MikroLeo v0.1901 Bill of Materials

https://github.com/edson-acordi/4bit-microcomputer

Visit the project repository and support this project!
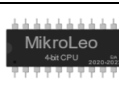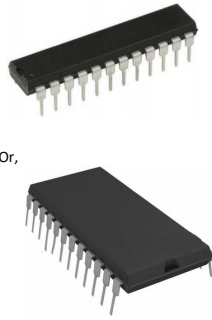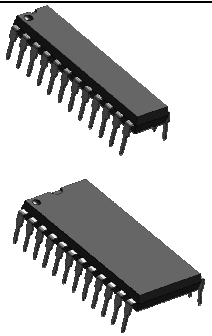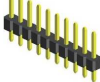
Id	Identification on the PCB	KiCad Package reference	Quantity	Function	Component part/value	Description	Physical aspect	Note	Supplier and ref
1	J67,J66,J50,J53,J54,J55,J56,J57,J58,J59	PinHeader_1x01_P2.54mm_Vertical	10		Conn_01x01_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
2	U46,U45,U44	DIP-8_W7.62mm_Socket	3	Clock	LM555	Timer (DIP-8)			https://www.mouser.com/ProductDetail/Texas-Instruments/LM555CN-NOPB?qs=QbsRYf82W3GjZpQL%2FakZOg%3D%3D
3	U5,U4,U3	DIP-16_W7.62mm	3	Program Counter (PC)	74HCT161	4-Bit Binary Counter With Asynchronous Reset			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT161E?qs=D5pVkbrsqqKvSCLRbNxabg%3D%3D
4	C58,C61,C59	C_Disc_D5.0mm_W2.5mm_P2.50mm	3	Delay Line (RAM)	22p	22p ceramic disc Capacitor (Lead Spacing = 2.5 mm)		optional (used for testing)	https://www.mouser.com/ProductDetail/Vishay-BC-Components/K220J15C0GF53L2?qs=k6LumrLTTeWv6vqIDyH76Q%3D%3D
5	BT1	BatteryHolder_Keystone_103_1x20mm	1	Program memory data retention	CR2032	20mm Horizontal Coin Cell Holder For CR2032 Type Batteries			https://www.mouser.com/ProductDetail/Keystone-Electronics/101?qs=sZfk%252BfAlGe5FX1UhR7FWzQ%3D%3D
6	BT1		1	Program memory data retention	CR2033	CR2032 3 V Coin Cell Battery Non-Rechargeable			https://www.mouser.com/ProductDetail/Panasonic-Battery/CR2032?qs=%2FcnINApUglPgybvG%2FLSG7w%3D%3D
7	U40,U43,U37,U34,U13	DIP-14_W7.62mm	5	ALU, Control Unit, Clock	74HCT32	Quad 2-Input OR Gate			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT32E?qs=KaAwwOlwaptQFgwtvZc7jA%3D%3D
8	R48,R64,R63,R62,R61,R60,R59,R58	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	8	OR logic gates (with Diode-Resistor)	2.2k	Resistor 2.2 kΩ (1/4 W - 5%)			https://www.mouser.com/ProductDetail/YAGEO/CFR-25JB-52-2K2?qs=oypCK0zG327VTyS4ZTRfWw%3D%3D
9	U7,U18,U17,U11	DIP-16_W7.62mm	4	Addressing Modes, ALU	74HCT157	Quadruple 2-Line To 1-Line Data Selectors/Multiplexers			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT157E?qs=spW5eSrOWB6trZoesU4jEQ%3D%3D
10	U2,U42,U36,U35	DIP-14_W7.62mm	4	Timing for Jump Control, ALU, Control Unit, Clock	74HCT08	Quadruple 2-Input Positive-AND Gates			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT08E?qs=dQbkqP7qjaY6wv23XXmChw%3D%3D

11	M1,M2	DIP-24_W7.62mm_and_W15.24mm	2	Program Memory	Static RAM 6116	Low power CMOS Static RAM 16k (2k x 8-Bit) 25 nS	Or,			https://www.mouser.com/ProductDetail/Renesas-Electronics/6116LA25TPG?qs=GVScuG1d83hdkT%2Fq5jR43w%3D%3D
12	M3	DIP-24_W7.62mm_and_W15.24mm	1	Randon Access Memory	Static RAM 6116	Standard CMOS Static RAM 16k (2k x 8-Bit)	Or,			https://www.mouser.com/ProductDetail/Renesas-Electronics/6116SA25TPG?qs=SmUuHNCnblqRA5%2FvttWSNw%3D%3D
13	R40,R3,R75,R72,R65,R57,R54,R53,R45,R35,R27,R36,R28,R37,R29,R38,R30,R39,R31,R32,R41,R33,R42,R34,R8,R7,R6,R5	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	28	ALU	1k	Resistor 1 kΩ (1/4 W - 5%)				https://www.mouser.com/ProductDetail/YAGEO/CFR-25JT-52-1K?qs=KUIzHt%2Fe91mODjNMcON1KQ%3D%3D
14	Q1	TO-92_Wide	1	Power Supervisory Circuit	BC548	Transistor BC548				https://www.mouser.com/ProductDetail/Diotec-Semiconductor/BC548BBK?qs=OlC7AqGiEDn6T8hJ38B5HA%3D%3D
15	RV1	PinHeader_1x03_P2.54mm_Vertical	1		1M	2.54mm Vertical (Through hole) pin header				https://www.mouser.com/ProductDetail/Wurth-Elektronik/61300311121?qs=PhR8RmCirEYxRWFJzNKsUw%3D%3D
16	RV1		1	Clock	1 MΩ	1 MΩ Linear Potentiometer				https://www.mouser.com/ProductDetail/Alpha-Taiwan/RV24AF-10-15R1-B1M-3?qs=sGAEpiMZZMtC25l1F4XBU7CwNoxw1lJd%252BZ9np7CsJcA%3D

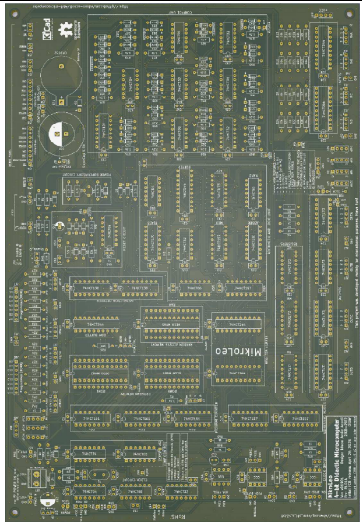| #	Reference	Footprint	Qty	Description	Value	Details			Link
17	J49,J45,J44,J31,J24,J25,J23,J22,J19,J21,J20,J13,J14,J15,J12,J11,J10,J9,J6,J5,J4,J16	PinHeader_1x04_P2.54mm_Vertical	22	Registers (dACC, dRA, dRB, dRC), Output ports, Input Ports, Program Counter (dPCH, dPCM, dPCL), Instruction Word (dHiNB, dMicro, dMAddr, dOPR), +Vcc, GND	Conn_01x04_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Amphenol-Commercial-Products/G800LW304032EU?qs=f9yNj16SXrLHgSdDNFfKUA%3D%3D
18	J48,J47,J46,J43,J42,J41,J33,J30,J26,J8,J1,J52,J60,J61,J62	PinHeader_1x02_P2.54mm_Vertical	15		Conn_01x02_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
19	J18,J17	PinHeader_1x08_P2.54mm_Vertical	2	Programming Connector	Conn_01x08_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990846?qs=ulE8k0yEMYb37YKanNqd%2FQ%3D%3D
20	R80,R68	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	2	Power Led, Clock 555	3k	Resistor 3 kΩ (1/4 W - 5%)			https://www.mouser.com/ProductDetail/YAGEO/CFR-25JR-52-3K?qs=sGAEpiMZZMsPqMdJzcrNwq%2F3sCyPxxe3m74NtL2wdb8%3D%3D
21	LED1,LED2	LED_D3.0mm	2	Power, Debug	LED	3mm red and green round LED			https://www.mouser.com/ProductDetail/Vishay-Semiconductors/TLHK46Q1R2?qs=5csRq1wdUj6nsU7Fz0sZGQ%3D%3D; https://www.mouser.com/ProductDetail/Vishay-Semiconductors/TLLG4400-AS12?qs=ZTK%252Bjoi3Sg6xGMde4j6A1A%3D%3D
22	J40,J39	PinHeader_1x01_P2.54mm_Vertical	2	Program Memory, RAM	A11	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
23	J38	PinHeader_1x02_P2.54mm_Vertical	1	3V Battery	JP_BAT	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
24	J37	TerminalBlock_Phoenix_MKDS-1,5-2_1x02_P5.00mm_Horizontal	1	Power Input	Conn_01x02_Male	PCB terminal block - MKDS 1.5/ 2-5.08			https://www.mouser.com/ProductDetail/Phoenix-Contact/1718760?qs=5SfROSHwb7AuQGo2ssSrww%3D%3D
25	C60	CP_Radial_D14.0mm_P5.00mm	1	Program memory data retention	1.5F	Supercapacitor 1.5 F - 5.5 V, diameter: 21.5 mm		optional	https://www.mouser.com/ProductDetail/Elna/RSCB11555R5L08015T?qs=4ASt3YYao0Wv%252BENvnw%252BeJg%3D%3D

#	Reference	Footprint	Qty	Function	Value	Description	Image		Link
26	D59,D58,D57,D56,D55,D54,D53,D52,D51,D50,D49,D48,D47,D46,D45,D44,D43,D42,D41,D40,D39,D38,D37,D36,D35,D34,D33,D32,D31,D30,D29,D28,D27,D26,D25,D9,D8,D7,D6,D3,D2,D1	D_DO-35_SOD27_P7.62mm_Horizontal	42	ALU, Control Unit, Reset Circuit, Power Supervisory Circuit, Program Memory Programming (Diode-resistor logic -AND)	BAT42	BAT42 or 1N60P (Small Signal Schottky Diode)			https://www.mouser.com/ProductDetail/STMicroelectronics/BAT42?qs=JV7lzlMm3yIGVWxr6mLMfQ%3D%3D
27	J36,J32,J29,J28,J3,J2,J63,J64	PinHeader_1x03_P2.54mm_Vertical	8	Clock Auto/Manual, Potentiometer, CLK Delay, EN Freq, Pierce Out, ROM size, Disable ID, Debug Panel	Conn_01x03_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Wurth-Elektronik/61300311121?qs=PhR8RmCirEYxRWFJzNKsUw%3D%3D
28	J35,J34	PinHeader_1x09_P2.54mm_Vertical	2	Control Signals (Debug Panel)	Conn_01x09_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990946?qs=ulE8k0yEMYaFEw9lvogPjA%3D%3D
29	C63	CP_Radial_D8.0mm_P5.00mm	1	Power	220u	470 µF / 16 V electrolytic capacitor (Lead Spacing = 5 mm)			https://www.mouser.com/ProductDetail/EPCOS-TDK/B41888C4477M000?qs=sGAEpiMZZMsh%252B1woXyUXjwldr5%252B2pbyU3VuAu6bQPuI%3D
30	C36,C33,C44,C30,C57,C56,C55,C46,C45,C43,C42,C41,C40,C39,C38,C37,C35,C34,C32,C31,C29,C28,C27,C26,C24,C23,C22,C21,C20,C19,C18,C17,C16,C14,C12,C11,C9,C8,C7,C6,C5,C4,C3,C2,C1	C_Disc_D5.0mm_W2.5mm_P2.50mm	45	Decoupling	0.1u	100 nF ceramic disc Capacitor (Lead Spacing = 2.5 mm)			https://www.mouser.com/ProductDetail/Vishay-BC-Components/K104K15X7RF5TL2?qs=sGAEpiMZZMsh%252B1woXyUXj3VKThCaWizcGzXWb87MXvc%3D
31	U41,U39,U30,U16	DIP-14_W7.62mm	4	Reset Circuit, ALU, RAM, Instruction Decoder (ID), Control Unit,	74HCT04	6-ch inverters			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT04E?qs=MXJmdiNpZe%2FLz1vF%252BbdCPg%3D%3D
32	SW3	PinHeader_1x03_P2.54mm_Vertical	1		SW_DPDT_x2	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Wurth-Elektronik/61300311121?qs=PhR8RmCirEYxRWFJzNKsUw%3D%3D
33	SW2	PinHeader_1x02_P2.54mm_Vertical	1		SW_Push	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
34	SW1	PinHeader_1x02_P2.54mm_Vertical	1	Reset Circuit	RESET	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
35	J27,J51	PinHeader_1x02_P2.54mm_Vertical	2		Conn_01x03_Male	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
36	J7	PinHeader_1x03_P2.54mm_Vertical	1	OEROM/WEROM	ROM_CTRL	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Wurth-Elektronik/61300311121?qs=PhR8RmCirEYxRWFJzNKsUw%3D%3D
37	C15,C13,C10,C25	C_Disc_D5.0mm_W2.5mm_P2.50mm	4	Decoupling	0.1uF	100 nF ceramic disc Capacitor (Lead Spacing = 2.5 mm)			https://www.mouser.com/ProductDetail/Vishay-BC-Components/K104K15X7RF5TL2?qs=sGAEpiMZZMsh%252B1woXyUXj3VKThCaWizcGzXWb87MXvc%3D

#	Designator	Footprint	Qty	Function	Part	Description	Image		Link
38	Y1	Crystal_HC49-U_Vertical	1	Clock	3Mhz/30pF	Crystal 3 MHz			https://br.mouser.com/ProductDetail/IQD/LFXTAL012580Bulk?qs=e4%2FAndAAwgKJHp6s%2Fvhjog%3D%3D
39	U38,U9	DIP-14_W7.62mm	2	ALU, Control Unit	74HCT00	Quad 2-input NAND gate			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT00E?qs=dQbkqP7qjabenzcveGuwtQ%3D%3D
40	U33	DIP-16_W7.62mm	1	Control Unit	74HCT139	Dual 2-Line To 4-Line Decoders/Demultiplexers			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT139E?qs=1K8%2FAQHn5WTLdoU8DSjgGg%3D%3D
41	U32,U31	DIP-16_W7.62mm	2	Instruction Decoder	74HCT138	3-Line to 8-Line Decoders/Demultiplexers			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT138E?qs=IEl3ej0IqwCH%2FZM9hy22Dg%3D%3D
42	U29,U28,U23,U22,U14,U6	DIP-20_W7.62mm	6	ALU, Program Memory Buffer, Register Buffer, Input Ports	74HCT244	8 three-state non-inverting buffers (DIP-20)			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT244E?qs=Zu35EjizYSQlHH5t78bA9Q%3D%3D
43	U27,U26,U25,U24,U21,U20,U19,U15,U12	DIP-16_W7.62mm	9	Registers, ALU, Output Ports	74HCT173	Quad D-Type Flip-Flop			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT173E?qs=xFfolx0DHx2tDVlMzi%2FMtQ%3D%3D
44	U10	DIP-16_W7.62mm	1	ALU	74HCT283	4-Bit Binary Full Adder with Fast Carry			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT283E?qs=RnzODY3cU8usGwlMNOS8bg%3D%3D
45	U8	DIP-14_W7.62mm	1	ALU	74HCT86	Quad 2-input EXCLUSIVE-OR gate			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT86E?qs=MXJmdiNpZe%2FMzcfaKOor4w%3D%3D
46	U1	DIP-14_W7.62mm	1	Timing for Jump Control	74HCT74	Two independent D-type positive-edge-triggered flip-flops			https://www.mouser.com/ProductDetail/Texas-Instruments/CD74HCT74E?qs=ZA235jQDfboKM%252BOEvlrfDA%3D%3D
47	R79,R78,R77,R76,R74,R73,R71,R70,R69,R67,R2,R1	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	12	AND logic gates (with Diode-Resistor)	1.5k	Resistor 1.5 kΩ (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JB-52-1K5?qs=%2F35zJ5USjokhRsfIrdvtSA%3D%3D
48	R66,R55	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	2	Clock	1M	Resistor 1 MΩ (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JR-52-1M?qs=19cKSROHwrDv1LccBOiIeg%3D%3D
49	R56,R50,R49,R47,R26,R20,R12,R19,R11,R24,R18,R16,R10,R25,R23,R17,R15,R9,R22,R14,R21,R13,R4	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	23	Power Supervisory Circuit, Program Memory, Input Ports, Clock, Reset Circuit, Instruction Decoder	10k	Resistor 10 kΩ (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JR-52-10K?qs=sGAEpiMZZMsPqMdJzcrNwslF2s3r2P4ueQrADaNOpZE%3D

#	References	Footprint	Section	Value	Description		Notes	Link
50	R52,R51	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	2	Power Supervisory Circuit	4.7k	Resistor 4.7 kΩ (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JB-52-4K7?qs=oypCK0zG3252T%2FvSUvCH9g%3D%3D
51	R46	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	1	Program Memory Programming (RSTPC)	100R	Resistor 100 Ω (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JR-52-100R?qs=KUIzHt%2Fe91nDL6zazlEElQ%3D%3D
52	R44,R43	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	2	Reset Circuit	22k	Resistor 22 kΩ (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JB-52-2K?qs=oypCK0zG327uIuS5q6gUYA%3D%3D
53	D24,D23,D22,D21,D20,D19,D18,D17,D16,D15,D14,D13,D12,D11,D10,D5,D4	D_DO-35_SOD27_P7.62mm_Horizontal	17	Control Unit, Reset Circuit, Clock	1N4148	Small Signal Fast Switching Diode			https://br.mouser.com/ProductDetail/onsemi-Fairchild/1N4148?qs=i4Fj9T%2FoRm8RMUhj5DeFQg%3D%3D
54	C54,C51,C48	C_Disc_D5.0mm_W2.5mm_P2.50mm	3	Clock	10nF	10 nF ceramic disc Capacitor (Lead Spacing = 2.5 mm)			https://br.mouser.com/ProductDetail/Vishay-BC-Components/K103K15X7RF5TL2?qs=sGAEpiMZZMukHu%252BjC5l7YTKm9k8%252BmTYhIQJ%252B3RFRUsc%3D
55	C53	C_Disc_D5.0mm_W2.5mm_P2.50mm	1	Delay Line (Clock)	22pf	22 pF ceramic disc Capacitor (Lead Spacing = 2.5 mm)		optional (used for testing)	https://www.mouser.com/ProductDetail/Vishay-BC-Components/K220J15C0GF53L2?qs=k6LumrLTTeWv6vqIDyH76Q%3D%3D
56	C52	C_Disc_D5.0mm_W2.5mm_P2.50mm	1		100nF	100 nF ceramic disc Capacitor (Lead Spacing = 2.5 mm)			https://www.mouser.com/ProductDetail/Vishay-BC-Components/K104K15X7RF5TL2?qs=sGAEpiMZZMsh%252B1woXyUXj3VKThCaWizcGzXWb87MXvc%3D
57	C50,C49	C_Disc_D5.0mm_W2.5mm_P2.50mm	2	Clock	47p	47 pF ceramic disc Capacitor (Lead Spacing = 2.5 mm)			https://br.mouser.com/ProductDetail/Vishay-BC-Components/K470J15C0GF53L2?qs=0lkCALImJFekxt0ldj4Frg%3D%3D
58	C47	C_Radial_D5.0mm_H5.0mm_P2.00mm	1	Clock	1uF	1 μF / 50 V electrolytic capacitor (Lead Spacing = 2.0 mm)			https://br.mouser.com/ProductDetail/Wurth-Elektronik/860020672005?qs=0KOYDY2FL29w5cS8aahRvQ%3D%3D
59	C62	CP_Radial_D5.0mm_P2.00mm	1	Reset Circuit	1uF	1 μF / 50 V electrolytic capacitor (Lead Spacing = 2.0 mm)			https://br.mouser.com/ProductDetail/Wurth-Elektronik/860020672005?qs=0KOYDY2FL29w5cS8aahRvQ%3D%3D
60	R81	R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal	1	Debug LED	510R	Resistor 510 Ω (1/4 W - 5%)			https://br.mouser.com/ProductDetail/YAGEO/CFR-25JB-52-510R?qs=sGAEpiMZZMsPqMdJzcrNwkGvfS0epmCo4GHZgsx7r8f5DwaE1wDfJg%3D%3D
61	C64	C_Disc_D5.0mm_W2.5mm_P2.50mm	1	Delay Line (CLOCKACC)	33p	33 pF ceramic disc Capacitor (Lead Spacing = 2.5 mm)		optional (used for testing)	https://br.mouser.com/ProductDetail/Vishay-BC-Components/K330J15C0GF53K2?qs=sGAEpiMZZMuMW9TJLBQkXn2nO3sjTuu%2FxFDmqCX1xbw%3D
62	J65	PinHeader_1x02_P2.54mm_Vertical	1	For Supercapacitor	JP_SCAP	2.54mm Vertical (Through hole) pin header			https://www.mouser.com/ProductDetail/Harwin/M20-9990246?qs=Jph8NoUxIfWjw4WmyRvzag%3D%3D
63			3	Program Memory / RAM		24 Pin DIP IC Socket (row spacing = 0.3")		Optional, but recommended. Machined socket is better, but it is more difficult to fit the IC.	https://br.mouser.com/ProductDetail/Mill-Max/21043-324-41-001000?qs=IGgAdOvCTsQhUss5rXpCyw%3D%3D
64			6	Program Memory / RAM		12 pin SIP Machined Socket		Can be used to make Memory socket with row spacing = 0.6" (old DIP-24 versions)	https://br.mouser.com/ProductDetail/Samtec/HSS-112-G-22?qs=0lQeLiL1qyZx4D9DDCFjeQ%3D%3D
65		-	3	PCB Configuration		2 pin-shunt jumper with handle 2.54mm			https://br.mouser.com/ProductDetail/Harwin/M7682-05?qs=vF78I%252BjhbY%252BSkiI90SyS2w%3D%3D

66		-	6	PCB Configuration		2 pin-shunt jumper 2.54 mm			https://br.mouser.com/ProductDetail/Wurth-Elektronik/60900213421?qs=W%252B2sBeLta1bsO5t19%2FBN7Q%3D%3D
67		-	2	Program Memory programming		2.54 mm Pitch 8-pin (female-female) Jumper Cable - 20 cm long			https://www.adafruit.com/product/4939
68	U46,U45,U44		3	Clock		8 Pin DIP IC Socket		Optional, but recommended.	https://br.mouser.com/ProductDetail/TE-Connectivity/1-2199298-2?qs=fK8dlpkaUMtEKa4wabwOXQ%3D%3D
69	U40,U43,U37,U34,U13,U2,U42,U36,U35,U41,U39,U30,U16,U38,U9,U8,U1		17	ALU, Control Unit, Clock, Timing for Jump Control, Reset Circuit, RAM, Instruction Decoder (ID)		14 Pin DIP IC Socket		Optional, but recommended.	https://br.mouser.com/ProductDetail/TE-Connectivity/1-2199298-3?qs=sGAEpiMZZMvlX3nhDDO4AFokPzkb3saqvJsyD%2F3hMug%3D
70	U5,U4,U3,U7,U18,U17,U11,U33,U32,U31,U27,U26,U25,U24,U21,U20,U19,U15,U12,U10,		20	Program Counter (PC), Addressing Modes, ALU, Control Unit, Instruction Decoder, Registers, ALU, Output Ports		16 Pin DIP IC Socket		Optional, but recommended.	https://br.mouser.com/ProductDetail/TE-Connectivity/1-2199298-4?qs=fK8dlpkaUMvpL10rY9Abiw%3D%3D
71	U29,U28,U23,U22,U14,U6		6	ALU, Program Memory Buffer, Register Buffer, Input Ports		20 Pin DIP IC Socket		Optional, but recommended.	https://br.mouser.com/ProductDetail/TE-Connectivity/1-2199298-6?qs=fK8dlpkaUMvuMXpJTs4GlA%3D%3D
72			2	Step-by-step execution, Reset		Push Button Switch SPST 2-pin		For Reset, it is optional (can be used with jumper with handle)	https://br.mouser.com/ProductDetail/Gravitech/BUTT-2?qs=Vxac6xGyzPn8jCxopasNEg%3D%3D
73			1	Reset, Step-by-step execution		26 AWG Flexible silicone Wire (60cm)			Any supplier

74	-	-	1	PCB		MikroLeo Printed Circuito Board		Lead Free HASL PCB gerber files (for the production of the MikroLeo printed circuit board): https://github.com/edson-acordi/4bit-microcomputer/raw/master/Kicad-files/MikroLeo/Gerber/MikroLeo_v0.1901_Rev1.01A_Gerber.zip	Any PCB manufacturer
75			1	For program memory programming		Arduino Mega			https://store.arduino.cc/products/arduino-mega-2560-rev3
76			1	For program memory programming		USB 2.0 Cable Type A/B			https://store-usa.arduino.cc/products/usb-2-0-cable-type-a-b
77			1	Power		Power Supply 5V / 1A		no connector needed	Any supplier

PCB gerber files (for the production of the MikroLeo printed circuit board) =>	https://github.com/edson-acordi/4bit-microcomputer/raw/master/Kicad-files/MikroLeo/Gerber/MikroLeo_v0.1901_Rev1.01A_Gerber.zip
Schematic diagram (pdf file) =>	https://github.com/edson-acordi/4bit-microcomputer/raw/master/Kicad-files/MikroLeo/MikroLeo_v0.1901_Rev1.01A.pdf