ITFreeTraining

Cleaning a Computer Keyboard

For the free video please see
http://itfreetraining.com/ap/1d15

In this video from ITFreeTraining I will have a look at how to clean a computer keyboard. As time goes on, your keyboard will collect dirt, hair, food and other materials. These will get stuck between the keys and attract germs. This may also affect how well the keyboard works.

Why Clean Your Keyboard?

- Contains more bacteria than a toilet seat

Keyboard under black light

0:17 The first thing to consider is, why should we clean our keyboards? There have been a number of studies done that have found that there are more bacteria in a computer keyboard then a toilet seat. This is mainly because we regularly clean our toilets, but we don't clean our keyboards very often, if at all. Everything from skin, hair and food gets stuck between the keys of the keyboard, making it a great breeding ground for bacteria. Shared computers that have many different people using them tend to have higher amounts of bacteria.

In this video I will be cleaning a mechanical keyboard. A mechanical keyboard has a switch for each key, so it is a little harder to clean then a non-mechanical keyboard. However, the processes I will show you can be used on a non-mechanical keyboard.

To get an understanding of how dirty a keyboard can get, I will have a look at the same keyboard using a black light. A black light will make certain things under it appear to glow. This can make it easier to see dirt and other materials. At the end of this video I will have a look at the same keyboard under the black light and see how much cleaner it looks. Black lights are good for checking how clean things really are, as they show things that you may not be able to see with the naked eye.

Keyboard Cleaning

- Basic keyboard clean
  - Quick easy clean (No disassemble)
- Medium level clean
  - Pull all the keys out and clean
- Advanced level clean
  - Fully disassemble

1:35 In this video I will look at three different levels you can use to clean your keyboard. The basic clean is a quick clean without taking anything apart. This clean will take care of the external dirt and dust from the keyboard making it look clean, but it won't clean anything under the keys or inside the keyboard. If you just want your keyboard to look nice, this is a good clean to do. However, if you are having problems with keys getting stuck this may not fix the problem, particularly if you have spilled anything on the keyboard and keys are now sticking.

Next, I will look at a medium level clean where I remove the keys from the keyboard. This clean will help with any stuck keys, but increases the chance that you may damage the keyboard.

The last clean that I will look at is the advanced clean. This will give your keyboard the very best clean. However, this will mean a full disassembling of the keyboard. This will increase the risk of damaging the keyboard and may void any keyboard warranty you have.

Each of the levels of cleaning builds on the last, so feel free to start with the basic cleaning and stop at any point if you feel you have cleaned your keyboard enough. In the real world, if your keyboard only costs a small amount, if it is really dirty you may just consider buying a new keyboard. If the keyboard costs a lot, it is probably worth the time cleaning it once in a while.

Without any further to do, let's get started on cleaning the keyboard.

Basic Clean (1)

- Unplug the keyboard

3:06 You can see this keyboard has seen a lot of use and is in need of a clean. You will notice that, between the keys, a lot of dust, dirt and other items get stuck in there. The first thing to do is try to remove the bulk of these unwanted materials.

Before starting the cleaning process, first unplug the keyboard. If you apply any kind of cleaning products or soapy water, it is easy to create a short circuit and potentially damage the keyboard.

Basic Clean (2)

- Use compressed air to remove dust/dirt

3:34 The next step is to use air compression to blow out as much dust and other materials as possible. The cheap option is to purchase a compressed air can. The more expensive option is to purchase a reusable can air system. In this case we will use the reusable can system.

You can see how much dust and dirt is removed, including dust that is under the keys. Using compressed air will not damage the keyboard. If the keyboard is particularly dirty, you may want to consider doing this step outside.

Basic Clean (3)

- Turn keyboard upside down and shake

4:05 The next step is to get the keyboard, turn it upside down and give it a good shake. This will help remove some more of the loose material inside the keyboard. If you have a stuck or sticking key, this may help remove any material that is preventing the key from working correctly.

Basic Clean (4)

- Clean with cloth (May use damp cloth. Dry after)

4:22 The next step is to get a cloth and run it over the keys and give it a good clean. In this case I have not used a damp cloth, however if you are just doing a basic clean you may consider using a damp cloth. If you do, make sure you give the keyboard time to dry before using it and don't make the cloth too wet. You want it just damp enough to remove dust and dirt from the keyboard. If there is any moisture left on the keyboard when it is switched on, you run the risk that the keyboard may short circuit and become damaged.

Basic Clean (5)

- Clean with brush

4:55 This has got some of the dirt off, but on this keyboard, there is a lot of ground-in dirt that is not so easy to remove. To remove this dirt, get a brush and run it over all the keys of the keyboard. Some areas may be harder to clean then others. Try to dislodge as much of the ground-in dirt from the keyboard as possible.

Basic Clean (6)

- Compressed air, shake and clean with cloth

5:15 Now that we have dislodged some ground-in dirt, I will use the compressed air a second time to blow any of the dislodged materials out of the keyboard. Once complete, turn the keyboard over again, give it a good shake and run the cloth over it a second time. The keyboard should be looking cleaner by now. However, there may still be some dirt in those hard to reach places.

Basic Clean (7)

- Cleaning component (Cleaning goo)

5:40 To get to these hard to reach places, without taking the keyboard apart, I use a cleaning component, commonly referred to as cleaning goo. This goo, which looks essentially like slime, just needs to be put on top of the keyboard. Once on the keyboard, spread it out a bit and press down a little bit so it goes between the keys on the keyboard. The goo is not used like a rag; it needs time to get in between the keys so don't move it backwards and forwards or in a circular motion. Just a little bit of motion may be required to help it go down between the keys or just let it sit there and gravity can do the work for you.

Once the goo has had a little time to sit, remove the goo from the keyboard. The goo likes sticking to itself, so hopefully it all comes out at once. You may get some residue, and I will look at how you remove that in a moment. The longer you leave it on the keyboard the harder it will be to remove; however, it will remove more grime and dirt, particularly from those hard to reach places.

To remove any residue that is still left on the keyboard, put the goo back on the keyboard, lightly push down on the goo and remove it. Don't leave it as long as you did the first time because most of the dirt should have been removed; you are simply removing any residue that is still left on the keyboard. Even a small amount of residue goo can be removed. Just apply the goo, push down on it and move it slightly to the left and right for a few seconds. Once done, remove the goo. After you have used the goo a few times, you will get an idea of how long it should be left on the keyboard to achieve the best results.

This concludes all the steps required for the basic clean. The keyboard looks dirty as I have

concentrated on just showing each step, rather than cleaning the whole keyboard. So, keep in mind that if the same steps were applied to the whole keyboard (rather than just the middle), it would look a lot cleaner.

The basic clean did not involve disassembling the keyboard. To clean the keyboard better, I will next look at how to perform a medium level clean, for which we will take the keys out of the keyboard.

Medium Level Clean (1)

- Take photo of keyboard for key placements

7:51 Before I start cleaning the keyboard, consider what effect this may have on the warranty of the keyboard. If during the cleaning, you remove or break seals, this may void your warranty. Also, if you break anything when disassembling the keyboard, this may also void the warranty.

Before I start removing each key from the keyboard, the first thing I will do is take a photo of the keyboard. The reason for doing this is I can refer to the photo later, if I have trouble remembering which key went where.

Medium Level Clean (2)

- Remove each key

8:20 To remove the keys, you simply need to lever the key out with a flat head screwdriver. The small keys should lever out very easily. The larger keys I will look at shortly. If they don't come out easily, try to lever the key from the other side; you should not have to apply too much force to get the keys to come out. If you do use too much force, you risk breaking the key or keyboard.

Some keyboards will come with a key removing tool or you can purchase one separately. If you have one of these, to remove the key it is just a matter of pushing down on the key with the tool and pulling it out.

Now I will repeat the process with the rest of the small keys. When removing the keys, you can place them on the table in the same order, so you remember which way to put them back in. In this case, it does not matter, since I will be washing each key later in the video. Even if you use this approach, it is good to have the photo for reference in case you bump the keys or someone bumps the table and they get out of order.

Now that all the small keys have been removed, I will next remove the medium sized keys. These keys will be too large using the tool the same way, so, to remove these keys, rotate the tool 90 degrees and you will be able to remove them using the same process as before.

In some cases, you may have a key that is stuck, and the tool won't be able to remove it. When this occurs, use your flat head screwdriver to lever it out. If it does not want to come out, lever it from different sides until it pops out.

Now I move onto the larger keys. You may find that these keys have additional metal brackets or devices holding them in. To remove the key, I will first use my tool to lift the key so it unclips, but not remove the key from the keyboard.

You can see under the key there is a metal bracket holding the key in place. To remove the key, use the flat head screwdriver to bend the metal bracket slightly to allow the key to pop out. Be careful with these keys, as if you damage them, they may not go back in or they won't work correctly.

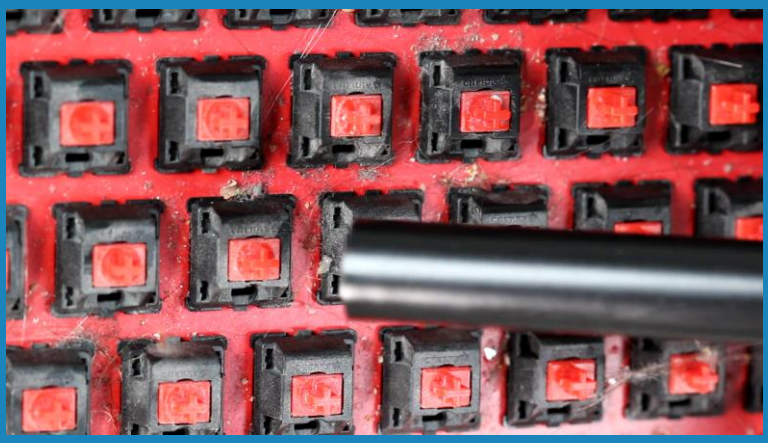
I will now use the same process to remove the rest of the keys. If you are worried that you may damage the keys removing them, you can always leave the more difficult to remove keys in the keyboard and work around them when you clean the keyboard.

The last key that I will remove is the space bar. This is generally the largest key on the keyboard. The same approach applies. Gently lever it out with the flat head screwdriver until it pops out. Once it has popped out, release it from the metal bracket using the screwdriver. Your keyboard may be different, it may have springs or other devices holding the keys in place. Take care not to damage any of these when you remove the key.

Now that all the keys have been removed, you can see how much dust, hair, dirt and food can get into a keyboard. You can understand why a basic clean can make the keyboard look a lot cleaner; however, to really clean the keyboard. you need to at least remove the keys.

Medium Level Clean (3)

- Use compressed air to remove dust/dirt



11:26 With the keys removed, I will once again run the compressed air over the keyboard. This will remove some more of the unwanted material from the keyboard, but not all. To remove some more, I will turn the keyboard over and give it a tap on the table to hopefully dislodge some more.

Medium Level Clean (4)

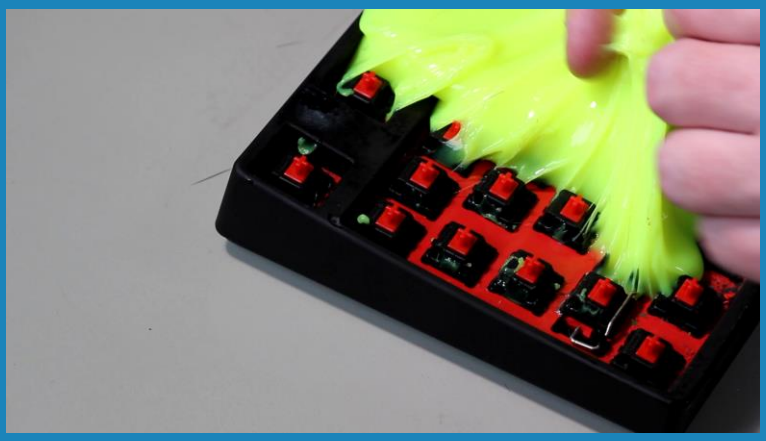
- Use cotton tip and Isopropyl alcohol

11:43 Given the amount of hair that is entangled in this keyboard, I will next use a cotton tip to dislodge the hair. There is also a lot of ground-in dirt that won't be so easy to dislodge. To remove this, I will use an isopropyl alcohol cleaner. This type of cleaner is good for cleaning devices like electronics as it has a high evaporation rate. For this reason, it will be dry within a minute after applying, unlike other cleaners, which is something you want when cleaning electronics, in order to reduce the chance of short circuits and damaging the equipment.

Whenever using cleaning products like these, consider using gloves to protect yourself. These cleaning products often contain chemicals that are harmful to humans, particularly if you use them regularly.

Medium Level Clean (5)

- Cleaning component (Cleaning goo)



12:30 There will be some ground-in dirt in areas that we can't get to with the cotton tip. To get to the last of it, I will once again use my cleaning goo. Since we are trying to get into those hard to reach places, give the goo a little bit of time to sink in, or press gently down on it and gently massage it into the keyboard.

Once complete, there may be some goo left on the keyboard, so just repeat the process; however, don't leave it on as long the second time, since you are only attempting to remove the left-over goo. You can also roll the goo over the keyboard pushing down where there is goo left over. This will help remove it. You may need to do it several times before you get all the goo off, however at least you have removed the dirt from those hard to reach places.

Medium Level Clean (6)

- Use wet wipes to clean keyboard case

13:17 The last step of the medium level clean is the case of the keyboard. To clean this, I will use some wet wipes. It is just a matter of wiping these over the case of the keyboard. If you find that this is not enough, you can also spray some isopropyl alcohol on the keyboard case and use that to help clean it.

This completes our medium level clean. Next, I will move on to the advanced clean. This will get the keyboard as clean as possible, but if not already done, will most likely void your warranty.

Advanced Level Clean (1)

- Wash keys in warm soapy water

13:49 The next step is to get a container and fill it with warm water. Next, add soap to the warm water. The last step is to put the keys in the soapy water. Before putting any keys in the warm soapy water, you can blow any remaining dust out of them using the compressed air.

Soap does a good job of removing dirt and grime from the keys given a bit of time. If you have some keys that have a lot of grime on them you can give them a bit of an extra clean with a cloth. For example, highly used keys like the space bar get more dirt on them then other keys.

The next thing I like to do is let the keys sit in the soapy water for at least a few minutes. Personally, I like to leave them in the soapy water for a least an hour. If you have particularly badly stained keys, you can use other cleaning products like bleach-based products to whiten the keys. In this case, my keys are not that badly stained and are black keys so there is no need. If you use products like these you can potentially fade the keys, so I would not use them unless you need to.

Advanced Level Clean (2)

- Rinse soap off keys

14:55 Now that the soap has had time to do its work, the next step is to wash the soap off. To do this I will get a second container which only has water in it. For each key I will use my cloth and brush to ensure that it is clean. Once clean I will put it into the water to wash the soap off.

Advanced Level Clean (3)

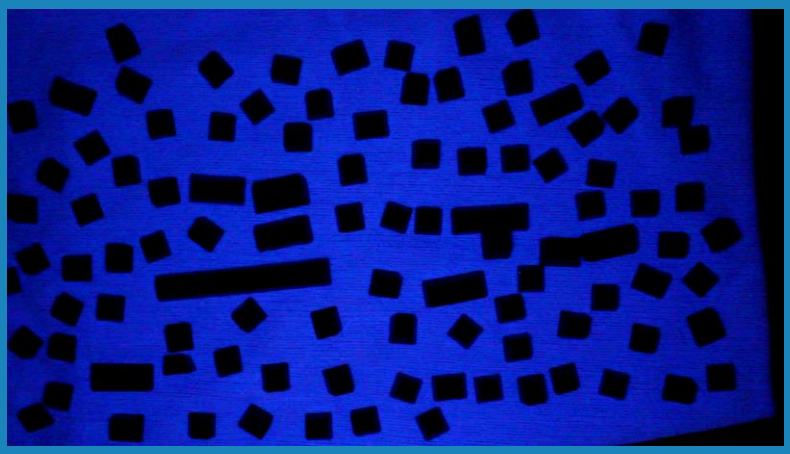
- Dry keys on towel face up

15:14 Once the soap has been washed off, put the keys face up on a towel to dry. If you find there is still soap in the water, consider draining the water and replacing it. You can also use a soap strainer to remove the soap. Whichever method you use, make sure if any small parts on the keys have fallen off that you don't lose them.

I will remove the containers of water; however, I will leave them to the side for the moment. If a small part of the keyboard has fallen off and is in the water, I don't want to lose it. Once I am happy the keyboard is put back together and I have not missed anything, I will throw the water away.

Advanced Level Clean (4)

- Kill bacteria with UV light



15:50 A Keyboard can have a lot of bacteria on it. To help kill any remaining bacteria I will put the keys under a UV light for the next 12 hours. You could also put the keys out in the sun, but you risk bleaching the keys if you do this. Keep in mind the black light I used at the start of the video and UV light I am using now are slightly different. The frequency range they output is slightly different. Both will achieve similar results; however, UV is better at killing bacteria and black light is better at making things glow in the dark.

Once the keys have been under the UV light for 12 hours, I will flip them over and apply the UV light on the other side for the next 12 hours.

Advanced Level Clean (5)

- Remove screws and release clips

16:33 We are done cleaning the keys for the moment, so I will move them out of the way. The next step is to clean the inside of the keyboard case. This step involves removing the back plate of the keyboard and cleaning inside. On some keyboards, this step is easier than others. Cleaning the inside of the keyboard probably won't be worth the effort in most cases, as most likely it will not affect the functionality of the keyboard and it is not something you can see from the outside. In rare cases, for example, the keyboard is used in very dirty environments like a manufacturing environment or there has been a very bad spill on the keyboard, it may be worth the time to clean inside. However, if the keyboard was used in a very dirty environment, I would consider purchasing a dust resistant keyboard instead.

With this keyboard, there are three screws that need to be removed. In this case, two of the screws are hidden under the keyboard feet. On some keyboards the screws may be in difficult-to-locate places, for example under the rubber protectors. With this keyboard, the last screw is located under a sticker in the middle of the keyboard.

This sticker is a warranty sticker. So essentially if this sticker is removed, you void your warranty for your keyboard. So, if you want to take your keyboard cleaning to this level, make sure either your keyboard is out of warranty or you're prepared to buy a new one if you break it. Keep in mind, it all depends on what your warranty conditions say, as potentially some of the steps I did earlier may have already voided the warranty. If you are fixing a bad spill on the keyboard, this may have voided the warranty before you even started taking the keyboard apart.

This keyboard has several snap fits which hold the two parts of the case together. Snap fits are

common in plastic components. They are a small piece of protruding plastic that locks in with a matching recess on the other side. They offer a cheap and strong way of keeping plastic components locked together.

To release the snap fits, I just need to put my flat head screwdriver between the two plastic parts and lever the screwdriver. The snap lock fits are on both sides, so you will need to lever around the edges of the keyboard case. Once all the snap fits are released, the back of the keyboard case should also release.

Advanced Level Clean (6)

- Clean inside keyboard case

18:54 The inside of the case is full of dust, so I will use my compressed air to blow the dust out. This will remove a lot of the dust, but some dust is hard to remove or in difficult places to get to. To remove this hard-to-reach dust and dirt, I will use a paint brush. The paint brush is good to get in those hard-to-reach places.

Since the electronics on the keyboard can't be seen from the outside, it is generally not worth cleaning them too much. In some cases, if the keyboard is malfunctioning, there may be a short on the board. On this board, you can see there is a build-up of some kind of sticky material in one place on the keyboard. The keyboard probably had something spilled on it, at some stage, and the liquid has sunk through.

To remove this, I will spray some isopropyl alcohol on the board. I will then use my cotton tip to remove the sticky material. It may take a few tries to remove it, but essentially as long as you remove enough, it will not short the board.

In an extreme case, you may want to remove the board and wash it with water. For example, I once had a computer that was subjected to flooding. Lucky it was switched off at the time. The inside of the computer was completely covered in mud from the flood waters. To clean it, I put all the components in a bath and washed it. I would not recommend this as a way of cleaning components, but in extreme cases, extreme methods are needed. The important point to remember is to make sure the components are completely dry before switching them back on. In the case of the isopropyl alcohol, it dries very quickly, so we don't have to worry.

The next step is to clean the back part of the keyboard case, and like before, I will blow out as much dust as I can using compressed air. Following this, I will clean the case using some wet wipes. These have some alcohol on them so will help clean the plastic and it will dry quickly. Remember: If you are doing a lot of cleaning, you should consider wearing gloves to protect yourself.

Assembling (1)

- Ensure everything is dry

20:54 The last step is to put the keyboard back together. Before doing this, make sure that every component is dry, particularly the keys, since they were washed in water. If there is any water on the components, this could cause a short circuit on the board and damage the keyboard.

Assembling (2)

- Push down on snap fits

21:12 To assemble the keyboard, place the two parts of the keyboard case together and then press down on the keyboard case. You should hear the snap fit lock into place. To ensure all the snap fits lock into place, press all around the keyboard. The keyboard case should be level on each side. If it is not, one of the snap fits may not have clicked into place.; If this is the case, push down on each side again until the keyboard case is level on all sides.

Assembling (3)

- Screw in each of the screws

21:41 Once all the snaps fits have locked into place, next screw each screw back in. If you have trouble screwing the screws back in, it may be that the keyboard case is not level because, most likely, a snap fit is not locked into place. Screw in the opposite screws first and then screw in the center screws. If the screws don't want to go in, screw them in partially and try screwing in opposite screws. Sometimes when you screw in a screw this will cause a snap fit to lock into place, so you may hear that noise when screwing in the screws. If that occurs, this is o.k. It is best if they lock into place before screwing in the screws, but sometimes the act of putting the screws back in will cause the snap fit to lock.

Assembling (4)

- Put all the keys back in

22:24 Once the back of the keyboard case has been put back on, I will next flip it over and start putting the keys back in. I generally like to start putting the large keys back in first as they are normally the hardest keys to get back in. It makes it a bit easier to put these keys in first as the other keys are not getting in the way.

To start with, I will put the space bar back in. In the case of this keyboard, each side of the space bar needs to be connected to a metal bracket. Under the key is a plastic connector; it is generally easier to get the metal into the connector on one side first.

Once one side is in, I can use a screwdriver to bend the bracket slightly allowing the other side of the key to be connected. It may take a few tries to get it.

Once both sides are clicked back in, press down all along the key to ensure that it is in place correctly and also ensure that it is springing back correctly. If it does not work correctly, it may be the key is upside down or has not been put in correctly. If this occurs, remove the key and try again.

I will now do the same for all the other large keys. You can see it is a bit of effort to get each key in. Your keyboard maybe slightly different; on some keyboards the larger keys will have springs to help you put them back into place.

You will notice that when I get to the zero key on the num lock pad, I will have some difficulty getting the key to go into place. Notice also that once the key is in place, the key does not

spring back correctly. There is something wrong with this key, so I will take the key out and have a look at what is causing the problem.

You can see the bottom of the key that was not working correctly. There are two white plastic parts which the metal bracket goes into, but one of them is upside down. If I turn the key it is easier to see this. When I was washing the keys, one of the plastic parts fell out and I put it in the wrong way. Not much of a difference, but enough to prevent the key from working correctly. To fix this, I will pull it out and turn it and put it back in the correct direction.

You can start to see why, when cleaning a keyboard, you may decide to leave the large keys in the keyboard and clean around them, if you don't want the hassle of trying to get them back in. On some keyboards they may contains springs and other small parts. If you lose anything, the key may not work correctly. This is the reason why I don't tip out the water I use for cleaning until I have finished assembling the keyboard. Small parts like this are easy to miss, and you don't want to find that you threw out a part by mistake, after you put the keyboard back together.

You will notice that now when I put the key back into the keyboard, this time it will go in correctly and spring up and down correctly. The next step is to put the last of the three remaining large keys into the keyboard. There are also some medium size keys as well; however, since these do have metal brackets attached to them, I can put them in with the rest of the keys.

To put the remaining keys back in the keyboard, it is just a matter of placing them on the keyboard and pushing down on the key. Once it has clicked into place, press down on the key to make sure that it is working correctly.

The key should spring back freely. If it does not, the key may not have clicked in correctly. Also, keep in mind that the keys are designed to go in one way. Multiple keys on the keyboard may be very similar in appearance. For example, the four arrow keys all have the same arrow on them, however they should only be put back in the keyboard facing the same orientation. They will, however, go back into the keyboard the wrong way. On some keyboards this will be very noticeable as the key will rub against other keys causing it to have problems going up and down. On other keyboards the key may still work but will not look right and feel a bit strange when pressing on it.

If you have trouble working out where the keys go, have a look at the photo you took before taking the keyboard apart. In some cases, there may be two of the same keys such as the number keys that appear on the num lock. Even when there are two keys with the same letter or number on them, a lot of the time they will be slightly

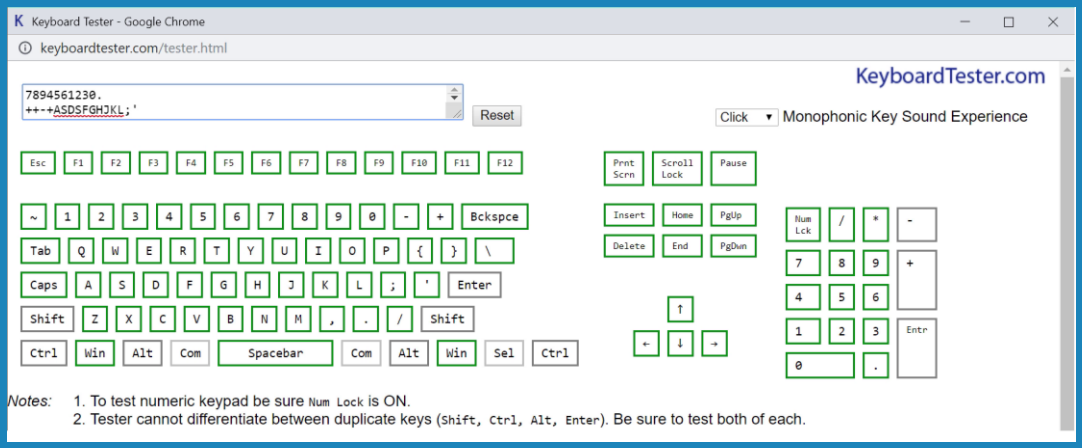
different. For example, the number or letter will be printed in a different location or another symbol will be on the key allowing you to work out where it goes and what orientation the key should be.

In this case, I have put one of the keys in the incorrect way. You will notice how it is on a different angle to all the other keys. When I press down on the key it will work o.k.; however, when typing, it will feel a bit strange, so I will remove it and put it back in the correct way. You can now see that the key matches the other keys. After you have put all the keys back in, have a look to make sure they are all in the correct way. When you look at a key and compare it to the ones next to it, it should be easy to see if any have been put in the incorrect way.

27:26 That completes the cleaning and reassembling of the keyboard. If I compare the keyboard to what it was like before the cleaning, you can see the difference the cleaning has made, and, in particular, the keys of the keyboard. It is particularly noticeable how much cleaner the keyboard is under the UV light. The last step of the process is to test the keyboard to make sure that it is working.

Test Keyboard

- https://www.keyboardtester.com/



27:48 To test the keyboard, I will use the site KeyBoardTester.com. This site has an application that simply shows the keyboard on the screen and changes the color of the key to green once it is pressed. All I need to do is press each key and make sure that it is working. Keep in mind that certain keys that are repeated on the keyboard, like shift, ctrl and alt. Here the keyboard tester can't tell which key is being pressed, since the same key appears multiple times on the keyboard. For these keys, they will not remain green, so you just need to press each one of them and make sure the app recognizes that they have been pressed. The key should highlight yellow while it is being pressed.

28:30 That concludes this video on how to clean a mechanical keyboard. The steps and processes used in this video apply to other keyboards and you are free to use or skip whichever steps you like. Your keyboard will be different and what you have for cleaning will be different.

In the workplace, if you use a shared keyboard, a basic clean with a cloth will do a lot to clean the keyboard. If you have it available, you can give the keyboard a spray with a cleaning solution before wiping the keyboard. Use one that is designed for that purpose like an alcohol-based cleaning solution. You don't want to get liquid in the keyboard and risk shorting the electronics.

Once or twice a year, or as required, run compressed air over the keyboard. This will help remove anything that has fallen into the keyboard. In some cases, some material may not be able to be removed with compressed air or a cloth. In this case, you can try some cleaning goo. This will get in between the keys and help remove dirt and grime from those hard to reach places.

If your keyboard requires it, you can remove the keys. Once you start taking the keyboard apart you increase the risk of damaging it or voiding the warranty. It is up to you to decide how far you want to take your keyboard cleaning.

In some cases, for example if you have a bad spill on the keyboard, you may need to remove the keys to clean it. If you have a bad spill, unplugging the keyboard, turning it upside down and letting it drain will hopefully be enough. If you find the keys are now all sticky and don't work

correctly, you may decide to remove each key to clean it. If you remove the keys, consider giving the keys a wash. Keep in mind that some of the keys may have small parts in them. Take care to not lose these parts as the key will not work correctly without them.

The last step is to reassemble and test the keyboard. Make sure everything is dry before you do this. If any parts of the keyboard have still got liquid on them, you run the risk of short circuiting the keyboard.

That concludes this video from ITFreeTraining on cleaning a keyboard. I hope you have found this video useful and I look forward to seeing you in the next video from us. Until the next video, I would like to thank you for watching.

References

"Microbial contamination of computer keyboards in a university setting." https://www.ncbi.nlm.nih.gov/pubmed/19233511
"Are There More Bacteria on Computer Keyboards Than Toilet Seats?" http://www.center4research.org/bacteria-computer-keyboards-toilet-seats/
"Picture: keyboard" https://pixabay.com/vectors/keyboard-electronic-computer-311803/

Credits

Trainer: Austin Mason http://ITFreeTraining.com
Voice Talent: HP Lewis http://hplewis.com
Quality Assurance: Brett Batson http://www.pbb-proofreading.uk