

# Upgrading Android on a Tablet

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Khalid Baheyeldin  
<http://2bits.com>



# Background

- Almost accidental ...
- Tablet died, would not boot (see list archive)
- Attempts to revive it (hardware, then software)
- Discovered a whole world of recovery managers and ROMs
- Experience distilled into this talk



# Goals

- Breathe new life in an older tablet (bought May 2011).
- Speed it up by doing away with preinstalled packages that start automatically.
- Get the latest possible Android version on it.
- Fun with experimenting!



- Acer Iconia A500
  - Applies to A501, which adds a SIM card
- Nvidia Tegra 2 platform
  - T20 CPU (Cortex A9 dual core), @ 1GHz
  - 1 GB RAM
- 16GB or 32GB of flash storage, and microSD
- 1280 x 800 pixel display
- Back and front cameras, GPS, Bluetooth



- Shipped with Android Honeycomb 3.x
- Android Ice Cream Sandwich (4.0.x) available OTA (over the air).
- Two more releases, not available from Acer:
  - Jelly Bean (4.1.x to 4.3)
  - KitKat (4.4)





# Where To Start?

- First, **[xda-developers.com](http://xda-developers.com)**, per device forums.
- Then, **[tegraowners.com](http://tegraowners.com)**



# Steps

- Boot into APX mode
  - Paper clip into **reset** for 4 seconds, power for 4 seconds, then reset for 2 more seconds
- Get the CPU ID (CPU UUID)
  - C program to do USB read when in APX mode
- Convert to SBK (Secure Boot Key)
  - C program or perl script
- Use nvflash



# Partitioning

- Different for Honeycomb than subsequent versions of Android
- So, you need to repartition, and put a bootloader
- Tools
  - Babsector
  - Timmy Dean V4 Rollback (tdv4)
  - V8 Bootloader





# Partitions

- /boot: Kernel and RAMdisk
- /recovery: Alternate boot partition, used for recovery systems (covered later)
- /system: Android itself (or custom ROM), mounted read-only
- /data: Your apps and data, read-write
- /cache: Dalvik cache, other cached stuff
- /flexrom: Specific to Acer



- Nvidia specific flashing tool
  - Command line tool for Windows and Linux
  - .deb available (wrapper that downloads)
  - <http://share.grandou.net/debian/nvflash/>
  - Not open source
- Used for:
  - partitioning,
  - Installing a bootloader,
  - Installing recovery, ...



# Recovery

- Options (for most devices):
  - ClockWorkMod (CWM)
  - Team Win Recovery Tool (TWRP)
- Once you have a modern recovery, you can:
  - Backup and Restore to/from microSD card (Nandroid, just a tar archive with md5sum)
  - Install a new ROM from microSD .zip file
  - Install Google Apps
  - Install root (SuperSU)



# Recovery

- Button Sequence
  - Volume Down + Power, until vibrate
  - Keep holding Volume Down for a few seconds



# OmniROM

- An alternative to CyanogenMod
- More adventurous in experimenting with features
- Has a good community at Tegra Owners
- Kitkat 4.4.4 version available for said tablet
- Has ART (Android Runtime, successor to Dalvik)
- Much faster than stock ROMs!



- BusyBox pre-installed
  - crond, wget, ssh, sshd, tar, ...
- Terminal pre-installed
- Hacker Keyboard for a full QWERTY keyboard (with arrow keys and tab key!)
- Nova Launcher, a fast Home app



# Tips and Tricks

- Using tar and md5sum, I was able to emulate Nandroid backups, in either TWRP or CWM format, and run them from cron!
- Got sshd working, so I can ssh to the tablet's command line!





# Walkthrough

Let us see all this in action ...







# Bonus

Still with me?





# Lubuntu 14.04

- Detailed instructions available for running Lubuntu 14.04 on Acer A500
- Full Linux, with X and a Desktop!
- Side by side along Android ...





# Questions?

Any questions? Comments?

