



# Bootloader, Recovery, and the joy of unlocking

Rebooting your Android phone to the system Bootloader and Recovery partitions allows access to repairing and resetting the device, even installing a new version of Android. Specific steps and options will differ from model to model. Samsung core

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## INTRODUCTION

[Android](#) devices, particularly the developer-friendly Nexus models from Google, are especially suited for unlocking and tinkering with.

The Android OS, based upon Linux, is modular enough to allow replacement and upgrading of particular components of the system: bootloader, recovery, radio software, and both the underlying operating system and the user interface. Just as you can replace the default home screen/launcher app with one you like better, you can run a different *build* of the open source Android operating system (AOSP) for improved performance or bleeding edge capabilities. These are called ROMs.

Even without switching out the core OS, you can use a customized *recovery* partition. Team Win (TWRP) and ClockworkMod (CWM) are the most popular third party *recovery* replacements, and are available for many Android devices. They provide advanced maintenance functions, including the ability to install *root* apps that let the user and apps perform functions as the system user.

## Tools

The basic tool for working with a Android device is the **Android Software Development Kit** (SDK), which includes tools like *fastboot* and *adb* (Android Debug Bridge). There are third party "lite" versions of the basic tools for most operating systems. Some GUI tools take the complexity out of using command line tools to perform common operations, but these actions are no less powerful.

## Warning

Unlocking, flashing, rooting your device may void the warranty. You are also at risk for "bricking" (rendering inoperable and irreparable) your phone or tablet. You assume full liability and responsibility for attempting to follow any of these steps.

Some applications will not work if a device has been unlocked or rooted. E.g. *Android Pay* now detects if the system has been compromised this way in Android 6.0, and will refuse to work for you.

## Further Information

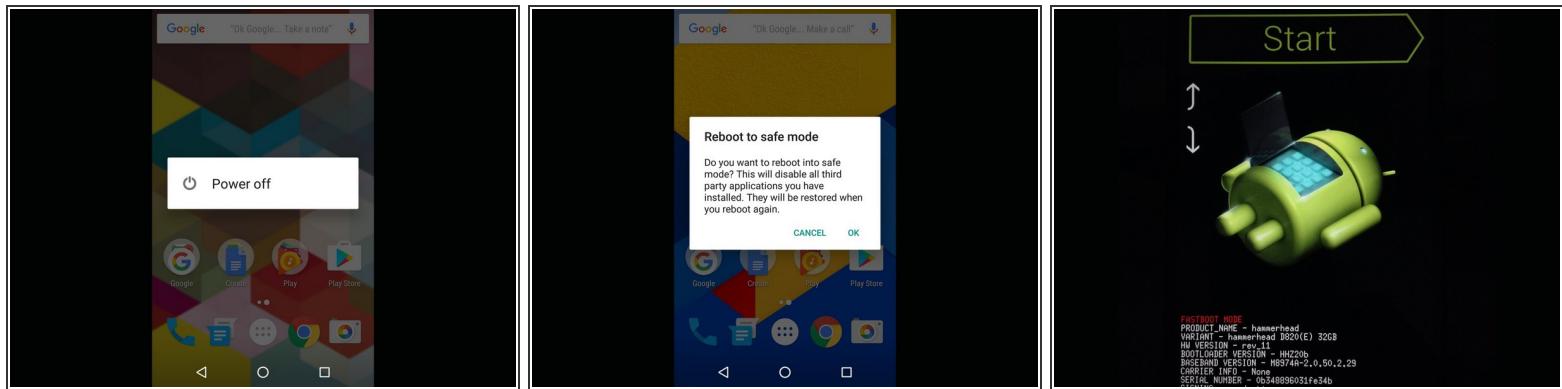
### Google Nexus

- [Google Nexus: Using Hardware Devices](#)
- [Google Nexus: Booting into fastboot \(bootloader\)](#)
- [ADB Fastboot Install \(MacOS, Linux\)](#)

### XDA developer forums

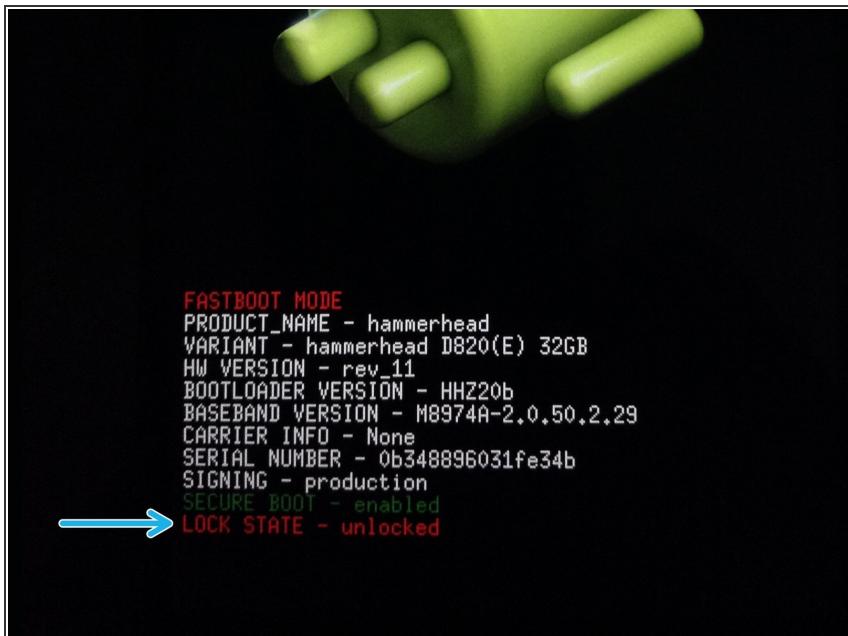
- [XDA Forums](#)
- [ADB Fastboot for Windows](#)

## Step 1 — Reboot to the bootloader, or reboot in Safe Mode



- *(i)* All steps in this guide will vary from one phone model to another. Read your device's documentation to determine the specific steps required.
- To power down most phones, hold down the power button until a prompt appears. Tap on the pop-up message. Some devices may have a "Power off" command in the software settings.
  - If your phone is crashing or locking up after boot, try rebooting into *safe mode*. In the previous step, tap and hold on "Power off" until the prompt changes to "Reboot to safe mode." Tap OK.
    - *(i)* Most third party apps will not run under *safe mode*. If the phone runs okay, then reboot normally and start uninstalling apps until you determine which one was the culprit.
    - **⚠** Some apps' settings will be lost or reset after using *safe mode*. You may have to set them up again.
- With the phone in an off state, hold down buttons in a combination to enter the bootloader. Google Nexus models [have specific combinations](#) like holding *Volume Down* and *Power* simultaneously.
- Your device's bootloader may look different from this Nexus 5 screen. That's okay. Note the essential information available to you here: phone model, product variant, serial/[IMEI number](#), [SIM](#) and bootloader locked state.

## Step 2 — Bootloader, fastboot



- The bootloader often displays information like the phone model, version of fastboot, whether or not it is boot-unlocked or not.

- For Google Nexus devices, you can now connect your phone to a computer (Windows, MacOS, Linux) running the **Android SDK** tools, allowing some commands to be sent.

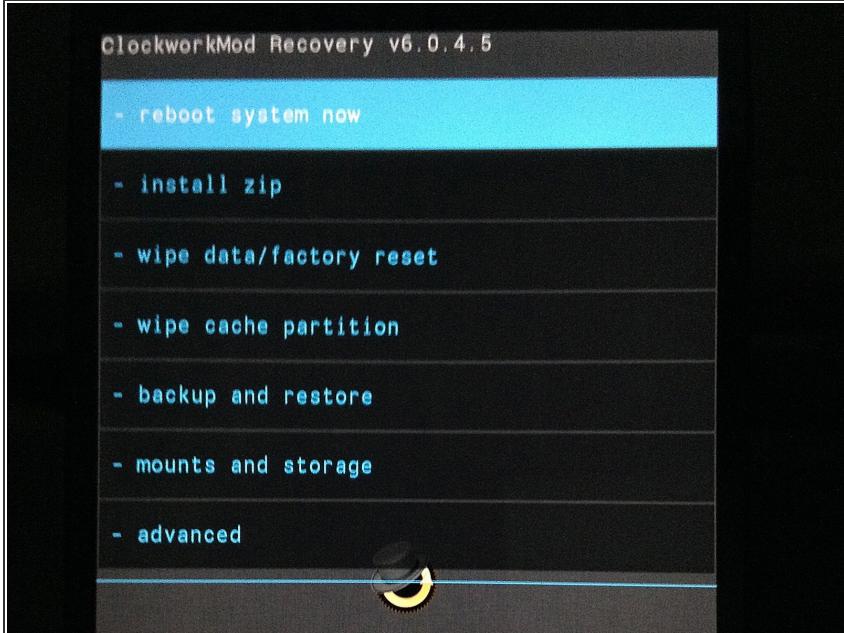
*(i)* The Android SDK *fastboot* command supports unlocking the bootloader, flashing factory images to Nexus phones, flashing a new *recovery* partition. Check the Android SDK documentation for further details, or type *fastboot -h* at the command line.

 Flashing a phone can often wipe out all user data and settings. *Fastboot flashing unlock* (formerly *fastboot oem unlock*) on Nexus phones will erase all user data as a security precaution. **Offload any information or media that you want to keep before unlocking a phone's bootloader.**

*(i)* Some manufacturers may supply custom code based on your phone's IMEI (unique serial number) which is required to unlock.

ⓘ Flashing an Android phone with compatible ROMs (operating firmware and software) is part of the fun of tinkering with Android Phones. With the phone in the bootloader state, this is where you can change your phone's software suite. For example, Google provides complete "[factory images](#)" to return the Nexus models to a new, "out of the box" state.

## Step 3 — Recovery is your friend



- From your bootloader screen, toggling the volume buttons will offer functions like Start, Power Down, Restart Bootloader, and usually ... Recovery. Pressing the *Power* button generally executes the displayed function.
- The recovery partition is a rudimentary mini operating mode which allows loading updates, wiping the cache partition, and performing a factory reset to a phone that cannot boot properly (e.g. in an endless bootloop, never reaching an unlock screen). It's not called *recovery* for no reason -- it's an essential tool for restoring a broken phone.

- ⓘ Some phones are supported by third party recovery images, like ClockworkMod, with advance features including selective backup and restore, mounting partitions usually only accessible after the Android OS is running, and installing a root service.
- ⓘ Similar to Unix' *superuser* command, *root* allows the user to perform system-level actions. Rooting is a powerful tool that enables some features and access to the operating system while it is running.
- ! Rooting suppresses built-in security protections of the operating system, and should only be done if you have full understanding of the risks. You should **never** grant an installed application root access, or permission to install a root service, without knowing exactly what it needs it for. 99.9% of apps will never need root access.

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Congratulations! You now know at least a little more about how to remedy operating system problems with your Android OS phone.