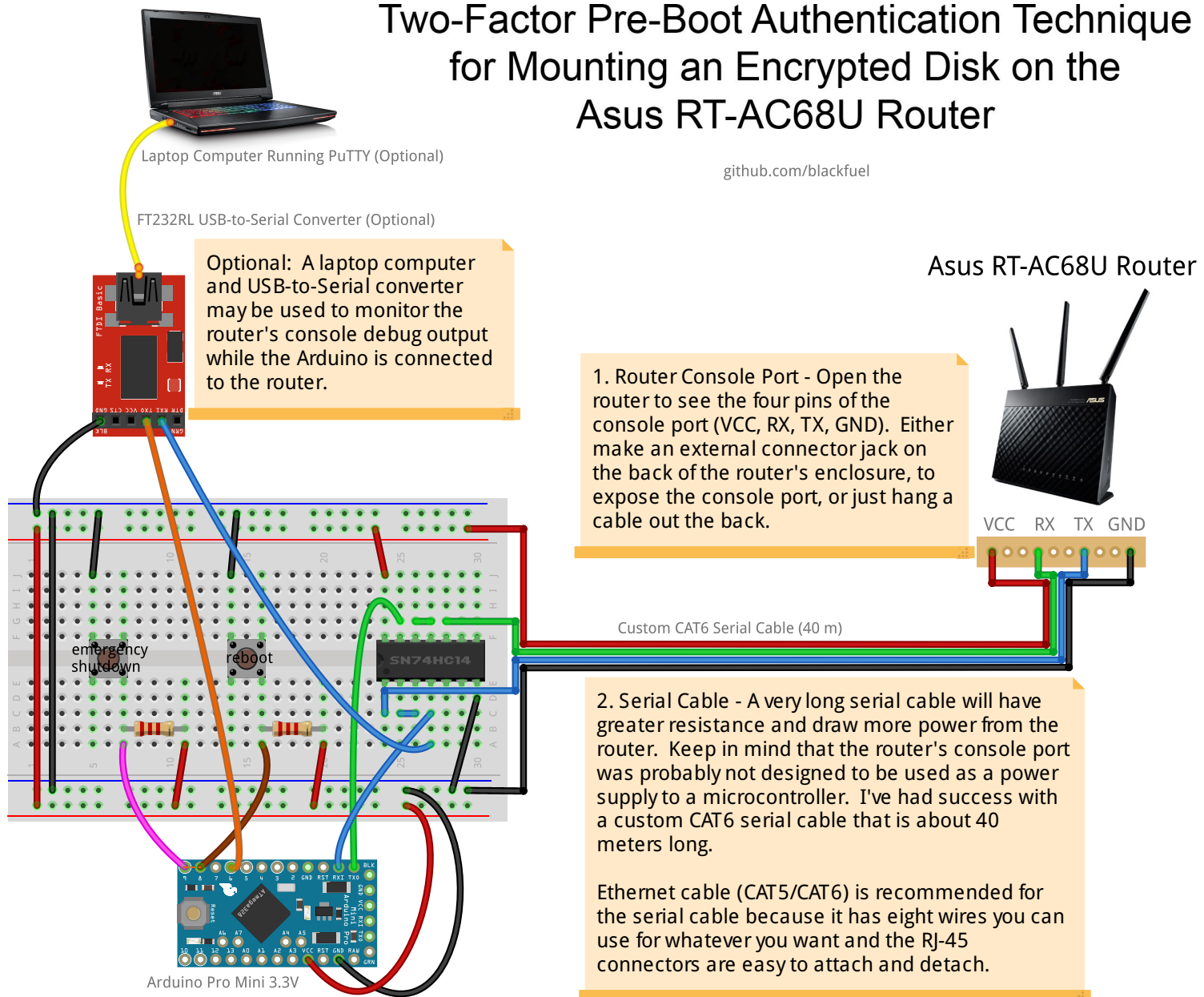


Two-Factor Pre-Boot Authentication Technique for Mounting an Encrypted Disk on the Asus RT-AC68U Router

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3. Arduino Pro Mini 3.3V - This is a microcontroller running a program that monitors the console port to know when the router is ready to begin accepting Linux shell commands. For instance, we can automatically write a passphrase directly into the router's RAM, very early in the boot process, by copying a passphrase text file from the Arduino to the router's /tmp folder, for the purpose of mounting an encrypted disk at startup. Once the router has mounted the encrypted disk, it simply deletes the passphrase file from the /tmp folder, for security purposes.

Hex Schmitt-Trigger Inverter - Each of the signals are inverted twice so the output is logically equivalent to the input. The purpose is to keep the router's TX pin LOW during power ON of the router, otherwise the router doesn't start up. I think it also helps to reduce line noise and interference. I could not make it work without this piece.

Emergency Shutdown button - Executes the Linux command "halt" to perform an immediate and orderly shutdown of the router.

Reboot button - Executes the Linux command "reboot" to reboot the router, for convenience.