

# 18-Channel Analog Stereo Vocoder and Formant System

## Assembly Tables and Bill of Materials (BOM)

### IMPORTANT NOTICE:

All content of this document is subject to copyright and may not be reproduced in any form without express written consent of the author. You may not copy or distribute this document, neither in part or in full. This document is for personal, non-commercial use only.

The information herein is provided “AS IS”, with no assurance or guarantee of completeness, accuracy or timeliness of the information, and without warranty of any kind, express or implied, including but not limited to warranties of performance or fitness for a particular purpose.

This document may change at any time without notice.

Your comments are welcome. If you have suggestions or believe something requires to be corrected, please contact the author at [vocoder@hoerold.com](mailto:vocoder@hoerold.com).

## General Information

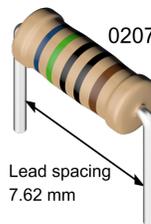
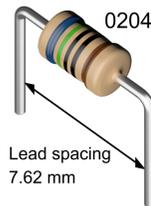
**IMPORTANT:** As market conditions change, some materials may become hard to find, may become unavailable, or may have stopped being manufactured. Before you start this project, make sure you are able to procure all components or, in case one or more components are not available, you find viable alternatives for this do-it-yourself project.

### General remarks:

- Except for the SMD capacitors in general and the MOSFET on the power supply board specifically, all other components for PCB assembly are through-hole components.
- In the assembly tables, the abbreviation RM (German for “Rastermaß”) is used to indicate the lead spacing. RM2.5 is equivalent to a lead spacing of 2.5 mm (0.1 in), RM5.0 is equivalent to 5 mm (0.2 in). Components with a lead spacing of 2.54 mm will also fit 2.5 mm pad hole spacing. Likewise, components with 5.08 mm lead spacing will also fit 5.0 mm pad hole spacing.
- It is advisable to use IC sockets. Lower-priced sockets may be preferred over the precision sockets suggested in the BOM.

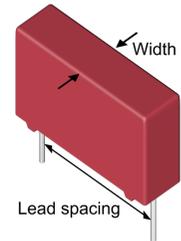
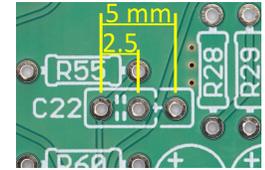
### Resistors:

- The lead spacing for the resistors on all boards is 7.62 mm (0.3 in).
- The resistor body width should not exceed 2.54 mm (0.1 in).
- The lead diameter must not exceed 0.7 mm (0.028 in).
- Unless noted otherwise, all resistor values are taken from the E24 series with a resistance tolerance of  $\pm 1\%$ , a power rating of 125 mW or higher, and body size 0207 or smaller.
- For ease of assembly, use size 0204 resistors. They have a body length of about 3.5 mm (0.14 in). Size 0207 resistors with a body length of about 6.2 mm (0.25 in) will also work. Their leads will have to be bent close to the resistor body.
- The resistor values used for the 8-pole channel filters are taken from the E48 series and are easier to find on the market in body size 0207.



### Film capacitors:

- The capacitors must be rated 35 V or higher.
- The lead diameter must not exceed 0.7 mm (0.028 in).
- All footprints on the PCB are laid out for allowing film capacitor lead spacing of 2.54 mm (0.1 in) and 5.08 mm (0.2 in). If a capacitor with 2.54 mm lead spacing is placed on the PCB, make sure to use the correct pads. In the example shown on the right, such a capacitor would be inserted in the left two pad holes of C22.
- The following list shows the maximum body widths:
  - 100 nF and lower: 2.54 mm (0.1 in)
  - 220 nF: 2.54 mm (0.1 in)
  - 330 nF: 3.5 mm (0.14 in)
  - 1  $\mu$ F: 5.5 mm (0.22 in)



Capacitors of larger body sizes than indicated above for their respective capacitance will not fit in most cases.

### Surface-mounted capacitors:

- The SMD pads on all boards, except the power supply board, are laid out for package size 1206. These pads also fit SMD capacitors with packages sized 0805.
- All SMD capacitors should be rated 35 V or higher.
- All SMD capacitors have a value of 100 nF, with the exception of the SMD capacitors dedicated to the 8-pole channel filters on the channel filter boards and the capacitors on the power supply board. Most of the 100 nF capacitors are used for blocking purposes and in parts of the design where 100 nF is the appropriate value (e.g. simple filtering, sample and hold).

### Electrolytic capacitors:

- All electrolytic capacitors should be rated 25 V or higher, unless noted otherwise.
- Make sure the diameter of a given electrolytic capacitor does not exceed the value shown in the BOM as it may otherwise not fit in at its position on the board.
- Tantalum capacitors are not recommended as a replacement for the electrolytic capacitors.

## General Information

### Mono potentiometers:

- The potentiometers from Alpha are well known in the do-it-yourself community for the use in Eurorack synthesizer modules. Make sure you order the right-angled versions with side adjust, not the vertical types.
- A datasheet for the potentiometers is available [here](#).
- The potentiometers are available from Small Bear (US), Erthenvar (US), Thonk (UK), and Musikding.de (EU).



*Alpha pot, 9 mm, mono.*

### Stereo potentiometers:

The suggested potentiometers are similar to the mono versions and are available from Small Bear (US) and Banzaimusic.com (EU).



*Alpha pot, 9 mm, stereo.*

### Alternative potentiometers:

If you are looking for alternative potentiometers that have to fit the optionally supplied 3 mm front panel in combination with Davies knobs, make sure the potentiometer thread is not too long. Otherwise the gap between the knob and the panel surface may become undesirably large. The picture on the right shows an example of a potentiometer that fits well in the PCB but has a thread that is too long.



*This pot fits the board's footprint well but its thread is too long.*



*A close-up view of the vocoder front panel, showing the recessed positioning of the potentiometers. This allows placing the knobs close to the panel surface, leaving only a small gap.*

## General Information

---

### LEDs:

All LEDs have a diameter of 3 mm and need to have low power consumption (2 mA). Do not use LEDs that have a current typically in the range of 16..20 mA as they will stay dark due to the values chosen for the series resistors. If all 53 high-current LEDs were illuminating, an extra current of about 1 A would be drawn. The power supply is not designed for providing that much extra current.

The LEDs found in the BOM (TLLR4401, TLLG4401, and TTY4401) have a diameter of 2.9 mm according to the datasheet. Please note that the optionally available front panel has holes with the exact diameter of 3 mm.

### Board interconnects:

The channel filter boards are solely interconnected via a 16-pole ribbon cable.

For signal distribution and power supply among all the other boards, a system from Japan Solderless Terminals (JST) was chosen. The connectors are S2B-EH(LF) (SN) and S3B-EH(LF) (SN), the corresponding plugs are EHR-2 and EHR-3, respectively, and the proper contacts are SEH-001T-P0.6.

There is no need to purchase a crimping tool. A little bit of dexterity, some practice and patience should be enough to assemble cables by hand. (*a mini-tutorial to be provided.*)



*An example showing the use of the interconnect system.*

## Contents

---

The following pages contain the assembly tables:

- Channel filters
  - Common materials that are identical for all 18 boards
  - Frequency-specific materials
- Preamplifiers
  - Voice
  - Carrier
- Internal excitation
  - Left channel
  - Right channel
- Voiced/unvoiced detector
- Output, PWM, and silence bridging
- Slew and freeze handling
- Power supply
- Miscellaneous

Starting on Page 41, you'll find the consolidated bill of all materials. This should be your reference for ordering purposes.

## Assembly Table: Common materials for the 18 channel filter boards

This is the BOM for the parts that are common to all 18 channel filter boards. In other words, **the below list of components is required 18 times**. The frequency-specific components are covered in the separate list following later.

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2	1N4148	2	DO-35	1N4148	Mouser	512-1N4148	
LED	LED	LED red, 2.4 V, 2 mA	1	3 mm LED	TLLR4401	Mouser	78-TLLR4401	
Transistor	T1, T2	2N3904	2	TO-92	2N3904BU	Mouser	512-2N3904BU	
IC	IC3, IC4	TL074	2	DIL14	TL074CN	Mouser	595-TL074CN	
IC	IC1, IC2	MC33079	2	DIL14	MC33079PG	Rochester		
IC	IC5	CD4053	1	DIL16	CD4053BE	Mouser	595-CD4053BE	
Ceramic	C18, C19, C20, C21, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34	100 nF	16	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Film	C17, C22	220 nF	2	RM2.5/RM5.0	R82DC3220Z360K	Mouser	80-82DC3220Z360K	
Electrolytic	C35, C36, C37, C38, C39, C40	47 µF/35 V, max. ø 5 mm	6	RM2.0	Würth 860010572005	Mouser	710-860010572005	
Resistor	R59, R60, R61, R62, R63, R64, R65	47 Ω, 250 mW	7	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R46	100 Ω	1	0204/0207	LR0204F100R	Farnell	2329854	
Resistor	R26	750 Ω	1	0204/0207	LR0204F750R	Farnell	2329971	
Resistor	R43	1 kΩ	1	0204/0207	LR0204F1K0	Farnell	2329885	
Resistor	R58	2.2 kΩ	1	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R52, R53	3.3 kΩ	2	0204/0207	LR0204F3K3	Farnell	2329934	
Resistor	R42	4.7 kΩ	1	0204/0207	LR0204F4K7	Farnell	2329947	
Resistor	R49	5.1 kΩ	1	0204/0207	LR0204F5K1	Farnell	2329957	
Resistor	R40, R50	8.2 kΩ	2	0204/0207	LR0204F8K2	Farnell	2329981	
Resistor	R27, R28, R29, R30, R31, R32, R33, R34, R41, R51, R54	10 kΩ	11	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R47, R48	15 kΩ	2	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R55	20 kΩ	1	0204/0207	LR0204F20K	Farnell	2329897	

## Assembly Table: Common materials for the 18 channel filter boards

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R57	22 kΩ	1	0204/0207	LR0204F22K	Farnell	2329901	
Resistor	R44	24 kΩ	1	0204/0207	LR0204F24K	Farnell	2329904	
Resistor	R25	33 kΩ	1	0204/0207	LR0204F33K	Farnell	2329922	
Resistor	R35, R45	47 kΩ	2	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R56, R66	100 kΩ	2	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R36	4.7 MΩ, 5%	1	0204/0207	CFR16J4M7	Farnell	2329535	
Trimmer, multi-turn	TR4, TR5	100 kΩ	2		T93XA104KT20	Mouser	72-T93XA-100K	
Trimmer	TR1, TR2, TR3	25 kΩ	3		PT 10 LH 25K	Mouser	531-PT10H-25K	
Potentiometer	P1, P2	100 kΩ log, Alpha 9 mm, right angled (side adjust)	2		RD901F-20-15R1-A100K	Small Bear (US) or Thonk (EU)		
Jack	CV-IN, CV-OUT	3.5 mm jack	2		CL13845G	Farnell	2766196	alternative: CL1384
Connector	2x	2x2 board-to-board connector, angled, RM2.54 mm	2		Würth 61300421021	Mouser	710-61300421021	
Connector	1x	2x8 board-to-board connector, angled, RM2.54 mm	1		Würth 61301621021	Mouser	710-61301621021	
Connector	1x	2x8 wire-to-board connector, RM2.54 mm	1		Würth 61201623021	Mouser	710-61201623021	
Connector	2x	Jumper	2		M7582-05	Mouser	855-M7582-05	
IC Socket	IC1, IC2, IC3, IC4	14 pins	4		110-99-314-41-001000	Mouser	575-199314	
IC Socket	IC5	16 pins	1		110-99-316-41-001000	Mouser	575-199316	
Misc	CHOP, CV, SYNTH, FLT	Solder pins, ø 1 mm	4		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Frequency-specific materials for the 18 channel filter boards

This table is an overview of the frequency-specific materials for easy reference during assembly. The actual BOM begins on the next page.

The resistors are from the E48 series,  $\pm 1\%$  tolerance, 125 mW or higher, throughhole, RM7.5 or smaller.

The capacitors are SMD size 1206 or size 0805,  $\pm 5\%$  tolerance or better, C0G/NP0 for temperature stability.

	R1, R13	R2, R14	R3, R15	R4, R16	R5, R17	R6, R18	R7, R19	R8, R20	R9, R21	R10, R22	R11, R23	R12, R24	R37	R38	R39	C1...C16
7000 Hz	301 $\Omega$	9.09 k $\Omega$	18.7 k $\Omega$	287 $\Omega$	8.66 k $\Omega$	17.8 k $\Omega$	237 $\Omega$	8.66 k $\Omega$	28.7 k $\Omega$	196 $\Omega$	6.81 k $\Omega$	22.6 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	10 nF
5500 Hz	383 $\Omega$	11.5 k $\Omega$	23.7 k $\Omega$	365 $\Omega$	11 k $\Omega$	22.6 k $\Omega$	301 $\Omega$	11 k $\Omega$	36.5 k $\Omega$	249 $\Omega$	8.66 k $\Omega$	28.7 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	10 nF
4330 Hz	487 $\Omega$	14.7 k $\Omega$	30.1 k $\Omega$	464 $\Omega$	14 k $\Omega$	28.7 k $\Omega$	383 $\Omega$	14 k $\Omega$	46.4 k $\Omega$	316 $\Omega$	11 k $\Omega$	36.5 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	10 nF
3410 Hz	619 $\Omega$	18.7 k $\Omega$	38.3 k $\Omega$	590 $\Omega$	17.8 k $\Omega$	36.5 k $\Omega$	487 $\Omega$	17.8 k $\Omega$	59 k $\Omega$	402 $\Omega$	14 k $\Omega$	46.4 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	10 nF
2680 Hz	787 $\Omega$	23.7 k $\Omega$	48.7 k $\Omega$	750 $\Omega$	22.6 k $\Omega$	46.4 k $\Omega$	619 $\Omega$	22.6 k $\Omega$	75 k $\Omega$	511 $\Omega$	17.8 k $\Omega$	59 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	10 nF
2110 Hz	1 k $\Omega$	30.1 k $\Omega$	61.9 k $\Omega$	953 $\Omega$	28.7 k $\Omega$	59 k $\Omega$	787 $\Omega$	28.7 k $\Omega$	95.3 k $\Omega$	649 $\Omega$	22.6 k $\Omega$	75 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	10 nF
1660 Hz	383 $\Omega$	11.5 k $\Omega$	23.7 k $\Omega$	365 $\Omega$	11 k $\Omega$	22.6 k $\Omega$	301 $\Omega$	11 k $\Omega$	36.5 k $\Omega$	249 $\Omega$	8.66 k $\Omega$	28.7 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	33 nF
1310 Hz	487 $\Omega$	14.7 k $\Omega$	30.1 k $\Omega$	464 $\Omega$	14 k $\Omega$	28.7 k $\Omega$	383 $\Omega$	14 k $\Omega$	46.4 k $\Omega$	316 $\Omega$	11 k $\Omega$	36.5 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	33 nF
1030 Hz	619 $\Omega$	18.7 k $\Omega$	38.3 k $\Omega$	590 $\Omega$	17.8 k $\Omega$	36.5 k $\Omega$	487 $\Omega$	17.8 k $\Omega$	59 k $\Omega$	402 $\Omega$	14 k $\Omega$	46.4 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	33 nF
810 Hz	787 $\Omega$	23.7 k $\Omega$	48.7 k $\Omega$	750 $\Omega$	22.6 k $\Omega$	46.4 k $\Omega$	619 $\Omega$	22.6 k $\Omega$	75 k $\Omega$	511 $\Omega$	17.8 k $\Omega$	59 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	33 nF
640 Hz	1 k $\Omega$	30.1 k $\Omega$	61.9 k $\Omega$	953 $\Omega$	28.7 k $\Omega$	59 k $\Omega$	787 $\Omega$	28.7 k $\Omega$	95.3 k $\Omega$	649 $\Omega$	22.6 k $\Omega$	75 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	33 nF
500 Hz	1.27 k $\Omega$	38.3 k $\Omega$	78.7 k $\Omega$	1.21 k $\Omega$	36.5 k $\Omega$	75 k $\Omega$	1 k $\Omega$	36.5 k $\Omega$	121 k $\Omega$	825 $\Omega$	28.7 k $\Omega$	95.3 k $\Omega$	24 k $\Omega$	20 k $\Omega$	6.8 k $\Omega$	33 nF
390 Hz	536 $\Omega$	16.2 k $\Omega$	33.2 k $\Omega$	511 $\Omega$	15.4 k $\Omega$	31.6 k $\Omega$	422 $\Omega$	15.4 k $\Omega$	51.1 k $\Omega$	348 $\Omega$	12.1 k $\Omega$	40.2 k $\Omega$	33 k $\Omega$	27 k $\Omega$	10 k $\Omega$	100 nF
310 Hz	681 $\Omega$	20.5 k $\Omega$	42.2 k $\Omega$	649 $\Omega$	19.6 k $\Omega$	40.2 k $\Omega$	536 $\Omega$	19.6 k $\Omega$	64.9 k $\Omega$	442 $\Omega$	15.4 k $\Omega$	51.1 k $\Omega$	33 k $\Omega$	27 k $\Omega$	10 k $\Omega$	100 nF
240 Hz	866 $\Omega$	26.1 k $\Omega$	53.6 k $\Omega$	825 $\Omega$	24.9 k $\Omega$	51.1 k $\Omega$	681 $\Omega$	24.9 k $\Omega$	82.5 k $\Omega$	562 $\Omega$	19.6 k $\Omega$	64.9 k $\Omega$	33 k $\Omega$	27 k $\Omega$	10 k $\Omega$	100 nF
190 Hz	1.1 k $\Omega$	33.2 k $\Omega$	68.1 k $\Omega$	1.05 k $\Omega$	31.6 k $\Omega$	64.9 k $\Omega$	866 $\Omega$	31.6 k $\Omega$	105 k $\Omega$	715 $\Omega$	24.9 k $\Omega$	82.5 k $\Omega$	33 k $\Omega$	27 k $\Omega$	10 k $\Omega$	100 nF
150 Hz	1.4 k $\Omega$	42.2 k $\Omega$	86.6 k $\Omega$	1.33 k $\Omega$	40.2 k $\Omega$	82.5 k $\Omega$	1.1 k $\Omega$	40.2 k $\Omega$	133 k $\Omega$	909 $\Omega$	31.6 k $\Omega$	105 k $\Omega$	33 k $\Omega$	27 k $\Omega$	10 k $\Omega$	100 nF
120 Hz	1.78 k $\Omega$	53.6 k $\Omega$	110 k $\Omega$	1.69 k $\Omega$	51.1 k $\Omega$	105 k $\Omega$	1.4 k $\Omega$	51.1 k $\Omega$	169 k $\Omega$	1.15 k $\Omega$	40.2 k $\Omega$	133 k $\Omega$	33 k $\Omega$	27 k $\Omega$	10 k $\Omega$	100 nF

## Assembly Table: Frequency-specific materials for the 18 channel filter boards

This is the assembly table for the parts that are different from channel to channel. See the previous page for a better overview of the actual filter channel board assignment.

Value	Count	Suggested Product	Distributor	Order #
10 nF	100	08055A103JAT2A	Mouser	581-08055A103JAT2A
33 nF	100	CGA5F2C0G1H333J085AA	Mouser	810-CGA5F2C0G1H333J
100 nF	100	GRM31C5C1H104JA01L	Mouser	81-GRM31C5C1H104JA1L
6.8 k $\Omega$	12	LR0204F6K8	Farnell	2329969
10 k $\Omega$	6	LR0204F10K	Farnell	2329855
20 k $\Omega$	12	LR0204F20K	Farnell	2329897
24 k $\Omega$	12	LR0204F24K	Farnell	2329904
27 k $\Omega$	6	LR0204F27K	Farnell	2329909
33 k $\Omega$	6	LR0204F33K	Farnell	2329922
196 $\Omega$	2	MRS25000C1960FCT00	Farnell	9465120
237 $\Omega$	2	MRS25000C2370FCT00	Farnell	9466185
249 $\Omega$	4	MRS25000C2490FCT00	Farnell	9466282
287 $\Omega$	2	MRS25000C2870FCT00	Farnell	9466584
301 $\Omega$	6	MRS25000C3010FCT00	Farnell	9467149
316 $\Omega$	4	MRS25000C3160FCT00	Farnell	9467246
348 $\Omega$	2	MRS25000C3480FCT00	Farnell	9467424
365 $\Omega$	4	MRS25000C3650FCT00	Farnell	9467548
383 $\Omega$	8	MRS25000C3830FCT00	Farnell	9467645
402 $\Omega$	4	MRS25000C4020FCT00	Farnell	9468145
422 $\Omega$	2	MRS25000C4220FCT00	Farnell	9468226
442 $\Omega$	2	MRS25000C4420FCT00	Farnell	9468340
464 $\Omega$	4	MRS25000C4640FCT00	Farnell	9468420
487 $\Omega$	8	MRS25000C4870FCT00	Farnell	9468544
511 $\Omega$	6	MRS25000C5110FCT00	Farnell	9468854
536 $\Omega$	4	MRS25000C5360FCT00	Farnell	9468951
562 $\Omega$	2	MRS25000C5620FCT00	Farnell	9469052
590 $\Omega$	4	MRS25000C5900FCT00	Farnell	9469150
619 $\Omega$	8	MRS25000C6190FCT00	Farnell	9469435

## Assembly Table: Frequency-specific materials for the 18 channel filter boards

---

Value	Count	Suggested Product	Distributor	Order #
649 $\Omega$	6	MRS25000C6490FCT00	Farnell	9469559
681 $\Omega$	4	MRS25000C6810FCT00	Farnell	9469656
715 $\Omega$	2	MRS25000C7150FCT00	Farnell	9469907
750 $\Omega$	4	MRS25000C7500FCT00	Farnell	9469982
787 $\Omega$	8	MRS25000C7870FCT00	Farnell	9470069
825 $\Omega$	4	MRS25000C8250FCT00	Farnell	9470263
866 $\Omega$	4	MRS25000C8660FCT00	Farnell	9470360
909 $\Omega$	2	MRS25000C9090FCT00	Farnell	9470549
953 $\Omega$	4	MRS25000C9530FCT00	Farnell	9470670
1 k $\Omega$	6	MRS25000C1001FCT00	Farnell	9465170
1.05 k $\Omega$	2	MRS25000C1051FCT00	Farnell	9465197
1.1 k $\Omega$	4	MRS25000C1101FCT00	Farnell	9465219
1.15 k $\Omega$	2	MRS25000C1151FCT00	Farnell	9465235
1.21 k $\Omega$	2	MRS25000C1211FCT00	Farnell	9465260
1.27 k $\Omega$	2	MRS25000C1271FCT00	Farnell	9465286
1.33 k $\Omega$	2	MRS25000C1331FCT00	Farnell	9465308
1.4 k $\Omega$	4	MRS25000C1401FCT00	Farnell	9465324
1.69 k $\Omega$	2	MRS25000C1691FCT00	Farnell	9465413
1.78 k $\Omega$	2	MRS25000C1781FCT00	Farnell	9465430
6.81 k $\Omega$	2	MRS25000C6811FCT00	Farnell	9469818
8.66 k $\Omega$	8	MRS25000C8661FCT00	Farnell	9470476
9.09 k $\Omega$	2	MRS25000C9091FCT00	Farnell	9470743
11 k $\Omega$	12	MRS25000C1102FCT00	Farnell	9464140
11.5 k $\Omega$	4	MRS25000C1152FCT00	Farnell	9464166
12.1 k $\Omega$	2	MRS25000C1212FCT00	Farnell	9464310
14 k $\Omega$	12	MRS25000C1402FCT00	Farnell	9464565
14.7 k $\Omega$	4	MRS25000C1472FCT00	Farnell	9464581
15.4 k $\Omega$	6	MRS25000C1542FCT00	Farnell	9464697
16.2 k $\Omega$	2	MRS25000C1622FCT00	Farnell	9464832

## Assembly Table: Frequency-specific materials for the 18 channel filter boards

---

Value	Count	Suggested Product	Distributor	Order #
17.8 kΩ	14	MRS25000C1782FCT00	Farnell	9464956
18.7 kΩ	6	MRS25000C1872FCT00	Farnell	9465057
19.6 kΩ	6	MRS25000C1962FCT00	Farnell	9465146
20.5 kΩ	2	MRS25000C2052FCT00	Farnell	9465928
22.6 kΩ	18	MRS25000C2262FCT00	Farnell	9466118
23.7 kΩ	8	MRS25000C2372FCT00	Farnell	9466207
24.9 kΩ	6	MRS25000C2492FCT00	Farnell	9466312
26.1 kΩ	2	MRS25000C2612FCT00	Farnell	9466436
28.7 kΩ	20	MRS25000C2872FCT00	Farnell	9466606
30.1 kΩ	8	MRS25000C3012FCT00	Farnell	9467181
31.6 kΩ	8	MRS25000C3162FCT00	Farnell	9467254
33.2 kΩ	4	MRS25000C3322FCT00	Farnell	9467360
36.5 kΩ	16	MRS25000C3652FCT00	Farnell	9467564
38.3 kΩ	6	MRS25000C3832FCT00	Farnell	9467653
40.2 kΩ	10	MRS25000C4022FCT00	Farnell	9468153
42.2 kΩ	4	MRS25000C4222FCT00	Farnell	9468234
46.4 kΩ	12	MRS25000C4642FCT00	Farnell	9468439
48.7 kΩ	4	MRS25000C4872FCT00	Farnell	9468552
51.1 kΩ	10	MRS25000C5112FCT00	Farnell	9468870
53.6 kΩ	4	MRS25000C5362FCT00	Farnell	9468960
59 kΩ	12	MRS25000C5902FCT00	Farnell	9469168
61.9 kΩ	4	MRS25000C6192FCT00	Farnell	9469443
64.9 kΩ	6	MRS25000C6492FCT00	Farnell	9469567
68.1 kΩ	2	MRS25000C6812FCT00	Farnell	9469672
75 kΩ	10	MRS25000C7502FCT00	Farnell	9469990
78.7 kΩ	2	MRS25000C7872FCT00	Farnell	9470077
82.5 kΩ	6	MRS25000C8252FCT00	Farnell	9470280
86.6 kΩ	2	MRS25000C8662FCT00	Farnell	9470379
95.3 kΩ	6	MRS25000C9532FCT00	Farnell	9470689

## Assembly Table: Frequency-specific materials for the 18 channel filter boards

---

Value	Count	Suggested Product	Distributor	Order #
105 k $\Omega$	6	MRS25000C1053FCT00	Farnell	9463933
110 k $\Omega$	2	MRS25000C1103FCT00	Farnell	9464069
121 k $\Omega$	2	MRS25000C1213FCT00	Farnell	9464247
133 k $\Omega$	4	MRS25000C1333FCT00	Farnell	9464409
169 k $\Omega$	2	MRS25000C1693FCT00	Farnell	9464808

## Assembly Table: Voice preamplifier

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2, D3, D4	1N4148	4	DO-35	1N4148	Mouser	512-1N4148	
LED	LED8, LED9, LED10	LED red, 2.4 V, 2 mA	3	3 mm LED	TLLR4401	Mouser	78-TLLR4401	
LED	LED7	LED yellow, 2.4 V, 2 mA	1	3 mm LED	TLLY4401	Mouser	78-TLLY4401	
LED	LED1, LED2, LED3, LED4, LED5, LED6	LED green, 2.4 V, 2 mA	6	3 mm LED	TLLG4401	Mouser	78-TLLG4401	
IC	IC1, IC2, IC3	NE5532	3	DIL8	NE5532AP	Mouser	595-NE5532AP	
IC	IC4	TL072	1	DIL8	TL072IP	Mouser	595-TL072IP	
IC	IC5	LM3916	1	DIL18	LM3916			
Ceramic	C5, C6	22 pF	2	RM2.5	K220J15C0GF53L2	Mouser	594-K220J15C0GF53L2	
Ceramic	C22, C23, C24, C25, C26, C27, C28, C29, C30	100 nF	9	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Film	C1, C11	100 nF	2	RM2.5/RM5.0	R82EC3100AA70J	Mouser	80-R82EC3100AA70J	
Film	C7	220 nF	1	RM2.5/RM5.0	R82DC3220Z360K	Mouser	80-82DC3220Z360K	
Film	C3, C4, C13, C14	1 $\mu$ F	4	RM2.5/RM5.0	R82DC4100Z360K	Mouser	80-R82DC4100Z360K	
Electrolytic	C8	3.3 $\mu$ F/50 V, max. $\varnothing$ 5 mm	1	RM2.0	Würth 860020672007	Mouser	710-860020672007	
Electrolytic	C2, C12	10 $\mu$ F/50 V, max. $\varnothing$ 5 mm	2	RM2.0	Würth 860020672010	Mouser	710-860020672010	
Electrolytic	C20, C21, C31, C32	100 $\mu$ F/25 V, max. $\varnothing$ 7 mm	4	RM2.5	Würth 860010473007	Mouser	710-860010473007	
Resistor	R23, R24	47 $\Omega$ , 250 mW	2	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R20	510 $\Omega$	1	0204/0207	LR0204F510R	Farnell	2329949	
Resistor	R3, R33	1 k $\Omega$	2	0204/0207	LR0204F1K0	Farnell	2329885	
Resistor	R21	7.5 k $\Omega$	1	0204/0207	LR0204F7K5	Farnell	2329974	
Resistor	R11	10 k $\Omega$	1	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R22	15 k $\Omega$	1	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R12	22 k $\Omega$	1	0204/0207	LR0204F22K	Farnell	2329901	
Resistor	R7	24 k $\Omega$	1	0204/0207	LR0204F24K	Farnell	2329904	
Resistor	R13	33 k $\Omega$	1	0204/0207	LR0204F33K	Farnell	2329922	
Resistor	R1, R5, R6, R8, R9, R31, R35, R36	47 k $\Omega$	8	0204/0207	LR0204F47K	Farnell	2329944	

## Assembly Table: Voice preamplifier

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R10, R14, R15, R16, R17	100 k $\Omega$	5	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R4, R18, R19, R34	200 k $\Omega$	4	0204/0207	LR0204F200K	Farnell	2329895	
Resistor	R2, R32	1 M $\Omega$	2	0204/0207	LR0204F1M0	Farnell	2329894	
Potentiometer	P1	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust)	1		RD901F-20-15R1-A100K	Small Bear (US) or Thonk (EU)		
Trimmer	TR1	100 k $\Omega$	1		PT 10 LH 100K	Mouser	531-PT10H-100K	
Jack	LINE-IN, MIC	6.35 mm jack	2		ACJS-MHDR	Mouser	523-ACJS-MHDR	
Connector	AGC-L, EXC-L, AUDIO-L, EXP-L	Wire-to-board connector, 2-pin	4		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	SUPPLY	Wire-to-board connector, 3-pin	1		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	4x	EHR-2	4		EHR-2	Farnell	2481434	
Connector	1x	EHR-3	1		EHR-3	Farnell	2399175	
Connector	11x	SEH-001T-P0.6	11		SEH-001T-P0.6	Farnell	1863249	
IC Socket	IC1, IC2, IC3, IC5	8 pins	4		110-99-308-41-001000	Mouser	575-199308	
IC Socket	IC4	18 pins	1		110-44-318-41-001000	Mouser	575-11044318	
Misc	LEFT, GND	Solder pins, $\varnothing$ 1 mm	2		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Carrier preamplifier

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2, D3, D4, D5, D6, D7, D8	1N4148	8	DO-35	1N4148	Mouser	512-1N4148	
JFET	J1	J113	1	TO-92	J113	Mouser	512-J113	
LED	LED8, LED9, LED10, LED18, LED19, LED20	LED red, 2.4 V, 2 mA	6	3 mm LED	TLLR4401	Mouser	78-TLLR4401	
LED	LED7, LED17	LED yellow, 2.4 V, 2 mA	2	3 mm LED	TLLY4401	Mouser	78-TLLY4401	
LED	LED1, LED2, LED3, LED4, LED5, LED6, LED11, LED12, LED13, LED14, LED15, LED16	LED green, 2.4 V, 2 mA	12	3 mm LED	TLLG4401	Mouser	78-TLLG4401	
IC	IC1, IC2, IC3, IC6, IC7	NE5532	5	DIL8	NE5532AP	Mouser	595-NE5532AP	
IC	IC4, IC8	TL072	2	DIL8	TL072IP	Mouser	595-TL072IP	
IC	IC5, IC9	LM3916	2	DIL18	LM3916			
Ceramic	C5, C6, C15, C16	22 pF	4	RM2.5	K220J15C0GF53L2	Mouser	594-K220J15C0GF53L2	
Ceramic	C22, C23, C24, C25, C26, C27, C28, C29, C30, C34, C35, C36, C37, C38, C39, C40	100 nF	16	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Ceramic	C19	10 nF	1	RM2.5	K103K15X7RF53L2	Mouser	594-K103K15X7RF53L2	
Film	C1, C11	100 nF	2	RM2.5/RM5.0	R82EC3100AA70J	Mouser	80-R82EC3100AA70J	
Film	C7, C17	220 nF	2	RM2.5/RM5.0	R82DC3220Z360K	Mouser	80-82DC3220Z360K	
Film	C3, C4, C13, C14	1 µF	4	RM2.5/RM5.0	R82DC4100Z360K	Mouser	80-R82DC4100Z360K	
Electrolytic	C8, C18	3.3 µF/50 V, max. ø 5 mm	2	RM2.0	Würth 860020672007	Mouser	710-860020672007	
Electrolytic	C2, C12	10 µF/50 V, max. ø 5 mm	2	RM2.0	Würth 860020672010	Mouser	710-860020672010	
Electrolytic	C20, C21, C31, C32	100 µF/25 V, max. ø 7 mm	4	RM2.5	Würth 860010473007	Mouser	710-860010473007	
Resistor	R23, R24	47 Ω, 250 mW	2	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R20, R50	510 Ω	2	0204/0207	LR0204F510R	Farnell	2329949	
Resistor	R3, R33	1 kΩ	2	0204/0207	LR0204F1K0	Farnell	2329885	

## Assembly Table: Carrier preamplifier

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R21, R51	7.5 k $\Omega$	2	0204/0207	LR0204F7K5	Farnell	2329974	
Resistor	R11, R41	10 k $\Omega$	2	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R22, R52	15 k $\Omega$	2	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R12, R42	22 k $\Omega$	2	0204/0207	LR0204F22K	Farnell	2329901	
Resistor	R13, R43	33 k $\Omega$	2	0204/0207	LR0204F33K	Farnell	2329922	
Resistor	R1, R5, R6, R7, R8, R9, R31, R35, R36, R37, R38, R39	47 k $\Omega$	12	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R10, R14, R15, R16, R17, R25, R26, R40, R44, R45, R46, R47	100 k $\Omega$	12	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R4, R18, R19, R34, R48, R49	200 k $\Omega$	6	0204/0207	LR0204F200K	Farnell	2329895	
Resistor	R2, R32	1 M $\Omega$	2	0204/0207	LR0204F1M0	Farnell	2329894	
Potentiometer	P1	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust), stereo	1		Alpha 9-PC-STE-100k log, RD902F-20-15R1-A100K	Small Bear (US) or banzaimusic.com (EU)		
Trimmer	TR1, TR2	100 k $\Omega$	2		PT 10 LH 100K	Mouser	531-PT10H-100K	
Jack	LINE-IN, MIC	6.35 mm jack	2		ACJS-MHDR	Mouser	523-ACJS-MHDR	
Connector	AGC-L, EXC-L, AUDIO-L, EXP-L, AGC-R, EXC-R, AUDIO-R, EXP-R, INT-R, INT-L, MONO-SW	Wire-to-board connector, 2-pin	11		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	SUPPLY	Wire-to-board connector, 3-pin	1		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	11x	EHR-2	11		EHR-2	Farnell	2481434	
Connector	1x	EHR-3	1		EHR-3	Farnell	2399175	
Connector	25x	SEH-001T-P0.6	25		SEH-001T-P0.6	Farnell	1863249	

## Assembly Table: Carrier preamplifier

---

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
IC Socket	IC1, IC2, IC3, IC5, IC6, IC7	8 pins	6		110-99-308-41-001000	Mouser	575-199308	
IC Socket	IC4, IC8	18 pins	2		110-44-318-41-001000	Mouser	575-11044318	
Misc	LEFT, RIGHT, GND	Solder pins, $\varnothing$ 1 mm	3		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Internal excitation (left channel)

This table contains fewer components than “internal excitation (right channel)”, namely J4, J5, C18, R66, R67, R68, and MIX–SW. Also notice the difference in MIX–IN1 and MIX–IN2.

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2	1N4148	2	DO-35	1N4148	Mouser	512-1N4148	
JFET	J1	J105	1	TO-92	J105	Mouser	512-J105	
JFET	J2, J3	J113	2	TO-92	J113	Mouser	512-J113	
Transistor	T1, T2	2N3904	2	TO-92	2N3904BU	Mouser	512-2N3904BU	
Transistor	T3	2N3906	1	TO-92	2N3906BU	Mouser	512-2N3906BU	
IC	IC1	TL072	1	DIL8	TL072IP	Mouser	595-TL072IP	
IC	IC3, IC5, IC7	TL074	3	DIL14	TL074CN	Mouser	595-TL074CN	
IC	IC2	THAT300	1	DIL14	THAT300P14-U	Mouser	887-300P14-U	
IC	IC6	LM13700	1	DIL16	LM13700N	Mouser	926-LM13700N/NOPB	
IC	IC4	LM319	1	DIL14	LM319N	Mouser	512-LM319N	
IC	IC8	NE5532	1	DIL8	NE5532AP	Mouser	595-NE5532AP	
Ceramic	C9	22 pF	1	RM2.5	K220J15C0GF53L2	Mouser	594-K220J15C0GF53L2	
Ceramic	C1, C6, C17	100 pF	3	RM2.5	K101J15C0GF53L2	Mouser	594-K101J15C0GF53L2	
Ceramic	C16	220 pF	1	RM2.5/RM5.0	C315C221M5R5TA	Mouser	80-C315C221M5R	
Ceramic	C15	470 pF	1	RM2.5/RM5.0	K471J15C0GF53L2	Mouser	594-K471J15C0GF53L2	
Film	C14	1 nF	1	RM2.5/RM5.0	R82EC1100AA50K	Mouser	80-R82EC1100AA50K	
Film	C13	2.2 nF	1	RM2.5/RM5.0	R82EC1220DQ50J	Mouser	80-R82EC1220DQ50J	
Film	C12	4.7 nF	1	RM2.5/RM5.0	R82EC1470CK50J	Mouser	80-R82EC1470CK50J	
Film	C11	10 nF	1	RM2.5/RM5.0	R82EC2100AA50J	Mouser	80-R82EC2100AA50J	
Film	C10	22 nF	1	RM2.5/RM5.0	R82EC2220AA50J	Mouser	80-R82EC2220AA50J	
Film	C5	47 nF	1	RM2.5/RM5.0	R82EC2470AA60J	Mouser	80-R82EC2470AA60J	
Film	C3, C8	100 nF	2	RM2.5/RM5.0	R82EC3100AA70J	Mouser	80-R82EC3100AA70J	
Ceramic	C2, C22, C23, C26, C27, C28, C29, C32, C33, C34, C35, C38, C39, C42, C43	100 nF	15	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Film	C4	1 $\mu$ F	1	RM2.5/RM5.0	R82DC4100Z360K	Mouser	80-R82DC4100Z360K	
Electrolytic	C7	2.2 $\mu$ F/25 V, max. $\varnothing$ 5 mm	1	RM2.0	Würth 860020672006	Mouser	710-860020672006	

## Assembly Table: Internal excitation (left channel)

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Electrolytic	C20, C21, C24, C25, C30, C31, C36, C37, C40, C41	47 $\mu$ F/35 V, max. $\varnothing$ 5 mm	10	RM2.0	Würth 860010572005	Mouser	710-860010572005	
Tempco	R7	2 k $\Omega$ , 3300 ppm/ $^{\circ}$ C	1			Thonk		Akaneohm
Resistor	R8, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R82, R83	47 $\Omega$ , 250 mW	13	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R41	430 $\Omega$	1	0204/0207	LR0204F430R	Farnell	2329938	
Resistor	R40	470 $\Omega$	1	0204/0207	LR0204F470R	Farnell	2329942	
Resistor	R9	820 $\Omega$	1	0204/0207	LR0204F820R	Farnell	2329976	
Resistor	R34	1 k $\Omega$	1	0204/0207	LR0204F1K0	Farnell	2329885	
Resistor	R6, R11	2.2 k $\Omega$	2	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R60, R81	3.3 k $\Omega$	2	0204/0207	LR0204F3K3	Farnell	2329934	
Resistor	R33, R44, R46, R59	4.7 k $\Omega$	4	0204/0207	LR0204F4K7	Farnell	2329947	
Resistor	R36, R37	5.6 k $\Omega$	2	0204/0207	LR0204F5K6	Farnell	2329958	
Resistor	R58	10 k $\Omega$	1	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R42	12 k $\Omega$	1	0204/0207	LR0204F12K	Farnell	2329863	
Resistor	R35, R43	15 k $\Omega$	2	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R27, R28, R29	18 k $\Omega$	3	0204/0207	LR0204F18K	Farnell	2329882	
Resistor	R57	22 k $\Omega$	1	0204/0207	LR0204F22K	Farnell	2329901	
Resistor	R50	24 k $\Omega$	1	0204/0207	LR0204F24K	Farnell	2329904	
Resistor	R17	33 k $\Omega$	1	0204/0207	LR0204F33K	Farnell	2329922	
Resistor	R30	36 k $\Omega$	1	0204/0207	LR0204F36K	Farnell	2329927	
Resistor	R19, R47, R56	47 k $\Omega$	3	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R14	56 k $\Omega$	1	0204/0207	LR0204F56K	Farnell	2329954	
Resistor	R65	62 k $\Omega$	1	0204/0207	LR0204F62K	Farnell	2329961	
Resistor	R1, R2, R5, R16, R18, R21, R22, R23, R55, R61, R62, R63, R64, R80	100 k $\Omega$	14	0204/0207	LR0204F100K	Farnell	2329853	

## Assembly Table: Internal excitation (left channel)

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R4, R20, R31	150 k $\Omega$	3	0204/0207	LR0204F150K	Farnell	2329871	
Resistor	R12, R32, R54	220 k $\Omega$	3	0204/0207	LR0204F220K	Farnell	2329899	
Resistor	R15	330 k $\Omega$	1	0204/0207	MFR3-330KFC	Farnell	1565303	
Resistor	R13	390 k $\Omega$	1	0204/0207	LR0204F390K	Farnell	2329929	
Resistor	R53	470 k $\Omega$	1	0204/0207	LR0204F470K	Farnell	2329941	
Resistor	R24	820 k $\Omega$	1	0204/0207	MRS25000C8203FCT00	Farnell	9470239	
Resistor	R25, R26, R38, R39, R45, R48, R49, R51, R52	1 M $\Omega$	9	0204/0207	LR0204F1M0	Farnell	2329894	
Resistor	R10, R79	1.5 M $\Omega$	2	0204/0207	MRS25000C1504FCT00	Farnell	9465537	
Resistor	R3	6.8 M $\Omega$	1	0204/0207	MRS25000C6804FCT00	Farnell	9469842	
Potentiometer	P1, P2	100 k $\Omega$ lin, Alpha 9 mm, right angled (side adjust)	2		RD901F-20-15R1-B100K	Small Bear (US) or Thonk (EU)		
Potentiometer	P3, P4	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust)	2		RD901F-20-15R1-A100K	Small Bear (US) or Thonk (EU)		
Trimmer, multi-turn	TR1, TR3	100 $\Omega$	2		T93XA101KT20	Mouser	72-T93XA-100	
Trimmer, multi-turn	TR2	2.2 k $\Omega$	1		T93XA202KT20	Mouser	72-T93XA-2K	
Trimmer, multi-turn	TR4	100 k $\Omega$	1		T93XA104KT20	Mouser	72-T93XA-100K	
Trimmer	TR5	10 k $\Omega$	1		PT 10 LH 10K	Mouser	531-PT10H-10K	
Trimmer	TR6, TR7, TR8, TR9	100 k $\Omega$	4		PT 10 LH 100K	Mouser	531-PT10H-100K	
Trimmer	TR10	250 k $\Omega$	1		PT 10 LH 250K	Mouser	531-PT10H-250K	
Jack	CV-IN	3.5 mm jack	1		CL13845G	Farnell	2766196	
Connector	2x	2x2 board-to-board connector, angled, RM2.54 mm	2		Würth 61300421021	Mouser	710-61300421021	

## Assembly Table: Internal excitation (left channel)

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Connector	VUV-NSE, AGC, EXC-OUT, MIX-IN1, MIX-IN2	Wire-to-board connector, 2-pin	5		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	SUPPLY, NOISE-SRC	Wire-to-board connector, 3-pin	2		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	5x	EHR-2	5		EHR-2	Farnell	2481434	
Connector	2x	EHR-3	2		EHR-3	Farnell	2399175	
Connector	16x	SEH-001T-P0.6	16		SEH-001T-P0.6	Farnell	1863249	
Connector	2x	Jumper	2		M7582-05	Mouser	855-M7582-05	
IC Socket	IC1, IC8	8 pins	2		110-99-308-41-001000	Mouser	575-199308	
IC Socket	IC2, IC3, IC4, IC5, IC7	14 pins	5		110-99-314-41-001000	Mouser	575-199314	
IC Socket	IC6	16 pins	1		110-99-316-41-001000	Mouser	575-199316	
Misc	AGCO, GND, PNK, SAW, WHT, SQR	Solder pins, $\varnothing$ 1 mm	6		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Internal excitation (right channel)

Compared to the previous table for “Internal excitation (left channel)”, this table contains additional components for the mixing circuitry.

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2	1N4148	2	DO-35	1N4148	Mouser	512-1N4148	
JFET	J1	J105	1	TO-92	J105	Mouser	512-J105	
JFET	J2, J3, J4, J5	J113	4	TO-92	J113	Mouser	512-J113	
Transistor	T1, T2	2N3904	2	TO-92	2N3904BU	Mouser	512-2N3904BU	
Transistor	T3	2N3906	1	TO-92	2N3906BU	Mouser	512-2N3906BU	
IC	IC1	TL072	1	DIL8	TL072IP	Mouser	595-TL072IP	
IC	IC3, IC5, IC7	TL074	3	DIL14	TL074CN	Mouser	595-TL074CN	
IC	IC2	THAT300	1	DIL14	THAT300P14-U	Mouser	887-300P14-U	
IC	IC6	LM13700	1	DIL16	LM13700N	Mouser	926-LM13700N/NOPB	
IC	IC4	LM319	1	DIL14	LM319N	Mouser	512-LM319N	
IC	IC8	NE5532	1	DIL8	NE5532AP	Mouser	595-NE5532AP	
Ceramic	C9	22 pF	1	RM2.5	K220J15C0GF53L2	Mouser	594-K220J15C0GF53L2	
Ceramic	C1, C6, C17	100 pF	3	RM2.5	K101J15C0GF53L2	Mouser	594-K101J15C0GF53L2	
Ceramic	C16	220 pF	1	RM2.5/RM5.0	C315C221M5R5TA	Mouser	80-C315C221M5R	
Ceramic	C15	470 pF	1	RM2.5/RM5.0	K471J15C0GF53L2	Mouser	594-K471J15C0GF53L2	
Film	C14	1 nF	1	RM2.5/RM5.0	R82EC1100AA50K	Mouser	80-R82EC1100AA50K	
Film	C13	2.2 nF	1	RM2.5/RM5.0	R82EC1220DQ50J	Mouser	80-R82EC1220DQ50J	
Film	C12	4.7 nF	1	RM2.5/RM5.0	R82EC1470CK50J	Mouser	80-R82EC1470CK50J	
Ceramic	C18	10 nF	1	RM2.5	K103K15X7RF53L2	Mouser	594-K103K15X7RF53L2	
Film	C11	10 nF	1	RM2.5/RM5.0	R82EC2100AA50J	Mouser	80-R82EC2100AA50J	
Film	C10	22 nF	1	RM2.5/RM5.0	R82EC2220AA50J	Mouser	80-R82EC2220AA50J	
Film	C5	47 nF	1	RM2.5/RM5.0	R82EC2470AA60J	Mouser	80-R82EC2470AA60J	
Film	C3, C8	100 nF	2	RM2.5/RM5.0	R82EC3100AA70J	Mouser	80-R82EC3100AA70J	
Ceramic	C2, C22, C23, C26, C27, C28, C29, C32, C33, C34, C35, C38, C39, C42, C43	100 nF	15	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Film	C4	1 $\mu$ F	1	RM2.5/RM5.0	R82DC4100Z360K	Mouser	80-R82DC4100Z360K	

## Assembly Table: Internal excitation (right channel)

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Electrolytic	C7	2.2 $\mu$ F/25 V, max. $\varnothing$ 5 mm	1	RM2.0	Würth 860020672006	Mouser	710-860020672006	
Electrolytic	C20, C21, C24, C25, C30, C31, C36, C37, C40, C41	47 $\mu$ F/35 V, max. $\varnothing$ 5 mm	10	RM2.0	Würth 860010572005	Mouser	710-860010572005	
Tempco	R7	2 k $\Omega$ , 3300 ppm/ $^{\circ}$ C	1			Thonk		Akaneohm
Resistor	R8, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R82, R83	47 $\Omega$ , 250 mW	13	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R41	430 $\Omega$	1	0204/0207	LR0204F430R	Farnell	2329938	
Resistor	R40	470 $\Omega$	1	0204/0207	LR0204F470R	Farnell	2329942	
Resistor	R9	820 $\Omega$	1	0204/0207	LR0204F820R	Farnell	2329976	
Resistor	R34	1 k $\Omega$	1	0204/0207	LR0204F1K0	Farnell	2329885	
Resistor	R6, R11	2.2 k $\Omega$	2	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R60, R81	3.3 k $\Omega$	2	0204/0207	LR0204F3K3	Farnell	2329934	
Resistor	R33, R44, R46, R59	4.7 k $\Omega$	4	0204/0207	LR0204F4K7	Farnell	2329947	
Resistor	R36, R37	5.6 k $\Omega$	2	0204/0207	LR0204F5K6	Farnell	2329958	
Resistor	R58	10 k $\Omega$	1	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R42	12 k $\Omega$	1	0204/0207	LR0204F12K	Farnell	2329863	
Resistor	R35, R43	15 k $\Omega$	2	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R27, R28, R29	18 k $\Omega$	3	0204/0207	LR0204F18K	Farnell	2329882	
Resistor	R57	22 k $\Omega$	1	0204/0207	LR0204F22K	Farnell	2329901	
Resistor	R50	24 k $\Omega$	1	0204/0207	LR0204F24K	Farnell	2329904	
Resistor	R17	33 k $\Omega$	1	0204/0207	LR0204F33K	Farnell	2329922	
Resistor	R30	36 k $\Omega$	1	0204/0207	LR0204F36K	Farnell	2329927	
Resistor	R19, R47, R56	47 k $\Omega$	3	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R14	56 k $\Omega$	1	0204/0207	LR0204F56K	Farnell	2329954	
Resistor	R65	62 k $\Omega$	1	0204/0207	LR0204F62K	Farnell	2329961	

## Assembly Table: Internal excitation (right channel)

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R1, R2, R5, R16, R18, R21, R22, R23, R55, R61, R62, R63, R64, R80	100 k $\Omega$	14	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R4, R20, R31	150 k $\Omega$	3	0204/0207	LR0204F150K	Farnell	2329871	
Resistor	R12, R32, R54, R66, R67, R68	220 k $\Omega$	6	0204/0207	LR0204F220K	Farnell	2329899	
Resistor	R15	330 k $\Omega$	1	0204/0207	MFR3-330KFC	Farnell	1565303	
Resistor	R13	390 k $\Omega$	1	0204/0207	LR0204F390K	Farnell	2329929	
Resistor	R53	470 k $\Omega$	1	0204/0207	LR0204F470K	Farnell	2329941	
Resistor	R24	820 k $\Omega$	1	0204/0207	MRS25000C8203FCT00	Farnell	9470239	
Resistor	R25, R26, R38, R39, R45, R48, R49, R51, R52	1 M $\Omega$	9	0204/0207	LR0204F1M0	Farnell	2329894	
Resistor	R10, R79	1.5 M $\Omega$	2	0204/0207	MRS25000C1504FCT00	Farnell	9465537	
Resistor	R3	6.8 M $\Omega$	1	0204/0207	MRS25000C6804FCT00	Farnell	9469842	
Potentiometer	P1, P2	100 k $\Omega$ lin, Alpha 9 mm, right angled (side adjust)	2		RD901F-20-15R1-B100K	Small Bear (US) or Thonk (EU)		
Potentiometer	P3, P4	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust)	2		RD901F-20-15R1-A100K	Small Bear (US) or Thonk (EU)		
Trimmer, multi-turn	TR1, TR3	100 $\Omega$	2		T93XA101KT20	Mouser	72-T93XA-100	
Trimmer, multi-turn	TR2	2.2 k $\Omega$	1		T93XA202KT20	Mouser	72-T93XA-2K	
Trimmer, multi-turn	TR4	100 k $\Omega$	1		T93XA104KT20	Mouser	72-T93XA-100K	
Trimmer	TR5	10 k $\Omega$	1		PT 10 LH 10K	Mouser	531-PT10H-10K	
Trimmer	TR6, TR7, TR8, TR9	100 k $\Omega$	4		PT 10 LH 100K	Mouser	531-PT10H-100K	
Trimmer	TR10	250 k $\Omega$	1		PT 10 LH 250K	Mouser	531-PT10H-250K	
Jack	CV-IN	3.5 mm jack	1		CL13845G	Farnell	2766196	

## Assembly Table: Internal excitation (right channel)

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Connector	2x	2x2 board-to-board connector, angled, RM2.54 mm	2		Würth 61300421021	Mouser	710-61300421021	
Connector	VUV-NSE, AGC, EXC-OUT, MIX-SW, MIX-OUT1, MIX-OUT2	Wire-to-board connector, 2-pin	6		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	SUPPLY, NOISE-SRC	Wire-to-board connector, 3-pin	2		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	6x	EHR-2	6		EHR-2	Farnell	2481434	
Connector	2x	EHR-3	2		EHR-3	Farnell	2399175	
Connector	18x	SEH-001T-P0.6	18		SEH-001T-P0.6	Farnell	1863249	
Connector	2x	Jumper	2		M7582-05	Mouser	855-M7582-05	
IC Socket	IC1, IC8	8 pins	2		110-99-308-41-001000	Mouser	575-199308	
IC Socket	IC2, IC3, IC4, IC5, IC7	14 pins	5		110-99-314-41-001000	Mouser	575-199314	
IC Socket	IC6	16 pins	1		110-99-316-41-001000	Mouser	575-199316	
Misc	AGCO, GND, PNK, SAW, WHT, SQR	Solder pins, $\varnothing$ 1 mm	6		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Voiced/unvoiced detector

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12	1N4148	12	DO-35	1N4148	Mouser	512-1N4148	
JFET	J1, J2, J3, J4	J113	4	TO-92	J113	Mouser	512-J113	
Transistor	T1, T2	2N3904	2	TO-92	2N3904BU	Mouser	512-2N3904BU	
IC	IC1	TL072	1	DIL8	TL072IP	Mouser	595-TL072IP	
IC	IC2, IC3, IC4, IC5	TL074	4	DIL14	TL074CN	Mouser	595-TL074CN	
IC	IC6	NE5532	1	DIL8	NE5532AP	Mouser	595-NE5532AP	
IC	IC7	CD4093	1	DIL14	CD4093BE	Mouser	595-CD4093BE	
IC	IC8	CD40106	1	DIL14	CD40106BE	Mouser	595-CD40106BE	
Ceramic	C26, C27	100 pF	2	RM2.5	K101J15C0GF53L2	Mouser	594-K101J15C0GF53L2	
Ceramic	C22, C23, C24, C25	1.5 nF	4	RM2.5	C315C152K1R5TA	Mouser	80-C315C152K1R	
Film	C1, C2, C3	10 nF	3	RM2.5/RM5.0	R82EC2100AA50J	Mouser	80-R82EC2100AA50J	
Ceramic	C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C30, C31, C34, C35, C38, C39, C40, C41, C42, C43, C44, C45, C47, C48	100 nF	32	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Electrolytic	C46	22 $\mu$ F/25 V, max. $\varnothing$ 5 mm	1	RM2.0	Würth 860010572003	Mouser	710-860010572003	
Electrolytic	C28, C29, C32, C33	47 $\mu$ F/35 V, max. $\varnothing$ 5 mm	4	RM2.0	Würth 860010572005	Mouser	710-860010572005	
Electrolytic	C36, C37	100 $\mu$ F/25 V, max. $\varnothing$ 7 mm	2	RM2.5	Würth 860010473007	Mouser	710-860010473007	
Resistor	R76, R77, R78, R79, R80, R81, R82	47 $\Omega$ , 250 mW	7	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R49	100 $\Omega$	1	0204/0207	LR0204F100R	Farnell	2329854	
Resistor	R5, R23	1.5 k $\Omega$	2	0204/0207	LR0204F1K5	Farnell	2329891	
Resistor	R73, R75	2.2 k $\Omega$	2	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R3	3.9 k $\Omega$	1	0204/0207	LR0204F3K9	Farnell	2329936	
Resistor	R13, R36, R46	4.7 k $\Omega$	3	0204/0207	LR0204F4K7	Farnell	2329947	

## Assembly Table: Voiced/unvoiced detector

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R21, R22	5.6 k $\Omega$	2	0204/0207	LR0204F5K6	Farnell	2329958	
Resistor	R19	6.8 k $\Omega$	1	0204/0207	LR0204F6K8	Farnell	2329969	
Resistor	R14, R34, R47	8.2 k $\Omega$	3	0204/0207	LR0204F8K2	Farnell	2329981	
Resistor	R1, R15, R16, R24, R25, R35, R48, R58, R59, R60, R61, R62, R63, R64, R65, R71	10 k $\Omega$	16	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R33	12 k $\Omega$	1	0204/0207	LR0204F12K	Farnell	2329863	
Resistor	R11, R12, R18, R44, R45	15 k $\Omega$	5	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R66, R67	20 k $\Omega$	2	0204/0207	LR0204F20K	Farnell	2329897	
Resistor	R2, R17	22 k $\Omega$	2	0204/0207	LR0204F22K	Farnell	2329901	
Resistor	R4, R50	27 k $\Omega$	2	0204/0207	LR0204F27K	Farnell	2329909	
Resistor	R31, R32	36 k $\Omega$	2	0204/0207	LR0204F36K	Farnell	2329927	
Resistor	R72, R74	47 k $\Omega$	2	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R6, R7, R8, R9, R10, R20, R26, R27, R28, R29, R30, R38, R39, R40, R41, R42, R43, R52, R53, R68, R69, R70	100 k $\Omega$	22	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R51	330 k $\Omega$	1	0204/0207	MFR3-330KFC	Farnell	1565303	
Resistor	R54, R55, R56, R57	1 M $\Omega$	4	0204/0207	LR0204F1M0	Farnell	2329894	
Resistor	R37	2.2 M $\Omega$ , 5%	1	0204/0207	CFR16J2M2	Farnell	2329510	
Trimmer	TR2	10 k $\Omega$	1		PT 10 LV 10K	Mouser	531-PT10V-10K	
Trimmer	TR1	100 k $\Omega$	1		PT 10 LV 100K	Mouser	531-PT10V-100K	

## Assembly Table: Voiced/unvoiced detector

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Connector	VOICE, NOISE-L, NOISE-R, EXC-L, EXC-R, MIX-L, MIX-R, NOISE-INH, NOISE-INH, VOICED-LED, UNVOICED-LED	Wire-to-board connector, 2-pin	11		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	SUPPLY, FORCED-VUV-SW	Wire-to-board connector, 3-pin	2		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	11x	EHR-2	11		EHR-2	Farnell	2481434	
Connector	2x	EHR-3	2		EHR-3	Farnell	2399175	
Connector	28x	SEH-001T-P0.6	28		SEH-001T-P0.6	Farnell	1863249	
IC Socket	IC1, IC6	8 pins	2		110-99-308-41-001000	Mouser	575-199308	
IC Socket	IC2, IC3, IC4, IC5, IC7, IC8	14 pins	6		110-99-314-41-001000	Mouser	575-199314	
Misc	GND, MIX-L, MIX-R	Solder pins, $\varnothing$ 1 mm	3		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Output, PWM, and silence bridging

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2, D3, D4	1N4148	4	DO-35	1N4148	Mouser	512-1N4148	
Diode	D5	1N4001	1	DO-41	1N4001RLG	Mouser	863-1N4001RLG	
LED	LED1	LED red, 2.4 V, 2 mA	1	3 mm LED	TLLR4401	Mouser	78-TLLR4401	
JFET	J1, J2, J3, J4	J113	4	TO-92	J113	Mouser	512-J113	
IC	IC8, IC10	LM319	2	DIL14	LM319N	Mouser	512-LM319N	
IC	IC1, IC2, IC3, IC4, IC5, IC6	NE5532	6	DIL8	NE5532AP	Mouser	595-NE5532AP	
IC	IC7, IC16	TL072	2	DIL8	TL072IP	Mouser	595-TL072IP	
IC	IC14, IC15	TL074	2	DIL14	TL074CN	Mouser	595-TL074CN	
IC	IC11	CD40106	1	DIL14	CD40106BE	Mouser	595-CD40106BE	
IC	IC9	CD4050	1	DIL16	CD4050BE	Mouser	595-CD4050BE	
IC	IC12	78L05	1	TO-92	LM78L05ACZXA	Mouser	511-L78L05ACZ	
IC	IC13	79L05	1	TO-92	LM79L05ACZ	Mouser	511-L79L05ACZ	
Ceramic	C1, C2, C3, C4, C5, C6, C11, C12, C14	22 pF	9	RM2.5	K220J15C0GF53L2	Mouser	594-K220J15C0GF53L2	
Ceramic	C19	100 pF	1	RM2.5	K101J15C0GF53L2	Mouser	594-K101J15C0GF53L2	
Ceramic	C26, C27, C29	1 nF	3	RM2.5	R82EC1100AA50K	Mouser	80-R82EC1100AA50K	
Film	C13, C30	10 nF	2	RM2.5/RM5.0	R82EC2100AA50J	Mouser	80-R82EC2100AA50J	
Ceramic	C20, C25, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C46, C48, C49, C51, C54, C55, C56, C57, C58, C59, C60, C63, C64	100 nF	27	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Film	C22, C23, C24, C28	220 nF	4	RM2.5/RM5.0	R82DC3220Z360K	Mouser	80-82DC3220Z360K	
Film	C52, C53	330 nF	2	RM2.5/RM5.0	R82DC3330AA60K	Mouser	80-R82DC3330AA60K	
Film	C21	1 $\mu$ F	1	RM2.5/RM5.0	R82DC4100Z360K	Mouser	80-R82DC4100Z360K	
Electrolytic	C7, C8, C9, C10, C15, C16, C17, C18, C47	22 $\mu$ F/25 V, max. $\varnothing$ 5 mm	9	RM2.0	Würth 860010572003	Mouser	710-860010572003	

## Assembly Table: Output, PWM, and silence bridging

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Electrolytic	C45, C61, C62	47 $\mu$ F/35 V, max. $\varnothing$ 5 mm	3	RM2.0	Würth 860010572005	Mouser	710-860010572005	
Electrolytic	C43, C44, C50	100 $\mu$ F/25 V, max. $\varnothing$ 7 mm	3	RM2.5	Würth 860010473007	Mouser	710-860010473007	
Resistor	R73, R85, R86, R87, R88, R89, R90, R91, R92, R93	47 $\Omega$ , 250 mW	10	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R95	220 $\Omega$	1	0204/0207	LR0204F220R	Farnell	2329900	
Resistor	R45, R46, R75	470 $\Omega$	3	0204/0207	LR0204F470R	Farnell	2329942	
Resistor	R21, R22, R33, R34	560 $\Omega$	4	0204/0207	LR0204F560R	Farnell	2329953	
Resistor	R84	2.2 k $\Omega$	1	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R50	3.3 k $\Omega$	1	0204/0207	LR0204F3K3	Farnell	2329934	
Resistor	R39, R81	4.7 k $\Omega$	2	0204/0207	LR0204F4K7	Farnell	2329947	
Resistor	R47, R48, R59	6.8 k $\Omega$	3	0204/0207	LR0204F6K8	Farnell	2329969	
Resistor	R60	8.2 k $\Omega$	1	0204/0207	LR0204F8K2	Farnell	2329981	
Resistor	R29, R30, R31, R32, R49, R52, R53, R54, R55, R56, R61, R64, R67, R77	10 k $\Omega$	14	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R1, R2	15 k $\Omega$	2	0204/0207	LR0204F15K	Farnell	2329873	
Resistor	R37	18 k $\Omega$	1	0204/0207	LR0204F18K	Farnell	2329882	
Resistor	R58, R62, R63, R76	20 k $\Omega$	4	0204/0207	LR0204F20K	Farnell	2329897	
Resistor	R51, R57, R94	24 k $\Omega$	3	0204/0207	LR0204F24K	Farnell	2329904	
Resistor	R9, R10	27 k $\Omega$	2	0204/0207	LR0204F27K	Farnell	2329909	
Resistor	R65	39 k $\Omega$	1	0204/0207	LR0204F39K	Farnell	2329932	
Resistor	R3, R4, R5, R6, R7, R8, R82	47 k $\Omega$	7	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R40	75 k $\Omega$	1	0204/0207	LR0204F75K	Farnell	2329972	

## Assembly Table: Output, PWM, and silence bridging

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R11, R12, R13, R14, R15, R16, R23, R24, R25, R26, R27, R35, R36, R38, R41, R42, R66, R68, R69, R70, R79, R80	100 k $\Omega$	22	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R19, R20	180 k $\Omega$	2	0204/0207	LR0204F180K	Farnell	2329880	
Resistor	R17, R18	200 k $\Omega$	2	0204/0207	LR0204F200K	Farnell	2329895	
Resistor	R74	220 k $\Omega$	1	0204/0207	LR0204F220K	Farnell	2329899	
Resistor	R43, R44, R71, R72, R78, R83	1 M $\Omega$	6	0204/0207	LR0204F1M0	Farnell	2329894	
Potentiometer	P2	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust), stereo	1		Alpha 9-PC-STE-100k log, RD902F-20-15R1-A100K	Small Bear (US) or banzaimu-sic.com (EU)		
Potentiometer	P1, P3	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust)	2		RD901F-20-15R1-A100K	Small Bear (US) or Thonk (EU)		
Trimmer, multi-turn	TR8, TR9, TR10	100 k $\Omega$	3		T93XA104KT20	Mouser	72-T93XA-100K	
Trimmer	TR1, TR2, TR3, TR5	10 k $\Omega$	4		PT 10 LH 10K	Mouser	531-PT10H-10K	
Trimmer	TR4, TR6, TR7	25 k $\Omega$	3		PT 10 LH 25K	Mouser	531-PT10H-25K	
Jack	FLTR-OUT, VOCODER-OUT	6.35 mm jack	2		ACJS-MHDR	Mouser	523-ACJS-MHDR	
Connector	11x	Wire-to-board connector, 2-pin	11		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	1x	Wire-to-board connector, 3-pin	1		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	11x	EHR-2	11		EHR-2	Farnell	2481434	
Connector	1x	EHR-3	1		EHR-3	Farnell	2399175	
Connector	23x	SEH-001T-P0.6	25		SEH-001T-P0.6	Farnell	1863249	

## Assembly Table: Output, PWM, and silence bridging

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Connector	1x	2x8 board-to-board connector, angled, RM2.54 mm	1		Würth 61301621021	Mouser	710-61301621021	
Connector	1x	2x8 wire-to-board connector, RM2.54 mm	1		Würth 61201623021	Mouser	710-61201623021	
IC Socket	IC1, IC2, IC3, IC4, IC5, IC6, IC16	8 pins	7		110-99-308-41-001000	Mouser	575-199308	
IC Socket	IC8, IC10, IC11, IC14, IC15	14 pins	5		110-99-314-41-001000	Mouser	575-199314	
IC Socket	IC9	16 pins	1		110-99-316-41-001000	Mouser	575-199316	
Misc	ENV, PWMR, PWML, BR, SBSW, GND, TRI, FLTR, VC-R, VC-L	Solder pins, $\varnothing$ 1 mm	10		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: Slew and freeze handling

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2, D3, D4, D5, D6, D7, D8	1N4148	8	DO-35	1N4148	Mouser	512-1N4148	
JFET	J1, J2	J113	2	TO-92	J113	Mouser	512-J113	
Transistor	T1, T2, T3	2N3904	3	TO-92	2N3904BU	Mouser	512-2N3904BU	
IC	IC1, IC2, IC3	TL074	3	DIL14	TL074CN	Mouser	595-TL074CN	
IC	IC4	LM319	1	DIL14	LM319N	Mouser	512-LM319N	
IC	IC5	CD4093	1	DIL14	CD4093BE	Mouser	595-CD4093BE	
Film	C6	1 nF	1	RM2.5/RM5.0	R82EC1100AA50K	Mouser	80-R82EC1100AA50K	
Film	C7	4.7 nF	1	RM2.5/RM5.0	R82EC1470CK50J	Mouser	80-R82EC1470CK50J	
Film	C5	10 nF	1	RM2.5/RM5.0	R82EC2100AA50J	Mouser	80-R82EC2100AA50J	
Film	C3, C4, C10	100 nF	3	RM2.5/RM5.0	R82EC3100AA70J	Mouser	80-R82EC3100AA70J	
Ceramic	C8, C9, C11, C12, C15, C16, C19, C20, C21, C22, C25	100 nF	11	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Film	C1	220 nF	1	RM2.5/RM5.0	R82DC3220Z360K	Mouser	80-82DC3220Z360K	
Electrolytic	C2	2.2 $\mu$ F/25 V, max. $\varnothing$ 5 mm	1	RM2.0	Würth 860020672006	Mouser	710-860020672006	
Electrolytic	C13, C14, C17, C18, C23, C24, C26	22 $\mu$ F/25 V, max. $\varnothing$ 5 mm	7	RM2.0	Würth 860010572003	Mouser	710-860010572003	
Tempco	R20	2 k $\Omega$ , 3300 ppm/ $^{\circ}$ C	1			Thonk		Akaneohm
Resistor	R34	10 $\Omega$	1	0204/0207	LR0204F10R	Farnell	2329856	
Resistor	R54, R55, R56, R57, R58, R59, R60, R61	47 $\Omega$ , 250 mW	8	0204/0207	LR0204F47R	Farnell	2329945	
Resistor	R23, R38, R39, R46, R50, R53	2.2 k $\Omega$	6	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R9, R25	4.7 k $\Omega$	2	0204/0207	LR0204F4K7	Farnell	2329947	
Resistor	R15, R49	7.5 k $\Omega$	2	0204/0207	LR0204F7K5	Farnell	2329974	
Resistor	R21, R22	10 k $\Omega$	2	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R41	30 k $\Omega$	1	0204/0207	LR0204F30K	Farnell	2329917	
Resistor	R13	33 k $\Omega$	1	0204/0207	LR0204F33K	Farnell	2329922	
Resistor	R10, R31, R32, R33, R37, R45, R51, R52	47 k $\Omega$	8	0204/0207	LR0204F47K	Farnell	2329944	

## Assembly Table: Slew and freeze handling

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Resistor	R12, R17	56 k $\Omega$	2	0204/0207	LR0204F56K	Farnell	2329954	
Resistor	R16, R27	91 k $\Omega$	2	0204/0207	LR0204F91K	Farnell	2329984	
Resistor	R1, R2, R3, R8, R19, R26, R28, R29, R30, R36, R44, R48	100 k $\Omega$	12	0204/0207	LR0204F100K	Farnell	2329853	
Resistor	R18	120 k $\Omega$	1	0204/0207	LR0204F120K	Farnell	2329861	
Resistor	R14	150 k $\Omega$	1	0204/0207	LR0204F150K	Farnell	2329871	
Resistor	R4	200 k $\Omega$	1	0204/0207	LR0204F200K	Farnell	2329895	
Resistor	R6, R47	220 k $\Omega$	2	0204/0207	LR0204F220K	Farnell	2329899	
Resistor	R24	470 k $\Omega$	1	0204/0207	LR0204F470K	Farnell	2329941	
Resistor	R5, R7, R11	1 M $\Omega$	3	0204/0207	LR0204F1M0	Farnell	2329894	
Resistor	R40	2.2 M $\Omega$ , 5%	1	0204/0207	CFR16J2M2	Farnell	2329510	
Resistor	R35	3.3 M $\Omega$ , 5%	1	0204/0207	CFR16J3M3	Farnell	2329524	
Potentiometer	P1	100 k $\Omega$ lin, Alpha 9 mm, right angled (side adjust)	1		RD901F-20-15R1-B100K	Small Bear (US) or Thonk (EU)		
Trimmer	TR3	1k $\Omega$	1		PT 10 LV 1K	Mouser	531-PT10V-1K	
Trimmer	TR1, TR2	10 k $\Omega$	2		PT 10 LV 10K	Mouser	531-PT10V-10K	
Trimmer	TR4	20 k $\Omega$	1		PT 10 LV 20K	Mouser	531-PT10V-20K	
Jack	CV-IN	3.5 mm jack	1		CL13845G	Farnell	2766196	alternative: CL1384
Jack	FOOT-SW	6.35 mm jack	1		ACJS-MHDR	Mouser	523-ACJS-MHDR	
Connector	7x	Wire-to-board connector, 2-pin	7		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	1x	Wire-to-board connector, 3-pin	1		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	7x	EHR-2	7		EHR-2	Farnell	2481434	
Connector	1x	EHR-3	1		EHR-3	Farnell	2399175	
Connector	7x	SEH-001T-P0.6	17		SEH-001T-P0.6	Farnell	1863249	
IC Socket	IC1, IC2, IC3, IC4, IC5	14 pins	5		110-99-314-41-001000	Mouser	575-199314	

## Assembly Table: Slew and freeze handling

---

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Misc	GND, LOG, OSC, SLEW	Solder pins, $\varnothing$ 1 mm	4		Vogt 1364A.68	Conrad	736018 - 62	

## Assembly Table: DC/DC power supply

This power supply is based on a DC/DC converter.

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Misc	TEN 40-1222N	TRACO TEN 40-1222N	1	Module	TRACO TEN 40-1222N	Mouser	495-TEN40-1222N	
Diode	D1	SB540	1	DO-201AD	SB540	Mouser	512-SB540	
IC	IC1	IRF7319	1	SO-8	IRF7319TRPBF	Mouser	942-IRF7319TRPBF	
Transistor	T2, T3	2N3904	2	TO-92	2N3904BU	Mouser	512-2N3904BU	
Transistor	T1, T4	2N3906	2	TO-92	2N3906BU	Mouser	512-2N3906BU	
Ceramic	C8, C9	100 nF	2	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Ceramic	C1, C4, C5, C6, C7	10 µF, 25 V	5	SMD 1812	C4532X7R1E106M250KA	Mouser	810-C4532X7R1E106M	
Ceramic	C2, C3	1 nF, 2 kV	2	SMD 1808	C1808C102MGRACAUTO	Mouser	80-C1808C102MGRAUTO	
Resistor	R1, R4, R8	2.2 kΩ	3	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R2, R3, R6, R7, R10	10 kΩ	5	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R5, R9	75 kΩ	2	0204/0207	LR0204F75K	Farnell	2329972	
Connector	2x	Wire-to-board connector, 2-pin	2		S2B-EH(LF)(SN)	Farnell	2481437	For power LED
Connector	9x	Wire-to-board connector, 3-pin	9		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	2x	EHR-2	2		EHR-2	Farnell	2481434	For power LED and switch
Connector	11x	EHR-3	11		EHR-3	Farnell	2399175	2 needed for supply testing
Connector	35x	SEH-001T-P0.6	35		SEH-001T-P0.6	Farnell	1863249	4 needed for supply testing
Connector	1x	Wire-to-board terminal block, 2 entries	1		Weidmuller 1934250000	Farnell	2893169	
Misc	L1, L2	ELC10D101E (100 µH)	2		ELC-10D101E	Mouser	667-ELC-10D101E	
Misc	FUSEHOLDER	HTC-100M	1		HTC-100M	Farnell	2550634	
Misc	FUSE	8 A, slow blow, 20 x 5 mm	1		Schurter 0001.2513	Farnell	1360861	As per TRACO datasheet

## Assembly Table: DC/DC power supply

---

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Misc	Power supply	12 VDC 5 A 60 W	1		GST60A12-P1J	Amazon, Jameco		Works for US and Europe (90-264 V). Power cord extra.
Misc	Power jack	Isolated 2.1x5.5mm power jack	1			JDS Labs	link	
Misc	GND, +12V, -12V	Solder pins, $\varnothing$ 1 mm	3		Vogt 1364A.68	Conrad	736018 - 62	
Misc-2	2x	10 $\Omega$ , 17 W resistor for testing purposes	2		SQP20AJB-10R	Mouser	603-SQP20AJB-10R	For power supply testing

## Assembly Table: LDO Power supply

This is the BOM for an alternative power supply based on LDOs. Use this instead the one for the DC/DC power supply if this is the preferred solution.

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Diode	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12	SB540	12	DO-201AD	SB540-E3/54	Mouser	625-SB540-E3	
IC	IC1, IC2	MIC29301-12WT	2	TO-220	MIC29301-12WT	Mouser	998-MIC29301-12WT	
Diode	D13, D14	1N4148	2	DO-35	1N4148	Mouser	512-1N4148	
Transistor	T1	2N3904	1	TO-92	2N3904BU	Mouser	512-2N3904BU	
Ceramic	C4A, C5A, C9A, C10A	100 nF	4	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R	
Electrolytic	C3, C8	10 µF/50 V, max. ø 5 mm	2	RM2.0	Würth 860020672010	Mouser	710-860020672010	
Electrolytic	C1, C2, C6, C7	3900 µF/35 V, max. ø 18 mm	4	RM7.5	EEUFC1V392	Mouser	667-EEU-FC1V392	
Resistor	R1	2.2 kΩ	1	0204/0207	LR0204F2K2	Farnell	2329912	
Resistor	R2, R3	10 kΩ	2	0204/0207	LR0204F10K	Farnell	2329855	
Resistor	R4	47 kΩ	1	0204/0207	LR0204F47K	Farnell	2329944	
Resistor	R5	330 kΩ	1	0204/0207	MFR3-330KFC	Farnell	1565303	
Connector	2x	Wire-to-board connector, 2-pin	2		S2B-EH(LF)(SN)	Farnell	2481437	
Connector	8x	Wire-to-board connector, 3-pin	9		S3B-EH(LF)(SN)	Farnell	2481438	
Connector	1x	Wire-to-board terminal block, 4 entries	1		Weidmuller 9994130000	Farnell	2884774	
Connector	2x	EHR-2	2		EHR-2	Farnell	2481434	For power LED and switch
Connector	2x	EHR-3	11		EHR-3	Farnell	2399175	2 needed for supply testing
Connector	4x	SEH-001T-P0.6	35		SEH-001T-P0.6	Farnell	1863249	4 needed for supply testing
Misc	GND, +12V, -12V	Solder pins, ø 1 mm	3		Vogt 1364A.68	Conrad	736018 - 62	
Misc	1x	Heat sink	1		OS518-150-B	Farnell	1773365	
Misc	2x	Heat sink clips, TO-220	2		MAX01NG	Farnell	2082840	

## Assembly Table: LDO Power supply

---

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
Misc	1x	Thermally conductive foil	1		WLFT 404 24.5 X 27.7	Farnell	4695525	
Misc	1x	Power entry module	1		Schurter 4304.6053	Mouser	693-4304.6053	
Misc	1x	Aluminum box	1		Multicomp MC001186	Farnell	2545078	To cover mains area
Misc-2	2x	10 $\Omega$ , 17 W resistor for testing purposes	2		SQP20AJB-10R	Mouser	603-SQP20AJB-10R	For power supply testing

## Assembly Table: Miscellaneous

Type	Designator	Identifier	Count	Body Type	Suggested Product	Distributor	Order #	Remarks
LED	5x front panel	LED red, 2.4 V, 2 mA	6	3 mm LED	TLLR4401	Mouser	78-TLLR4401	Freeze, silence bridging, attack detect, voiced, unvoiced, power
Misc-2	1x	16-wire ribbon cable, 28 AWG	1		3M 3365-16	Farnell	297318	1 meter
Misc-2	5x	Single-pole dual-throw switch, ON-ON	6		H8610VBAAA	Farnell	151134	Front panel, various switches
Misc-2	1x	Single-pole dual-throw switch, ON-OFF-ON	1		H8620VBAAA	Farnell	733878	Front panel, VUV function
Misc-2	1x	Single-pole single-throw switch, momentary ON	1		H8601VBAAA	Farnell	480393	Front panel, freeze switch
Misc-2	1x	1.6 mm shrink tubing	1			Farnell	1210349	4 feet
Misc-2	1x	3.2 mm shrink tubing	1			Farnell	1210352	4 feet
Misc-2	1x	Coax cable, 1.9 mm overall diameter	3		Lapp 2170002	Farnell	1491534	3 meters (10 feet)
Misc-2	50x	Knobs	50	6.35 mm round shaft	Davies clone 1900h with brass insert	Thonk		
Misc-2	1x	19 inch 3U enclosure	1		Slim Line 03/230 3U 400 SILVER	Modushop		
Misc-2	6x	Round nylon spacer	6		D01475	Farnell	1733405	
Misc-2	6x	3 mm screws with nut, 12 mm length	6					Used for VUV detector board and slew/freeze board
Misc-2	4x	3 mm screws with nut, 25 mm length	4					Used for DC/DC board assembly

### Notes:

- The LEDs shown in this list are not soldered into any of the boards but are wired to the corresponding boards instead.
- the 16-wire ribbon cable is used for the interconnect of all 18 channel filter boards and the output board.
- The coax cable is used for the shielded interconnect among various boards. Different sizes may be preferred but should provide enough flexibility for ease of use.
- The shrink tubing is used for isolating various cables and the tabs of the switches.

## Bill of Materials: consolidated list of all materials used

---

This consolidated list has all materials shown on the previous pages combined into a single table. This should simplify ordering materials as a large number of components are part of more than just one assembly table. Note that “Resistor–F” in column “Type” has been introduced to distinguish the regular resistors from those dedicated to the individual channel filter boards. They are from the E48 resistor series.

**IMPORTANT:** this consolidated list includes the components for the DC/DC–based power supply, **not** the LDO–based power supply.

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
1	IC	78L05	1	TO-92	LM78L05ACZXA	Mouser	511-L78L05ACZ
2	IC	79L05	1	TO-92	LM79L05ACZ	Mouser	511-L79L05ACZ
3	IC	CD40106	2	DIL14	CD40106BE	Mouser	595-CD40106BE
4	IC	CD4050	1	DIL16	CD4050BE	Mouser	595-CD4050BE
5	IC	CD4053	18	DIL16	CD4053BE	Mouser	595-CD4053BE
6	IC	CD4093	2	DIL14	CD4093BE	Mouser	595-CD4093BE
7	IC	IRF7319	1	SO-8	IRF7319TRPBF	Mouser	942-IRF7319TRPBF
8	IC	LM13700	2	DIL16	LM13700N	Mouser	926-LM13700N/NOPB
9	IC	LM319	5	DIL14	LM319N	Mouser	512-LM319N
10	IC	LM3916	3	DIL18	LM3916		
11	IC	MC33079	36	DIL14	MC33079PG	Rochester	
12	IC	NE5532	17	DIL8	NE5532AP	Mouser	595-NE5532AP
13	IC	THAT300	2	DIL14	THAT300P14-U	Mouser	887-300P14-U
14	IC	TL072	8	DIL8	TL072IP	Mouser	595-TL072IP
15	IC	TL074	51	DIL14	TL074CN	Mouser	595-TL074CN
16	Transistor	2N3904	47	TO-92	2N3904BU	Mouser	512-2N3904BU
17	Transistor	2N3906	4	TO-92	2N3906BU	Mouser	512-2N3906BU
18	JFET	J105	2	TO-92	J105	Mouser	512-J105
19	JFET	J113	17	TO-92	J113	Mouser	512-J113
20	Diode	1N4148	76	DO-35	1N4148	Mouser	512-1N4148
21	Diode	1N4001	1	DO-41	1N4001RLG	Mouser	863-1N4001RLG
22	Diode	SB540	1	DO-201AD	SB540	Mouser	512-SB540
23	Resistor	10 Ω	1	0204/0207	MFR-12FTF52-10R	Mouser	603-MFR-12FTF52-10R
24	Resistor	47 Ω, 250 mW	181	0204/0207	MFR-12FTF52-47R	Mouser	603-MFR-12FTF52-47R
25	Resistor	100 Ω	19	0204/0207	MFR-12FTF52-100R	Mouser	603-MFR-12FTF52-100R

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
26	Resistor	220 $\Omega$	1	0204/0207	MFR-12FTF52-220R	Mouser	603-MFR-12FTF52-220R
27	Resistor	430 $\Omega$	2	0204/0207	MFR-12FTF52-430R	Mouser	603-MFR-12FTF52-430R
28	Resistor	470 $\Omega$	5	0204/0207	MFR-12FTF52-470R	Mouser	603-MFR-12FTF52-470R
29	Resistor	510 $\Omega$	3	0204/0207	MFR-12FTF52-510R	Mouser	603-MFR-12FTF52-510R
30	Resistor	560 $\Omega$	4	0204/0207	MFR-12FTF52-560R	Mouser	603-MFR-12FTF52-560R
31	Resistor	750 $\Omega$	18	0204/0207	MFR-12FTF52-750R	Mouser	603-MFR-12FTF52-750R
32	Resistor	820 $\Omega$	2	0204/0207	MFR-12FTF52-820R	Mouser	603-MFR-12FTF52-820R
33	Resistor	1 k $\Omega$	24	0204/0207	MFR-12FTF52-1K	Mouser	603-MFR-12FTF52-1K
34	Resistor	1.5 k $\Omega$	2	0204/0207	MFR-12FTF52-1K5	Mouser	603-MFR-12FTF52-1K5
35	Resistor	2.2 k $\Omega$	34	0204/0207	MFR-12FTF52-2K2	Mouser	603-MFR-12FTF52-2K2
36	Resistor	3.3 k $\Omega$	41	0204/0207	MFR-12FTF52-3K3	Mouser	603-MFR-12FTF52-3K3
37	Resistor	3.9 k $\Omega$	1	0204/0207	MFR-12FTF52-3K9	Mouser	603-MFR-12FTF52-3K9
38	Resistor	4.7 k $\Omega$	33	0204/0207	MFR-12FTF52-4K7	Mouser	603-MFR-12FTF52-4K7
39	Resistor	5.1 k $\Omega$	18	0204/0207	MFR-12FTF52-5K1	Mouser	603-MFR-12FTF52-5K1
40	Resistor	5.6 k $\Omega$	6	0204/0207	MFR-12FTF52-5K6	Mouser	603-MFR-12FTF52-5K6
41	Resistor	6.8 k $\Omega$	16	0204/0207	MFR-12FTF52-6K8	Mouser	603-MFR-12FTF52-6K8
42	Resistor	7.5 k $\Omega$	5	0204/0207	MFR-12FTF52-7K5	Mouser	603-MFR-12FTF52-7K5
43	Resistor	8.2 k $\Omega$	40	0204/0207	MFR-12FTF52-8K2	Mouser	603-MFR-12FTF52-8K2
44	Resistor	10 k $\Omega$	246	0204/0207	MFR-12FTF52-10K	Mouser	603-MFR-12FTF52-10K
45	Resistor	12 k $\Omega$	3	0204/0207	MFR-12FTF52-12K	Mouser	603-MFR-12FTF52-12K
46	Resistor	15 k $\Omega$	50	0204/0207	MFR-12FTF52-15K	Mouser	603-MFR-12FTF52-15K
47	Resistor	18 k $\Omega$	7	0204/0207	MFR-12FTF52-18K	Mouser	603-MFR-12FTF52-18K
48	Resistor	20 k $\Omega$	36	0204/0207	MFR-12FTF52-20K	Mouser	603-MFR-12FTF52-20K
49	Resistor	22 k $\Omega$	25	0204/0207	MFR-12FTF52-22K	Mouser	603-MFR-12FTF52-22K
50	Resistor	24 k $\Omega$	36	0204/0207	MFR-12FTF52-24K	Mouser	603-MFR-12FTF52-24K
51	Resistor	27 k $\Omega$	10	0204/0207	MFR-12FTF52-27K	Mouser	603-MFR-12FTF52-27K
52	Resistor	30 k $\Omega$	1	0204/0207	MFR-12FTF52-30K	Mouser	603-MFR-12FTF52-30K
53	Resistor	33 k $\Omega$	30	0204/0207	MFR-12FTF52-33K	Mouser	603-MFR-12FTF52-33K
54	Resistor	36 k $\Omega$	4	0204/0207	MFR-12FTF52-36K	Mouser	603-MFR-12FTF52-36K

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
55	Resistor	39 k $\Omega$	1	0204/0207	MFR-12FTF52-39K	Mouser	603-MFR-12FTF52-39K
56	Resistor	47 k $\Omega$	79	0204/0207	MFR-12FTF52-47K	Mouser	603-MFR-12FTF52-47K
57	Resistor	56 k $\Omega$	4	0204/0207	MFR-12FTF52-56K	Mouser	603-MFR-12FTF52-56K
58	Resistor	62 k $\Omega$	2	0204/0207	MFR-12FTF52-62K	Mouser	603-MFR-12FTF52-62K
59	Resistor	75 k $\Omega$	3	0204/0207	MFR-12FTF52-75K	Mouser	603-MFR-12FTF52-75K
60	Resistor	91 k $\Omega$	2	0204/0207	MFR-12FTF52-91K	Mouser	603-MFR-12FTF52-91K
61	Resistor	100 k $\Omega$	137	0204/0207	MFR-12FTF52-100K	Mouser	603-MFR-12FTF52-100K
62	Resistor	120 k $\Omega$	1	0204/0207	MFR-12FTF52-120K	Mouser	603-MFR-12FTF52-120K
63	Resistor	150 k $\Omega$	7	0204/0207	MFR-12FTF52-150K	Mouser	603-MFR-12FTF52-150K
64	Resistor	180 k $\Omega$	2	0204/0207	MFR-12FTF52-180K	Mouser	603-MFR-12FTF52-180K
65	Resistor	200 k $\Omega$	13	0204/0207	MFR-12FTF52-200K	Mouser	603-MFR-12FTF52-200K
66	Resistor	220 k $\Omega$	12	0204/0207	MFR-12FTF52-220K	Mouser	603-MFR-12FTF52-220K
67	Resistor	330 k $\Omega$	3	0204/0207	MFR-12FTF52-330K	Mouser	603-MFR-12FTF52-330K
68	Resistor	390 k $\Omega$	2	0204/0207	MFR-12FTF52-390K	Mouser	603-MFR-12FTF52-390K
69	Resistor	470 k $\Omega$	3	0204/0207	MFR-12FTF52-470K	Mouser	603-MFR-12FTF52-470K
70	Resistor	820 k $\Omega$	2	0204/0207	MFR-12FTF52-820K	Mouser	603-MFR-12FTF52-820K
71	Resistor	1 M $\Omega$	35	0204/0207	MFR-12FTF52-1M	Mouser	603-MFR-12FTF52-1M
72	Resistor	1.5 M $\Omega$	4	0204/0207	MFR-12FTF52-1M5	Mouser	603-MFR-12FTF52-1M5
73	Resistor	2.2 M $\Omega$ , 5%	2	0204/0207	MFR-12FTF52-2M2	Mouser	603-MFR-12FTF52-2M2
74	Resistor	3.3 M $\Omega$ , 5%	1	0204/0207	MFR-12FTF52-3M3	Mouser	603-MFR-12FTF52-3M3
75	Resistor	4.7 M $\Omega$ , 5%	18	0204/0207	MFR-12FTF52-4M7	Mouser	603-MFR-12FTF52-4M7
76	Resistor	6.8 M $\Omega$	2	0204/0207	MFR-12FTF52-6M8	Mouser	603-MFR-12FTF52-6M8
77	Resistor-F	196 $\Omega$	2	0204/0207	MFR-25FBF52-196R	Mouser	603-MFR-25FBF52-196R
78	Resistor-F	237 $\Omega$	2	0204/0207	MFR-25FBF52-237R	Mouser	603-MFR-25FBF52-237R
79	Resistor-F	249 $\Omega$	4	0204/0207	MFR-25FBF52-249R	Mouser	603-MFR-25FBF52-249R
80	Resistor-F	287 $\Omega$	2	0204/0207	MFR-25FBF52-287R	Mouser	603-MFR-25FBF52-287R
81	Resistor-F	301 $\Omega$	6	0204/0207	MFR-25FBF52-301R	Mouser	603-MFR-25FBF52-301R
82	Resistor-F	316 $\Omega$	4	0204/0207	MFR-25FBF52-316R	Mouser	603-MFR-25FBF52-316R
83	Resistor-F	348 $\Omega$	2	0204/0207	MFR-25FBF52-348R	Mouser	603-MFR-25FBF52-348R

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
84	Resistor-F	365 $\Omega$	4	0204/0207	MFR-25F52-365R	Mouser	603-MFR-25F52-365R
85	Resistor-F	383 $\Omega$	8	0204/0207	MFR-25F52-383R	Mouser	603-MFR-25F52-383R
86	Resistor-F	402 $\Omega$	4	0204/0207	MFR-25F52-402R	Mouser	603-MFR-25F52-402R
87	Resistor-F	422 $\Omega$	2	0204/0207	MFR-25F52-422R	Mouser	603-MFR-25F52-422R
88	Resistor-F	442 $\Omega$	2	0204/0207	MFR-25F52-442R	Mouser	603-MFR-25F52-442R
89	Resistor-F	464 $\Omega$	4	0204/0207	MFR-25F52-464R	Mouser	603-MFR-25F52-464R
90	Resistor-F	487 $\Omega$	8	0204/0207	MFR-25F52-487R	Mouser	603-MFR-25F52-487R
91	Resistor-F	511 $\Omega$	6	0204/0207	MFR-25F52-511R	Mouser	603-MFR-25F52-511R
92	Resistor-F	536 $\Omega$	4	0204/0207	MFR-25F52-536R	Mouser	603-MFR-25F52-536R
93	Resistor-F	562 $\Omega$	2	0204/0207	MFR-25F52-562R	Mouser	603-MFR-25F52-562R
94	Resistor-F	590 $\Omega$	4	0204/0207	MFR-25F52-590R	Mouser	603-MFR-25F52-590R
95	Resistor-F	619 $\Omega$	8	0204/0207	MFR-25F52-619R	Mouser	603-MFR-25F52-619R
96	Resistor-F	649 $\Omega$	6	0204/0207	MFR-25F52-649R	Mouser	603-MFR-25F52-649R
97	Resistor-F	681 $\Omega$	4	0204/0207	MFR-25F52-681R	Mouser	603-MFR-25F52-681R
98	Resistor-F	715 $\Omega$	2	0204/0207	MFR-25F52-715R	Mouser	603-MFR-25F52-715R
99	Resistor-F	750 $\Omega$	4	0204/0207	MFR-25F52-750R	Mouser	603-MFR-25F52-750R
100	Resistor-F	787 $\Omega$	8	0204/0207	MFR-25FRF52-787R	Mouser	603-MFR-25FRF52-787R
101	Resistor-F	825 $\Omega$	4	0204/0207	MFR-25F52-825R	Mouser	603-MFR-25F52-825R
102	Resistor-F	866 $\Omega$	4	0204/0207	MFR-25F52-866R	Mouser	603-MFR-25F52-866R
103	Resistor-F	909 $\Omega$	2	0204/0207	MFR-25F52-909R	Mouser	603-MFR-25F52-909R
104	Resistor-F	953 $\Omega$	4	0204/0207	MFR-25F52-953R	Mouser	603-MFR-25F52-953R
105	Resistor-F	1 k $\Omega$	6	0204/0207	MFR-25F52-1K	Mouser	603-MFR-25F52-1K
106	Resistor-F	1.05 k $\Omega$	2	0204/0207	MFR-25F52-1K05	Mouser	603-MFR-25F52-1K05
107	Resistor-F	1.1 k $\Omega$	4	0204/0207	MFR-25F52-1K1	Mouser	603-MFR-25F52-1K1
108	Resistor-F	1.15 k $\Omega$	2	0204/0207	MFR-25F52-1K15	Mouser	603-MFR-25F52-1K15
109	Resistor-F	1.21 k $\Omega$	2	0204/0207	MFR-25F52-1K21	Mouser	603-MFR-25F52-1K21
110	Resistor-F	1.27 k $\Omega$	2	0204/0207	MFR-25F52-1K27	Mouser	603-MFR-25F52-1K27
111	Resistor-F	1.33 k $\Omega$	2	0204/0207	MFR-25F52-1K33	Mouser	603-MFR-25F52-1K33
112	Resistor-F	1.4 k $\Omega$	4	0204/0207	MFR-25F52-1K4	Mouser	603-MFR-25F52-1K4

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
113	Resistor-F	1.69 kΩ	2	0204/0207	MFR-25F52-1K69	Mouser	603-MFR-25F52-1K69
114	Resistor-F	1.78 kΩ	2	0204/0207	MFR-25F52-1K78	Mouser	603-MFR-25F52-1K78
115	Resistor-F	6.81 kΩ	2	0204/0207	MFR-25F52-6K81	Mouser	603-MFR-25F52-6K81
116	Resistor-F	8.66 kΩ	8	0204/0207	MFR-25F52-8K66	Mouser	603-MFR-25F52-8K66
117	Resistor-F	9.09 kΩ	2	0204/0207	MFR-25F52-9K09	Mouser	603-MFR-25F52-9K09
118	Resistor-F	11 kΩ	12	0204/0207	MFR-25F52-11K	Mouser	603-MFR-25F52-11K
119	Resistor-F	11.5 kΩ	4	0204/0207	MFR-25F52-11K5	Mouser	603-MFR-25F52-11K5
120	Resistor-F	12.1 kΩ	2	0204/0207	MFR-25F52-12K1	Mouser	603-MFR-25F52-12K1
121	Resistor-F	14 kΩ	12	0204/0207	MFR-25F52-14K	Mouser	603-MFR-25F52-14K
122	Resistor-F	14.7 kΩ	4	0204/0207	MFR-25F52-14K7	Mouser	603-MFR-25F52-14K7
123	Resistor-F	15.4 kΩ	6	0204/0207	MFR-25F52-15K4	Mouser	603-MFR-25F52-15K4
124	Resistor-F	16.2 kΩ	2	0204/0207	MFR-25F52-16K2	Mouser	603-MFR-25F52-16K2
125	Resistor-F	17.8 kΩ	14	0204/0207	MFR-25F52-17K8	Mouser	603-MFR-25F52-17K8
126	Resistor-F	18.7 kΩ	6	0204/0207	MFR-25F52-18K7	Mouser	603-MFR-25F52-18K7
127	Resistor-F	19.6 kΩ	6	0204/0207	MFR-25F52-19K6	Mouser	603-MFR-25F52-19K6
128	Resistor-F	20.5 kΩ	2	0204/0207	MFR-25F52-20K5	Mouser	603-MFR-25F52-20K5
129	Resistor-F	22.6 kΩ	18	0204/0207	MFR-25F52-22K6	Mouser	603-MFR-25F52-22K6
130	Resistor-F	23.7 kΩ	8	0204/0207	MFR-25F52-23K7	Mouser	603-MFR-25F52-23K7
131	Resistor-F	24.9 kΩ	6	0204/0207	MFR-25F52-24K9	Mouser	603-MFR-25F52-24K9
132	Resistor-F	26.1 kΩ	2	0204/0207	MFR-25F52-26K1	Mouser	603-MFR-25F52-26K1
133	Resistor-F	28.7 kΩ	20	0204/0207	MFR-25F52-28K7	Mouser	603-MFR-25F52-28K7
134	Resistor-F	30.1 kΩ	8	0204/0207	MFR-25F52-30K1	Mouser	603-MFR-25F52-30K1
135	Resistor-F	31.6 kΩ	8	0204/0207	MFR-25F52-31K6	Mouser	603-MFR-25F52-31K6
136	Resistor-F	33.2 kΩ	4	0204/0207	MFR-25F52-33K2	Mouser	603-MFR-25F52-33K2
137	Resistor-F	36.5 kΩ	16	0204/0207	MFR-25F52-36K5	Mouser	603-MFR-25F52-36K5
138	Resistor-F	38.3 kΩ	6	0204/0207	MFR-25F52-38K3	Mouser	603-MFR-25F52-38K3
139	Resistor-F	40.2 kΩ	10	0204/0207	MFR-25F52-40K2	Mouser	603-MFR-25F52-40K2
140	Resistor-F	42.2 kΩ	4	0204/0207	MFR-25F52-42K2	Mouser	603-MFR-25F52-42K2
141	Resistor-F	46.4 kΩ	12	0204/0207	MFR-25F52-46K4	Mouser	603-MFR-25F52-46K4

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
142	Resistor-F	48.7 kΩ	4	0204/0207	MFR-25F52-48K7	Mouser	603-MFR-25F52-48K7
143	Resistor-F	51.1 kΩ	10	0204/0207	MFR-25F52-51K1	Mouser	603-MFR-25F52-51K1
144	Resistor-F	53.6 kΩ	4	0204/0207	MFR-25F52-53K6	Mouser	603-MFR-25F52-53K6
145	Resistor-F	59 kΩ	12	0204/0207	MFR-25F52-59K	Mouser	603-MFR-25F52-59K
146	Resistor-F	61.9 kΩ	4	0204/0207	MFR-25F52-61K9	Mouser	603-MFR-25F52-61K9
147	Resistor-F	64.9 kΩ	6	0204/0207	MFR-25F52-64K9	Mouser	603-MFR-25F52-64K9
148	Resistor-F	68.1 kΩ	2	0204/0207	MFR-25F52-68K1	Mouser	603-MFR-25F52-68K1
149	Resistor-F	75 kΩ	10	0204/0207	MFR-25F52-75K	Mouser	603-MFR-25F52-75K
150	Resistor-F	78.7 kΩ	2	0204/0207	MFR-25F52-78K7	Mouser	603-MFR-25F52-78K7
151	Resistor-F	82.5 kΩ	6	0204/0207	MFR-25F52-82K5	Mouser	603-MFR-25F52-82K5
152	Resistor-F	86.6 kΩ	2	0204/0207	MFR-25F52-86K6	Mouser	603-MFR-25F52-86K6
153	Resistor-F	95.3 kΩ	6	0204/0207	MFR-25F52-95K3	Mouser	603-MFR-25F52-95K3
154	Resistor-F	105 kΩ	6	0204/0207	MFR-25F52-105K	Mouser	603-MFR-25F52-105K
155	Resistor-F	110 kΩ	2	0204/0207	MFR-25F52-110K	Mouser	603-MFR-25F52-110K
156	Resistor-F	121 kΩ	2	0204/0207	MFR-25F52-121K	Mouser	603-MFR-25F52-121K
157	Resistor-F	133 kΩ	4	0204/0207	MFR-25F52-133K	Mouser	603-MFR-25F52-133K
158	Resistor-F	169 kΩ	2	0204/0207	MFR-25F52-169K	Mouser	603-MFR-25F52-169K
159	Tempco	2 kΩ, 3300 ppm/°C	3			Thonk	
160	Ceramic	22 pF	17	RM2.5	K220J15C0GF53L2	Mouser	594-K220J15C0GF53L2
161	Ceramic	100 pF	9	RM2.5	K101J15C0GF53L2	Mouser	594-K101J15C0GF53L2
162	Ceramic	220 pF	2	RM2.5/RM5.0	C315C221M5R5TA	Mouser	80-C315C221M5R
163	Ceramic	470 pF	2	RM2.5/RM5.0	K471J15C0GF53L2	Mouser	594-K471J15C0GF53L2
164	Ceramic	1 nF, 2 kV	2	SMD 1808	C1808C102MGRACAUTO	Mouser	80-C1808C102MGRAUTO
165	Ceramic	1 nF	3	RM2.5	R82EC1100AA50K	Mouser	80-R82EC1100AA50K
166	Ceramic	1.5 nF	4	RM2.5	C315C152K1R5TA	Mouser	80-C315C152K1R
167	Ceramic	10 nF	96	SMD (1206 or 0805)	08055A103JAT2A	Mouser	581-08055A103JAT2A
168	Ceramic	10 nF	2	RM2.5	K103K15X7RF53L2	Mouser	594-K103K15X7RF53L2
169	Ceramic	33 nF	96	SMD (1206 or 0805)	CGA5F2C0G1H333J085AA	Mouser	810-CGA5F2C0G1H333J
170	Ceramic	100 nF	415	SMD (1206 or 0805)	C1206C104K5RACTU	Mouser	80-C1206C104K5R

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
171	Ceramic	100 nF	96	SMD (1206 or 0805)	GRM31C5C1H104JA01L	Mouser	81-GRM31C5C1H104JA1L
172	Ceramic	10 $\mu$ F, 25 V	5	SMD 1812	C4532X7R1E106M250KA	Mouser	810-C4532X7R1E106M
173	Film	1 nF	3	RM2.5/RM5.0	R82EC1100AA50K	Mouser	80-R82EC1100AA50K
174	Film	2.2 nF	2	RM2.5/RM5.0	R82EC1220DQ50J	Mouser	80-R82EC1220DQ50J
175	Film	4.7 nF	3	RM2.5/RM5.0	R82EC1470CK50J	Mouser	80-R82EC1470CK50J
176	Film	10 nF	8	RM2.5/RM5.0	R82EC2100AA50J	Mouser	80-R82EC2100AA50J
177	Film	22 nF	2	RM2.5/RM5.0	R82EC2220AA50J	Mouser	80-R82EC2220AA50J
178	Film	47 nF	2	RM2.5/RM5.0	R82EC2470AA60J	Mouser	80-R82EC2470AA60J
179	Film	100 nF	11	RM2.5/RM5.0	R82EC3100AA70J	Mouser	80-R82EC3100AA70J
180	Film	220 nF	44	RM2.5/RM5.0	R82DC3220Z360K	Mouser	80-82DC3220Z360K
181	Film	330 nF	2	RM2.5/RM5.0	R82DC3330AA60K	Mouser	80-R82DC3330AA60K
182	Film	1 $\mu$ F	11	RM2.5/RM5.0	R82DC4100Z360K	Mouser	80-R82DC4100Z360K
183	Electrolytic	2.2 $\mu$ F/25 V, max. $\varnothing$ 5 mm	3	RM2.0	Würth 860020672006	Mouser	710-860020672006
184	Electrolytic	3.3 $\mu$ F/50 V, max. $\varnothing$ 5 mm	3	RM2.0	Würth 860020672007	Mouser	710-860020672007
185	Electrolytic	10 $\mu$ F/50 V, max. $\varnothing$ 5 mm	4	RM2.0	Würth 860020672010	Mouser	710-860020672010
186	Electrolytic	22 $\mu$ F/25 V, max. $\varnothing$ 5 mm	17	RM2.0	Würth 860010572003	Mouser	710-860010572003
187	Electrolytic	47 $\mu$ F/35 V, max. $\varnothing$ 5 mm	135	RM2.0	Würth 860010572005	Mouser	710-860010572005
188	Electrolytic	100 $\mu$ F/25 V, max. $\varnothing$ 7 mm	13	RM2.5	Würth 860010473007	Mouser	710-860010473007
189	Potentiometer	100 k $\Omega$ lin, Alpha 9 mm, right angled (side adjust)	5		RD901F-20-15R1-B100K	Small Bear (US) or Thonk (EU)	
190	Potentiometer	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust)	43		RD901F-20-15R1-A100K	Small Bear (US) or Thonk (EU)	
191	Potentiometer	100 k $\Omega$ log, Alpha 9 mm, right angled (side adjust), stereo	2		Alpha 9-PC-STE-100k log, RD902F-20-15R1-A100K	Small Bear (US) or banzaimusic.com (EU)	
192	Trimmer	1k $\Omega$	1		PT 10 LV 1K	Mouser	531-PT10V-1K
193	Trimmer	10 k $\Omega$	6		PT 10 LH 10K	Mouser	531-PT10H-10K
194	Trimmer	10 k $\Omega$	3		PT 10 LV 10K	Mouser	531-PT10V-10K
195	Trimmer	20 k $\Omega$	1		PT 10 LV 20K	Mouser	531-PT10V-20K

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
196	Trimmer	25 k $\Omega$	57		PT 10 LH 25K	Mouser	531-PT10H-25K
197	Trimmer	100 k $\Omega$	11		PT 10 LH 100K	Mouser	531-PT10H-100K
198	Trimmer	100 k $\Omega$	1		PT 10 LV 100K	Mouser	531-PT10V-100K
199	Trimmer	250 k $\Omega$	2		PT 10 LH 250K	Mouser	531-PT10H-250K
200	Trimmer, multi-turn	100 $\Omega$	4		T93XA101KT20	Mouser	72-T93XA-100
201	Trimmer, multi-turn	2.2 k $\Omega$	2		T93XA202KT20	Mouser	72-T93XA-2K
202	Trimmer, multi-turn	100 k $\Omega$	41		T93XA104KT20	Mouser	72-T93XA-100K
203	LED	LED green, 2.4 V, 2 mA	18	3 mm LED	TLLG4401	Mouser	78-TLLG4401
204	LED	LED red, 2.4 V, 2 mA	34	3 mm LED	TLLR4401	Mouser	78-TLLR4401
205	LED	LED yellow, 2.4 V, 2 mA	3	3 mm LED	TLLY4401	Mouser	78-TLLY4401
206	IC Socket	8 pins	23		110-99-308-41-001000	Mouser	575-199308
207	IC Socket	14 pins	98		110-99-314-41-001000	Mouser	575-199314
208	IC Socket	16 pins	21		110-99-316-41-001000	Mouser	575-199316
209	IC Socket	18 pins	3		110-44-318-41-001000	Mouser	575-11044318
210	Jack	3.5 mm jack	39		CL13845G	Farnell	2766196
211	Jack	6.35 mm jack	7		ACJS-MHDR	Mouser	523-ACJS-MHDR
212	Connector	2x8 wire-to-board connector, RM2.54 mm	19		Würth 61201623021	Mouser	710-61201623021
213	Connector	2x2 board-to-board connector, angled, RM2.54 mm	40		Würth 61300421021	Mouser	710-61300421021
214	Connector	2x8 board-to-board connector, angled, RM2.54 mm	19		Würth 61301621021	Mouser	710-61301621021
215	Connector	EHR-2	57		EHR-2	Farnell	2481434
216	Connector	EHR-3	21		EHR-3	Farnell	2399175
217	Connector	Jumper	40		M7582-05	Mouser	855-M7582-05
218	Connector	SEH-001T-P0.6	175		SEH-001T-P0.6	Farnell	1863249
219	Connector	Wire-to-board connector, 2-pin	57		S2B-EH(LF)(SN)	Farnell	2481437

## Bill of Materials: consolidated list of all materials used

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
220	Connector	Wire-to-board connector, 3-pin	19		S3B-EH(LF)(SN)	Farnell	2481438
221	Connector	Wire-to-board terminal block, 2 entries	1		Weidmuller 1934250000	Farnell	2893169
222	Misc	8 A, slow blow, 20 x 5 mm	1		Schurter 0001.2513	Farnell	1360861
223	Misc	12 VDC 5 A 60 W	1		GST60A12-P1J	Amazon, Jameco	
224	Misc	ELC10D101E (100 $\mu$ H)	2		ELC-10D101E	Mouser	667-ELC-10D101E
225	Misc	HTC-100M	1		HTC-100M	Farnell	2550634
226	Misc	Isolated 2.1x5.5mm power jack	1			JDS Labs	link
227	Misc	Solder pins, $\varnothing$ 1 mm	109		Vogt 1364A.68	Conrad	736018 - 62
228	Misc	TRACO TEN 40-1222N	1	Module	TRACO TEN 40-1222N	Mouser	495-TEN40-1222N
229	Misc-2	1.6 mm shrink tubing	1			Farnell	1210349
230	Misc-2	3 mm screws with nut, 12 mm length	6				
231	Misc-2	3 mm screws with nut, 25 mm length	4				
232	Misc-2	3.2 mm shrink tubing	1			Farnell	1210352
233	Misc-2	10 $\Omega$ , 17 W resistor for testing purposes	2		SQP20AJB-10R	Mouser	603-SQP20AJB-10R
234	Misc-2	16-wire ribbon cable, 28 AWG	1		3M 3365-16	Farnell	297318
235	Misc-2	19 inch 3U enclosure	1		Slim Line 03/230 3U 400 SILVER	Modushop	
236	Misc-2	Coax cable, 1.9 mm overall diameter	3		Lapp 2170002	Farnell	1491534
237	Misc-2	Knobs	50	6.35 mm round shaft	Davies clone 1900h with brass insert	Thonk	
238	Misc-2	Round nylon spacer	6		D01475	Farnell	1733405
239	Misc-2	Single-pole dual-throw switch, ON-OFF-ON	1		H8620VBAAA	Farnell	733878
240	Misc-2	Single-pole dual-throw switch, ON-ON	6		H8610VBAAA	Farnell	151134

## Bill of Materials: consolidated list of all materials used

---

Entry	Type	Designator	Count	Body Type	Suggested Product	Distributor	Order #
241	Misc-2	Single-pole single-throw switch, momentary ON	1		H8601VBAAA	Farnell	480393

## Revision History

Revision	Date	Changes
1.0	Aug 15 2018	Initial document release.
1.1	Aug 19 2018	Added 19 inch 3U enclosure in BOM.
1.2	Sep 3 2018	Added information about the diameter of the LED type suggested in the BOM (2.9 mm for the TLLR/TLLY/TLLG4401).
1.3	Sep 16 2018	Changes for the power supply based on the DC/DC converter and other minor info added to Section “General Information”.
2.0	Jan 17 2019	Completed switch of content to DC/DC-based power supply, final BOM content reviewed, most components switched to Mouser.
2.1	Mar 3 2019	Changed R94 of output board from 470 k $\Omega$ to 24 k $\Omega$ . Adjusted R1 and R2 for higher gain of vocoder output level. Added BOM for alternative power supply based on LDOs.
2.2	Mar 24 2019	Updated BOM for LDO-based power supply to ensure proper supply turn-off in standby.