

BILL OF MATERIALS

	Part	# Req	Digikey Part Number	Notes
<i>Ics</i>	TL072	10	296-14997-5-ND	
	LM311	3	296-1389-5-ND	
	CD4051	2	296-2057-5-ND	
	CD4024	1	296-2042-5-ND	
<i>Voltage Reg.</i>	78105	3	LM78L05ACZFS-ND	
	LM7812	1	LM7812CTFS-ND	
	LM7912	1	LM7912CTFS-ND	
<i>Transistors</i>	2n3904	9	2N3904FS-ND	
	2n3906	4	2N3906FS-ND	
<i>Diodes</i>	1n4148	3	1N4148FS-ND	
	1n4004	6	1N4004FSCT-ND	
	8x8 LED matrix	1		32mm x 32mm
<i>Resistors</i>	10k 3000ppm PTC	3	1624329-1	
	1	6	1.0QBK-ND	5% carbon film, 1/4 watt
	100	1	100XBK-ND	1% metal film, 1/4 watt
	1k	12	1.00KXBK-ND	...
	2.2k	7	2.21KXBK-ND	...
	2.7k	2	2.74KXBK-ND	...
	10k	21	10.0KXBK-ND	...
	22k	12	22.1KXBK-ND	...
	47k	2	47.5KXBK-ND	...
	100k	12	100KXBK-ND	...
	180k	5	182KXBK-ND	...
	220k	4	221KXBK-ND	...
	270k	2	274KXBK-ND	...
	390k	4	392KXBK-ND	...
	1M	7	1.00MXBK-ND	...
	4.7M	3	RNF14FTD4M75CT-ND	...
	10M	2	RNF14FTD10M0CT-ND	...
<i>Capacitors</i>	1nF	3	BC1659-ND	10% polyester film box
	33nF	2	BC1650-ND	...
	47pF	1		ceramic disc or multilayer
	100pF	4		...
	220pF	1		...
	100nF	31		...
	1000uF 35V	2	URS1V102MHD-ND	electrolytic
	100uF 25V	4	493-1061-ND	...
	10uF 25V	10	493-1057-ND	...
	1uF 50V	4	493-1099-ND	...

<i>Potentiometers</i>	100k	12	PTV09A-4020U-B104	
<i>Trimmers</i>	100k	3	3306F-104-ND	
<i>Switches</i>	DP3T slide switch	8	CKN9554-ND	
<i>Jacks</i>	3.5mm stereo jack	2	SJ1-3523N	
	2.1mm barrel jack	1	EJ508A-ND	
<i>Sockets</i>	8 pin DIP	13	AE9986-ND	
	14 pin DIP	1	AE9989-ND	
	16 pin DIP	2	AE9992-ND	
	8 pin SIP	2	A774AR-ND	
<i>Hardware</i>	heatsink	2	507302B00000G	
	1 1/4 in 6-32 standoff	6	1853K-ND	
	1/8 in #6 standoff	4	492-1102-ND	
	rubber feet	4	SJ5303-7-ND	
	1/4 x 6-32 screw	14	H354-ND	
	3/8 x 6-32 screw	4	H356-ND	
	6-32 nut	6	KEY1033-ND	
	5x2 pin header	4	609-3243-ND	
	ribbon cable 5 ft	1	AE10G-5-ND	
	IDC connector	3	3030-10-0101-00	
	acrylic backplate	1		
<i>PCB</i>	main	1		
	power supply	1		
<i>Wall Adapter</i>	12VAC	1	T1127-P5-ND	500 to 1000mA

REFERENCE LISTED BY PART VALUE

	Part	Reference
<i>Ics</i>	TL072	U1 U3 U5 U7 U9 U11 U13 U14 U15 U16
	LM311	U4 U8 U12
	CD4051	U17 U18
	CD4024	U19
<i>Voltage Reg.</i>	78l05	U2 U6 U10
	LM7812	U20
	LM7912	U21
<i>Transistors</i>	2n3904	Q1 Q2 Q4 Q5 Q7 Q8 Q10 Q11 Q13
	2n3906	Q3 Q6 Q9 Q12
<i>Diodes</i>	1n4148	D1 D2 D3
	1n4004	D4 D5 D6 D7 D8 D9
	8x8 LED matrix	M1
<i>Resistors</i>	10k 3000ppm PTC	R4 R23 R43
	1	R100 R101 R102 R103 R104 R105
	100	R80
	1k	R10 R30 R49 R60 R67 R74 R75 R91 R96 R97 R98 R99
	2.2k	R6 R18 R25 R38 R45 R94 R95
	2.7k	R17 R37
	10k	R5 R9 R12 R14 R16 R19 R24 R29 R32 R34 R36 R39 R44 R48 R52 R53 R56 R58 R87 R88 R90
	22k	R13 R33 R51 R55 R57 R59 R61 R68 R79 R83 R92 R93
	47k	R62 R69
	100k	R11 R31 R50 R65 R72 R77 R78 R81 R82 R84 R86 R89
	180k	R3 R22 R42 R63 R70
	220k	R7 R26 R27 R46
	270k	R41 R76
	390k	R2 R21 R66 R73
	1M	R8 R15 R28 R35 R47 R54 R85
	4.7M	R1 R20 R40
10M	R64 R71	
<i>Capacitors</i>	1nF	C10 C22 C34
	33nF	C36 C40
	47pF	C49
	100pF	C9 C21 C33 C57
	220pF	C45
	100nF	C3 C4 C5 C6 C7 C8 C15 C16 C17 C18 C19 C20 C27 C28 C29 C30 C31 C32 C38 C39 C42 C43 C46 C47 C52 C53 C54 C55 C56 C60 C61
	1000uF 35V	C58 C59
	100uF 25V	C50 C51 C62 C63
	10uF 25V	C1 C2 C13 C14 C25 C26 C44 C48 C64 C65
	1uF 50V	C11 C23 C37 C41

<i>Potentiometers</i>	100k	VR1 to VR12
<i>Trimmers</i>	100k	TR1 to TR3
<i>Switches</i>	DP3T slide switch	S1 to S8
<i>Jacks</i>	3.5mm stereo jack	J1 J2
	2.1mm barrel jack	J3
<i>Sockets</i>	8 pin DIP	-
	14 pin DIP	-
	16 pin DIP	-
	8 pin SIP	-
<i>Hardware</i>	heatsink	-
	1 1/4 in 6-32 standoff	-
	1/8 in #6 standoff	-
	rubber feet	-
	1/4 x 6-32 screw	-
	3/8 x 6-32 screw	-
	6-32 nut	-
	5x2 pin header	P1 to P4
	ribbon cable 5 ft	-
	IDC connector	-
	acrylic backplate	-
<i>PCB</i>	main	-
	power supply	-
<i>Wall Adapter</i>	12VAC	-

PART VALUE LISTED BY REFERENCE

CAPACITORS

C1	10uF
C2	10uF
C3	100nF
C4	100nF
C5	100nF
C6	100nF
C7	100nF
C8	100nF
C9	100pF
C10	1nF
C11	1uF
C12	3pF
C13	10uF
C14	10uF
C15	100nF
C16	100nF
C17	100nF
C18	100nF
C19	100nF
C20	100nF
C21	100pF
C22	1nF
C23	1uF
C24	3pF
C25	10uF
C26	10uF
C27	100nF
C28	100nF
C29	100nF
C30	100nF
C31	100nF
C32	100nF
C33	100pF
C34	1nF
C35	3pF
C36	33nF
C37	1uF
C38	100nF

C39	100nF
C40	33nF
C41	1uF
C42	100nF
C43	100nF
C44	10uF
C45	220pF
C46	100nF
C47	100nF
C48	10uF
C49	47pF
C50	100uF
C51	100uF
C52	100nF
C53	100nF
C54	100nF
C55	100nF
C56	100nF
C57	100pF
C58	1000uF
C59	1000uF
C60	100nF
C61	100nF
C62	100uF
C63	100uF
C64	10uF
C65	10uF

DIODES

D1	1N4148
D2	1N4148
D3	1N4148
D4	1N4004
D5	1N4004
D6	1N4004
D7	1N4004
D8	1N4004
D9	1N4004

TRANSISTORS

Q1	2N3904
Q2	2N3904
Q3	2N3906
Q4	2N3904
Q5	2N3904
Q6	2N3906
Q7	2N3904
Q8	2N3904
Q9	2N3906
Q10	2N3904
Q11	2N3904
Q12	2N3906
Q13	2N3904

ICS

U1	TL072
U2	LM78L05
U3	TL072
U4	LM311
U5	TL072
U6	LM78L05
U7	TL072
U8	LM311
U9	TL072
U10	LM78L05
U11	TL072
U12	LM311
U13	TL072
U14	TL072
U15	TL072
U16	TL072
U17	CD4051
U18	CD4051
U19	CD4024
U20	LM7812
U21	LM7912

RESISTORS

R1	4.7M
R2	390k
R3	180k
R4	10k
R5	10k
R6	2.2k
R7	220k
R8	1M
R9	10k
R10	1k
R11	100k
R12	10k
R13	22k
R14	10k
R15	1M
R16	10k
R17	2.7k
R18	2.2k
R19	10k
R20	4.7M
R21	390k
R22	180k
R23	10k
R24	10k
R25	2.2k
R26	220k
R27	220k
R28	1M
R29	10k
R30	1k
R31	100k
R32	10k
R33	22k
R34	10k
R35	1M
R36	10k
R37	2.7k
R38	2.2k
R39	10k
R40	4.7M
R41	270k
R42	180k
R43	10k
R44	10k
R45	2.2k

R46	220k
R47	1M
R48	10k
R49	1k
R50	100k
R51	22k
R52	10k
R53	10k
R54	1M
R55	22k
R56	10k
R57	22k
R58	10k
R59	22k
R60	1k
R61	22k
R62	47k
R63	180k
R64	10M
R65	100k
R66	390k
R67	1k
R68	22k
R69	47k
R70	180k
R71	10M
R72	100k
R73	390k
R74	1k
R75	1k
R76	270k
R77	100k
R78	100k
R79	22k
R80	100
R81	100k
R82	100k
R83	22k
R84	100k
R85	1M
R86	100k
R87	10k
R88	10k
R89	100k
R90	10k
R91	1k
R92	22k

R93	22k
R94	2.2k
R95	2.2k
R96	1k
R97	1k
R98	1k
R99	1k
R100	1
R101	1
R102	1
R103	1
R104	1
R105	1

OTHER

J1	3.5MM JACK
J2	3.5MM JACK
J3	2.1MM JACK
M1	8X8 MATRIX
P1	5X2 HEADER
P2	5X2 HEADER
P3	5X2 HEADER
P4	5X2 HEADER
SW1	DP3T SWITCH
SW2	DP3T SWITCH
SW3	DP3T SWITCH
SW4	DP3T SWITCH
SW5	DP3T SWITCH
SW6	DP3T SWITCH
SW7	DP3T SWITCH
SW8	DP3T SWITCH
TR1	100k TRIMMER
TR2	100k TRIMMER
TR3	100k TRIMMER
VR1	100k POT
VR2	100k POT
VR3	100k POT
VR4	100k POT
VR5	100k POT
VR6	100k POT
VR7	100k POT
VR8	100k POT
VR9	100k POT
VR10	100k POT
VR11	100k POT
VR12	100k POT