

3e Audio Amp Construction

Tips and the Bill of Materials

In the November 2018 issue of *IEEE Spectrum*, Executive Editor Glenn Zorpette returns to the world of high-performance DIY audio in our Hands On column. In this member-only appendix, he goes into greater detail about the construction and provides a complete parts lists with links to suppliers.

Construction Tips

Chassis: Cut the rectangular hole for the power-inlet module using a nibbler tool. Cut the hole slightly smaller than you need and file it out for a smooth finish. For the large round holes for the XLR audio connectors, use a hole saw, with teeth designed to cut metal, or use a knockout punch, such as a Greenlee. The power transformer is heavy, so support it with four rubber bumpers mounted directly below it on the underside of the chassis and put two more bumpers on the two far corners of the chassis, for a total of six bumpers supporting the chassis.

The deluxe chassis comes from [Landfall Systems](#). It is sturdily made of 0.125"-thick sheet aluminum, and it is 16.5" wide by 9" deep by 3.25" high (normally we use S.I. units in *Spectrum*, but as Landfall Systems is a U.S. supplier, I'm quoting the imperial measurements I used to order). For an extra \$25, Landfall will laser-cut the holes in the front and rear panels to your specifications (it's best to measure and drill the holes in the bottom plate—for the PCB standoffs and the rubber bumpers—yourself). I can provide a sketch for anyone pursuing this option; write to g.zorpette@ieee.org.

- **Power transformer:** The power transformer, AnTek AS-2222 or AS-3222, has two primary and two secondary coils. It is capable of 230- or 115-volt input, so for U.S. mains, wire the two primaries in parallel. Connect the transformer's two red lead wires to the mains-load side of the on-off switch, and the two black leads to the neutral side. Similarly, connect the transformer's secondary leads in parallel. Connect the two blue leads to one of the two input terminals on the power-supply board, and connect the two green leads to the other terminal.

The quick-disconnect connectors that fit on the power-supply-board terminals have dimensions as follows: 5.21 mm (0.205") wide by 0.81 mm (0.032") thick by 7.75 mm (0.305") long. Yes, it's a slightly odd size.

- **Indicator light:** Power the LED indicator light with the + 29-V DC from the power-supply output and limit the current with a 10k-ohm, 1/2-watt resistor.
- **Power-supply board:** The kit for the power-supply board comes with four Nichicon UY1J682MRD electrolytic capacitors. They're 6800 µF, 63 V, and they're plenty good. But a reasonable upgrade option is to use Nichicon UKW1J682MRD capacitors. A set of four from Mouser costs \$24.64.
- **Amplifier board:** The amplifier board comes with premade cables and terminals for the signal-input and power connections. For the signal-input cables, the wire gauge is so fine that you should protect and support them with a short segment of heat-shrink tubing where they connect to the panel-mount XLR solder cups. Or, better yet, make a couple of new input cables yourself, using thicker-gauge input wires. To do that you need the plastic, 3-socket, female half of a JST connector, with a pitch of 2.54 mm. They are readily available on e-Bay.

To view the Bill of Materials please view this page on a tablet or desktop screen.

Bill of Materials

Part or service	Manufacturer or provider, part number	Source, part number	Alternate source, part number	Quantity	Cost, Low-cost version	Deluxe version: source, part number	Deluxe version cost
Class-D amplifier board	3e Audio TPA3250-2CH-50W	3e-Audio.com, <u>EAUMT-0050-2-A</u>		1	US \$49.00	(Same)	\$49.00

Power-supply board	Xkitz Electronics XAPS-500W	Xkitz.com, XAPS-500W		1	\$29.95	(Same)	\$29.95
Power-supply capacitors	(Included with Xkitz kit)			4	\$0 (included with kit)	Digi-Key, 493-10689-ND	\$24.88
Power transformer	AnTek, AS-2222	AnTek.com, AS-2222		1	\$32.00	AnTek.com, AS-3222	\$41.00
Chassis, cover plate	Hammond, 1444-28; 1434-26	Mouser, 546-1444-28 ; 546-1434-26	Digi-Key, HM270-ND ; HM284-ND	1	\$31.66 \$11.36	Landfall Systems (custom order)	\$154.01
Powder coating of chassis	Absolute Powder Coating , St. Mary's, Penn.			—	\$37.50	(Same)	\$37.50
XLR connectors	Switchcraft, PD3FSC3	Adorama, SWPD3FSC3	Mouser, 502-PD3FSC3	2	\$5.20	Mouser, 568-NC3FDM3-H	\$11.68
Binding posts	Cal Test Electronics, CT2232-2 (Red); CT2232-0 (Black)	Digi-Key, BKCT2232-2-ND ; BKCT2232-0-ND	Mouser, 510-CT2232-2 ; 510-CT2232-0	4 (2 Red; 2 Black)	\$16.40	Audio Note Speaker Terminals: Parts Connexion, ANCNCTR-82156 (quantity 2); ANCNCTR-82157 (quantity 2)	\$34.44
Power inlet module	TE Connectivity, 6EGG1-1	Mouser, 592-6EGG1-1	Digi-Key, CCM1620-ND		\$14.86	(Same)	\$14.86
Power cord	Inventus Power, 67400-185-EB	Digi-Key, EPS614-ND		1	\$3.91	(Same)	\$3.91
On-off switch	E-Switch, RR3405A	Digi-Key, EG1895-ND	Mouser, 612-RR3405A	1	\$3.19	(Same)	\$3.19
Fuses, 5 mm x 20 mm, 5 A, Slow-blow	Littelfuse, 0215005.MXP	Mouser, 576-0215005.MXP	Digi-Key, F4611-ND	1	\$1.48	(Same)	\$1.48

On-off indicator light: 5-mm LED (blue)	Visual Communications Co., LTH5MM12VFR4600	Mouser, 593-LTH5MM12VFR4600	Digi-Key, LTH5MM12VFR4600-ND	1	\$0.80	Digi-Key, PML50BFVW-ND	\$11.91
Indicator-light cable assembly	Visual Communications Co., CNX_440_X02_4_1_12	Mouser, 593-CNX440X24112	Digi-Key, CNX 440 X02 4 1 12-ND	1	\$3.36	(Not needed)	\$0
Lens for cable assembly	Visual Communications Co., CMS_442_CTP	Mouser, 593-CMS442CTP	Digi-Key, CMS 442 CTP-ND	1	\$2.09	(Not needed)	\$0
Current-limiting resistor for indicator light (10 kΩ)	Vishay Dale, CMF5510K000FKEK	Mouser, 71-CMF5510K000FKEK	Digi-Key, CMF10.0KHFCT-ND	1	\$0.15	(Not needed)	\$0
Quick-disconnect terminals (for power-supply board)	TE Connectivity, 640915-1	Digi-Key, A0908-ND	Mouser, 571-6409151	6	\$2.16	(Same)	\$2.16
Female threaded standoffs, aluminum, 5/8 inch (for power-supply board)	McMaster-Carr, 91780A165	McMaster-Carr, 91780A165		4	\$1.36	(Same)	\$1.36
Female threaded standoffs, 4-40 steel, 3/4 inch (for amplifier board)	McMaster-Carr, 91125A437	McMaster-Carr, 91125A437		4	\$9.40	(Same)	\$9.40

Rubber bumpers	Keystone Electronics, 724	Mouser, 534-724	Digi-Key, 36-724-ND	6	\$3.18	McMaster-Carr, 9540K737	\$6.48
Additional items needed: solder; hookup wire; #6 and #4, or M3 and M2.5, pan-head and flat-head screws; nuts and lock washers, heat-shrink tubing.							
Total cost:					\$259.01		\$437.21

