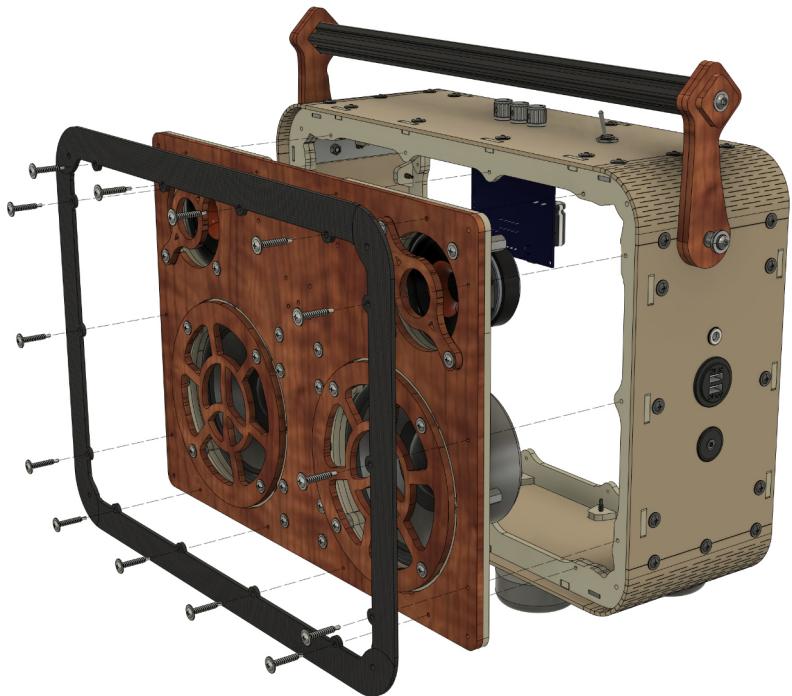


MAKEBOOMBOXES
for the love of music

MOJOFESTO DIY Kit

Assembly Guide Part II of II

11/3/2023



Milestones:

- D. Soundboard
- E. Closure

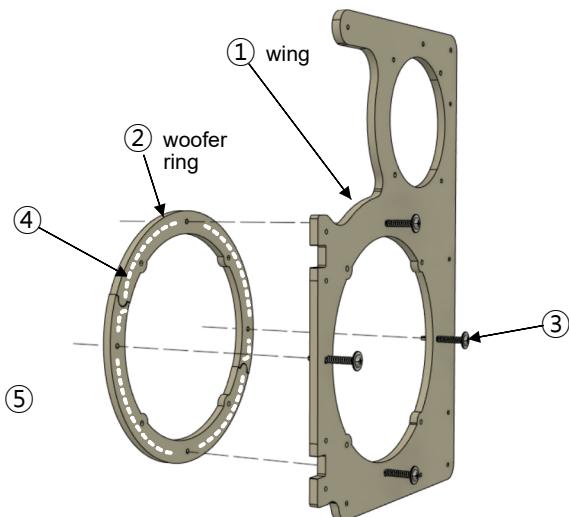
[Print PDF](#)



STEP
D1a **Glue And Screw the Woofer Rings to the Wings**

For each of the two soundboard wings ①, glue up the woofer rings ② as follows:

- ▶ Partly drive four woofer mounting screws ($1\frac{1}{4}$ " self-tapping) ③ into the wing's woofer holes at 3, 6, 9 and 12 o'clock — until just the screw tips (but not the threads) poke through
- ▶ Put glue on the inside of the woofer ring halves ④
- ▶ Position woofer ring halves ⑤ over the woofer mounting screws' tips
- ▶ While pinching the ring to the wing, screw in the woofer mounting screws to finger tight
- ▶ Clamp woofer rings with eight medium binder clips ⑥
- ▶ Remove excess glue from the inside edge of the speaker cutout circles ⑦

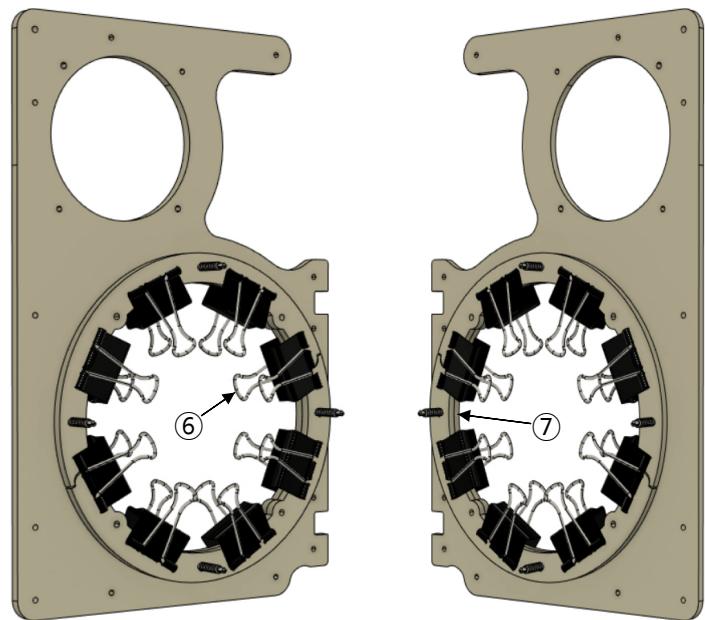
**Tools:**

- Medium binder clips
- Phillips head screwdriver
- Yellow glue with precise nozzle

Note: The woofer mounting screws go in to the pilot holes located at 12, 3, 6, and 9 o'clock along the woofer cutout circle. The other four pilot holes around the woofer are for mounting the speaker covers in Step D9.

Check:

- The woofer and full-range speaker rings are correctly positioned and glued flat to the wings — no gaps
- The woofer mounting screws are fully screwed finger tight into the wings
- All glue squeeze-out is removed from the woofer rings and cutout circles



**Online
Guide:**

<https://mkbx.info/festo-wooferings>



**STEP
D1b**

Glue And Screw the Full-range Rings to the Wings

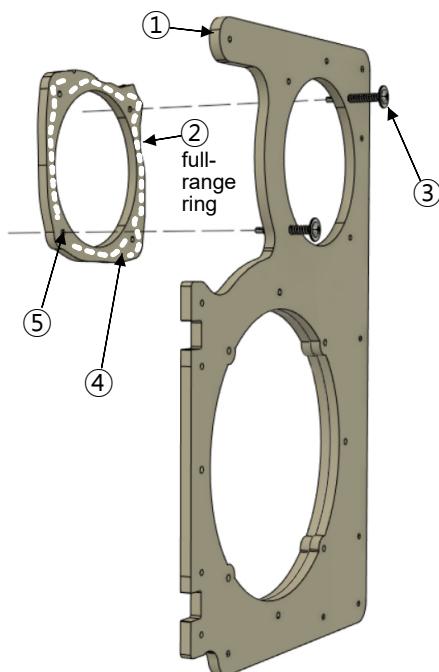


For each of the two wings ①, glue up the full-range speaker rings ② as follows:

- ▶ Partly drive two full-range mounting screws ($1\frac{1}{4}$ " self-tapping) ③ into any two of the full-range pilot holes (see note) — until just the screw tips poke through
- ▶ Put glue on the inside of the full-range ring ④
- ▶ Position full-range ring pilot holes ⑤ over the full-range mounting screw tips
- ▶ While pinching the ring to the wing, screw in the woofer mounting screws to finger tight
- ▶ Clamp the full-range rings using medium binder clips ⑥
- ▶ Remove the two mounting screws (save for next step, see note)



Remove excess glue from the inside edge of the speaker cutout circles ⑦



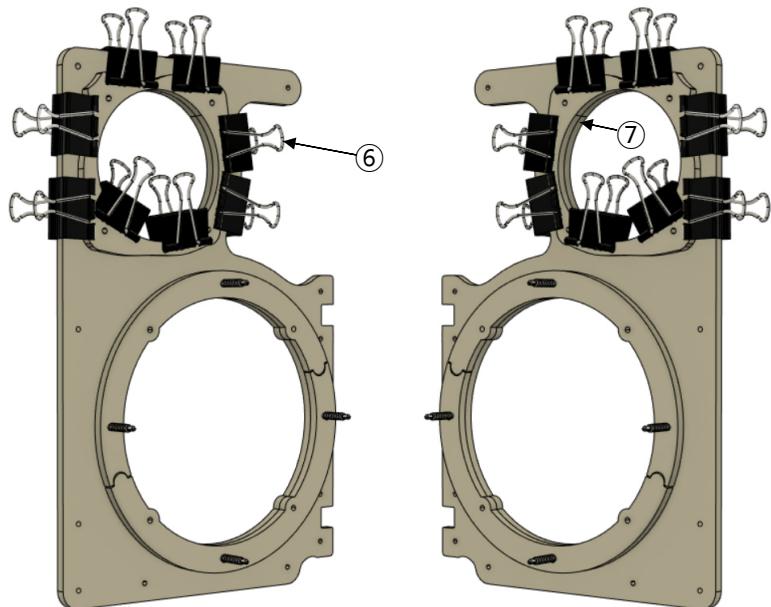
Note: In this step, the mounting screw tips are used temporarily to align the exact position of the rings for gluing. Unlike the woofer mounting screws, the full-range screws are driven through the soundboard front layer AND the wings, and so are removed for the next step.

Tools:

- Medium binder clips
- Phillips head screwdriver
- Yellow glue with precise nozzle

Check:

- The full-range speaker rings are correctly oriented, well-aligned and glued flat to the wings — no gaps
- All glue squeeze-out is removed the full-range rings and cutout circles
- The full-range speaker mounting screws are unscrewed and saved for the next step



**Online
Guide:**

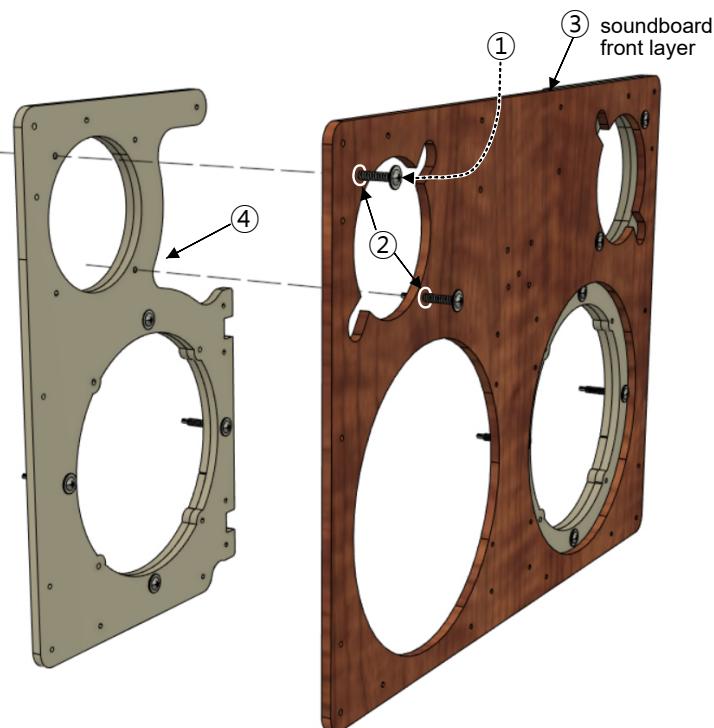
<https://mkbx.info/festo-fullrangerings>



**STEP
D2**

Screw the Wings to the Soundboard Front Layer

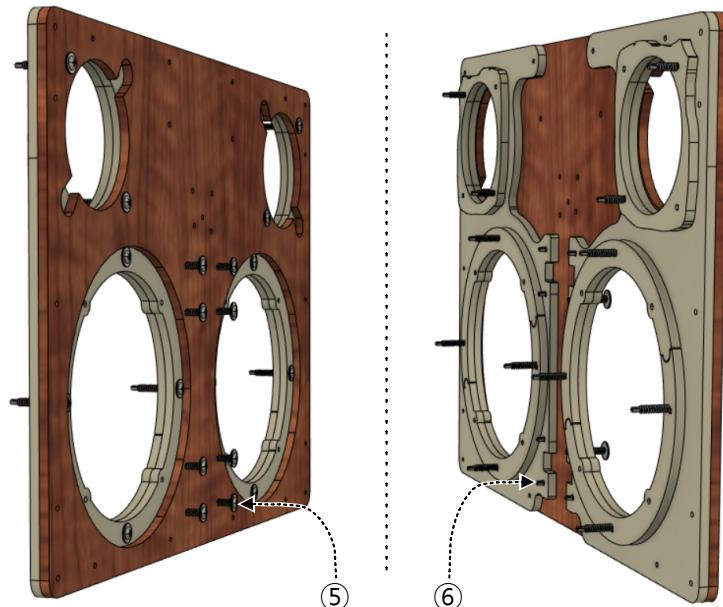
- ▶ Partially screw the four full-range speaker mounting screws (1¼" self-tapping) ① into their pilot holes ② in soundboard front layer ③ — just the tips stick out
-  For each of the two soundboard wings ④, mate to the full-range mounting screws as follows:
-  While pinching the wing to the soundboard front layer, fully screw in the four full-range mounting screws to finger tight
- ▶ While pinching the wing to the soundboard top, partially screw in the eight battery bracket mounting screws ⑤ — until just the tips stick out ⑥

**Tools:**

- Phillips head screwdriver

✓ Check:

- The flat heads of the speaker mounting screws are fully-seated finger tight to the soundboard — no gaps and not stripped
- The wings lays perfectly flat against the soundboard — no gaps

**🔍 Design Note:**

The wings are designed to fit specific speaker drivers' precise bolt circle mounting specifications. To allow for easy speaker customization in the future, the wings are kept modular and not glued to the soundboard front layer. The boombox sounds great with or without gluing the wings to the front layer. The full fastening of the wings to the soundboard is completed in Step E1.



**Online
Guide:**

<https://mkbx.info/festo-wings>

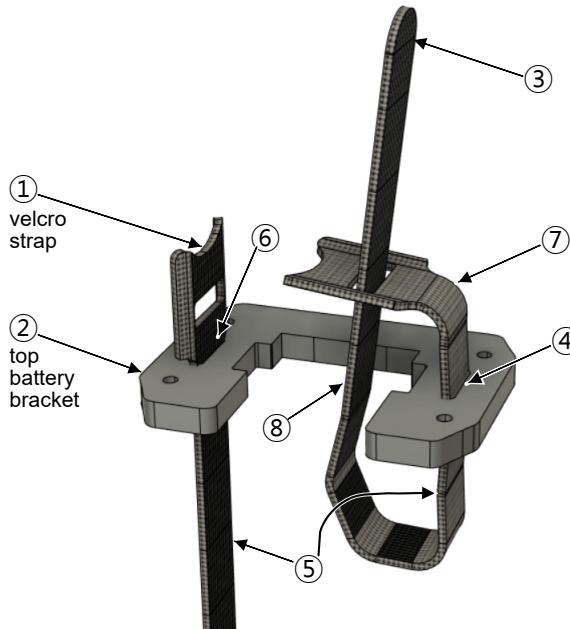


Note: The battery bracket mounting screws will be driven in fully when mounting the battery bracket in Step D5.

**STEP
D3**

Attach the Battery Straps to the Battery Bracket(s)

- ▶ For the standard kit battery (3000MAh), do the following step. For an upgraded battery, skip this step and use the instructions included with the upgrade.
- ▶ For each of two velcro straps ①, attach to the top bracket (the shorter of the two brackets) ② as follows:
 - ▶ Pull the head ③ of the velcro strap downward through the top battery bracket strap slot ④ with the velcro soft side ⑤ facing inward. Seat the tail ⑥ fully
 - ▶ Bend the velcro tail inward ⑦ and loop the head up through the tail from the inward direction ⑧
 - ▶ Pull the head all the way through and cinch tightly ⑨
 - ▶ Save the other two velcro straps for Step D7



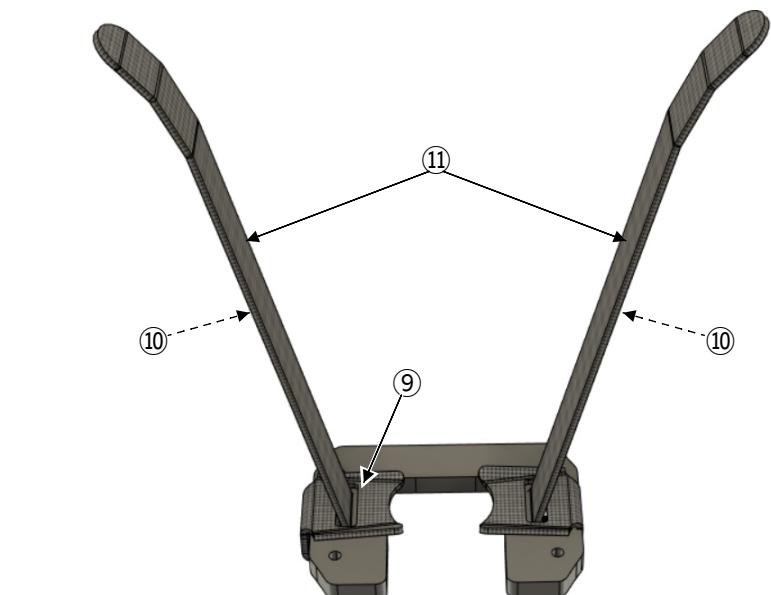
Tools: None for this step

⚙ Options:

Velcro straps provide a removable means of holding the battery firmly in place, making it possible to swap batteries in the field should the need arise. If a more permanent battery strapping is desired, then replace the velcro straps with zip ties. Search for "battery mods" in the MAKEBOOMBOXES.com forum.

✓ Check:

- Velcro straps are looped tight in the battery brackets
- The velcro soft sides face outwards ⑩ and the rough sides face inwards ⑪



**Online
Guide:**

<https://mkbx.info/festo-batterystraps>



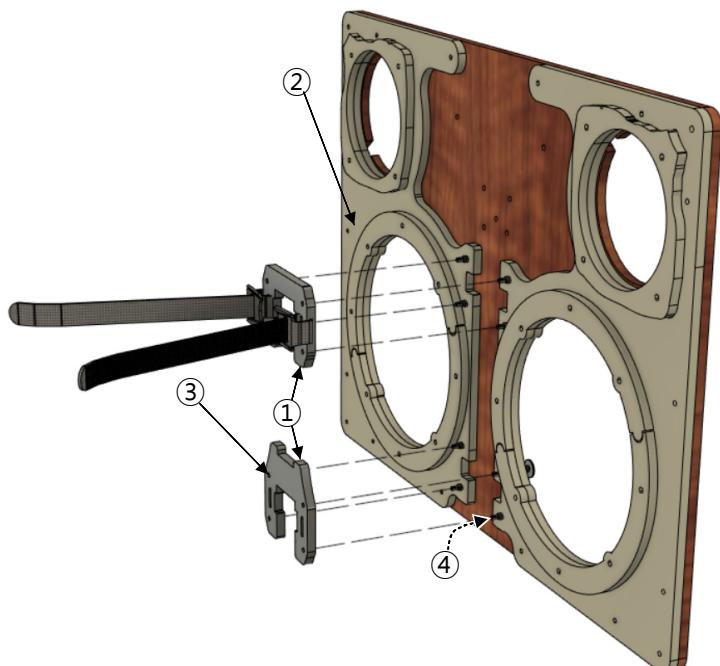
**STEP
D4**

Screw the Battery Brackets to the Soundboard

 For each of the two battery brackets ①, screw to the soundboard wings ② as follows:

- ▶ Position the bracket mounting holes ③ over the tips of the battery bracket mounting screws ④ which are partially screwed through the soundboard.
- ▶ Press down firmly and hold the bracket flush to the wing

 Screw in the four mounting screws to finger tight

**Tools:**

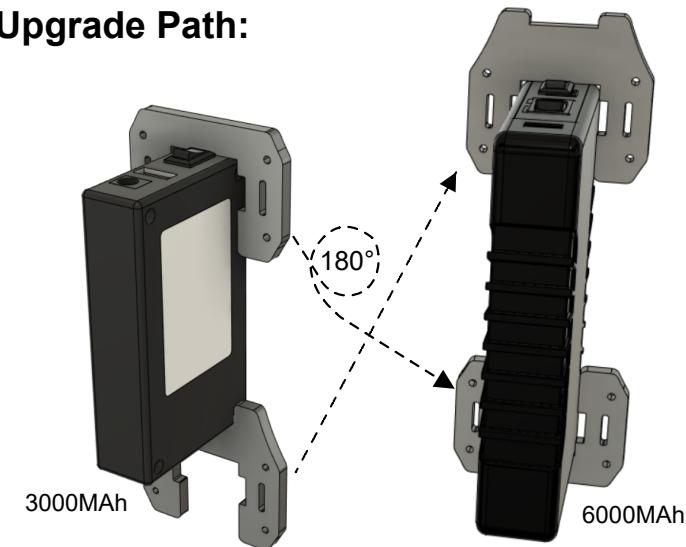
- Phillips head screwdriver

 **Options:**

To use a different battery altogether, fashion DIY brackets to fit, or purchase after-market brackets designed for the alternative battery.

 **Check:**

- All the battery holder mounting screws are fully tightened down to the soundboard front layer — no gaps and not stripped
- Battery brackets are securely fastened flat and even against the soundboard wings — no gaps
- Battery holder brackets are oriented correctly (the battery can fit snugly in the rectangle formed between the two battery brackets)

 **Upgrade Path:**

The battery brackets can hold either the 3000MAh or the 6000MAh 12V battery pack made by TalentCell. When upgrading, simply flip the top bracket and swap the top and bottom bracket positions.

**Online
Guide:**

<https://mkbx.info/festo-batterybrackets>

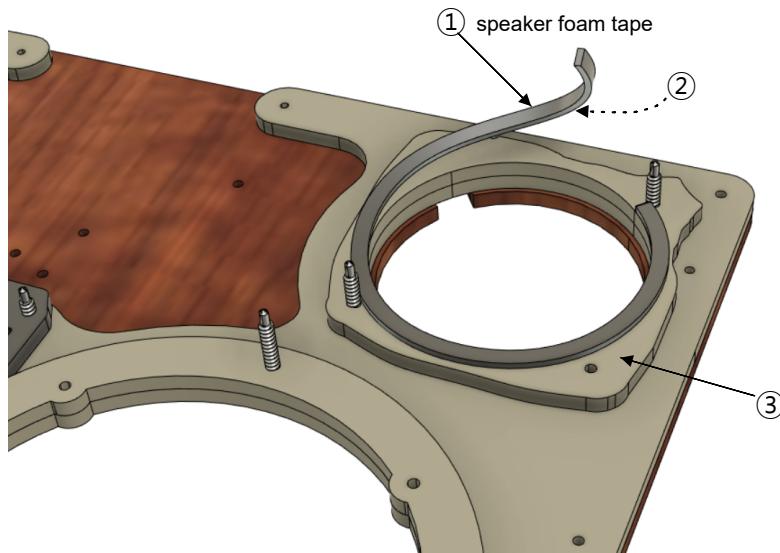


**STEP
D5** Stick the Foam Circles to the Full-range Speaker Rings

- Separate the two perforated spirals of speaker foam tape ① (boxed with the full-range speakers)

 For each of the two full-range speakers, attach the foam circles as follows:

- Peel the backing ② away from the foam tape
- Carefully stick the foam mounting tape to the full-range ring ③ in a circle around the cutout hole ④
- Trim the foam tape to size ⑤

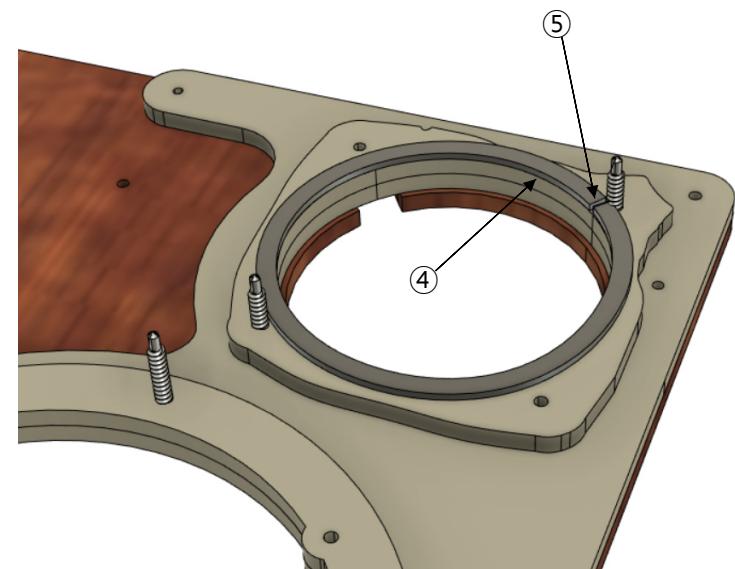


Tools:

- Scissors

 Check:

- The foam tape circles have their inner edges flush to the inside of the cutout circles all the way around
- The foam tape ends butt together neatly and completely — no gap or overlap



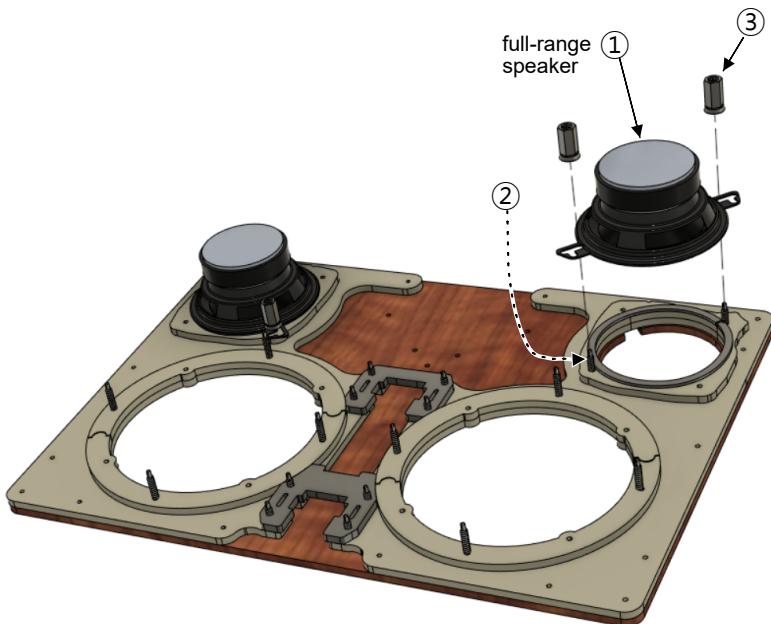
<https://mkbx.info/festo-foamcircles>



STEP
D6**Mount Full-Range Speakers
to the Soundboard**

 For each of the two full-range speakers ①, mount to the soundboard as follows:

- ▶ Lower the full-range speaker onto the two mounting screws ② (see note on correct orientation)
- ▶ Anchor the full-range speaker by threading down the two speaker mounting nuts ③ on to the speaker mounting screws with socket driver or wrench
- ▶ Anchoring the nuts should not turn the mounting screws in their holes, but if the screws do turn, use a screwdriver to counter-turn the screw while threading down the nut

**Tools:**

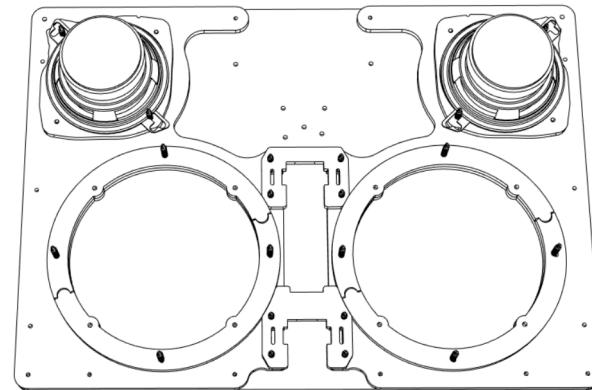
- Adjustable wrench, or socket driver: 9mm, or 11/32"

Notes: The correctly-oriented full-range speakers will have their connector terminal blocks pointing inwards towards the center line of the boombox.

Lowering the full-range speakers down the mounting screws shouldn't take much force if any. Wiggling the speaker may help to walk the speaker's bolt holes all the way down the mounting screws if needed.

 **Check:**

- The full-range speakers sit flat and even to the foam circles — no gaps
- The full-range speakers are exactly centered in the cutout circles (check from the soundboard front side)
- Speaker mounting nuts are threaded finger tight to the base of the full-range speaker mounting screws
- None of the nuts are cracked, broken or missing
- Full-range speaker mounting screws are tightened flush to the soundboard front layer (check from front)

**Online
Guide:**

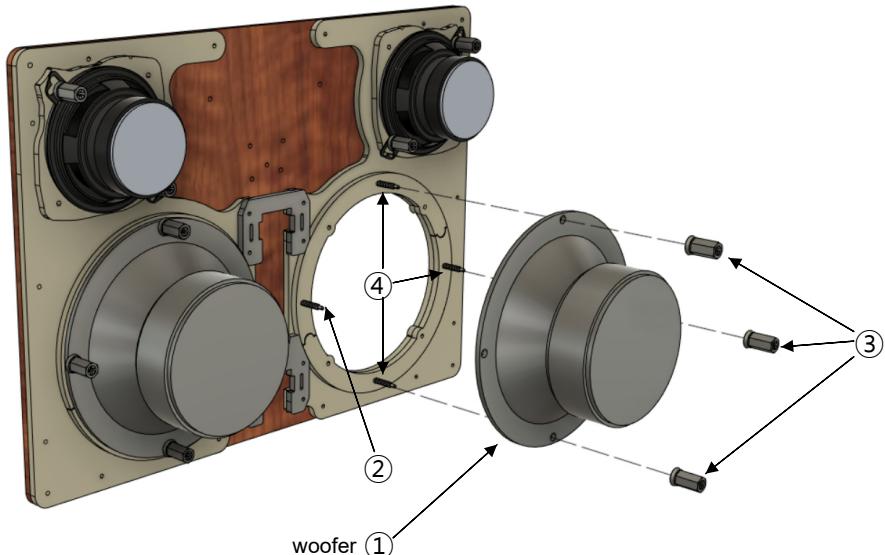
<https://mkbx.info/festo-fullrangespeakers>



**STEP
D7**

Mount the Woofers to the Soundboard

- For each of the two woofers ① mount as follows:
- ▶ Turned to the correct orientation (see note), lower the woofer onto the mounting screws ②
 - ▶ Thread down three of the four speaker mounting nuts ③ on to the outer three speaker mounting screws ④ with socket driver or wrench
 - ▶ Place the tail of a velcro strap ⑤ over the fourth (inner) mounting screw followed by a finish washer ⑥
 - Holding the velcro strap head toward the other woofer, drive the fourth mounting nut down the mounting screw ⑦ as before
 - ▶ The mounting screws should not turn in their holes when anchoring the nuts on them. But if the screws do turn, use a screwdriver to counter-turn the screw while driving down the nut

**Tools:**

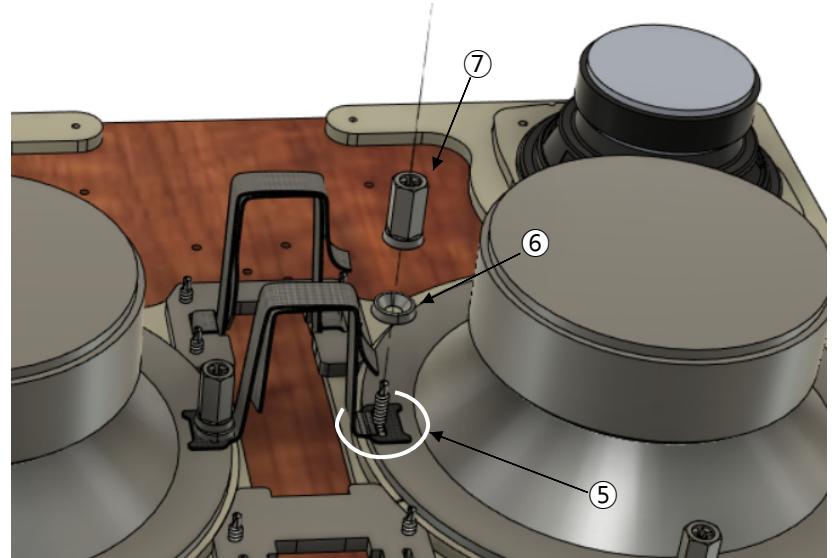
- Adjustable wrench, or socket driver: 9mm, or 11/32"
- Possibly need Phillips head screwdriver

Note: The correctly-oriented woofers will have their connector terminal blocks pointing towards the top and center of the boombox.

Lowering the woofers down their mounting screws shouldn't take much force if any. Wiggling the woofer may help to walk the woofer's bolt holes all the way down the mounting screw threads if needed.

Check:

- The woofers are flat to the woofer rings with no gap
- Speaker mounting nuts are threaded finger tight all the way down the woofer mounting screws
- None of the nuts are cracked, broken or missing
- Woofer mounting screws are tightened flush to the soundboard wings (check from the front)



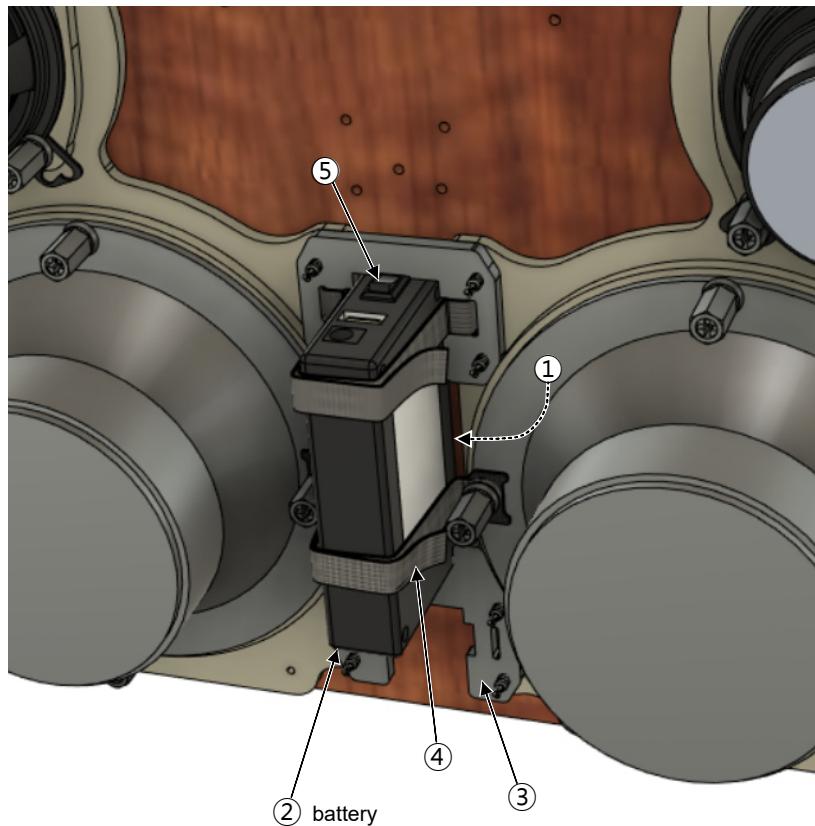
**Online
Guide:**

<https://mkbx.info/festo-woofers>



**STEP
D8****Strap In the Battery
to the Battery Brackets**

- ▶ Attach the strip of anti-vibration foam tape (not pictured) to the soundboard beneath the battery ①
- ▶ Seat the battery pack ② in the battery brackets ③
- ◀ For each pair of velcro hold-downs ④ cinch together tightly across the battery as follows:
- ◀ While pulling the battery firmly to the soundboard with one velcro strap, tension the other strap and fold it evenly across the first strap to stick the velcro



Tools: there are no tools for this

⚠ Important:

Note: for the boombox to operate, the TalentCell battery used in this kit needs its power switch ⑤ permanently on.

Make sure the battery switch is turned on before the closure steps that seal the box.

✓ Check:

- The battery is oriented correctly with its power jack towards the box top
- The battery straps are evenly overlapped to ensure maximum velcro hold
- The battery straps hold the battery snugly to the soundboard – minimal movement if wiggled by hand

🔍 Zoom Out:

The kit battery comes with a specific wall power adapter that indicates the battery charging status.

When the adapter is plugged into the wall and its wire is plugged into the boombox wall power jack, the LED light ⑥ illuminates red when charging, and green when fully-charged.

**Online
Guide:**

<https://mkbx.info/festo-battery>



STEP
D9

Mount the Speaker Covers and Speaker Cover Spacers

 For each of the four speaker covers ①, screw in while gluing their spacers ② to the wings ③ as follows:

- ▶ Pilot the speaker cover mounting screws ④ (four per woofer, two per full-range) into the speaker cover mounting holes until just the tips ⑤ poke through
- ▶ For each screw: hold a spacer over the screw and drive screw tip to poke out slightly from the spacer ⑥
- ▶ Let go of the spacer and back the screw out slightly to pull the spacer flush to the speaker cover ⑦
- ▶ Put a few small drops of glue on the spacers ⑧ and seat the cover mounting screws down to their pilot holes in the wing ⑨

 With the cover's wood grain aligned to the soundboard's grain, pilot the speaker cover screws into the spacer holes, and while pressing the cover down gently, screw the mounting screws to finger tight

**Tools:**

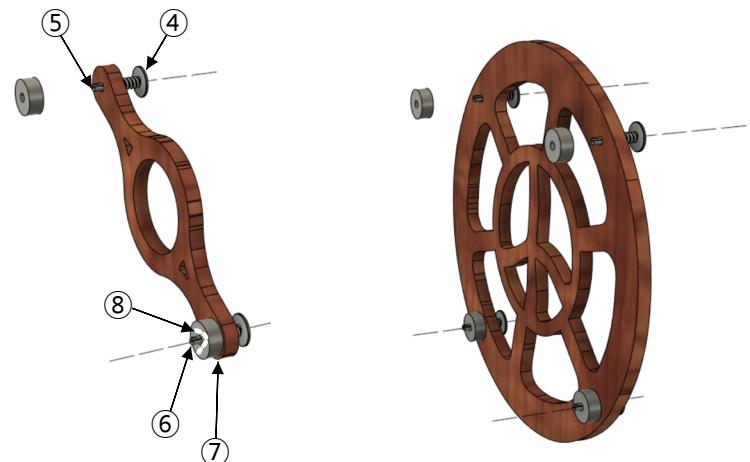
- Phillips head screwdriver.
- Yellow glue with precise nozzle.

⌚ Timing:

To speed up the build time, this step combines two tasks (gluing the spacers, and screwing the covers) into one workflow. Alternatively, these tasks can be done one after the other — first gluing on the spacers (clamped to the wings with binder clips), and then screwing in the covers after the glue dries. This takes a bit more time but may be preferred by some makers.

✓ Check:

- Speaker covers are firmly mounted
- There are no gaps between the speaker covers and spacers, nor between spacers and soundboard wings

**🔍 Design Note:**

The spacers are glued on permanently, whereas the covers are screwed in to allow for their repair or replacement.



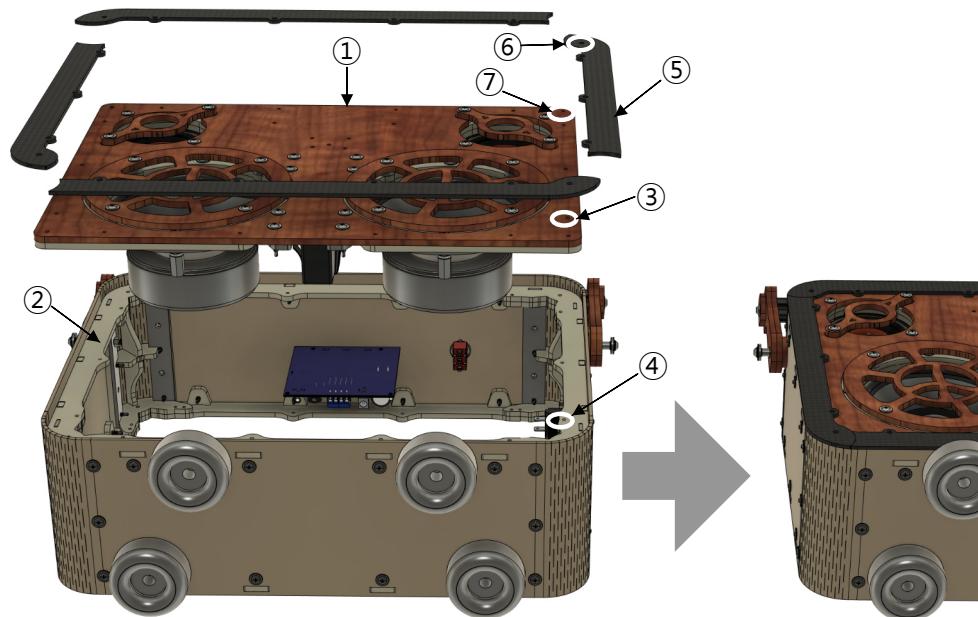
**Online
Guide:**

<https://mkbx.info/festo-speakercovers>



STEP E1 Screw the Soundboard to the Frame via the Front Borders

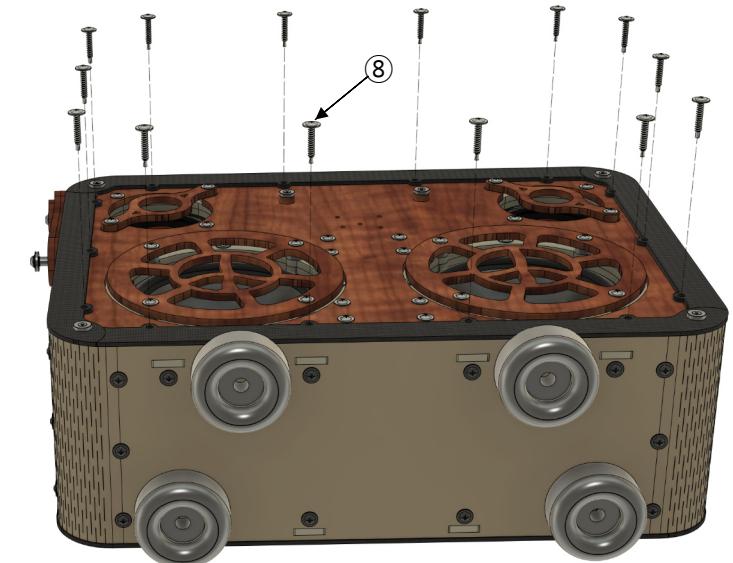
- ▶ Lay the soundboard ① down to the front bulkhead ②
- ▶ Confirm the soundboard mounting pilot holes ③ align with bulkhead pilot holes ④
- ▶ Lay the four border pieces ⑤ down on the soundboard
- ▶ Align the borders' mounting holes ⑥ with soundboard pilot holes ⑦
- ▶ Screw in 14 soundboard mounting screws ⑧ to finger tight – skipping the four holes. (In the next step, the corners will receive magnets making the boombox compatible with Art Face add-ons)

**Tools:**

- Phillips head screwdriver

 Check:

- All the soundboard mounting screws are fully tightened down — no gaps and not stripped
- The soundboard is flat and tight against the bulkhead – no gaps
- The border pieces are flat and tight to the soundboard — no gaps


🔍 **Design Note:**

The borders, soundboard and backboard are modular elements, screwed in to allow for maintenance, repairs and customization.


Online Guide:

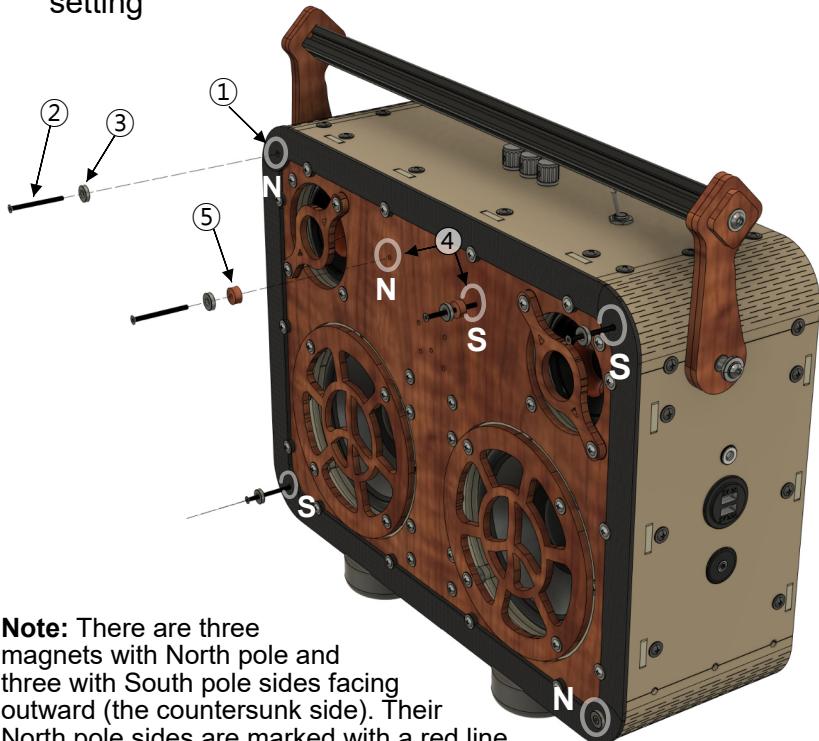
<https://mkbx.info/festo-soundboard>



**STEP
E2**

Fasten the Art Face Magnets to the Soundboard

- ▶ Magnet polarity must be arranged correctly as noted
- ➡ For each of the four corner locations ①, pass an M3 x 25mm bolt ② through the magnet ③, and then through its correct corner hole
- ➡ For each of the two middle locations ④, pass a bolt through the correct magnet, then through a 12mm x 5mm ring spacer ⑤, and then its correct hole
- ➡ For each of the six bolts, thread by hand an M3 x 12mm plastic hex nut ⑥ (shown in cutaway). Drive the bolt to finger tight using ⑦ an Allen wrench or power drill with 2mm hex driver set to lowest torque setting

**Tools:**

- Allen wrench or power drill with hex driver (2mm)

Options:

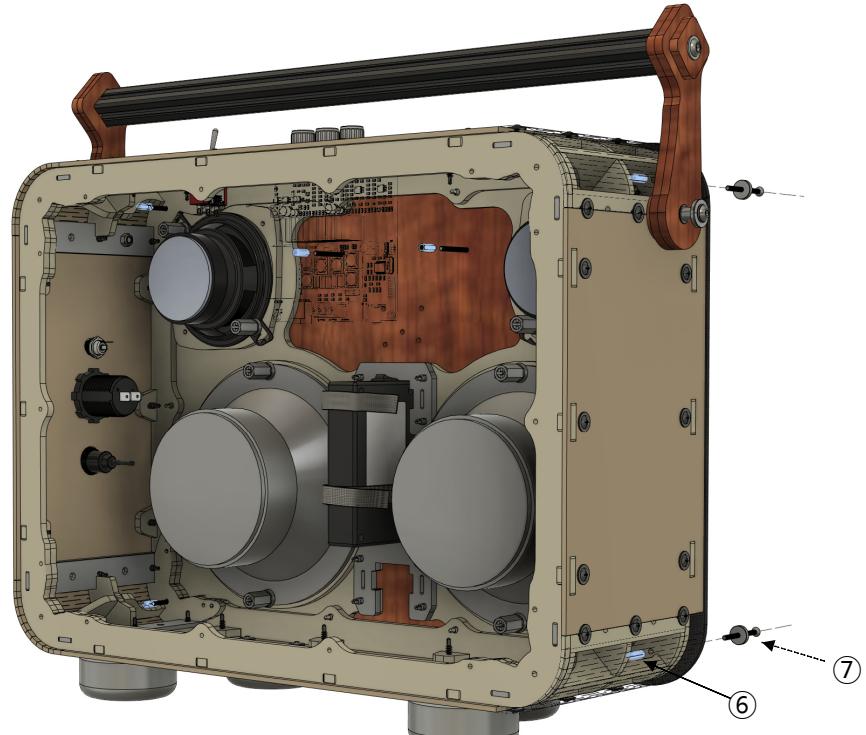
Art Face magnets make the boombox compatible with add-on art products and accessories available at MAKEBOOMBOXES.com

✓ Check:

- The magnet poles arrangement matches the diagram
- All the magnets are fully tightened down — with no gaps and no stripped nuts

⚠ Warning:

Safety First: Keep magnets away from children and pets. If swallowed, magnets can be harmful. Seek immediate medical attention if magnets are swallowed.

**Online Guide:**

<https://mkbx.info/festo-artfacemagnets>

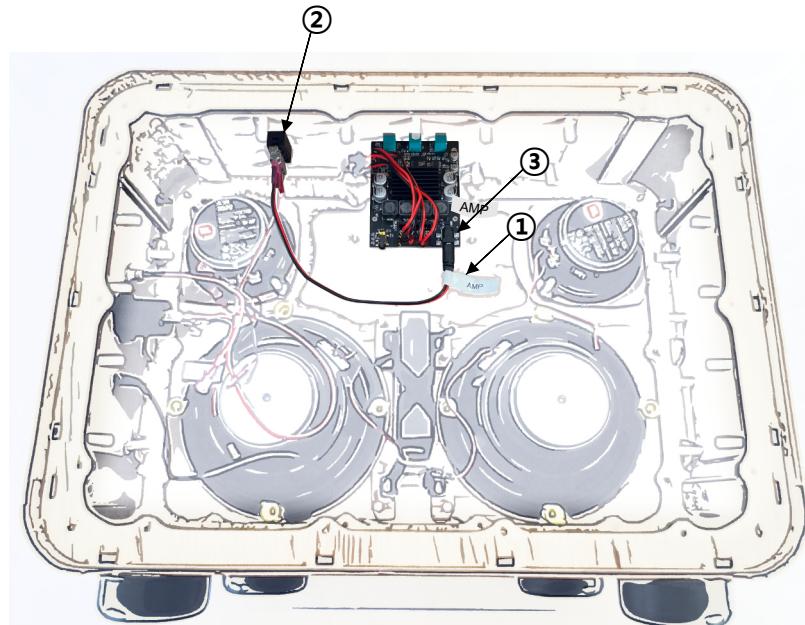


**STEP
E3** **Plug the Amp Board Power In and Plug the Optional Aux In**

- ▶ Locate the plug labeled "AMP" (short for amplifier) ① wired to the kill switch ②
- ▶ Plug the "AMP" plug in to the DC input jack of the amp board ③
- ▶

⚙️ Options:

- ▶ If the optional audio Aux In port was chosen with the kit, plug the Aux In plug ④ into the Aux In jack of the amp board ⑤ and
- ▶ Tidy up: Loop and tie down any over-long aux input wire a with velcro or zip ties ⑥



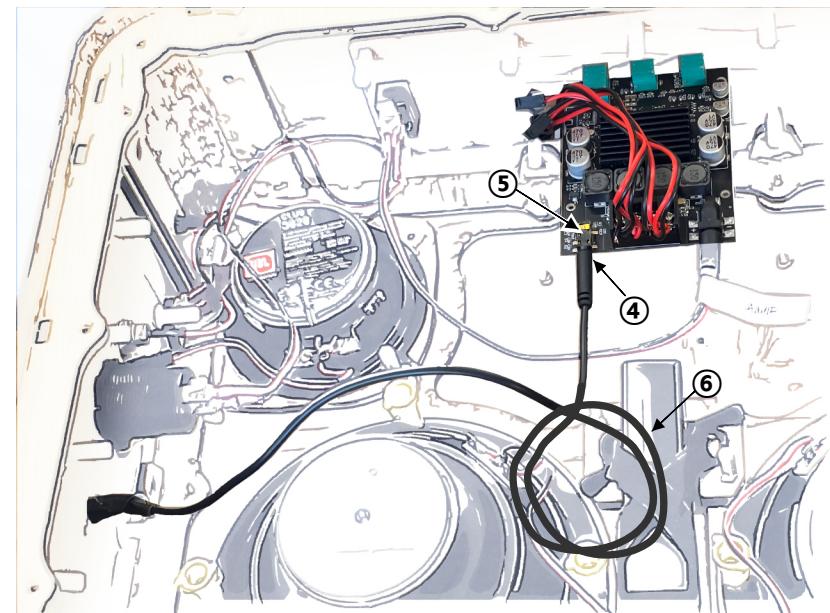
Tools: there are no tools for this

✓ Check:

- Make sure the "AMP" plug is seated fully
- Make sure the optional Aux In plug is seated fully
- Any over-long aux input wire is tied in a loop

⚙️ More Options:

You can always DIY modify your own configuration of Aux input connector(s) according to your needs later. For example, adding guitar and/or microphone input connectors would allow you to use the boombox as a performance amp. Different input ideas and kits are available at makeboomboxes.com

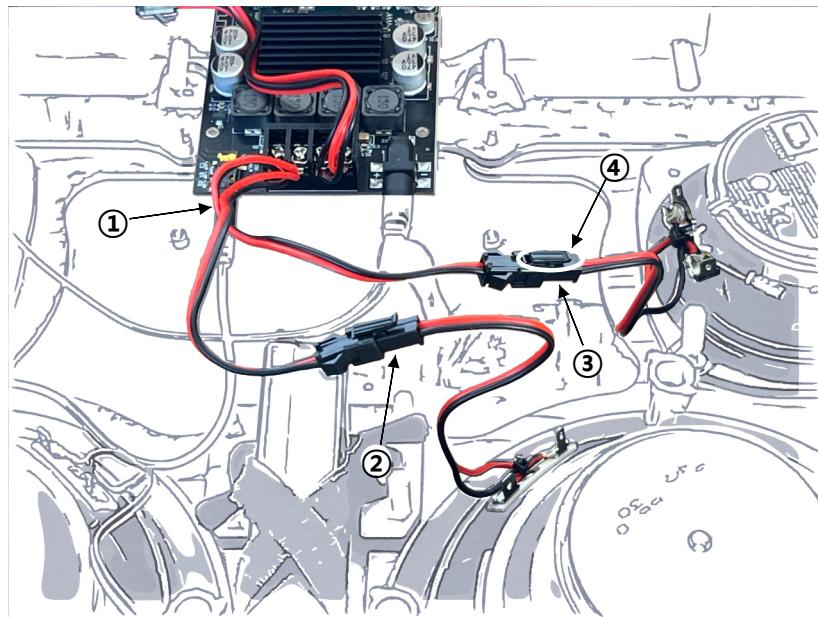

Online Guide:

<https://mkbx.info/festo-amppowerauxin>



STEP E4 Connect the Amp Disconnects to the Speaker Disconnects

- ▶ Connect the two **left-channel** Y-splitter ① speaker wire disconnects to the left woofer disconnect ② and left full-range disconnect ③
- ▶ The speaker wire disconnects click securely together and must be squeezed at their release lever ④ to separate the wires if needed
- ▶ Connect the two **right-channel** Y-splitter ⑤ speaker wire disconnects to the right woofer disconnect ⑥ and right full-range disconnect ⑦



Tools: there are no tools for this

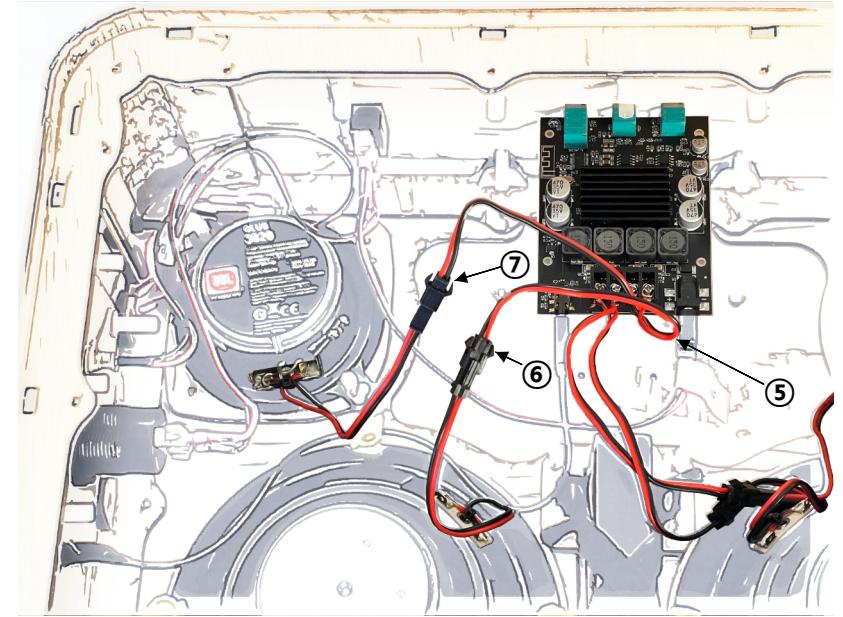
Tip: The two branches of a given Y-splitter are interchangeable – it doesn't matter which branch connects to full-range versus woofer.

✓ Check:

- The disconnects are fully clicked together – they stay connected when gently tugged apart by hand
- Each Y-splitter is connected to the full-range and woofer on the same side

🔍 Design Note:

The amp board has four speaker terminals (left and right, each with a positive and a negative) to connect the powered output to the speakers. The left and right amp outputs each feed their full-range speaker and woofer in parallel via the pre-installed Y-splitter wires.



**Online
Guide:**

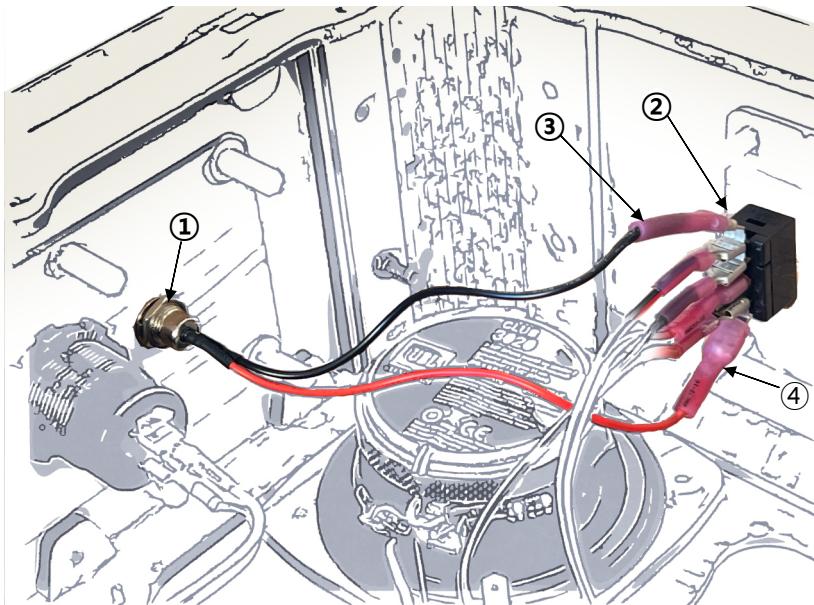
<https://mkbx.info/festo-ampdisconnects>



**STEP
E5**

Connect the Charging Jack Leads to the Kill Switch

- If the optional USB Power Out jack was chosen with the kit, then skip to Step E6, otherwise do as follows:
- Attach the wall power jack ① pre-wired connectors to the kill switch ② piggyback terminals
 - IMPORTANT connect black wire to black wire piggyback ③ and red wire to red wire piggyback ④ (see IMPORTANT note)

**⚠ Important:**

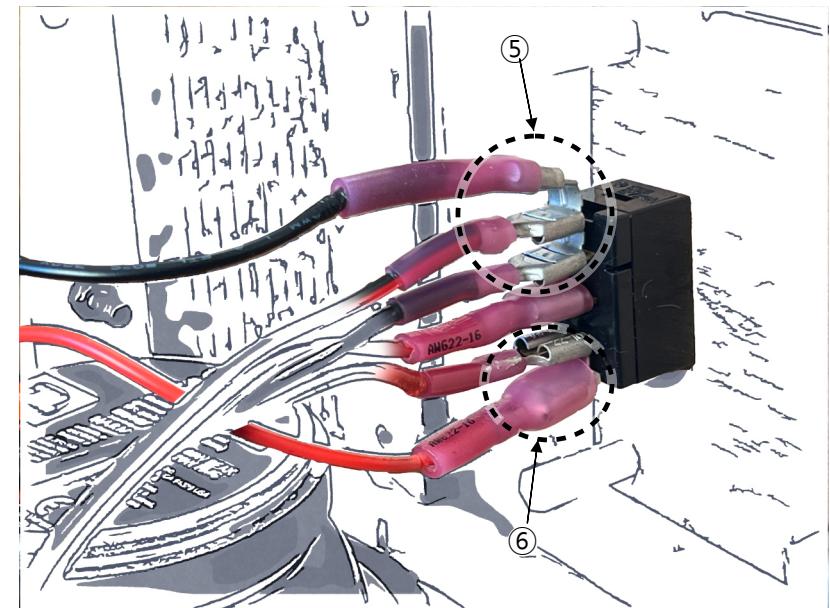
Note: Pay attention to the wire color, not the connector color. The connector color has no meaning, but the wire color does (red wire is positive, and black wire is negative or ground)

Tools:

- Use needle-nosed pliers if connecting by hand isn't working

✓ Check:

- The wall power jack wires' are piggy-backed to the same-color wire at the kill switch. Black wires connect to the ground terminal ⑤. Red wires connect to the power terminal ⑥
- The spade connectors are firmly connected finger tight and can't wiggle off from vibrations
- The connectors on the kill switch terminals are compacted together neatly

**Online
Guide:**

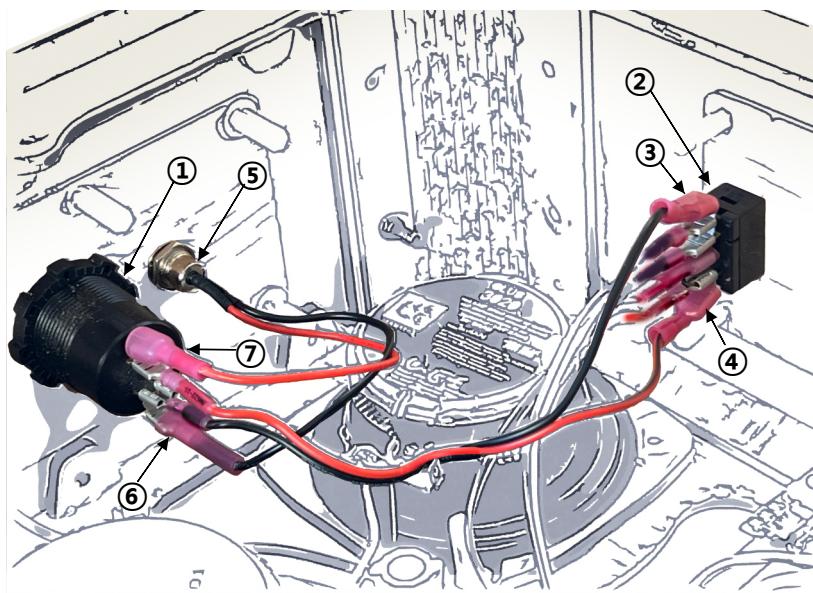
<https://mkbx.info/festo-chargingjackleads>



STEP E6 Connect Charging Jack to Kill Switch via Optional Usb Jack

► If the optional USB Power Out jack was chosen with the kit, do as follows:

- Attach the USB Power Out ① pre-wired connectors to the kill switch ② piggyback terminals
- IMPORTANT connect black wire to black wire piggyback ③ and red wire to red wire piggyback ④
- Attach the wall power jack ⑤ wires' connectors to the USB Power Out piggyback terminals
- IMPORTANT connect black wire to black wire piggyback ⑥ and red wire to red wire piggyback ⑦


⚠ Important:

Note: Pay attention to the wire color, not the connector color. The connector color has no meaning, but the wire color does (red wire is positive, and black wire is negative or ground)

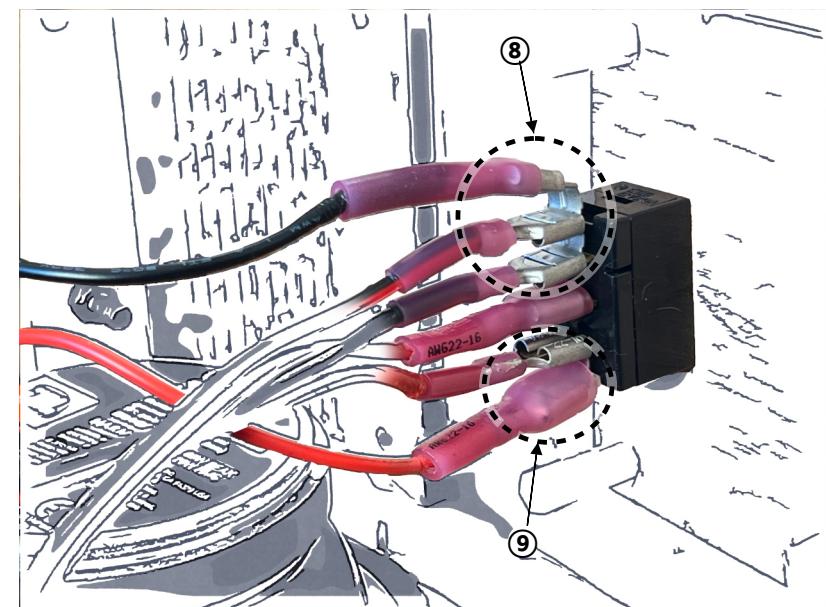
Tools: there are no tools for this

⚙ Options:

The USB Power Out, which can be added any time, has a voltage meter and USB 5V outputs to charge external devices such as phones.

✓ **Check:**

- The wall power jack wires' are piggy-backed to the same-color wire at the USB Power Out jack. Black wires connect to the ground terminal ⑥. Red wires connect to the power terminal ⑦.
- The USB Power Out jack wires are piggy-backed to the same-color wire at the kill switch. Black wires connect to the ground terminal ⑧. Red wires connect to the power terminal ⑨
- The spade connectors are inserted all the way down the terminals and can't wiggle off from vibrations
- The connectors on the kill switch terminals and USB Power Out terminals are compacted together neatly

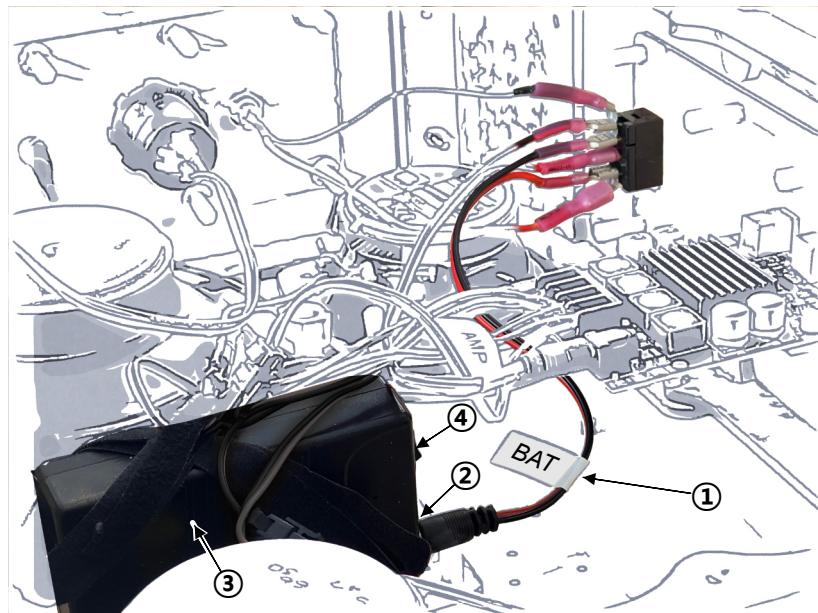

Online Guide:

<https://mkbx.info/festo-usboutconnectors>



**STEP
E7** **Plug the Kill Switch Battery Plug to the Battery Power**

- ▶ Locate the plug labeled "BAT" (short for battery) ① pre-wired to the kill switch.
- ▶ Plug the "BAT" plug in to the power jack ② of the Battery ③
- ▶ Make sure the plug is fully seated
- ▶ Turn the battery power switch on ④

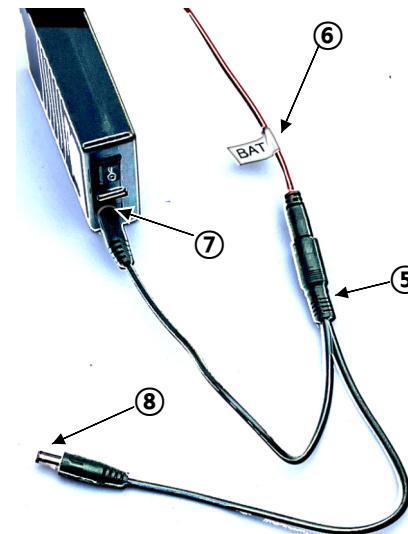


Tools: there are no tools for this

Check:

- Battery pack power is switched on
- Toggling on the kill switch to the on position lights up the kill switch LED. (The kill switch on position is toggled towards the back of the boombox.)
- With the battery power on, the kill switch on, and the amp knobs turned up, then the amp's power LED will light up and a power-on sound will be heard

Powering other 12V accessories



Optional user-added 12V accessories can be powered by tapping the battery pack using the included y-splitter ⑤.

Patch the y-splitter between the plug labeled "BAT" ⑥ and the battery power jack ⑦.

Anything powered by this optional 12V power plug ⑧ gets its power directly from the battery or from the wall power jack, and will not be switched by the main kill switch.



**Online
Guide:**

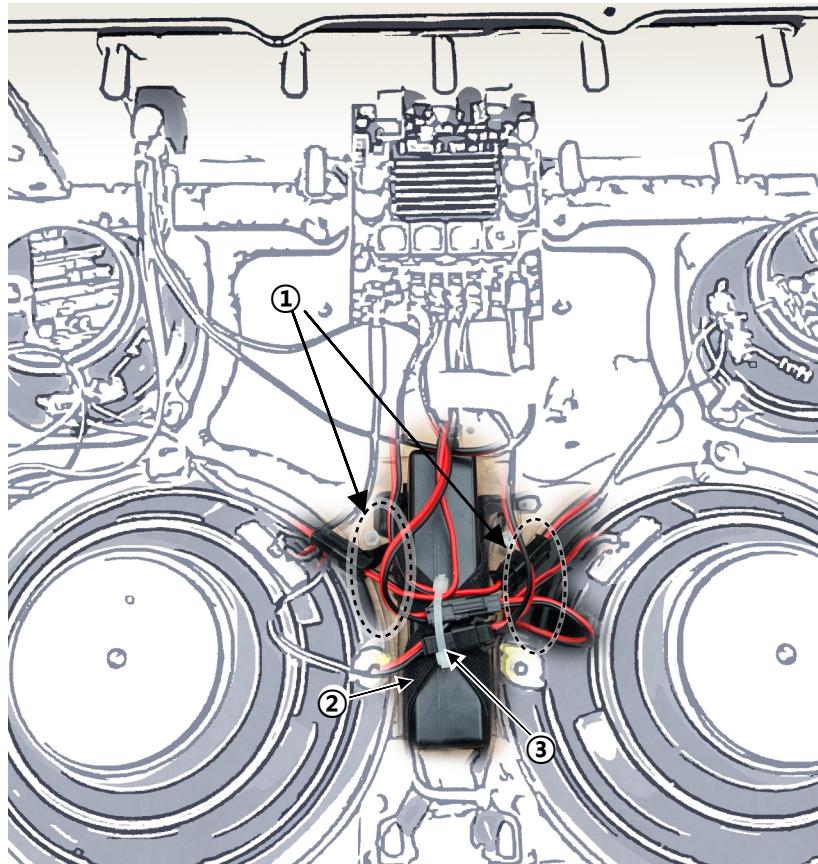
<https://mkbx.info/festo-killswitchbatteryplug>



**STEP
E8**

Tie Down Wires to the Battery Straps

- To prevent loose wires from touching and rattling against the backboard or other vibrating parts, all loose wires ① are tied down to the battery velcro straps ② with zip tie ③ and trim excess zip tie ends
- There's no one right way to tie down the free wires
- The velcro battery straps provide a handy central point to tie down the free wires with zip tie as pictured

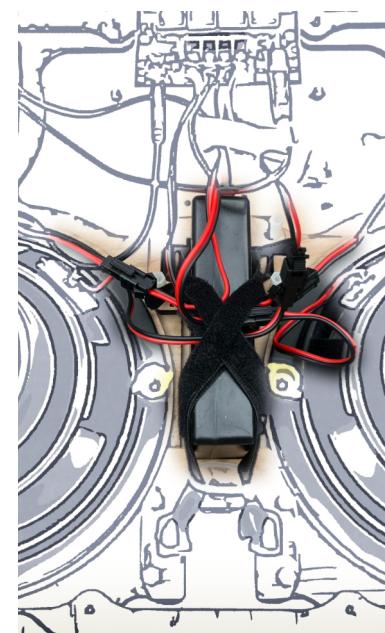
**Tools:**

- Scissors or nippers to trim off the zip tie ends

Tips: Tie down the wires after the box functionality is confirmed — the battery powers the kill switch LED, and the amp powers on, and the speakers make sound.

Check:

- There are no loose wires that can rattle against other parts of the boombox
- All the wires are neatly managed
- All the zip tie ends are trimmed

**Options**

In place of zip tie, additional velcro strap (not included) can hold down the free wires.

Simply trap the loose wires beneath some short lengths of added velcro strap which will stick on top of the already-installed velcro battery straps.

**Online
Guide:**

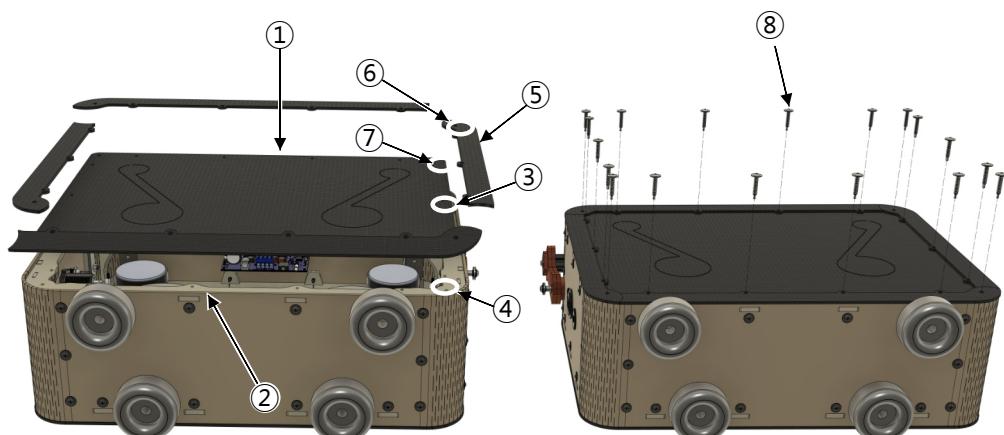
<https://mkbx.info/festo-tiedownwires>



STEP
E9

Screw the Backboard to the Frame Via the Back Border

- ▶ Lay the backboard ① down on the rear bulkhead ②
- ▶ Confirm the backboard mounting pilot holes ③ align with bulkhead pilot holes ④
- ▶ Lay the four border pieces ⑤ down on the backboard
- ▶ Confirm the borders' mounting holes ⑥ align with backboard pilot holes ⑦
- ▶ Screw in the 18 backboard mounting screws ⑧ to finger tight



⚠ Important:

Confirm basic functioning before closing the box: The battery powers the kill switch LED, the amp powers on, and the speakers make sound. Confirm with wall power and with battery power.

Tools:

- Phillips head screwdriver

✓ Check:

- All the backboard mounting screws are fully tightened down — no gaps and not stripped
- The backboard is flat and tight against the bulkhead — no gaps
- The border pieces are flat and tight to the backboard — no gaps

 **Zoom Out:** This is the moment you've made happen... the completed boombox is ready to power up and play.



**Online
Guide:**

<https://mkbx.info/festo-backboard>



Notes:

Fin

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