Flashing Devices

This page provides details for running builds on specific devices. These details complement the information in Building Android.

Note: You can flash an existing build from the Android Continuous Integration dashboard with the Android Flash Tool. For details see the Android Flash Tool page.

[Building fastboot and adb]

If you don't already have `fastboot` and `adb`, you can build them with the regular build system. Use the instructions in Building Android and replace the main `make` command with this one:

```
make fastboot adb
```

See Android Debug Bridge (ADB) for details on Android Debug Bridge (ADB).

[Booting into fastboot mode]

You can flash a device when it's in the `fastboot` bootloader mode. To enter `fastboot` mode when a device is undergoing a cold boot, use the key combinations given in the table below.

You can also use the command `adb reboot bootloader` to reboot directly into the bootloader. See Flashing instructions for full instructions.

Device	Code name	Key combinations
Pixel 6 Pro	raven	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 6	oriole	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 5a (5G)	barbet	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 5	redfin	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 4a (5G)	bramble	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 4a	sunfish	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 4 XL	coral	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 4	flame	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 3a XL	bonito	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 3a	sargo	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 3 XL	crosshatch	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 3	blueline	Press and hold **Volume Down**, then press and hold **Power**.
Pixel 2 XL	taimen	Press and hold **Volume Down**, then press and hold **Power**.

Pixel 2	walleye	Press and hold **Volume Down**, then press and hold **Power**.
Pixel XL	marlin	Press and hold **Volume Down**, then press and hold **Power**.
Pixel	sailfish	Press and hold **Volume Down**, then press and hold **Power**.
hikey	hikey	Link pins 1 - 2 and 5 - 6 of J15.
Nexus 6P	angler	Press and hold **Volume Down**, then press and hold **Power**.
Nexus 5X	bullhead	Press and hold **Volume Down**, then press and hold **Power**.
Nexus 6	shamu	Press and hold **Volume Down**, then press and hold **Power**.
Nexus Player	fugu	Press and hold **Power**.
Nexus 9	volantis	Press and hold **Volume Down**, then press and hold **Power**.
Nexus 5	hammerhead	Press and hold both **Volume Up** and **Volume Down**, then press and hold **Power**.
Nexus 7	flo	Press and hold **Volume Down**, then press and hold **Power**.
Nexus 7 3G	deb	Press and hold **Volume Down**, then press and hold **Power**.
Nexus 10	manta	Press and hold both **Volume Up** and **Volume Down**, then press and hold **Power**.
Nexus 4	mako	Press and hold **Volume Down**, then press and hold **Power**.

Nexus 7 (2012)	grouper	Press and hold **Volume Down**, then press and hold **Power**.
Nexus 7 3G (2012)	tilapia	Press and hold **Volume Down**, then press and hold **Power**.
Nexus Q	phantasm	Power the device then cover it with one hand after the LEDs light up and until they turn red.
Galaxy Nexus GSM	maguro	Press and hold both **Volume Up** and **Volume Down**, then press and hold **Power**.
Galaxy Nexus (Verizon)	toro	Press and hold both **Volume Up** and **Volume Down**, then press and hold **Power**.
Galaxy Nexus (Sprint)	toroplus	Press and hold both **Volume Up** and **Volume Down**, then press and hold **Power**.
Motorola Xoom	wingray	Press and hold **Volume Down**, then press and hold **Power**.
Nexus S	crespo	Press and hold **Volume Up**, then press and hold **Power**.
Nexus SG	crespo4g	Press and hold **Volume Up**, then press and hold **Power**.

[Unlocking the bootloader]

You can flash a custom system only if the bootloader allows it. Note, though, that the bootloader is locked by default. You can unlock the bootloader, but doing so deletes user data for privacy reasons. After unlocking, *all* data on the device is erased, that is, both private app data and shared data accessible over USB (including photos and movies). Before attempting to unlock the bootloader, back up any important files on the device.

You need to unlock the bootloader only once, and you can re-lock it if necessary.

[Unlocking recent devices]

All Nexus and Pixel devices released since 2014 (starting with Nexus 6 and Nexus 9) have factory-reset protection and require a multistep process to unlock the bootloader.

1. To enable OEM unlocking on the device:
    1. In Settings, tap **About phone**, then tap **Build number** seven times.
    2. When you see the message *You are now a developer!*, tap the **back** button.
    3. In Settings, tap **System**, then tap **Developer options** and enable **OEM unlocking** and **USB debugging**. (If **OEM unlocking** is disabled, connect to the internet so the device can check in at least once. If it remains disabled, your device might be SIM locked by your carrier and the bootloader can't be unlocked.)
2. Reboot into the bootloader and use `fastboot` to unlock it.
    - For newer devices (2015 and higher):

      :::

      ```
      fastboot flashing unlock
      ```

    - For older devices (2014 and lower):

      :::

      ```
      fastboot oem unlock
      ```

      Tip: if you're seeing `adb devices` output before reboot but fastboot or the flash script are misbehaving, it might be issues with your USB cable. Try a different port and/or switching connectors. If you are using a USB C port on your computer try a USB A port instead.

3. Confirm the unlock onscreen.

Note: On Nexus 10, after unlocking the bootloader, the internal storage remains unformatted. You can format the device using `fastboot format cache` followed by `fastboot format userdata`.

[Re-locking the bootloader]

To re-lock the bootloader:

- For newer devices (2015 and higher):

```
fastboot flashing lock
```

- For older devices (2014 and lower):

```
fastboot oem lock
```

Note: Re-locking the bootloading on a Motorola Xoom erases all user data (including the shared USB data).

[Using flash lock states]

The `getFlashLockState()` system API transmits the bootloader state and the `PersistentDataBlockManager.getFlashLockState()` system API returns the bootloader's lock status on compliant devices.

Return value	Conditions
`FLASH_LOCK_UNKNOWN`	Returned only by devices upgrading to Android 7.x or higher that didn't previously support the bootloader changes required to get the flash lock status if they supported flashing lock/unlock capability. • New devices running Android 7.x or higher must be in either a `FLASH_LOCK_LOCKED` or `FLASH_LOCK_UNLOCKED` state. • Devices upgrading to Android 7.x or higher that don't support flashing unlock/lock capability should return a `FLASH_LOCK_LOCKED` state.
`FLASH_LOCK_LOCKED`	Returned by any device that doesn't support flashing lock/unlock (that is, the device is always locked), or any device that supports flashing lock/unlock and is in the locked state.
`FLASH_LOCK_UNLOCKED`	Returned by any device that supports flashing lock/unlock and is in the unlocked state.

Manufacturers should test the values returned by devices with locked and unlocked bootloaders. For an example, the Android Open Source Project (AOSP) contains a reference implementation that returns a value based on the `ro.boot.flash.locked` boot property. Example code is located in the following directories:

- `frameworks/base/services/core/java/com/android/server/PersistentDataBlockService.java` s/base/core/java/android/service/persistentdata/Persist dir="ltr"}

[Selecting a device build]

The recommended device builds are available from the `lunch` menu, accessed when running the `lunch` command with no arguments. See Choosing a target for available build types and more information on the `lunch` command.

You can download factory images and binaries for Pixel and Nexus devices from developers.google.com. See Device binaries for downloads. For details and additional resources, see Obtaining proprietary binaries.

Device	Code name	Build configuration
Pixel 6 Pro	raven	`aosp_raven-userdebug`
Pixel 6	oriole	`aosp_oriole-userdebug`
Pixel 5	redfin	`aosp_redfin-userdebug`
Pixel 4a 5G	bramble	`aosp_bramble-userdebug`
Pixel 4a	sunfish	`aosp_sunfish-userdebug`
Pixel 4 XL	coral	`aosp_coral-userdebug`
Pixel 4	flame	`aosp_flame-userdebug`
Pixel 3a XL	bonito	`aosp_bonito-userdebug`
Pixel 3a	sargo	`aosp_sargo-userdebug`
Pixel 3 XL	crosshatch	`aosp_crosshatch-userdebug`
Pixel 3	blueline	`aosp_blueline-userdebug`
Pixel 2 XL	taimen	`aosp_taimen-userdebug`
Pixel 2	walleye	`aosp_walleye-userdebug`
Pixel XL	marlin	`aosp_marlin-userdebug`
Pixel	sailfish	`aosp_sailfish-userdebug`
HiKey	hikey	`hikey-userdebug`
Nexus 6P	angler	`aosp_angler-userdebug`
Nexus 5X	bullhead	`aosp_bullhead-userdebug`
Nexus 6	shamu	`aosp_shamu-userdebug`
Nexus Player	fugu	`aosp_fugu-userdebug`
Nexus 9	volantis (flounder)	`aosp_flounder-userdebug`
Nexus 5 (GSM/LTE)	hammerhead	`aosp_hammerhead-userdebug`
Nexus 7 (Wi-Fi)	razor (flo)	`aosp_flo-userdebug`
Nexus 7 (Mobile)	razorg (deb)	`aosp_deb-userdebug`
Nexus 10	mantaray (manta)	`full_manta-userdebug`

Nexus 4	occam (mako)	`full_mako-userdebug`
Nexus 7 (Wi-Fi)	nakasi (grouper)	`full_grouper-userdebug`
Nexus 7 (Mobile)	nakasig (tilapia)	`full_tilapia-userdebug`
Galaxy Nexus (GSM/HSPA+)	yakju (maguro)	`full_maguro-userdebug`
Galaxy Nexus (Verizon)	mysid (toro)	`√aosp_toro-userdebug`
Galaxy Nexus (Experimental)	mysidspr (toroplus)	`aosp_toroplus-userdebug`
Motorola Xoom (U.S. Wi-Fi)	wingray	`full_wingray-userdebug`
Nexus S	soju (crespo)	`full_crespo-userdebug`
Nexus S 4G	sojus (crespo4g)	`full_crespo4g-userdebug`

Note: Don't use Android 4.1.1 on a Nexus 7 originally sold with Android 4.1.2 or higher.

[Flashing a device]

You can flash an entire Android system in a single command; doing so verifies that the system being flashed is compatible with the installed bootloader and radio, writes the boot, recovery, and system partitions together, then reboots the system. Flashing also erases all user data, similarly to `fastboot oem unlock`.

To flash a device:

1. Place the device in `fastboot` mode by holding the appropriate key combination at boot or using the following command:

   ```
   adb reboot bootloader
   ```

2. After the device is in fastboot mode, run:

   ```
   fastboot flashall -w
   ```

   The `-w` option wipes the `/data` partition on the device; this is useful for your first time flashing a particular device but is otherwise unnecessary.

Note: File systems created with `fastboot` on Motorola Xoom don't function optimally. The Android team recommends that you recreate file systems through recovery using `$ adb reboot recovery`. While in recovery, open the menu (press **Power + Volume Up**), wipe the cache partition, then wipe the data.

[Restoring devices to factory state]

Factory images for Google devices are available from Factory Images for Nexus and Pixel Devices. Factory images for the Motorola Xoom are distributed directly by Motorola.