

BOM -01	Penrose small Kit			TubeOhm, www.tubeohm.com			
antity	Description	Designator	Value	Reichelt	Mouser	TME	Other
01.06.24							
2	ceramic capacitor 18pF (value must match xtal specifications)	C5 C6	18pF (matching to XTAL)	KERKO 22P/18pF	581-SR152A180JAA		
2	ceramic capacitor 47pF	C10 C17	47pF	KERKO 47P	594-K470J15C0GH53L2	CCT-47P/50V-S	
1	ceramic capacitor 1nF	C15	1nF	KERKO 1,0N	594-K102K15X7RH53L2	C315C102K1 R5TA	
9	ceramic capacitor 100nF	C1 C2 C3 C4 C7 C8 C9 C16 C18	100nF	KERKO 100N	75-1C10Z5U104M050B	C320C104K5 R5TA	
1	Tantal capacitor 10uF/16V	C14	10uF Tantal	TANTAL 10/16	74-199D10V10-E	TC-10/25	
3	Low profile electrolytic capacitor (height below 10mm)	C11 C12 C13	100uF/16/25V low profile	SM 100/16RAD	647-URS1E101MDD		
1	Power connector 5X2	P1	5x2 pin array male	SL 2X40G 2,54 (we buy a 2x24 pin header that can be broken into pieces for P1, P2, AVR-ISP and JP1)			
1	PCB connector 2x8	P2	8x2 pin array male				
1	PCB connector 2x4	JP1	4x2 pin array male	included with P1			
1	AVR-ISP 2x3	CON1	3x2 pin array male	included with P1			
1	2x4 socket female	JP2		MPE 094-2-008	855-M20-7830446	ZL262-8DG	
1	8x2 socket female	P3		(2x MPE 094-2-008)	855-M20-7830846	ZL262-16DG	
2	Diode	D1 D2	1N5819	1N 5819	625-1N5819-E3/73	1N5819	
1	Green LED	D3		V 322	604-WP424GDT	L-424GDT	
2	Resettable fuse	F1 F2	PTC	LITT RXEF005	652-MF-R010-2		can be also a 5R resistor
1	AVR microcontroller	IC1	ATMEGA168- P	ATMEGA 168A-PU	556-ATMEGA168A-PU		Tubeohm pre progd
4	3.5mm Jacks	J1 J2 J3 J4	PJ3410				Thank: PJ3410
1	Transistor	Q2	2n3904	2N 3904	512-2N3904TF	2N3904	
6	Resistor 10 ohm	R11 R12 R13 R16 R22 R23	10R	METALL 10	660-MF1/4DC10R0F		
1	Resistor 220 ohm	R24	220R	METALL220	660-MF1/4DC2200F		
2	Resistor 1k	R5 R21	1k	METALL 1,00K	MF1/4DC1001F		
7	Resistor 10k	R1 R3 R4 R8 R10 R17 R18	10k	METALL 10,0K	660-MF1/4DC1002F		
1	Resistor 49k9	R6	49K9	METALL 49,9K	660-MF1/4DC4992F		
6	Resistor 100k	R2 R7 R9 R14 R15 R20	100k	METALL 100K	660-MF1/4DC1003F		
1	Resistor 1M	R19	1M	METALL 1,00M	660-MF1/4DC1004F		
12	Illuminated button	S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12	PB6149L-13- 102			PB6149L-13- 102	
1	Voltage regulator	U4	78L05	µA 78L05	511-L78L05CZ	L78L05ACZ	
1	OpAmp TL 072	U2	TL072	TL 072 DIP			
1	DAC MCP 4801-E/P, 4811-E/P, 4821-E/P	all three works 01=8bit, 11=10bit, 21=12bit	MCP4801, 4811, 4821	MCP 4801-E/P, MCP4811, MCP412 8/ 4811/482	579-MCP4801-E/P, 579- MCP4811-E/P, 579- MCP4821-E/P	MCP4801-E/P	Recommendation MCP4811
1	OpAmp MCP 602-I/P	U3	MCP6002	MCP 6002-I/P	579-MCP6002IP	MCP602-I/P	
1	Trimmer 10k	VR1	10k	64Z-10K	858-67ZR10KLF	T910Z-10K	
1	Quarz	X1	20MHz	20,0000-HC49U-S (10-32pF)	717-9B-20.000MAAJ-B (18pF)		
3	Ic socket dip 8			GS 8P	571-1-390261-2 (low cost)	GOLD-8P	
1	ic socket dip 28			GS 28P-S	571-1-2199298-9	GOLD-28P-W	
1	Isolator disc xtal					QW-3	http://www.csd-electronics.de - Isolierscheibe HC49
	PCB			TubeOhm			
	PCB stack mounting hardware						
1	M3 metal standoff 11mm, female/female			DI 10MM (Attention! only has 10mm)			
1	M3 metal standoff 13mm, male/female			DA 12MM (Attention! only has 12mm)			
1	M3x6mm screw						
	Power ribbon cable						
1	Ribbon cable 10-pin			AWG 28-10G 30M			
1	PFL 10		Pfostenstecker 10 pin (2x5)	PFL 10			
1	PFL 16		(2x8)	PFL 16			
				Frontblende black	TubeOhm	TubeOhm	eof