

Butterfly Mechanism Keycap Replacement

Butterfly Mechanism Keycap Replacement MacBook Pro (2016 and 2017) and MacBook (Retina, 12-inch, 2017)

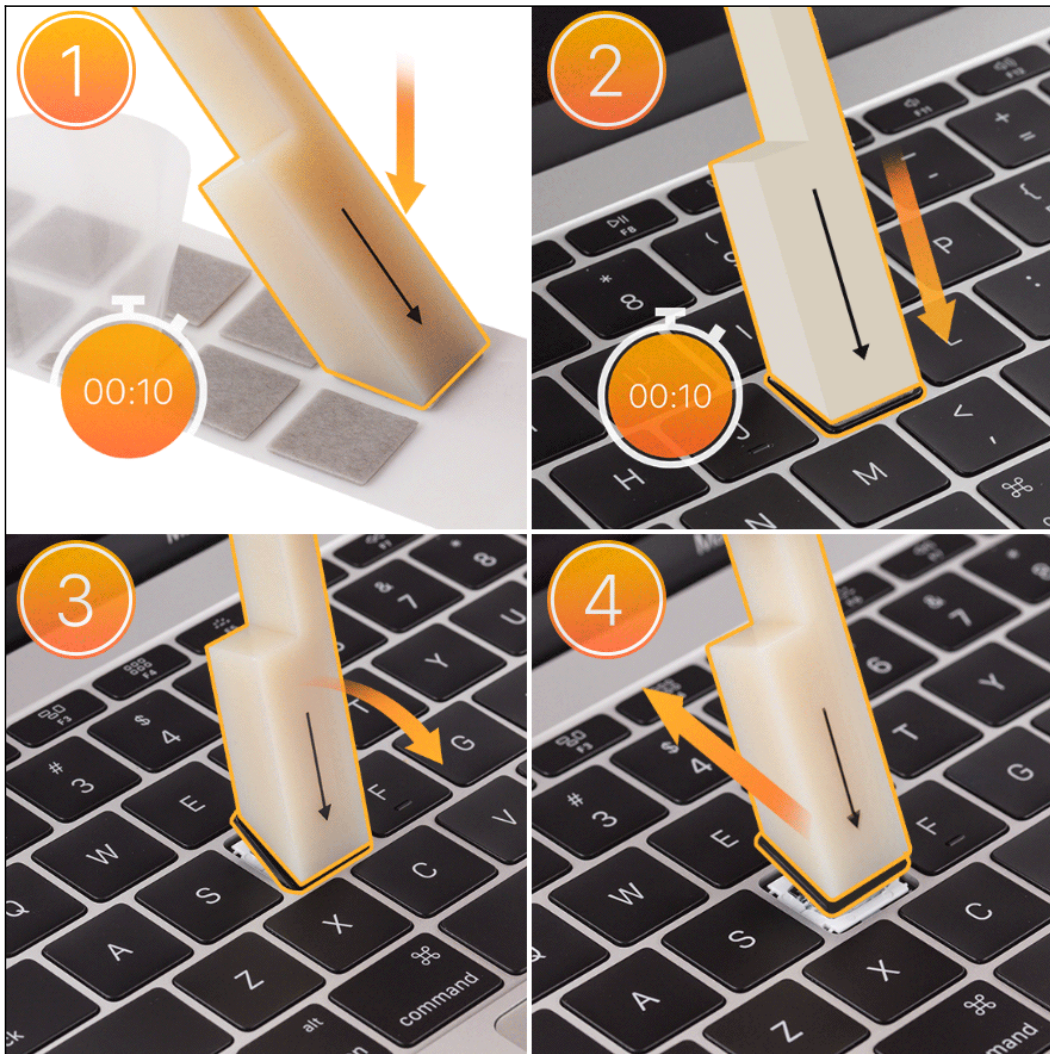
With the introduction of the keycap lever tool, keycaps for MacBook Pro (2016 and 2017) and MacBook (Retina, 12-inch, 2017) computers are now easier and faster to replace. Individual keycaps should be replaced instead of the entire top case. This procedure can be done in under three minutes.

This procedure is the quickest and most cost-effective way to fix the following butterfly mechanism issues:

- Sticking keys (stuck in up or down position)
- Key press feels uneven or stiff
- Keycap not responding, is spongy, or is not going all the way down
- The key makes abnormal noise and/or is a metallic click sound
 - **Note:** For MacBook Pro (2016), first install the keycap shim to the new keycap for this issue. Refer to article [TP1550: Keycap Shim Installation](#).

The procedure involves four basic steps:

1. Applying the adhesive to the tool.
2. Pressing the tool on the keycap for 10 seconds.
3. Pulling the keycap in the correct direction to release snaps.
4. Pushing it in the opposite direction to release hooks.



For video instruction, refer to [SV347: Portables Keycap Lever Video](#).

For part numbers, go to the [Keycap Kit Part Numbers](#) section below.

For a guide to placing the lever tool, see the [Keycap Lever Placement Map](#) below.

For detailed information on the procedure, go to the [Procedure for Removing and Replacing Keycaps](#) section below.

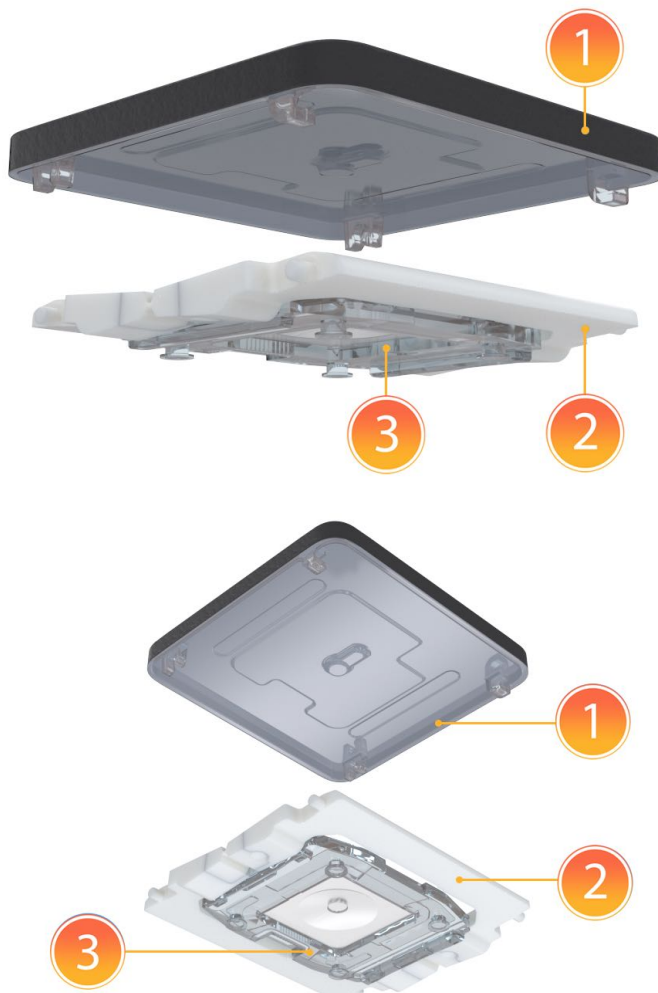
First Steps

- Before replacing the keycap on an unresponsive keyboard, be sure to clean the keyboard thoroughly with compressed air. Then remove the keycap, spray the well with compressed air, and check for liquid damage.
- Before attempting this procedure for the first time, practice on a KBB top case and keyboard with butterfly mechanism.
- Always use a new keycap. Do not attempt to reinstall the keycap that was removed.
- For instructions on removing and replacing the **Space bar**, refer to article [OP1469: Butterfly Mechanism Keycap Replacement](#).
- For instruction on installing a keycap shim to MacBook Pro (2016) keycaps that exhibit a loud clicking sound after the system has warmed up, refer to article [TP1550: Keycap Shim Installation](#).
- For Arabic keyboards, the return key may show uneven backlighting from top to bottom. This is expected behavior. Do not repair or replace for this issue.
- When replacing an option key, make sure the old option key and the new option key have the same glyphs. If they do not, replace both keys.

1. Keycap Anatomy

Keycap mechanisms consist of three parts. Only number 1 is replaceable:

1. Keycap, the surface key that a user sees on the keyboard
2. Butterfly, the hinged piece under the keycap
3. Switch housing, the piece that secures the butterfly to the top case



Important: Although keycaps can be replaced, the butterfly and switch housing cannot. A damaged switch housing or butterfly requires replacement of the entire top case.

If a keycap needs replacement due to accidental damage, such as a liquid spill, refer to article [OP14: Determining and quoting accidental damage for Mac portables](#).

2. Keycap Kit Part Numbers

Important: The keycap kits vary by the computer color and the keyboard language.

To help determine keyboard localization or keycap placement, refer to article [HT201794: How to identify keyboard localizations](#).

Notes:

- Keycap kits are available for UK English (ISO), U.S. English (ANSI), Chinese (ANSI) and Japanese (JIS) version keyboards.
- The **Super ISO** is a European special character kit that includes specific keycap characters for:
 - German (D)
 - French (F)
 - Danish (DK)
 - Italian (T)
 - Spanish (E)
 - Swedish (S)
- **Common Kits** include:
 - ANSI - space bar, left and right shift, caps lock, delete, tab, return, escape
 - JIS - space bar, return, left and right shift, #1, power
 - ISO - space bar, right shift, caps lock, delete, tab, return, escape

MacBook Pro (13-inch, 2016, 2 Thunderbolt 3 Ports)

Part Number	Label Number	Language	Computer Color
923-01088	605-01344	ANSI English	Space Gray
923-01089	605-01345	ANSI English	Silver
923-01661	605-02130	ANSI English Common Kit	Space Gray
923-01660	605-02129	ANSI English Common Kit	Silver
CH923-01088	CH605-01344	ANSI English, China	Space Gray
CH923-01089	CH605-01345	ANSI English, China	Silver
B923-01088	B605-01344	ISO English	Space Gray
B923-01089	B605-01345	ISO English	Silver
ZM923-01088	ZM605-01344	Super ISO English	Space Gray
ZM923-01089	ZM605-01345	Super ISO English	Silver
ZM923-01661	ZM605-02130	ISO English Common Kit	Space Gray
ZM923-01660	ZM605-02129	ISO English Common Kit	Silver
J923-01088	J605-01344	Japanese	Space Gray
J923-01089	J605-01345	Japanese	Silver
J923-01661	J605-02130	Japanese Common Kit	Space Gray
J923-01660	J605-02129	Japanese Common Kit	Silver

MacBook Pro (13-inch, 2016, 4 Thunderbolt 3 Ports) and MacBook Pro (15-inch, 2016)

Part Number	Label Number	Language	Computer Color
923-01454	605-01811	ANSI English	Space Gray
923-01455	605-01812	ANSI English	Silver
923-01663	605-02132	ANSI English Common Kit	Space Gray
923-01662	605-02131	ANSI English Common Kit	Silver
CH923-01454	CH605-01811	ANSI English, China	Space Gray
CH923-01455	CH605-01812	ANSI English, China	Silver
B923-01454	B605-01811	ISO English	Space Gray
B923-01455	B605-01812	ISO English	Silver
ZM923-01088	ZM605-01344	Super ISO, English	Space Gray
ZM923-01089	ZM605-01345	Super ISO, English	Silver
ZM923-01663	ZM605-02132	ISO English Common Kit	Space Gray
ZM923-01662	ZM605-02131	ISO English Common Kit	Silver
J923-01454	J605-01811	Japanese	Space Gray
J923-01455	J605-01812	Japanese	Silver
J923-01663	J605-02132	Japanese Common Kit	Space Gray
J923-01662	J605-02131	Japanese Common Kit	Silver

MacBook Pro (13-inch, 2017) and MacBook Pro (15-inch, 2017)

Part Number	Label Number	Language	Computer Color
923-01849	605-03030	ANSI English	Space Gray
923-01850	605-03031	ANSI English	Silver
923-01857	605-03034	ANSI English Common Kit	Space Gray
923-01858	605-03035	ANSI English Common Kit	Silver
CH923-01849	CH605-03030	ANSI English, China	Space Gray
CH923-01850	CH605-03031	ANSI English, China	Silver
B923-01849	B605-03030	ISO English	Space Gray
B923-01850	B605-03031	ISO English	Silver
ZM923-01857	ZM605-03034	ISO English Common Kit	Space Gray
ZM923-01858	ZM605-03035	ISO English Common Kit	Silver
J923-01849	J605-03030	Japanese	Space Gray
J923-01850	J605-03031	Japanese	Silver
J923-01857	J605-03034	Japanese Common Kit	Space Gray
J923-01858	J605-03035	Japanese Common Kit	Silver

MacBook (Retina, 12-inch, 2017)

Part Number	Label Number	Language	Computer Color
923-01730	605-02311	ANSI English	Space Gray
923-01731	605-02312	ANSI English	Silver, Gold, Rose Gold
923-01732	605-02313	ANSI English Common Kit	Space Gray
923-01733	605-02314	ANSI English Common Kit	Silver, Gold, Rose Gold
CH923-01730	CH605-02311	ANSI English, China	Space Gray
CH923-01731	CH605-02312	ANSI English, China	Silver, Gold, Rose Gold
B923-01730	B605-02311	ISO English	Space Gray
B923-01731	B605-02312	ISO English	Silver, Gold, Rose Gold
ZM923-01730	ZM605-02311	Super ISO, English	Space Gray
ZM923-01731	ZM605-02312	Super ISO, English	Silver, Gold, Rose Gold
ZM923-01732	ZM605-02313	ISO English Common Kit	Space Gray
ZM923-01733	ZM605-02314	ISO English Common Kit	Silver, Gold, Rose Gold
J923-01730	J605-02311	Japanese	Space Gray
J923-01731	J605-02312	Japanese	Silver, Gold, Rose Gold
J923-01732	J605-02313	Japanese Common Kit	Space Gray
J923-01733	J605-02314	Japanese Common Kit	Silver, Gold, Rose Gold

3. Keycap Lever Placement Map

The following illustrations show where to place the keycap lever when removing keycaps.

Release the edge of the keycap at the snaps before releasing the edge with the hooks. For detailed instructions, go to the [Procedure](#) section below.



Yellow: The hooks are on the bottom and the snaps are on the top.



Blue: The hooks are on the right and the snaps are on the left.



Orange: There are four snaps on top and four hooks on the bottom.



Purple: The hooks are on the left and the snaps are on the right.



Green: There are three hooks on the bottom and three snaps on the top.



Light Orange: There are three hooks on the right and three snaps on the left.



Pink (Japan only): The hooks are on the top and the snaps are on the bottom.

Click on the image below to enlarge it.



4. Procedure for Removing and Replacing Keycaps

Caution:

- Shut down the computer before replacing a keycap.
- Press the keycap lever very gently on the keycap when initializing the VHB. The top case should not bend when pressing the keycap lever tool onto the keycap. Too much pressure can damage the butterfly resulting in a full top case replacement.
- If the butterfly is damaged, a full top case replacement is required.
- Inspect the switch housing with a USB microscope. If the pockets are damaged, a full top case replacement will be required. Refer to step 9 of Section 4A.

Tools:



- Compressed air
- Pre-cut VHB adhesive strips (923-01801, 1x1; 923-01800, 1x.5)

- Keycap lever (923-01803) **Note:** This tool is double-sided. The large side is for yellow, pink, and green keys; the smaller side is for blue, light orange, and purple keys. This tool is not to be used for the space bar (orange keys).
- USB Microscope
- Keycap tool kit (076-00337) includes: Keycap slider tool, keycap lever, Kapton tape, and pre-cut VHB adhesive strips

Note: Before attempting this procedure for the first time, practice on a KBB top case and keyboard with butterfly mechanism.

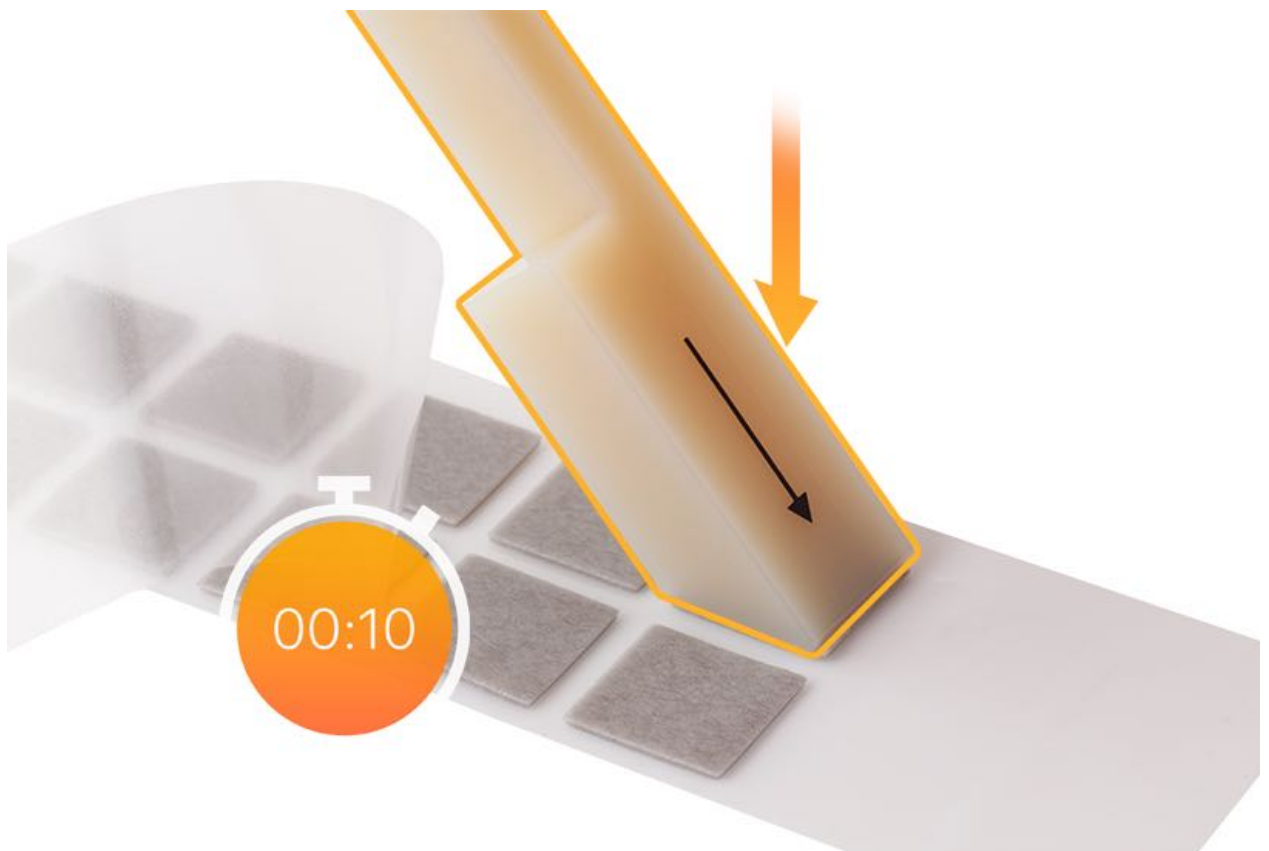
Follow these steps to remove and replace a keycap.

There are four types of keys on the keyboard. Each type requires a different procedure.

- For instructions on removing and replacing the **Space bar**, refer to article [OP1469: Butterfly Mechanism Keycap Replacement](#).

A. Removing and Replacing Yellow, Green, and Pink Keys

1. Peel back the frosted paper liner from one side of the adhesive. Press the large end of the keycap lever tool onto the 1x1 adhesive and hold for 10 seconds.



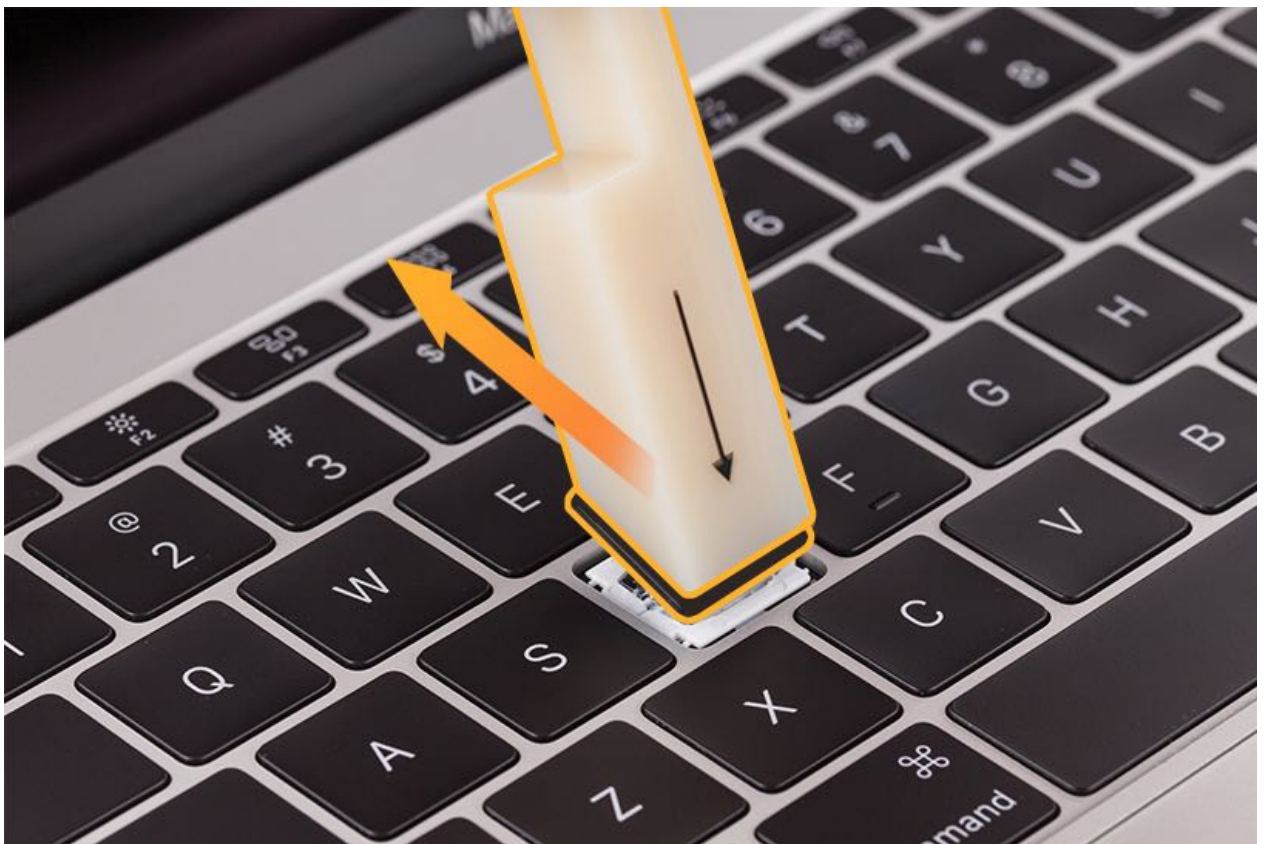
2. Lift the tool, with the adhesive attached, from the clear liner.
3. Lightly press the tool with the adhesive side down, onto the key, aligning the arrow on the tool with the hooks on the keycap. See the keycap map for location of hooks.

Note:

- On the larger keys such as caps lock, return, shift, tab, delete, command, place the tool in the middle of the key.
- If the tool is accidentally placed onto the wrong keycap continue with the removal process and replace with a new keycap. This is necessary due to the strength of the adhesive.



6. Then push the lever tool up towards the display to unhook the keycap hooks and remove the keycap.



7. Remove the keycap and the adhesive from the keycap lever and discard both. **Note:** The adhesive is one-time use only and needs to be replaced for every keycap removal.

8. Visually inspect the keycap well for debris or foreign objects. If debris is found, use compressed air to clean the keycap well. **Note:** If the debris is visible and compressed air does not dislodge it, use a black stick to gently dislodge the debris.

9. Visually inspect the butterfly. Be sure the pins are properly seated and have not popped out of

place.

10. Using the flat end of a black stick, gently tap the edge of the butterfly on the side of the hinge (circled) and verify that the butterfly moves up and down.



11. If the pins are damaged or not in place or the butterfly does not move up and down, a whole top case replacement is necessary.

12. Always replace the keycap with a new one. Do not reuse keycaps. Insert the bottom of the keycap into the well at a 15-degree angle and gently push to engage the hooks.

13. Gently push down on the top of the keycap to engage the snaps. If the keycap is not lined up properly, the snaps will not engage. If this happens, start again.

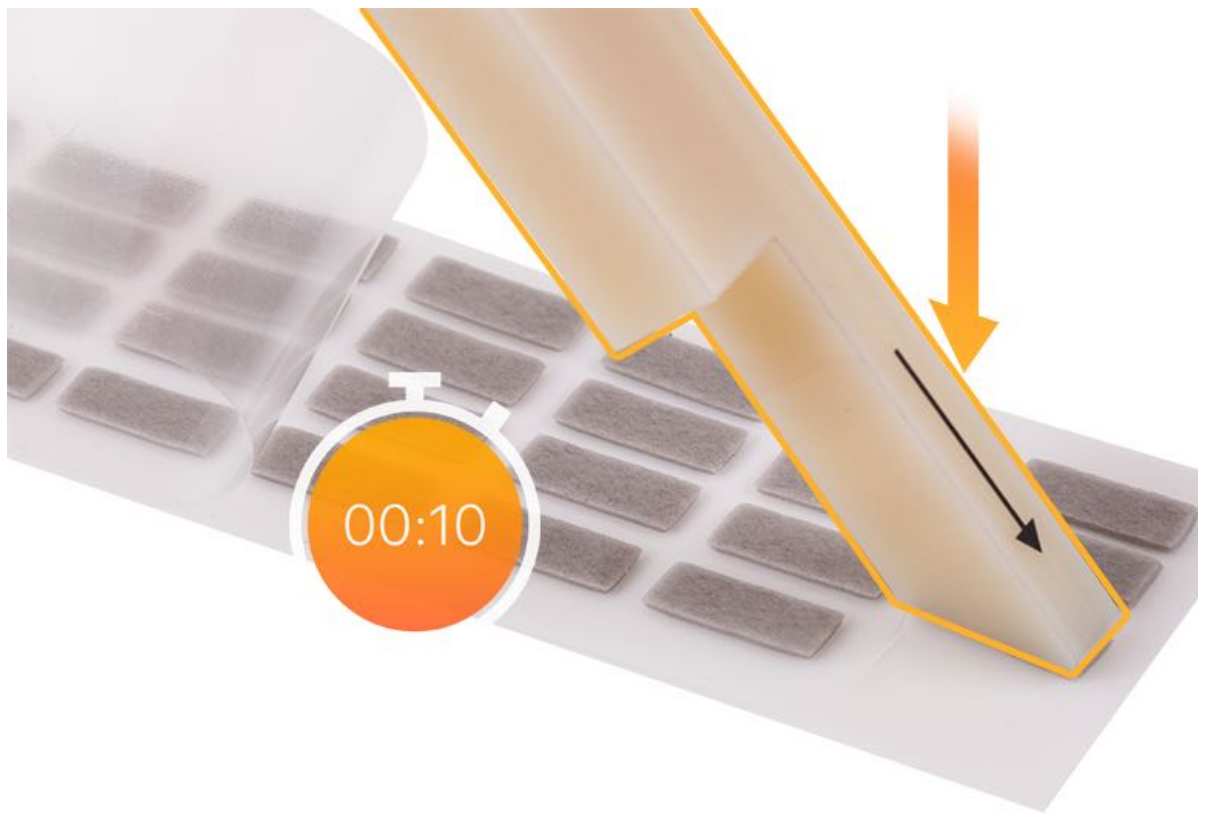
14. Check the key from all angles to make sure it is uniformly flat. Tap the key repeatedly to verify that it springs back each time. Compare the response of the new keycap with the keycaps around it.

15. When replacing the option key, check to make sure both keys have the same glyphs. If the new option key is different from the old one, replace both keys.

B. Removing and Replacing the Up Arrow Keys (Purple), ISO and JIS Return Keys (Light Orange), and the Function and Down Arrow Keys (Blue)

Steps for Removing the Up Arrow Key

1. Peel back the frosted paper liner from one side of the adhesive. Press the small end of the keycap lever tool onto the 1x.5 adhesive and hold for 10 seconds.



2. Lift the tool, with the adhesive attached, from the clear liner.

3. Lightly press the tool with the adhesive side down, onto the up arrow key, aligning the arrow with the hooks on the left side.

Note: If the tool is accidentally placed onto the wrong keycap continue with the removal process and replace with a new keycap. This is necessary due to the strength of the adhesive.

4. Hold for about 10 seconds to activate the adhesive.



5. Pull the lever to the left to unsnap the keycap. Stop when you hear a click.



6. Then push the lever slightly forward to unhook the hooks and lift up to remove the keycap.

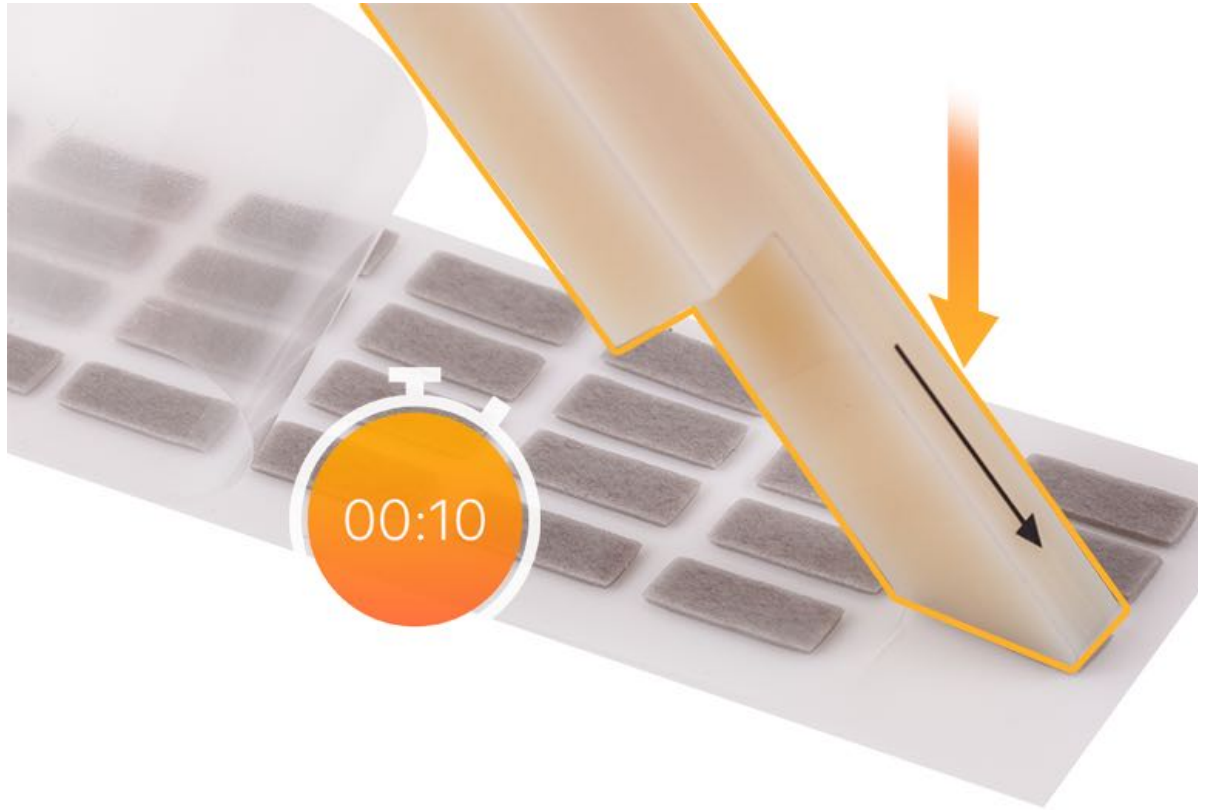


7. Remove the keycap and the adhesive from the lever and discard both. **Note:** The adhesive is one-time use only and needs to be replaced for every keycap removal.

Steps for Removing the Down Arrow, JIS and ISO Return, and Function Keys

1. Peel back the frosted paper liner from one side of the adhesive. Press the small end of

the keycap lever tool onto the 1x.5 adhesive and hold for 10 seconds.



2. Lift the tool, with the adhesive attached, from the clear liner.

3. Lightly press the tool with the adhesive side down, onto the down arrow key or function key, aligning the arrow with the hooks on the right side.

Note: If the tool is accidentally placed onto the wrong keycap continue with the removal process and replace with a new keycap. This is necessary due to the strength of the adhesive.

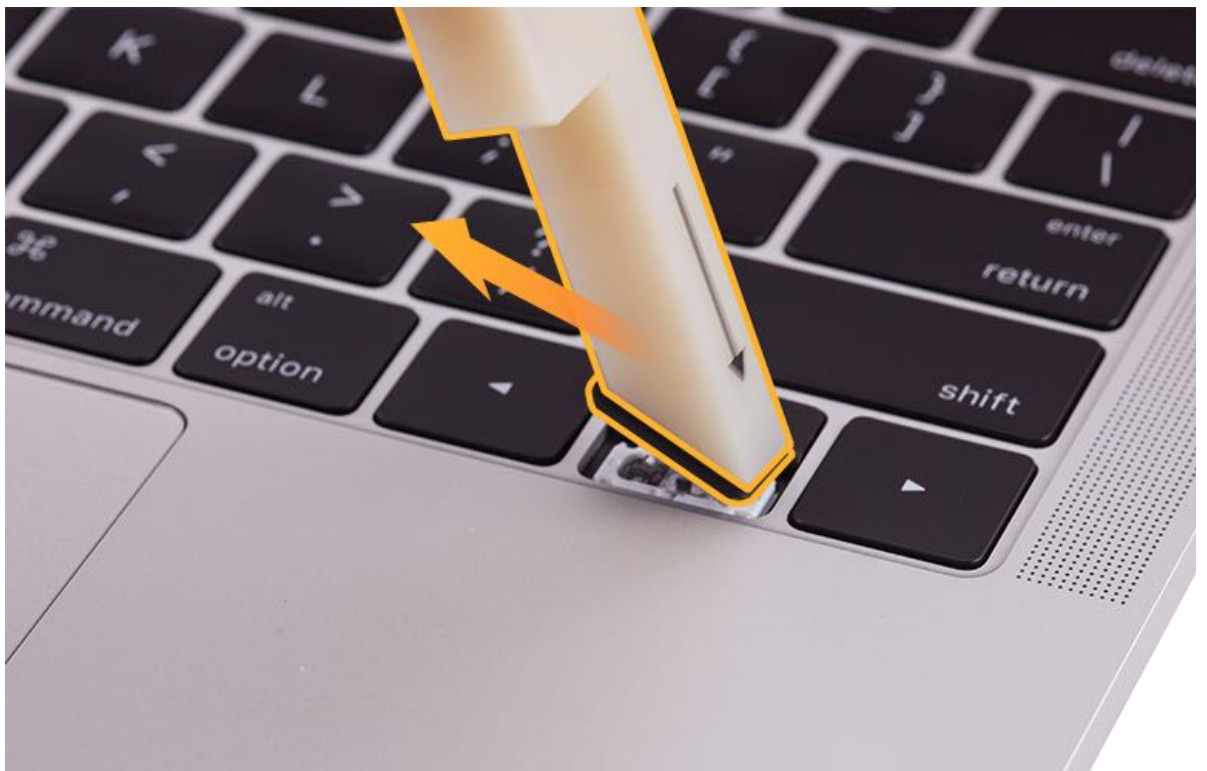
4. Hold for about 10 seconds to activate the adhesive.



5. Slowly pull the lever to the right to unsnap the keycap. Stop when you hear a click.



6. Then push the lever slightly forward to unhook the hooks and lift up to remove the keycap.



7. Remove the keycap and the adhesive from the lever and discard both. **Note:** The adhesive is one-time use only and needs to be replaced for every keycap removal.

Replacing the Arrow Keys, JIS and ANSI Return Keys, and Function Keys

1. Visually inspect the butterfly. Be sure the pins are properly seated and have not popped out of place.
2. Using the flat end of a black stick, gently tap the edge of the butterfly on the side of the hinge (circled) and verify that the butterfly moves up and down.



3. If the pins are damaged or not in place or the butterfly does not move up and down, a whole top case replacement is necessary.
4. Always replace the keycap with a new one. Do not reuse keycaps.
 - For the up arrow, insert the right side of the keycap into the well at a 15-degree angle and gently push to engage the hooks.
 - For the down arrow and function keys, insert the left side of the keycap into the well at a 15-degree angle and gently push to engage the hooks.
5. Gently push down on the left side of the keycap to engage the snaps. If the keycap is not lined up properly, the snaps will not engage. If this happens, start again.
6. Check the key from all angles to make sure it is uniformly flat. Tap the key repeatedly to verify that it springs back each time. Compare the response of the new keycap with the keycaps around it.