A Login Assistant, Version 1.0

By R. G. Sparber with extensive software assistance from Justisse Mulligan

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The Problem

You walk up to someone else's computer and want to log into one of your accounts. Since you are security-minded, your password is long and filled with all types of characters.

```
/24vdt4~VmFDFG3v!*[TtO0+{#
```

After much hunt-and-peck typing, you press Enter and are met with an error message saying your login or password is invalid. Ah, you mistyped one character. Damn! Start over.

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A Solution: A Portable Password Vault

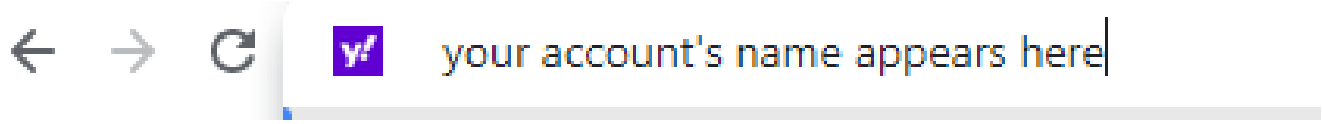
Let's try this again. You walk up to someone else's computer and want to log into one of your accounts.

You take out a device not much larger than a thumb drive and plug it into a USB port. The device has two buttons on it: Select and Scroll.

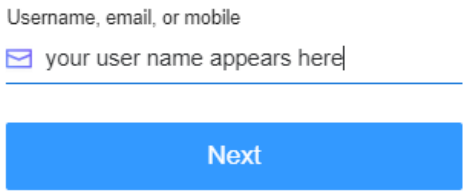
The device appears to the PC as a keyboard, so no drivers need to be installed. No security code bothers with it.

The text that is output into the password window is part of the password. You must type in the rest. Consider these added characters your key. If someone tries to use your device and doesn't have this key, they can't get into your account.

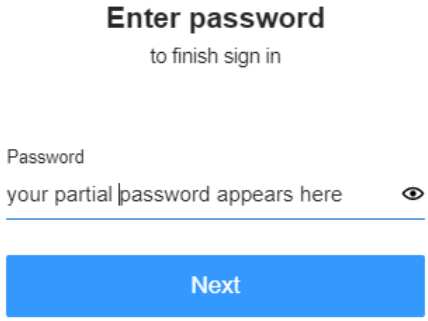
After opening a browser, you click into the navigation window. Then you push Scroll the button on the Login Assistant, one of your account names appears:



Each press of the Scroll button brings up the next account name. Press Select and the account name is replaced by the URL. Press Enter on your keyboard.



Click into the login window. Push Select on the Login Assistant, and your user name appears. Click Next.



Push Select on the Login Assistant, and your partial password appears. Type in your key. Click Next. You are in.

I suggest you unplug the Login Assistant now so you don't forget it.

User's Guide

Passwords

The safest way to use the Login Assistant is to create new passwords for its accounts. You can use your old passwords but add a "key" on the end. In this way, a thief can take your device but, without the key, can't access any accounts.

I know I will have trouble remembering the key, so I include a hint in my account name. For example, `AOL (dog)` can be an account name.

That `(dog)` text is a reminder of my key. My first dog's name was Sam, and he was always getting into trouble, so `SAM!` is my key.

Provisioning

This requires the installation of a terminal emulator. I prefer TeraTerm.

1. Plug in the Password Vault
2. Start the terminal emulator
3. Select the port used by the Password Vault
4. Press any key and you will see the main menu:

```
                Login Assistant

            Menu
            Show the current account
            Change this account
            Advance to the next account
            Return to being a Login Assistant

    Enter the first letter of any of these actions.
```

5. Follow the instructions on the screen.

The Software

The centerpiece to making the Portable Password Vault work is making the Arduino look like a keyboard.

At the top of my program, I have

```
#include <Keyboard.h>
```

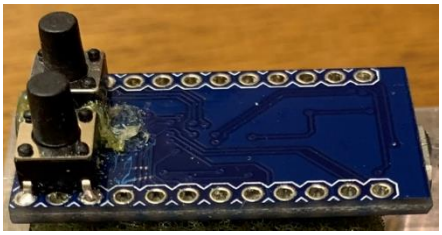
In `setup()` I have

```
Keyboard.begin();
```

The rest of the code looks for button pushes and prints predefined strings of characters. The PC sees these prints as typing on a keyboard.

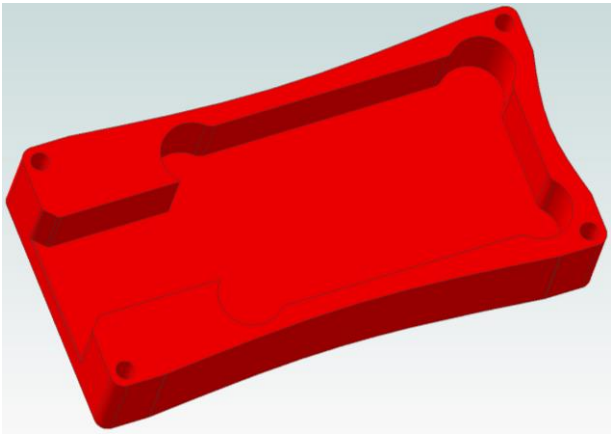
Much of the operational code was written by Justisse Mulligan. He is a professional programmer, so his style is far more advanced than mine. Justisse helped me greatly improve my coding style. I wrote the provisioning code. Here is the code.

The Hardware



The electronics consists of two tactile pushbuttons soldered to the back of an Arduino Leonardo. I used the many spare General Purpose Input Output pins for mechanical support and to provide ground connections to the buttons. Pull-up resistors were switched on in the Pro Micro. A dab of glue held the buttons down on the board.

The switches are mounted at the end opposite the USB connector.



Most of the effort went to making the enclosure. I drew up a 3D model using Alibre. Jonathan Wulff was gracious enough to 3D print a model, which worked very well. From an engineering standpoint, this is the best solution. However, I wanted to experience making this enclosure using my CNC mill.

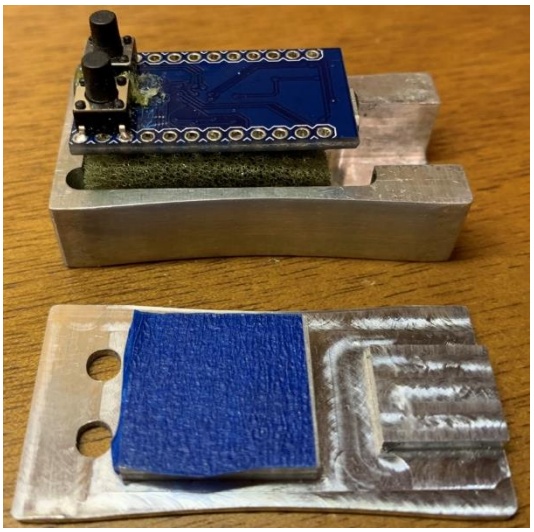
The bottom of the enclosure was CNC milled from a block of ½” x 1” x 2” 6061-T6 aluminum.

The cover was CNC milled from ¼” x 1” x 2” 6061-T6 aluminum. The two parts were glued together with Crazy Glue.

A rectangle of soft foam supports the circuit board.

I placed my Arduino Leonardo on the foam.

Note that the USB plug passes through a close-fitting channel which provides good mechanical support. Any twisting of the USB plug does not cause stress on the board's USB connector, which is fragile. The board floats in the enclosure.



I'm ready to commit. I put blue insulating tape on the square milled out of the top. It presses on the board. Once glued, it will be hard to get this apart.

A detachable 6” long USB cable connects the device to the PC.

Acknowledgment

Thanks to Andrew Ayers for reminding me of the security aspects of this design. Thanks to Justisse Mulligan for writing the multi-account code and teaching me so much. Thanks to Johnathan Wulff for showing me the power of 3D printing.

I welcome your comments and questions.

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