adafruit learning system

3D Printed RFID NFC Rings

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Guide Contents

Overview

In this project we're embedding an RFID tag into a 3D printed ring.

The micro RFID NFC tag is incredibly small and yet flexible enough to be embed into all sorts of objects.

It features a NTAG203 chip plus antenna and contains 144 bytes of read-write memory. It works with almost any NFC capable tablet and has secure 8-byte user ID.

Although we carry NFC/RFID rings in the shop, it's much more cost effective to 3D print one and you can also customize it to any size or shape.

3D Printing

Download, Modify, Remix Design

The parts were modeled in Autodesk Fusion 360 and available to download, modify and remix. The parts can be exported in several file formats - great if you're using a different CAD package.

https://adafru.it/IFX

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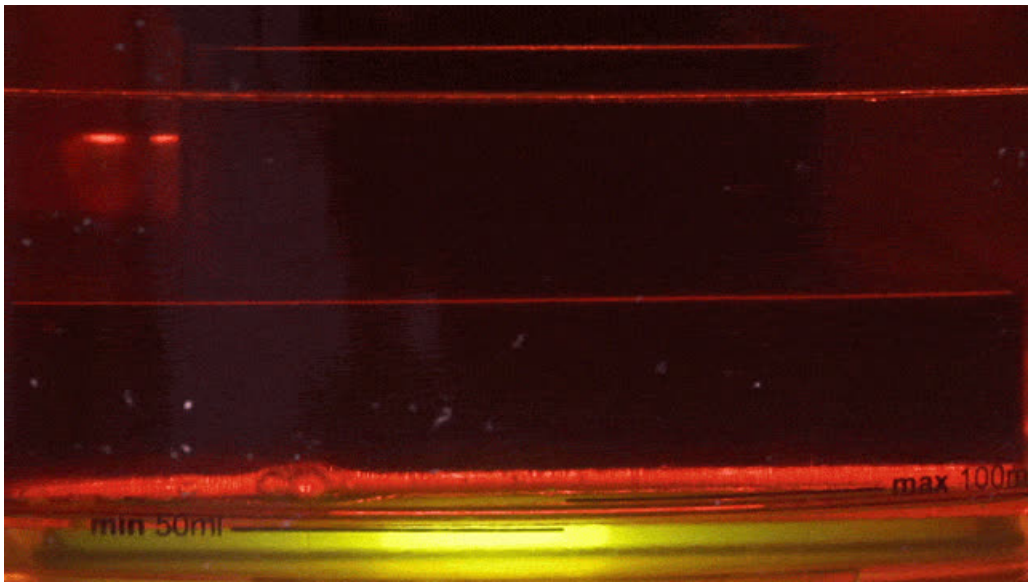
Material Options

To get the intricate details, we used the ember DLP/SLA resin-based 3D printer from Autodesk.

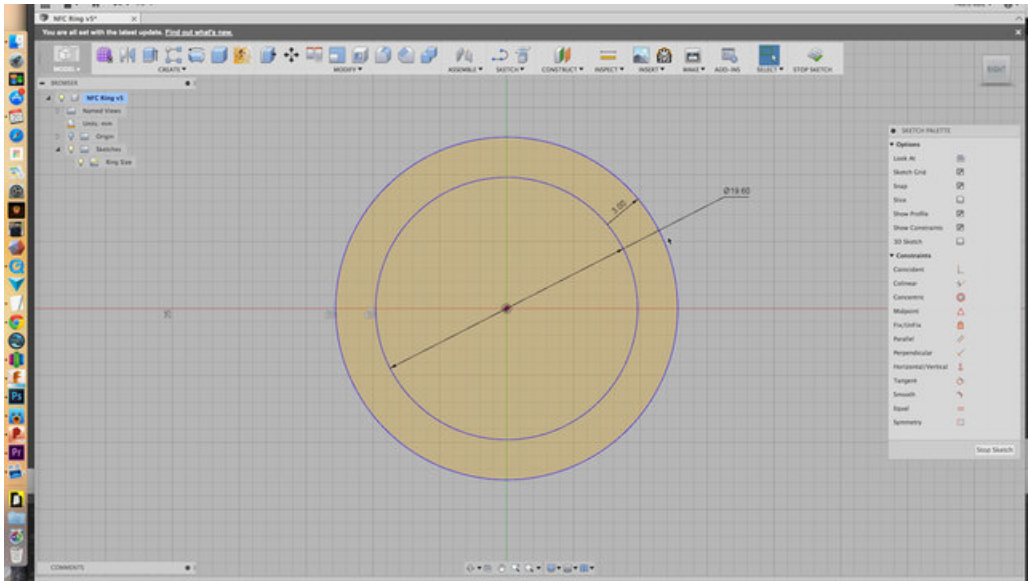
But you can use an FDM machine with PLA, ABS or other type of filaments which may require a heated bed. PLA prints with minimal warping and doesn't necessary require a heated bed.



Slice Settings

The table below is a general reference for slice settings. Every 3D printer is slightly different, so you might want to use settings you're familiar with.

RFID-ring19	220c 10% Infill 0.1mm Layer Height Custom Supports 50/150 mm/s Speeds 1-4.5mm retraction length **SLA/DLP** 0.025 Layer Height 2s Exposure 4 Burn-in Layers Supports Off	about 40 mins on FDM printins about 3 hours on SLA / DPL printers



Edit ring size

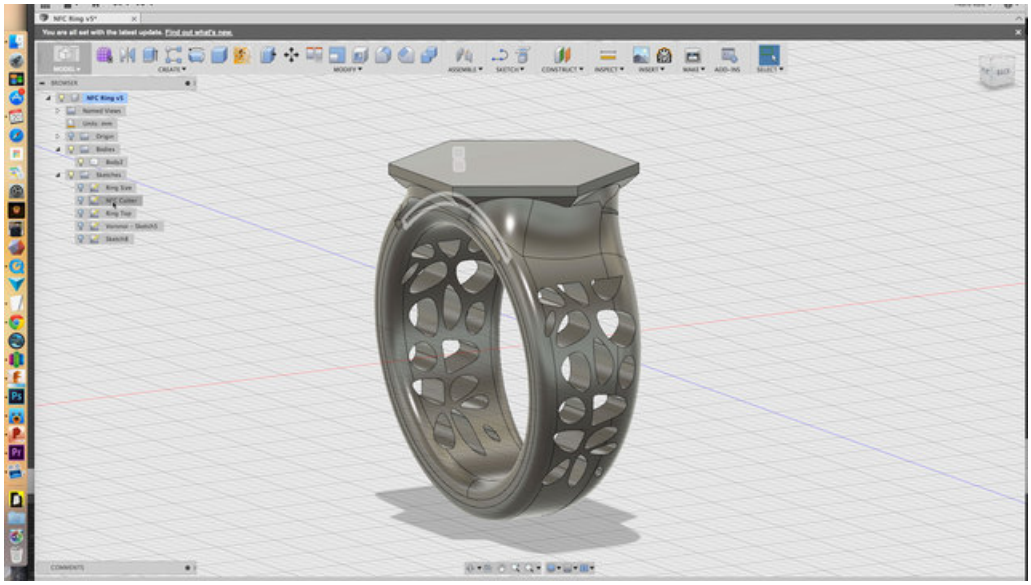
Customize the ring size to fit by measuring the width of your finger. Input these measurments into the sketch for the ring size inside the Fusion 360 project file. The depth of the ring shank is offset by 3mm. You can edit this if you need a thinner or thicker shank.

NFC Slot

You can edit the position of the NFC slot by moving the sketch. You can edit the slot position if you wish to adjust the thicknes of the ring shoulder.

Ring Head

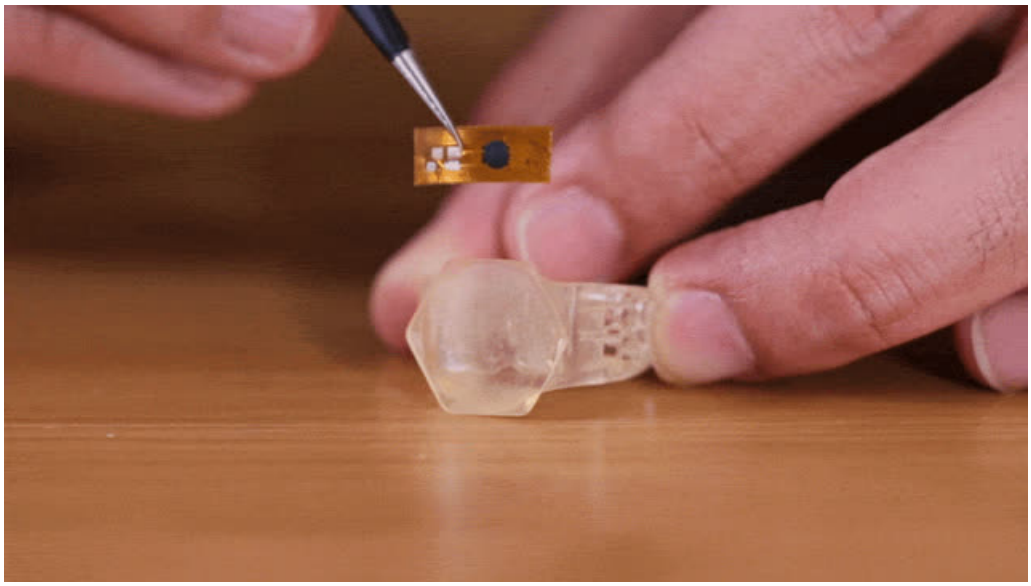
You can adjust the size and shape of the ring head by editing the attached sketch. We included a circle and a ploygon. You can even project a symbol or logo on the ring head!



Assembly

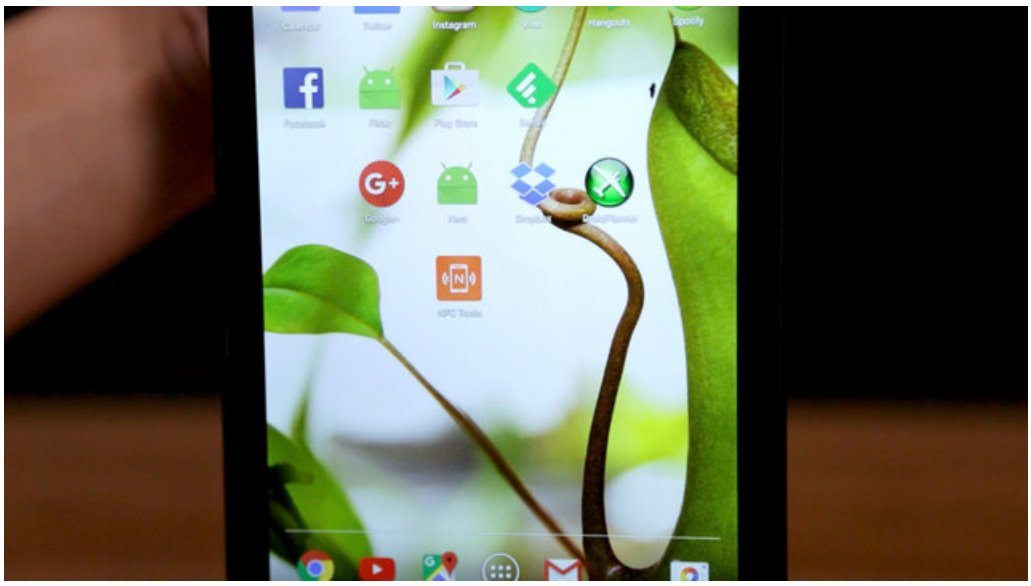
We added a curved slit in the center of the bridge so we can insert the tag.

Fine tipped tweezers help insert the tag into the slot. Make sure to orient the chip so it's facing towards the head of the ring.



Writing data to the tag

NFC Tools is an Android app that can be used to write data to the tag. You can write contact information, trigger actions like loading a website, or application and you can even assign custom tasks.



To trigger actions on the Nexus 7 tablet, the tag has to be pointing between the letter "N" and "E".

For this demo, we thought it'd be cool to fire up a video on YouTube, but you could use it to store contact info like a business card!

And that’s it! A really easy way to embed RFID tags into 3D printed things.