

TB-Valhalla v3 BOM

If you order everything on this one sheet, you will have everything you need to build the Valhalla when included with the DIY partial kit.

BOM notes etc in individual BOMs for each module - this provides simple "ALL COMPONENTS" for ordering purposes.

these are included in the partial DIY kit

Last updated 31st January 2024

Value	Count	Mouser	Alternatives	Notes
Resistors				
TEMPCO				
1K	6			Thonk
Resistors				
1% MetalFilm 1/4W - or better (0.1% - but can be expensive)				
3K	1			All used in Sequencer board.
4K7	1			All used in Sequencer board.
6K8	1			All used in Sequencer board.
10K	2			All used in Sequencer board.
5% Carbon 1/4W				
22R	1			
100R	6			
220R	2			
1K	37	Search "CFR 1K 1/4w" etc		
1K2	3			
2K2	17			
3K	1			
3K3	2			
4K7	4			
5K6	1			
6K8	1			
10K	75			
15K	7			
22K	12			
27K	3			
33K	4			
39K	1			
47K	22			

56K	1
68K	4
82K	3
100K	53
150K	3
180K	1
220K	7
270K	1
330K	4
390K	1
470K	1
510K	1
680K	1
820K	1
1M	2
1M5	2

Capacitors

Ceramic

10pF	2 810-CC45SL3DD100JYNA
47pF	1 810-CC45SL3DD470JYVN

MLCC

22pF	2 80-C315C220J2G5STATU	2.5mm leg spacing
10n	4 810-FG18C0G1H103JNT6	2.5mm leg spacing
100n	26 594-K104K10X7RF5TL2	2.5mm leg spacing

Tantalum

1uF/35	2 581-TAP105K035SRS	2.5mm leg spacing
220n	2 TAP224K035SRS	2.5mm leg spacing

Polybox

1uF	7 80-R82DC4100Z360K	5mm leg spacing, no taller than 10mm
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Polyester (Nichicon QYX)

1n	5 647-QYX1H102JTP	5mm leg spacing - 50v versions to keep size minimal
2.2n	3 647-QYX1H222JTP	5mm leg spacing

10n	8 647-QYX1H103JTP	5mm leg spacing	
12n	3 667-ECQ-E6123JFW	5mm leg spacing	Mouser don't stock 12nf QYX - Digikey do
18n	1 667-ECQ-E2183JB	5mm leg spacing	
33n	5 647-QYX1H333JTP	5mm leg spacing	
47n	4 647-QYX1H473JTP	5mm leg spacing	
100n	4 647-QYX1H104JTP	5mm leg spacing	

Electrolytic

0.33u/25	4 232-450PK0R47MEFC63X	Low profile, but normal 11mm will fit laying on an angle	0.33 or 0.47uf
1u/50	10 647-UFG1H010MDM	Low profile, but normal 11mm will fit laying on an angle	
2.2u/50	2 647-UFG2A2R2MDM	Low profile, but normal 11mm will fit laying on an angle	
10u/16	11 647-UFG1K100MEM1TD	Low profile, but normal 11mm will fit laying on an angle	
47u/25	11 647-UFW1E470MDD	Low profile, but normal 11mm will fit laying on an angle	
220uF ++	2 647-UFG1E221MPM1TD	These can be between 100uf and 1000uF as you wish, 25v minimum, but keep height and width as low as possible.	
1u/25 BP	1 50NXA1MEFC5X11	BIPOLAR!	
10u/25 BP	3 ECE-A1EN100UI	BIPOLAR!	

Any electro caps that are 11mm or less in height are fine - minimum specs listed in terms of voltage - if only higher V available, no issues. The UFG/UFW Nichicon are my fav, but look to be EOL...

Diodes

1SS133M	6 1SS133M	1N4148
1N4148	13 512-1N4148	
1N5817	8 511-1N5817	
3mm LED	3 2 Blue, 1 Red	Any standard 3mm LED

Crystal

16Mhz	1 815-ABL-16-B4Y
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IC

78L05	4 511-L78L05ABZ	
TL074	2 595-TL074CN	
AN6562	9 926-LM358N/NOPB	LM358
TL072	2 595-TL072IP	
4066	1 595-CD4066BE	MC14066B,HD14066BP
4013	1 595-CD4013BE	
4558	1 RC4558P	

TL082	2 TL082CPE4	
BA6110	2 in kit	
PT2399	1 in kit	
ATMEGA328P	1 in kit	Programmed IC in kit
MCP4822	1 579-MCP4822-E/P	
6N138	1 859-6N138	

DC/DC Convertor

DCW12A-12	1 709-DCW12-12
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Transistors

2SA733P	18 NOS rare part	2SA1015,2SA608**	
2SC945P	43 NOS rare part	2SA1815,2SC536F**	
2SK30A-O	3 NOS rare part	2SK118-O***	
2SK30A-Y	1 NOS rare part		
2SK30A-GR	2 NOS rare part	2SK30A	Most variants will work
2SA1015	2 NOS rare part	2SA733,2SA1115	
2SC1815	4 NOS rare part	2SC945,2SC2603	
2SC828	1 NOS rare part		The fabled 808 noise transistor, anything really works!

These are provided in the partial kit option.

Trimmer

100K	6 652-3362P-1-104LF
10K	1 652-3362P-1-103LF
5K	3 652-3362P-1-502LF

Misc

ON-ON	2 Sub-mini Toggle on-on	Thonk etc
ON-OFF-ON	1 Sub-mini on-off-on switch	Thonk etc
2P5T	1 in kit	
Reset SW	1 710-431256031716	Momentary right angle switch
PWR SW	1 PB400EEQR1BLK PB400OAQX	Latching right angle power switch
0.96 OLED	1 in kit	
Encoder	1 in kit	
MIDI JACK	1 806-KCDX-5S-N2	Horizontal PCB mount
DC	1 992-CON-SOCJ-2155	DC 2.1mm power jack
1/4" jack	1 550-20311	Solder on underside of PCB!

1/4" jack nut 1 550-1005

B5K 1 Thonk etc
B10K 3 Thonk etc
B50K 5 Thonk etc
B50K **CENTER** 3 Thonk etc
B50K-**DUAL** 1 Thonk etc
B100K 2 Thonk etc
B500K 1 Thonk etc
B1M 1 Thonk etc
A50K 2 Thonk etc
A500K 1 Thonk etc
A1M 1 Thonk etc

A100K or	1 or 0	Thonk etc
B250K	0 or 1	Thonk etc

B10K 9 Thonk etc
B100K 2 Thonk etc
A100K 1 Thonk etc

PJ301M 52 Thonk etc

PWR 2
PWR 4

1x10 1
1x6 2
1x4 6
1x3 4
1x2 2
2x3 2

1x10 1
1x6 1
1x4 7
1x3 4
1x2 2
2x3 1
3way RA 1 in kit

9mm alpha
9mm alpha
9mm alpha
9mm alpha center detent for TUNE on VCO PCB
9mm alpha dual
9mm alpha
9mm alpha
9mm alpha
9mm alpha
9mm alpha
9mm alpha

Only fit JUMPER if using A100K Leade JUMPER empty if using B250K	See VCF Build guide
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Song Heui tall trimmer
Song Heui tall trimmer
Song Heui tall trimmer

Thonkiconn

10pin euro power header or 2x5 pin header for the PSU board only
2x5 pin strip for the modules (don't use shrowded headers as case fitment tight!)

1x10 pin male header 40pin strips and cut to length
1x6 pin male header
1x4 pin male header
1x3 pin male header
1x2 pin male header
2x3 pin male header

1x10 pin female header 40pin strips and cut to length
1x6 pin female header
1x4 pin female header
1x3 pin female header
1x2 pin female header
2x3 pin female header
Right angle pin strip header

Molex 4way	5	538-22-27-2041	Molex header 1x4	Any dupont or molex plugs
Molex 4way	5	538-22-01-2041	Molex connector 1x4	
Molex 2way	2	538-22-27-2021	Molex header 1x2	
Molex 2way	2	538-22-01-2021	Molex connector 1x2	
Molex 6way	1	538-22-27-2061	Molex header 6way	
Molex 6way	1	538-22-01-2061	Molex connector 6way	
Molex 3way	1	538-22-27-2031	Molex header 3way	
Molex 3way	2	538-22-01-2031	Molex connector 3way	
Molex pins	36	538-08-55-0102	Molex crimp pins	
11mm	14		Standoff	
3mm	28		Screws for standoff	
10mm/M3	10 in kit		Plastic M3 10mm bolt	
3mm	10 in kit		Plastic M3 nut	
6mm/M2	4 in kit		Plastic M2 10mm bolt	
2mm	4 in kit		Plastic M2 nut	
Hookup wire	3m approx			
Case	1	546-1441-16BK3	Hammond 1441 enclosure - 10x6x2"	
PSU	1	SMI12-12-KB-P5	12v DC 1A	

History

- 231025 Added suitable part numbers for the capacitors
- 231104 Fixed 1K resistor count, clarified R305 not needed on LFO PCB, R600 missing from mixer BOM
- 231108 Corrected the MIDI jack needed in Sequencer BOM
 - Included other BOMs as sheets in this document for reference
 - Fixed 47uF capacitor mouser part number.
 - Added full LFO BOM for v3.1 of LFO PCBs here.
- 231125 Fixed second image for v2.3.0 errata wires in EFAv2
- 240131 Fixed part for 0.33uf - hard to find, 0.47uf will also work here
 - Removed v2.3.0 EFAv2 errata as no v2.3.0 PCBs shipped
- 250201 Updatde fpr v2.5 EFA Rev2 - clarified Sequencer Molex header

TB-EFA v2.5.3 BOM

The part numbers may seem strange at first.
To try and simplify things, the parts that come directly from the original 303 schematic maintain the 303 original part numbering.
The parts added for this design are generally numbered 300+ for the voice board, and 400+ for the control board.
Things like IC, pots, jacks etc don't follow this numbering. They just start from part number 1 etc.

Part substitution is fine, if you have lots of 1% resistors, then go for it.
The only thing to watch is the height of electrolytics, low profile ones can be used (an example Mouser part is provided)
However standard 11mm electrolytics can be used, just lay them flat against the board (where space permits) or place them at 45degrees to the board.
Voltages also not an issue, anything over 16v should be good, maybe 25v for the 47uF in the power filtering.

There are two types of drive - one that uses the same 5v offset on the signal that is used in the 303 - this is with the A100K for VR1-DRIVE, and needs a jumper where marked JUMPER.
Use a resistor leg to JUMPER if you are using the A100K and want this 5v offset signal - this will allow the drive pot to cut the audio completely and drive it up quite loud.
Alternatively use a B250K for VR1-DRIVE and **do not fit** JUMPER. This just uses a variable resistor from 33K base up to 283K in place of the default 220K resistor in the 303.
This alternative does not completely cut the signal into the filter, and keeps the loudness within typical ranges.

OPTIONAL: At very short VCA decay and with a powerful gate input, you can hear a short DC thump at the start of the audio trigger. **If this bothers you, there are two options available.**
1. Add a 2.2uF capacitor at C306 which smooths the gate input and removes the thump. It does remove some of the 'pluckyness' of the gate trigger, hence making optional.
2. Add a 33K resistor at C306 (standing up). This removes some of the current bias on the gate signal and helps greatly reduce the thump without affecting the 'pluckyness'.
The added 'thump' is a consequence of the additional audio gain op-amp to boost the output signal from the module with rev2.

Standard 11mm clearance between the two boards, so just keep that in mind.

If you are sourcing your own transistors, Aliexpress has loads of modern 733,945,1815 etc, I've tested these and they work fine and have >300hfe mostly
In the Mouser column, I've either placed a part number or search terms. Due to part shortages etc, the string that will find you suitable parts to choose from what is in stock etc.

Value	Count	Location	Mouser	Alternatives	Notes
Resistors					
5% Carbon 1/4W					
22R	1	R150	Search "CFR 1K 1/4w" etc		
100R	4	R95,R130,R132,R152			
1K	7	R123*,R400-R405			Replaced R123 which was a 1M5 - with B1M pot and 1K in series.
2K2	12	R67,R68,R69,R70,R71,R98,R108,R124,R125,R126,R133,R162			
4K7	1	R97A			Combines with VR97 to tweak rez chirp - 10K fixed in original 303 - so if no B5K pots, try 10K and R100 here or such
10K	17	R47,R61,R64,R65,R94,R96,R109,R112,R115,R116,R142,R143,R144,R145,R148,R149,R306			
22K	8	R110,R111,R117,R120,R129,R134,R146,R151			
33K	3	R62*,R302,C306			R62* Initial pre-filter drive level - reduce for more drive! R302 is the op amp multiplier for output signal level - 33K gives 4x gain. C306 option2, see notes above.
47K	4	R46,R119,R127,R305			
68K	1	R138			
100K	13	R66,R72,R73,R99,R113,R114,R122,R139,R140,R141,R300,R301,R303			
220K	4	R63,R121,R128,R131			
Capacitors					
MLCC					
10n	1	C305	mlcc leaded 0.01uf	2.5mm leg spacing	
100n	2	C303,C304	mlcc leaded 0.1uf	2.5mm leg spacing	v2.3.0 only needs C303
				2.5mm leg spacing	

Tantalum				
1uF/35	2 C42,C62	581-TAP105K035SRS	2.5mm leg spacing	
Polyester (Nichicon QYX "yellow") - Panasonic "red" - old style "greenies" or poly box in theory				
10n	2 C20*,C21	"qyx 10nf 50v"	5mm leg spacing	C20* - Marked C22 input to VCA on 303 service notes, but already C22 in filter - should be C20 ! The "missing" 4th pole - could try 33n here to make 4pole?!
18n	1 C18	"qyx 18nf 50v"	5mm leg spacing	
33n	4 C19,C24,C26,C36	"qyx 33nf 50v"	5mm leg spacing	
47n	1 C54	"qyx 47nf 50v"	5mm leg spacing	
100n	3 C25,C27,41	"qyx 100nf 50v"	5mm leg spacing	
Electrolytic				
0.33u/25	1 C302	0.47uf if no 0.33uf	Low profile, but normal 11mm will fit laying flat	
1u/50	7 C13,C14,C15,C22,C23,C29,C38			
2.2u/50	2 C306,C400		C400 - The rubbery mod - you can try with different values here. C306 optional see notes above	
10u/16	6 C16,C17,C30,C37,C40,C72			
47u/25	4 C28,C55,C300,C301			
Diodes				
1N4148	9 D24,D26,D27,D28,D29*,D35,D36,D37,D401	512-1N4148	D27 appears twice on the 303 service notes, input to amp should be D29	
1N5230	1 D400	78-1N5230B		
1N5817	2 D301,D302	511-1N5817		
IC				
78L05	1 IC2	511-L78L05ABZ		
AN6562	1 IC5	595-LM358N	LM358	
4066	1 IC3	595-CD4066BE	MC14066B,HD14066BP	
4013	1 IC4	595-CD4013BE		
Transistors				
2SC1583	2 or 0 Q12,Q21	NOS rare part	*	If you use Q12 and Q21 leave Q12A,Q12B,Q21A and Q21B empty
2SC2291	1 or 0 Q22	NOS rare part	*	If you use Q22 leave Q22A and Q22B empty
2SA733P 2SC945P	Q3A,Q3B,Q4A,Q4B,Q5A,Q5B,Q8A			The A/B parts in the BA662 (3,4,5) should be matched - the 733 provided in the kit are all very close, but
	12 Q9,Q10,Q31,Q36,Q38	NOS rare part	2SA1015,2SA608**	if you have a tester, match them - mount touching each other
	25 or 31 Q1A,Q1B,Q2A,Q2B,Q6A,Q6B,Q7A,Q7B,Q9A,Q9B Q11,Q13,Q14,Q15,Q16,Q17,Q18,Q19 Q20,Q23,Q32,Q35,Q37,Q40,Q41 [Q12A,Q12B,Q21A,Q21B,Q22A,Q22B]			If you use Q12A-B, Q21A-B and Q22A-B then leave Q12,Q21 and Q22 empty. The A/B parts in the BA662 (1,2,6,7,9) should be matched - the 945 provided in the kit are all very close, but if you have a
	2SK30A-Y	1 Q39	NOS rare part NOS rare part	2SA1815,2SC536F**
<p>* To be clear, the board has space for either. If you don't have any 1583,2291 as real ones are getting harder to find and can be costly, a matched pair of the NPN you are using will be fine. So if you are using a matched pair, use the A and B locations, and ignore the 5 pin footprints.</p> <p>** Ignore most of the voodoo around transistor types, the original 303 used all NPN types listed during production, so any will be fine.</p>				
	These are provided in the partial kit option.			
Misc				
ON-ON	1 SW1	Thonk etc	Sub-mini Toggle on-on	
B5K	1 VR97-CHIRP	Thonk etc	9mm alpha	See notes re R97A - can use B10K with different resistor at R97A
B50K	1 VR7-ACCENT	Thonl etc	9mm alpha	
B50K-DUAL	1 VR4-REZ	Thonk etc	9mm alpha dual	
B500K	1 VR-TM3-WIDTH	Thonk etc	9mm alpha	
B1M	1 VR2-VCA-DELAY	Thonk etc	9mm alpha	
A50K	2 VR3-CUTOFF, VR5-ENV-MOD	Thonk etc	9mm apha	
A1M	1 VR6-DECAY	Thonk etc	9mm apha	
A100K or	1 VR1-DRIVE	Thonk etc	9mm alpha	See notes above. Only fit JUMPER if using A100K

B250K	1 VR1-DRIVE	Thonk etc	9mm aplha	Leave JUMPER empty if using B250K
PJ301M	11 U1-U11	Thonk etc		Thonkiconn
PWR	1			10pin euro power header or 2x5 pin header
1x10	1			1x10 male header 2.54mm
1x4	3			1x4 male header 2.54mm
1x10	2			1x10 female header 2.54mm
1x4	1			1x4 female header 2.54mm
11mm	3 Standoff			
3mm	6 Screws			

GS1-L version 3.1 BOM

These parts are included in the ALL_PARTS_NEEDED section in this document!

Part substitution is fine, if you have lots of 1% resistors, then go for it.

The only thing to watch is the height of electrolytics, low profile ones can be used (an example Mouser part is provided)

However standard 11mm electrolytics can be used, just lay them flat against the board (where space permits) or place them at 45degrees to the board.

Voltages also not an issue, anything over 16v should be good, maybe 25v for the 47uF in the power filtering.

Standard 11mm clearance between the two boards, so just keep that in mind.

If you are sourcing your own transistors, Aliexpress has loads of modern 1015,1815 etc, I've tested these and they work fine

In the Mouser column, I've either placed a part number or search terms. Due to part shortages etc, using that string will find you suitable parts to choose from what is in stock etc.

Components in blue, numbers 300+ are on the upper control board.

Value	Count	Location	Mouser	Alternatives	Notes
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Resistors

5% Carbon 1/4W

		R5,R8,R9,R16,R36,R37,R311,R312,R315	
1K	10	,R325	Search "CFR 1K 1/4w" etc
3.3K	1	R13	
4.7K	1	R3	
10K	7	R1,R2,R11,R14,R320,R321,R324	
15K	2	R10,R27	
22K	4	R7,R309,R310,R313	
33K	1	R17	
39K	1	R31	
47K	6	R12,R23,R29,R32,R307,R317	
56K	1	R26	
82K	3	R21,R25,R306	
100K	13	R6,R15,R18,R20,R22,R28,R30,R33,R34,R308,R316,R318,R319	
150K	2	R35,R304	
180K	1	R24	
270K	1	R300	
330K	2	R38,R314	
390K	1	R302	
470K	1	R301	
820K	1	R4	

Capacitors

Ceramic

10pF	2	C300,C301
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MLCC				
100n	2 C1,C2	mlcc leaded 0.1uf		2.5mm leg spacing
Polyester (Nichicon QYX)				
47n	1 C5	qyx 47nf 50v		5mm leg spacing
100n	1 C6	qyx 100nf 50v		5mm leg spacing
Electrolytic				
47u/25	2 C3,C4			Low profile, but normal 11mm will fit laying flat as marked
Diodes				
1SS133M	4 D3,D4,D5,D6	1SS133M		
1N5817	2 D1,D2	511-1N5817		
3mm LED	1 D300	Blue		Any standard 3mm LED
IC				
4558	1 IC3	RC4558P		Any variant of the 4558 op amp
LM358	1 IC3	595-LM358AP	TL072/82	Note two IC3's by mistake - this one on black control PCB.
TL082	2 IC1,IC2	TL082CPE4		Any variant of the TL082 op amp
BA6110	2 IC4,IC5	BA6110 NOS		Included in partial DIY kit DO NOT use a socket for IC2, clearance for rotary switch
Transistors				
2SK30A-GR	2 Q3,Q4	NOS rare part	2SK30A	Most variants will work
2SA1015	2 Q2,Q302	NOS rare part	2SA733,2SA1115	
2SC1815	2 Q1,Q301	NOS rare part	2SC945,2SC2603	
These are provided in the partial kit option.				
Trimmer				
100K	3 VR2,VR3,VR4	652-3362P-1-104LF		3362
Misc				
2P5T	1 S1	INCLUDED IN KIT		https://www.aliexpress.com/item/1005003505887887.html
ON-OFF-ON	1 SW1	612-200MSP3T1B2M7RE	Thonk cheaper etc	Sub-mini on-off-on switch
PJ301M	1 U1	Thonk etc		Thonkiconn
B100K	2 ATTEN,OFFSET	Thonk etc		Song heiu tall trimmer pots
B100K	1 VR1-FREQ	Thonk etc		Alpha 9mm
PWR	1 SV1			10pin euro power header or 2x5 pin header
1x4	1 JP1			1x4 male header
1x6	2 JP2,JP3			1x6 male header
1x2	1 JP4			1x2 male header
1x4	1 JP1			1x4 female header
11mm	4 Standoff			
3mm	8 Screws for standoff			

PSU

Part substitution is fine, if you have lots of 1% resistors, then go for it.

The only thing to watch is the height of big electrolytics.

These parts are included in the ALL_PARTS_NEEDED section in this document!

Value	Count	Location	Mouser	Alternatives	Notes
Capacitors					
Electrolytic					
220uF ++	2	C1,C2	647-UFG1E221MPM1TD		These can be between 100uf and 1000uF as you wish, 25v minimum, but keep height and width as low as possible.
MLCC					
100nf	2	C3,C4			2.5mm leg spacing
DC/DC Convertor					
DCW12A-12	1		709-DCW12-12		
Misc					
PWR	2	SV1,SV2			10pin euro power header or 2x5 pin header
DC	1		992-CON-SOCJ-2155		DC 2.1mm power jack
Switch	1	SW1	PB400EEQR1BLK	PB400OAQX	Latching right angle power switch
Molex	3	GND,+12V,-12V	538-22-27-2041		Molex header 1x4
Molex	3		538-22-01-2041		Molex connector 1x4
Molex	8		538-08-55-0102		Molex crimp terminal
10mm/3mm	3			In kit	Plastic 3mm bolt
3mm	3			In kit	Plastic 3mm nut
Cables	2			In kit	

Jacks & Mult

Part substitution is fine, if you have lots of 1% resistors, then go for it.

The only thing to watch is the height of big electrolytics.

These parts are included in the ALL_PARTS_NEEDED section in this document!

Value	Count	Location	Mouser	Alternatives	Notes
Misc					
PJ301M	16				Thonk etc
Molex	2		538-22-27-2041		Molex header 1x4
Molex	2		538-22-01-2041		Molex connector 1x4
Molex	1		538-22-27-2021		Molex header 1x2
Molex	1		538-22-01-2021		Molex connector 1x2
Molex	10		538-08-55-0102		Molex crimp terminal

Mixer

Part substitution is fine, if you have lots of 1% resistors, then go for it.

The only thing to watch is the height of big electrolytics.

These parts are included in the previous list in this document!

Value	Count	Location	Mouser	Alternatives	Notes
Resistors					
5% Carbon 1/4W					
3.3k		1 R612			
10K		13 R600-R611,R616			
100K		3 R613,R614,R615			
Capacitors					
MLCC					
100nF		2 C601,C602	mlcc leaded 0.1uf		2.5mm leg spacing
IC					
TL074		1 IC600	595-TL074CN		
Misc					
1/4" jack		1 J1-LINE-OUT	550-20311		Solder on underside of PCB!
1/4" jack nut		1	550-1005		
B10K		3 VR1,VR2,VR3		Thonk etc	Song heiu tall trimmer pots
A100K		1 VR4		Thonk etc	Song heiu tall trimmer pots
SubMini O-O		1 S601		Thonk etc	Sub-mini toggle switch (on-on) SPDT
Encoder	1		in kit		thonk etc WAY cheaper!
PJ301M	6				
Molex 6way	1	Audio	538-22-27-2061		Molex header 6way
Molex 6way	1		538-22-01-2061		Molex connector 6way
Molex 3way	1	Power	538-22-27-2031		Molex header 3way
Molex 3way	2		538-22-01-2031		Molex connector 3way
3way RA	1	Encoder	in kit		Right angle header
Molex	12		538-08-55-0102		Molex crimp terminal

The following BOMs are provided for reference, they are the same as the Euro module BOMs

Ge0Seq v1.5.1 BOM

These parts are included in the ALL_PARTS_NEEDED section in this document!

BUILDING FOR DESKTOP

You only need to build the lower "Sequencer Board" PCB

Install all parts on the PCB numbered 0-100 and 900+ **Do not install those numbered 300+ i.e the Euro power input circuit**

Install only 2x (Display and Encoder) 4pin and 1x 2pin Molex headers - leave the two jacks board headers empty!

If in doubt read the build guide!

included in kit

Standard 11mm clearance between the two boards, so just keep that in mind.

In the Mouser column, I've either placed a part number or search terms. Due to part shortages etc, the string that will find you suitable parts to choose from what is in stock etc.

Value	Count	Location	Mouser	Alternatives	Notes
Resistors					
1% MetalFilm 1/4W - or better (0.1% - but can be expensive)					
3K	1	R3	Search "MFR 3K 1/4w" etc		
4K7	1	R5			
6K8	1	R14			
10K	2	R4,R15			
5% Carbon 1/4W or better (can be 1%)					
220R	1	R900	Search "CFR 220ohm 1/4w" etc		
1K	7	R6,R7,R8,R9,R10,R11,R12	Search "CFR 1K 1/4w" etc		
1K2	3	R901,R912,R916			
5K6	1	R902			
10K	3	R1,R2,R13			
Jumper	1	RX-JUMP			
Capacitors					
MLCC					
22p	2	C4,C5	mlcc leaded 22pf		2.5mm leg spacing
10n	1	C2	mlcc leaded 0.01uf		2.5mm leg spacing
100n	1	C1	mlcc leaded 0.1uf		2.5mm leg spacing
Electrolytic					
0.33u/25	1	C3			Low profile, but normal 11mm will fit laying flat
Diodes					
1N4148	1	D902	512-1N4148		On control PCB
Diodes					
3mm LED	2	RDY, BOOT		Normal 3mm led - any colour	Attach to LOWER sequencer PCB only, at 90 degrees - see build guide
IC					
78L05	1	IC1	511-L78L05ABZ		
ATMEGA328P	1	IC3	556-ATMEGA328P-PU		Programmed version included in kit
MCP4822	1	IC4	579-MCP4822-E/P		
LM358	1	IC5	926-LM358N/NOPB		Must be good quality for DAC multiplier - DO NOT USE TL072 they don't cope well with low voltages - 358N better than 358P but 358P better than any TL
6N138	1	IC900	859-6N138		
Crystal					
16Mhz	1	Q1	815-ABL-16-B4Y		

Misc			
PJ301M	8 U1-U8	Thonk etc	Thonkiconn
Reset SW	1 S1-RESET	710-431256031716	
0.96 OLED	1 I2C-DISPLAY		I2C 4pin variant - VCC,GND,SCL,SDA
MIDI JACK	1 MIDI IN	806-KCDX-5S-N2	Horizontal PCB Mount
2x3	1 JP1		2x3 male header
1x4	2 DISPLAY, ENC-MIDI	538-10-11-2043	Molex 4 pin plug
1x2	1 PWR,GND	538-10-11-2023	Molex 2 pin plug
1x4	2 DISPLAY, ENC-MIDI	538-22-04-5048	Molex 4 pin header
1x2	1 PWR,GND	538-22-23-2028	Molex 2 pin header
Molex pin	10	538-08-55-0129	Molex plug pins, maybe cheaper - cheaper in bulk
Hookup wire			For cables from molex plugs to Jack board, encoder, display and power input

TB-Super-O v1.0.6 BOM

These parts are included in the ALL_PARTS_NEEDED section in this document!

Part substitution is fine, if you have lots of 1% resistors, then go for it.

The only thing to watch is the height of electrolytics, low profile ones can be used (an example Mouser part is provided)

However standard 11mm electrolytics can be used, just lay them flat against the board (where space permits) or place them at 45degrees to the board.

Voltages also not an issue, anything over 16v should be good, maybe 25v for the 47uF in the power filtering.

Standard 11mm clearance between the two boards, so just keep that in mind.

If you are sourcing your own transistors, Aliexpress has loads of modern 733,945,1815 etc, I've tested these and they work fine and have >300hfe mostly

In the Mouser column, I've either placed a part number or search terms. Due to part shortages etc, the string that will find you suitable parts to choose from what is in stock etc.

Parts numbered 400+ are on the upper board.

Value	Count	Location	Mouser	Alternatives	Notes
Resistors					
TEMPCO					
1K	6	R7A,R7B,R14A,R14B,R23A,R23B			Thonk
5% Carbon 1/4W					
1K	6	R28,R31,R37,R40,R59,R60	Search "CFR 1K 1/4w" etc		
2K2	3	R3,R17,R24			
10K	22	R4,R5,R11,R12,R20,R21,R34,R36,R46 R48,R51,R54, R401-R410			
15K	3	R30,R39,R58			
27K	3	R6,R13,R22			
47K	9	R2,R8,R10,R16,R19,R25,R29,R38,R56			
68K	3	R42,R45,R52			
100K	15	R15,R26,R27,R32,R33,R35 R41,R43,R44,R47,R49,R50,R53,R55,R57			
220K	3	R1,R9,R18			
Capacitors					
MLCC					
10n	1	C305	mlcc leaded 0.01uf		2.5mm leg spacing
100n	8	C1,C2,C3,C4,C303,C304, C401,C402	mlcc leaded 0.1uf		2.5mm leg spacing
Polybox					
1uF	6	C13,C14,C17,C18,C21,C22	polyester 1uf 63v		5mm leg spacing, no taller than 10mm
Polyester (Nichicon QYX)					
1n	3	C6,C8,C12	qyx 1nf 50v		5mm leg spacing
10n	3	C5,C7,C9	qyx 10nf 50v		5mm leg spacing
12n	3	C10,C16,C19	qyx 12nf 50v		5mm leg spacing
Electrolytic					
0.33u/25	1	C302			Low profile, but normal 11mm will fit laying on an angle
1u/50	3	C11,C15,C20			Low profile, but normal 11mm will fit laying on an angle towards spaces
47u/25	2	C300,C301			Low profile, but normal 11mm will fit laying on an angle

Diodes				
1N4148	3 D3,D4,D5	512-1N4148		
1N5817	2 D1,D2	511-1N5817		

IC				
78L05	1 IC1	511-L78L05ABZ		
TL074	1 IC2	595-TL074ACN		
AN6562	3 IC3,IC4,IC5	926-LM358N/NOPB	LM358	AN6562 NOS rare part searchinv, or LM358 is fine.
TL072	2 IC6,IC7	595-TL072IP		

Transistors				
2SA733P	6 Q1,Q5,Q8,Q9,Q16,Q17	NOS rare part	2SA1015,2SA608**	Highest hfe, use P164C from kit
2SC945P	Q2,Q3,Q4A,A4B,Q6,Q7,Q8A,Q8B			
	12 Q10,Q11,Q12A,Q12B	NOS rare part	2SA1815,2SC536F**	*Use H945P or STC945P for the A/B parts
2SK30A-O	3 Q13,Q14,Q15	NOS rare part	2SK118-O***	

* To be clear, the kit will come with two sets of 6 945P variants. The ones marked H945P or with STC label should be used for the dual A/B positions, they have matched hfe

** Ignore most of the voodoo around transistor types, the original 303 used all NPN types listed during production, so any will be fine.

*** Creates the base SAW core shape, should be the -O variant, getting harder to find, but the 118-O is identical, just in the smaller package.

These are provided in the partial kit option.

Trimmer				
100K	3 TUNE1-3	652-3362P-1-104LF		3362
5K	3 WIDTH1-3	652-3362P-1-502LF		3362

Misc				
B50K	6 VR1-VR6	Thonk etc	9mm alpha	Can get a center detent for VR1,VR2,VR3 the TUNE pots if you like
B10K	6 VR7-VR12	Thonk etc	Song Heui tall trimmer	Can use normal alpha 9mm with tall trimmer caps on them - best to get D or flower shaft if doing this.
PJ301M	11 U1-U11	Thonk etc	Thonkiconn	
PWR	1 SV1		10pin euro power header or 2x5 pin header	
1x4	3 JP1,JP2,JP3		1x4 pin male header	
1x3	1 JP5		1x3 pin male header	
1x2	2 JP4,JP6		1x2 pin male header	
1x4	3 JP1,JP2,JP3		1x4 pin female header	
1x3	1 JP5		1x3 pin female header	
1x2	2 JP4,JP6		1x2 pin female header	
11mm	3 Standoff			
3mm	6 Screws for standoff			

TB-FX 1.1.1 BOM

These parts are included in the ALL_PARTS_NEEDED section in this document!

The footprints for poly-box style caps can be used for MLCC style if you have them, may change sound slightly in overdrive circuit.

Blue parts on on upper "Control Board"

Standard 11mm clearance between the two boards, so just keep that in mind.

In the Mouser column, I've either placed a part number or search terms. Due to part shortages etc, the string that will find you suitable parts to choose from what is in stock etc.

Value	Count	Location	Mouser	Alternatives	Notes
Resistors					
5% Carbon 1/4W or better (can be 1%)					
100R	2	R33,R47	Search "CFR 100ohm 1/4w" etc		
220R	1	R44			
1K	7	R2,R3,R5,R14,R15,R34,R41			
2K2	2	R24,R25			
4K7	1	R42			
		R1,R4,R8,R11,R12,R16,R17,R18,R30,			
10K	14	R31,R32,R39,R46,R48			
15K	2	R10,R13			
47K	3	R6,R7,R43			
100K	7	R9,R19,R22,R29,R35,R37,R38			
150K	1	R23			
330K	2	R26,R27			
510K	1	R45			
680K	1	R28			
1M	2	R36,R40	R40 optional - jumper if too quiet		
1M5	2	R20,R21			
Capacitors					
MLCC					
47p	1	C16	mlcc leaded 47pf		2.5mm leg spacing
10n	1	C305			2.5mm leg spacing
100n	10	C3,C7,C12,C13,C14,C17,C27,C31,C303,C304			2.5mm leg spacing C3 & C31 have larger footprint, can use a polybox here (QYX style may not fit)
Polyester (QYX, Panasonic Red, PolyBox etc)					
1n	2	C5,C26	Nichicon QYX 1n 50v		5mm leg spacing
2.2n	3	C8,C9,C23			5mm leg spacing
10n	3	C6,C10,C18			5mm leg spacing
33n	1	C4			5mm leg spacing
47n	2	C24,C29			5mm leg spacing
1u	1	C11	80-R82DC4100Z360K		5mm leg spacing Polybox style - no more than 10mm in height
Electrolytic					
0.33u/25	1	C302			Low profile, but normal 11mm will fit laying flat C10 printed twice, on control board its an electrolytic!
10u/16	5	C1,C15,C10,C25,C28			
47u/25	3	C2,C300,C301			
1u/25 BP	1	C21	50NXA1MEFC5X11		BIPOLAR!
10u/25 BP	3	C19,C22,C32	ECE-A1EN100UI		BIPOLAR!

Tantalum			
220n	2 C20,C30	TAP224K035SRS	
Diodes			
1SS133	2 D1,D2	1SS133M R0G	Any small switching diode - used for OD feedback - 1SS133 are nice!
1N5817	2 D301,D302		
IC			
PT2399	1 IC1		Included in kit
78L05	1 IC2	L78L05ACZ-AP	Programmed version included in kit
LM358	3 IC3,IC4,IC5	926-LM358N/NOPB	
Transistors			
2SC828	1 Q1		HTF - Noise generator - any NPN, ECB really
2SC1815	4 Q2,Q3,Q4,Q5	2SC945P,2SC536	etc
Trimmer			
10K	1 VR1-NS-LVL	652-3362P-1-103LF	
Misc			
PWR	1		10pin euro power header or 2x5 pin header
PJ301M	6 U1-U6	Thonk etc	Thonkiconn
B10K	3 VR2,VR3,VR6	Thonk etc	9mm Alpha Potentiometer
B50K	1 VR4	Thonk etc	9mm Alpha Potentiometer
B100K	1 VR7	Thonk etc	9mm Alpha Potentiometer
A500K	1 VR5	Thonk etc	9mm Alpha Potentiometer
1x3	3 JP1,JP2,JP4		1x3 pin header male
2x3	1 JP5		2x3 pin header male
1x4	1 JP3		1x4 pin header male
1x3	3 JP1,JP2,JP4		1x3 pin header female
2x3	1 JP5		2x3 pin header female
1x4	1 JP3		1x4 pin header female
11mm	4 Standoff		
3mm	8 Screws		
PCB			
EURO			