 40DIP	YM2149F	AliExpress/eBay (estimated cost)	\$4.00	\$4.00
1	U1	CONN IC THT PLCC SOCKET 44POS	PLCC-44-AT	2057-PLCC-44-AT-ND	\$1.36	\$1.36
1	U2	CONN IC DUAL LEAF DIP SOCKET 28POS	ICS-328-T	2057-ICS-328-T-ND	\$0.27	\$0.27

Qty	Part ID	Description	Manufacturer P/N	Digi-Key P/N (or other source)	Price	Ext
1	U3	CONN IC DUAL LEAF DIP SOCKET 16POS	ED16DT	ED3046-5-ND	\$0.26	\$0.26
1	U4	CONN IC DUAL LEAF DIP SOCKET 40POS	ED40DT	ED3048-5-ND	\$0.48	\$0.48

The CV-NUC+MSX board can also accept an ATF1502AS-7JX44 CPLD which supports JTAG programming

Shipping Not Included

Total= \$20.74

CV-NUC+QUAD BOARD (absolutely required if Roller-Controller and/or USB Mouse Support is a must)

1	CV-NUC+QUAD PCB V1.5	51.4MM x 47MM 2-LAYER 1.6MM PCB	JLC (Minimum Order 5 pieces)	N.A.	\$1.00	\$1.00
2	C5,C9	CAP CERAMIC 100PF 100V AXIAL	C410C101J1G5TA7200	399-4447-1-ND	\$0.29	\$0.58
2	C4,C8	CAP CERAMIC 0.01UF 50V RADIAL	C317C103K5R5TA	399-4206-ND	\$0.24	\$0.48
2	C10,C11	CAP CERAMIC .047UF 50V RADIAL	C322C473K5R5TA	399-4371-ND	\$0.32	\$0.64
5	C1,C6,C7,C12,C13	CAP CERAMIC 0.1UF 50V RADIAL	C322C104K5R5TA	399-4329-ND	\$0.21	\$1.05
2	C2,C3	CAP ELECTROLYTIC 10UF 16V Radial	ECA-1CM100I	P19513CT-ND	\$0.27	\$0.54
1	R14	RES 1K OHM 1/8W 5% CF AXIAL	CF18JT1K00	CF18JT1K00CT-ND	\$0.10	\$0.10
1	R10	RES 1.5K OHM 1/8W 5% CF AXIAL	CF18JT1K50	CF18JT1K50CT-ND	\$0.10	\$0.10
2	R7,R11	RES 1.8K OHM 1/8W 5% CF AXIAL	CF18JT1K80	CF18JT1K80CT-ND	\$0.10	\$0.20
7	R1,R2,R4,R12,R13,R15,R16	RES 10K OHM 1/8W 5% CF AXIAL	CF18JT10K0	CF18JT10K0CT-ND	\$0.10	\$0.70
2	R5,R8	RES 22K OHM 1/8W 5% CF AXIAL	CF18JT22K0	CF18JT22K0CT-ND	\$0.10	\$0.20
1	R3	RES 47K OHM 1/8W 5% CF AXIAL	CF18JT47K0	CF18JT47K0CT-ND	\$0.10	\$0.10
2	R6,R9	RES 100K OHM 1/8W 5% CF AXIAL	CF18JT100K	CF18JT100KTR-ND	\$0.10	\$0.20
2	RN1,RN2	RES ARRAY 4 RES 10K OHM 5SIP	4605X-101-103LF	4605X-101-103LF-ND	\$0.47	\$0.94
8	D1,D2,D3,D4,D5,D6,D7,D8	DIODE GEN PURP 100V 200MA DO-35	1N4148	1N4148FS-ND	\$0.10	\$0.80
1	D9	LED-BLUE DIFFUSED T-1	NTE3183	2368-NTE3183-ND	\$1.48	\$1.48
2	Q1,Q2	TRANS NPN 40V 1A TO92-3	PN2222A	2368-PN2222A-ND	\$0.11	\$0.22
1	Q3	MOSFET N-CH 60V 200MA TO92-3	2N7000	2N7000FS-ND	\$0.51	\$0.51
1	J1,J2,J3 (QUAD A,B,C)	CONN PIN HEADER VERT 50POS 2.54MM SIP	TSW-150-15-T-S	SAM12373-ND	\$3.71	\$3.71
1	J4 (BOOT)	CONN PIN HEADER VERT 2POS 2.54MM SIP	PH1-02-UA	2057-PH1-02-UA-ND	\$0.10	\$0.10
1	J5	USB Type-A R/A THT Socket Connector	SS-52100-001	380-1412-ND	\$0.57	\$0.57
1	U1	IC GATE NAND 4CH 2-INP 14DIP	SN74HCT00N	296-1603-5-ND	\$0.68	\$0.68
2	U3,U4	IC BILATERAL SW 1 X 1:1 14DIP	CD4066BE	296-2061-5-ND	\$0.56	\$1.12
1	U2 (Programmable Device)	IC E8051 MCU 24MHZ USB 16SOIC	CH554G	AliExpress/eBay (estimated cost)	\$1.00	\$1.00
3	U1,U3,U4	CONN IC DUAL LEAF DIP SOCKET 14POS	ED14DT	ED3045-5-ND	\$0.19	\$0.57

Shipping Not Included

Total= \$17.59

CV-KEYPAD BOARD (optional – adds built-in controller #1 keypad in case of using Atari or Genesis controllers)

1	CV-KEYPAD PCB V1.2	36.8MM x 31.8MM 2-LAYER 1.6MM PCB	JLC (Minimum Order 5 pieces)	N.A.	\$1.00	\$1.00
1	C1	CAP CERAMIC 0.1UF 50V RADIAL	C322C104K5R5TA	399-4329-ND	\$0.21	\$0.21
4	R1,R2,R3,R4	RES 10K OHM 1/4W 5% CF AXIAL	CF14JT10K0	CF14JT10K0CT-ND	\$0.10	\$0.40
1	J1 (KEYPAD-IN)	CONN PIN HDR VERT 9POS 2.54MM SIP	PH1-09-UA	2057-PH1-09-UA-ND	\$0.19	\$0.19
1	J2 (KEYPAD-OUT)	CONN PIN HEADER VERT 7POS 2.54MM SIP	PH1-07-UA	2057-PH1-07-UA-ND	\$0.15	\$0.15
1	J3 (ICSP – optional)	CONN PIN HEADER VERT 5POS 2.54MM SIP	PH1-05-UA	2057-PH1-05-UA-ND	\$0.10	\$0.10
1	J1	SparkFun Telephone Style 12-Key Pad	COM-14662	1568-1856-ND	\$4.95	\$4.95
1	U1	IC BILATERAL SW 1 X 1:1 14DIP	CD4066BE	296-2061-5-ND	\$0.56	\$0.56
1	U2 (Programmable Device)	IC MCU 8BIT 1.75KB FLASH 14DIP	PIC16F630-I/P	PIC16F630-I/P-ND	\$2.12	\$2.12
2	U1,U2	CONN IC DUAL LEAF DIP SOCKET 14POS	ED14DT	ED3045-5-ND	\$0.19	\$0.38
1	J1	2.54MM DUPONT 7-PIN F-F 20cm FLAT CABLE	Adafruit 4938	1528-4938-ND	\$0.95	\$0.95

Shipping Not Included

Total= \$11.01

The Brewing Academy will be selling a bare PCB kit with the programmable and hard to find ICs included (all but the CH554G will be pre-programmed). 3D printed cases will be available as well.

Substitution: Any resistor with the same ohm value and same wattage can be swapped from any vendor or manufacturer, assuming that the length and width are fairly similar in size.

1N914 diodes can be swapped for 1N4148 diodes. 2N3904 NPN transistors can be swapped for PN2222. 2N3906 PNP transistors can be swapped for PN2907.

No-Substitution: Texas Instruments chips have been specified for the glue logic, and that's what should be adhered to in order to avoid any potential timing issues. Same goes for LS, HC, or HCT specific versions. The PSU2-5 from EZSBC is an extremely low-noise Switch-Mode 5VDC Regulator, and should not be substituted with something else due to potential video interference issues.