Super Heresy 2.0 recipe

The Super Heresy 2.0 is a modded bass-reflex version of a classic Heresy, developed by forum member @ClaudeJ1.

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Heritage Members

💬 9.5k
Location: Detroit Area

Here's some summary images. I did a mirror image of the port on the other speaker (port in other corner of rear).

Edited May 29, 2014 by ClaudeJ1

The original Heresy is a very good sounding speaker. The Super Heresy was developed to provide better midrange/midbass definition without losing bass. With @DaveTennessee's SMAHL tweeter, an improved woofer, and porting, it can be "a superlative speaker rather than just 'good enough'".

The developer (@ClaudeJ1) recommends using the Super Heresy with a subwoofer (to take over the duties below 40-60 Hz thereby reducing reduce IM distortion). Any affordable subwoofer should be adequate. Notwithstanding that recommendation, some users have reported adequate bass down to about 30 Hz (largely dependent on the positioning of the Super Heresy in the listening room) and have been satisfied without a subwoofer.

Converting a Heresy to a Super Heresy v2 requires:
1. replacing the Heresy's K-77 tweeter with a SMAHL (Small Machined Audio Horn Lens) tweeter from @DaveTennessee Ault. The SMAHL tweeter is a DE120 driver coupled with a custom lens (horn) developed by @DaveTennessee and @ClaudeJ1.
2. Replacing the Heresy's K-22 woofer (a compromise chosen by PWK for low IM distortion) with one of several choices with higher BL woofer.
3. porting and stuffing the cabinet
4. (optionally) refreshing the capacitors on the network, or modding the network

Be aware that doing only a partial conversion will yield disappointing results. In particular, although porting the cabinet to make it bass-reflex --- without replacing the K-22 woofer -- will increase the bass, the sound will be boomy and indistinct (according to users @tubelectron and @Gigantic). Real improvement in bass requires upgrading the woofers.

The conversion of a Heresy to a Super Heresy is entirely reversible: just remove the egg crate foam, and re-install the old tweeters, woofers and original rear panels.

<u>Tools required</u>
- Screwdrivers
- Drill
- 1/8" drill bit
- Stapler
- Jigsaw or hole saw
- Hot glue gun and/or caulking gun

<u>Ingredients</u>

1) Start with
- 2 x Heresy 1 speakers with
  - K-77 driver and lens (tweeter)
  - K-52 driver and K-700 horn (squawker/mid-range)
  - K-22 woofer
  - E-2 network

2) Add
- 2 x ½" (13mm) thick x 19 ¾" H x 14" W Baltic birch panels (for new rear panels)
- 2 x terminal cups or binding posts
- 2 x @DaveTennessee's SMAHL V2 tweeters (DE120 drivers + custom SMAHL lens)
- 2 x 4"ID x 4"L flared ports
- 2 x Eminence Kappalite 3012HO woofers (or similar)
- ~ 16 square feet of "egg crate" foam (in 12" x 12" tiles)
- Staples (to attach egg crate foam)
- 8-16 #10 x 1 ¼" pan-head screws (for woofer)
- 16 AWG (or better) wire
- Electrical connectors (e.g., spade or ring crimp connectors)

Cost will amount to approx. US$850 (CAD$1400) plus tax to convert a pair of Heresy I speakers

<u>Sources of supply</u>

a) SMAHL V2 tweeters: The SMAHL tweeters (developed by @DaveTenessee and @ClaudeJ1, and available from @DaveTennessee) make a remarkable improvement and is the only tweeter recommended.
- https://www.ebay.com/itm/223930007695 (be sure to ask for the DE120 drivers too)

b) Woofers: Although nearly any professional PA type driver with a big magnet should work, these have been tested (or simulated):
- Kappalite 3012 HO
- LaVoce WAN123.00
- B&C 12plb76 (with aluminum voice coil)
- Klipsch K-42
- Eminence Delta Pro 12a (reportedly the same as a K-42)
- Kappa Pro 12a (also reportedly the same as a K-42)
- Eminence Kappa 12a
- Celestion TF 1225.

A recent ranking of those woofers (by @Gigantic and @tubelectron) places them:

1. Eminence DeltaPro 12A
2. Eminence Kappalite 3012HO
3. Celestion TF 1225 (best bang for the buck)

The preferred woofer is the Eminence Kappalite 3012HO because (according to @ClaudeJ1):

- it reduces the weight by about 15 pounds,
- it yields a 1 litre internal volume increase (about 1/2 Hz lower bass), and
- it delivers about 1 dB higher output in the midrange.

Nevertheless, all of the woofers mentioned are quite similar; any of them should perform well.

Eminence Kappalite 3012HO woofers

- USA: https://www.parts-express.com/Eminence-KAPPALITE-3012HO-Neo-12-Driver-290-589?quantity=1
- Canada: https://qcomponents.ca/products/eminence-kappalite-3012ho-8-ohm-12-400w-neodymium-pro-audio-woofer

c) Terminal cups/binding posts (choose from)

- USA: https://www.parts-express.com/search?order=relevance:desc&keywords=terminal%20cup
- Canada: https://qcomponents.ca/search?type=product&options%5Bprefix%5D=last&options%5Bunavailable_products%5D=last&q=terminal+cups&page=1

- USA: https://www.daytonaudio.com/product/253/bpa-38g-hd-binding-post-pair-gold
- Canada: https://solen.ca/en/products?query=binding%20post

d) Port tubes: any 4" OD port 4" deep will do, flared on one end, both, or even just a cardboard tube.

- USA: https://www.parts-express.com/Port-Tube-4-ID-x-4-L-Flared-260-403?quantity=1
- Canada: https://solen.ca/en/products/solen-pt-4f-104mm-flared-port-tube
- Canada: https://qcomponents.ca/products/mcbride-pt-f440-port-tube?_pos=1&_sid=2ef152de7&_ss=r

e) Egg crate foam

- USA: https://www.amazon.com/gp/product/B076JNCQ39/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&th=1
- Canada: https://www.amazon.ca/Eggcrate-Acoustic-Panels-Dampening-Equipment/dp/B076JNCQ39/ref=sr_1_10?crid=2GN0IFUPT9E3T&keywords=egg+crate+acoustic+foam&qid=1674333131&sprefix=egg+crate+acoustic+foam%2Caps%2C97&sr=8-10

<u>Process</u>

For each speaker:

1) Prepare cabinet
- Remove all components from Heresy 1 cabinet
- Staple egg crate foam to inside of the sides, top, and bottom (but not the mortarboard)

2) (optional) refresh or modify networks

The Heresy I should have come with either an E or E-2 network. Unless the networks have been refreshed, the capacitors will be more than 40 years old and should be replaced (e.g., with Dayton Poly Film capacitors).

The E and E-2 networks work well in the Super Heresy. No changes are needed.

If one is converting a HIP (Heresy Industrial Ported) to a Super Heresy, @ClaudeJ1 recommends converting the existing network to an E network.

Some network mods have been shared by users @tubelectron and @THD+N. Those mods may be found in a separate document "SH network mods" attached to this post.

3) Install components
- Re-install squawker (K-52 with K-700) using existing screws
- Install new SMAHL tweeters using existing screws
- Install new Eminence Kapalite 3012HO woofers with 8 screws (not 4 as original)
- Re-install E2 network. No changes are required for the networks.
- Wire tweeter, squawker, and woofer to network

4) Create and install new rear panels
   a) prepare rear panel
- Ascertain locations for mounting screws by using existing rear panel as template
- Pre-drill 1/8" pilot holes for mounting screws (#8 x 1" or #8 x 1 ¼"))
   b) Install port on the back panels
- Locate the port in a bottom corner of the cabinet.
  - If desired (and as preferred by @ClaudeJ1) one could install two mirror-imaged ports in the bottom back corners.
  - Although the smaller magnets on some woofers permit positioning the port in the bottom centre of the cabinet, one must take great care because clearances are tight.
- Mark for port tube hole
- Cut 5 5/8" diameter hole centred on mark
- Install and affix the port tube. Clear silicone caulking is recommended to attach the port tube to the back panel.

c) Install terminal cup
- Mark for terminal cup or binding posts: centred (~7" from sides) and with uppermost part 2 approx. 2" from top of panel
- Cut out/drill appropriate space for terminal cup or binding posts (size will vary depending on what terminal cup or binding post is used)
- Install terminal cup or binding posts using appropriate method (screws/hot glue/silicone caulking)

d) Finish and install rear panel
- Fill any gaps around cut-outs (port tubes, terminal cups) with hot glue or caulking
- Where feasible, staple egg crate foam to interior of rear panel
- Wire the network to terminal cup
- Use existing screws to mount rear panel to cabinet