iPHONE SCREEN REPAIR

Replace the broken glass of an iPhone 3G.
By Morten Skogly

I dropped my iPhone and broke its glass touch-screen. It didn't take much; just a 40cm drop onto asphalt, and my lovely iPhone 3G was transformed into a cobweb of sadness.

Apple doesn't repair this, at least not in Norway, where I live. There's Dr. iPod (dripod.no), who specializes in iPhone repairs, but he has so many customers that he now does repairs only for people who come to his shop, which is in Oslo, 550km away from me. But I like fixing things, so I replaced the screen myself. And it wasn't even that hard.

1. Remove the SIM tray and screws.

Find a paper clip and stick it into the tiny hole at the top of the iPhone to pop out the SIM card tray. Unscrew the 2 screws at the bottom of the iPhone, near the charger port (Figure A, following page). Congratulations, you've just voided your warranty!

MATERIALS AND TOOLS

iPhone with broken glass touchscreen broken, but LCD still works

iPhone glass touchscreen replacement part #16101 from Deal Extreme (dealextreme.com), $24

Double-sided tape You can buy pre-cut "3G Front Panel Adhesive Strips" from iFixit (ifixit.com) or you can cut your own, like I did.

Heat gun or hair dryer A heat gun gives you more control.

Paper clip aka SIM tray removal device

Scissors, tweezers, newspaper

Sharp knife or 2 with a thin blade, or small suction cup to pry loose the screen from the frame

Tiny Phillips screwdriver Deal Extreme #11839, including some useless plastic tools that won't help you at all, is $3.

Box or something else to keep the tiny screws in

Cotton swab and electronics cleaner or acetone or nail polish remover

Fig. A: The first 2 screws to unscrew flank the charger port. Fig. B: Dig in with a sharp blade to pry away the touchscreen assembly, or use a suction cup.

Fig. C: Touchscreen and frame pried away.
Fig. D: Touchscreen and 3 cables detached.

2. Gently pry the frame loose.
Place the knife blade (the thinner the better) in the crack between the black rubber seal and the silver plastic frame, then pry away the frame (Figure B). You might have to use a little force, but don't overdo it. You can also use a small suction cup.

I had 2 iPhones, one to practice with and one to actually fix, but you probably have only one chance at this. So be careful not to damage the black rubber seal or the frame itself. On one of my iPhones, the screen came loose pretty easily, but on the other I had to try several times to get the blade far enough down to produce the leverage I needed. This caused a little damage to the rubber edges of the frame.

When you get the crack wide enough using the knife, you can wedge in a guitar pick or another knife to gently widen the gap. The screen and frame should lift up fairly easy then (Figure C).

3. Disconnect the 3 cables.
Use the knife to disconnect the cable connectors, conveniently labeled 1, 2, and 3, that are located toward the top of the phone. Be very careful and don't use too much force. Connectors 1 and 2 lift straight up, but 3 is a bit different. On my iPhone there's a tiny black flap that holds cable 3 in place,

but on some iPhones it's white. Gently lift this flap up and the last cable should slide out easily.

You have now completely separated the touchscreen assembly from the body of the iPhone (Figure D). Sweet! Now put it all back together again before continuing, so that you know how it should feel when you do it for real later. No, really, I mean it!

4. Separate the LCD from the frame.
There are 3 tiny screws on one side of the frame, and 2 on the other side, hidden underneath a piece of black tape. Unscrew all 5. Then there's one more screw to remove, and I promise it's the last one. It's located toward the top. This screw and the 5 screws from the sides are all the same size, so you don't have to worry about mixing them up (Figures E, F, and G).

Put your knife or similar thin instrument underneath the LCD. Gently lift the LCD away from the frame, being careful not to break it (Figure H). You should be able to slide the LCD gently toward you until it's completely separated from the frame.

5. Use a heat gun to remove the broken glass.
The glass is fastened to the frame with clear

E

F

G

H

Figs. E, F, G: Unscrew 5 tiny screws on the sides and top of the frame to separate the LCD touchscreen from its frame. Some of these screws are hidden under pieces of tape.

Fig. H: Pry the LCD away from its frame very gently, taking care not to break it.

double-sided tape at the top and bottom, and some kind of silicone or rubber cement around the edges. You want to heat the glass and underlying adhesives just enough to let you pry or tweeze off the glass, but not so much that you melt the plastic or rubber.

Depending on how broken your screen is, you might be able to remove the entire panel in one fell swoop. More likely, you'll have to remove it in pieces.

Put the frame and glass on newspaper, glass side up, and use a heat gun or hair dryer, experimenting with distance and time for loosening the tape (Figure I, following page).

I found that heating the glass in short bursts let me use my knife (and later a pair of tweezers) to remove all the glass fragments one by one. It took a little under half an hour.

My glass had already loosened on the sides, so I started there. I removed the middle part quite easily, even without a heat gun. But the glass at the top and bottom of the panel was really stuck.

NOTE: Try not to melt the plastic or rubber, or warp the frame with the heat. I warped my frame a little bit, but was able to fix it by heating it a little and bending it back into shape.

6. Clean the frame.
Use a knife or flathead screwdriver to scrape away as much as you can of the remaining adhesive around the edges. Get the surface as clean as possible, and at least remove anything loose. I used a cotton swab and some electronics cleaner spray, but you might also try acetone or nail polish remover (Figure J).

7. Cut the tape strips.
The strips of adhesive film at the top and bottom are shaped to fit around the speaker, sensors, and other electronics. If you don't use pre-cut adhesive strips, you can cut clear, double-sided tape to fit. You basically want to cover as wide an area as possible.

My replacement front panel was protected with a piece of translucent plastic that fit it perfectly. To cut the outlines of my tape strips, I temporarily stuck this plastic onto the tape's backing (Figure K), and cut around the shape with scissors, making sure to avoid touching the sticky side inside the outline.

The top section had more intricate shapes to cut out. For this, I put a plastic bag over the top of the frame and used a permanent marker to color the pieces I had to cut out. Then I taped this plastic-bag template on top of a piece of double-sided tape, and went bananas with the scissors (Figure L).
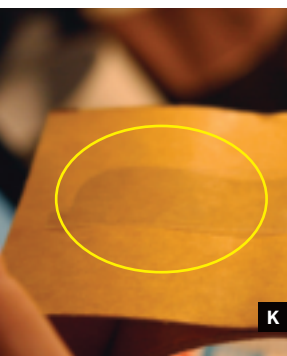
Fig. I: Separating the broken glass from the frame after heating. Fig. J: The frame after removing the glass and the old adhesive, and cleaning it with acetone or electronics cleaner spray.

Fig. K: My iPhone's bottom strip template placed on double-sided tape. Fig. L: My carefully cut-out strips of tape in place on the frame. Fig. M: The repaired iPhone with its shiny new replacement screen.

8. Put in the new front panel.

Put the tape in place on the frame and press down hard for a while. Then peel away the backing. Wash your hands or wear gloves to avoid staining the new glass panel, especially on the inside. Remove any protective plastic covering the glass on the inside, but leave the plastic on the front side.

Place the lower part of the panel in the frame, aligning it perfectly with the lower edge of the frame. Carefully lower it down. Make sure the cables connected to the panel don't get stuck on the tape, and use your fingers to make them go under the frame.

The tape is sticky, but you'll be able to move the glass back and forth a bit to adjust its position in the frame. When you're happy with its placement, press it down hard. Then add pressure on one corner at a time, for about 20–30 seconds, allowing the glass to fasten. You want the glass as deep in the frame as possible. (I felt a little lazy and didn't do this step properly, so my new glass is raised slightly higher than the original.) Voilà, the hard part is done!

9. Reassemble your iPhone, good as new!

Just follow the disassembly steps in reverse. First fasten the LCD with the 6 screws, then attach the 3 cables. One cable runs in a loop, which you need to curve downward, pointing toward the Home button; otherwise this cable will get in the way of the SIM tray. Be careful when reattaching the cables; if you apply too much pressure and break the cables or connectors, you're out of luck!

When the 3 cables are properly connected, turn on the iPhone and test it to see if everything works, before you press the glass and frame completely back in place. (Otherwise you might need to use the knife again to lift off the frame, risking more damage to the frame.)

Now go forth and brag to all your friends, and feel pride in a job well done and money and environment saved (Figure M)!

➕ For a helpful video, source tutorial, and a Norwegian version of this article, visit makezine.com/22/ diyworkshop_iphonerepair.

Morten Skogly is a cheerful man, even in the dark. He makes things to impress his wife and kids. See more of his DIY stuff at pappmaskin.no and find him on Twitter at twitter.com/mskogly.