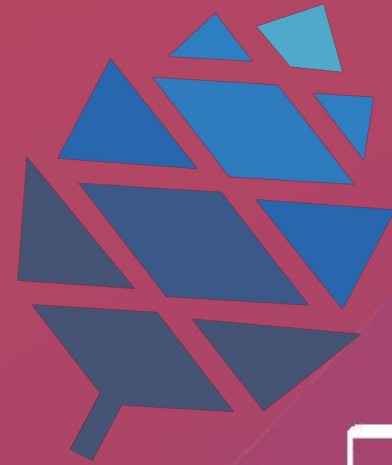


The Journey to Ubuntu Touch 20.04 on Pine64

Oren Klopfer



1.1 Intro: About Me

Why Ubuntu Touch? Why Pine64?

- Tech tinkering
- Ubuntu obsessions
- Asahi aspirations
- Affordable, accessible, and Linux-first
- Pine cone-ctions



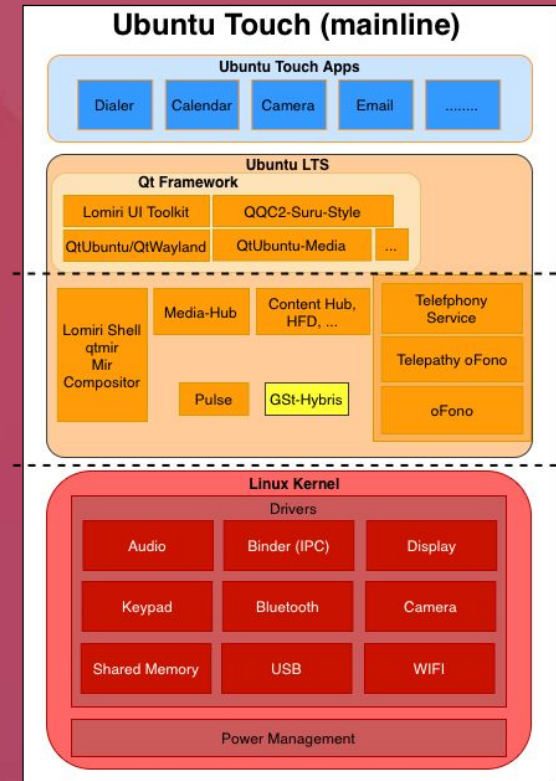
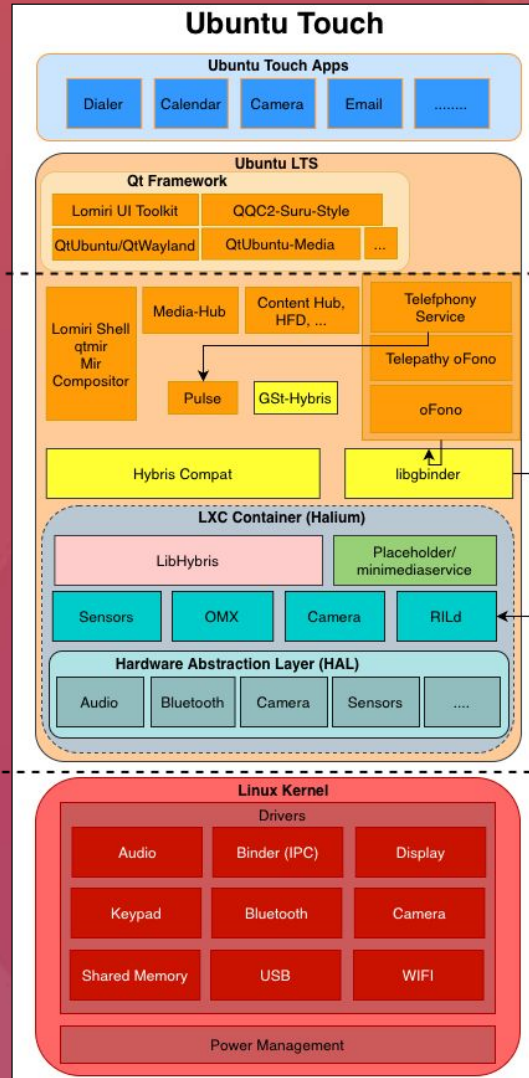
1.2 Intro: Thesis

What makes Pine64 devices different from most Ubuntu Touch devices?

- Halium vs mainline kernels

What makes Ubuntu Touch different from most mobile linux distributions?

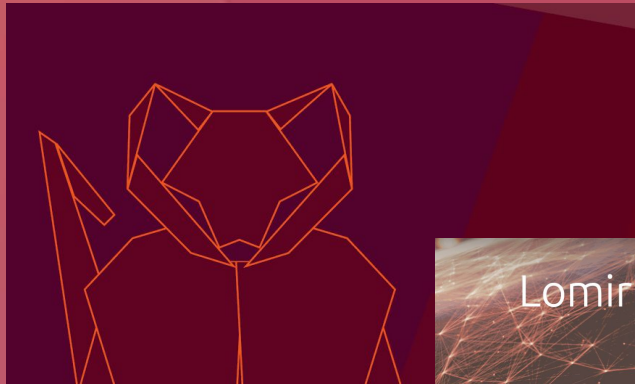
- r/o vs r/w filesystems
- OTA vs incremental updates



2.1 Background: Ubuntu Touch 16.04 -> 20.04

2020, UBports changes brewing:

- 16.04 -> ~~18.04~~ -> 20.04
- Unity8 -> Lomiri
- Upstart -> Systemd



Major Changes:

- Use Ubuntu 20.04 (focal fossa) as base OS.
- Support Android 9+-based devices.
- Fork Unity8 as Lomiri and make it available to distributions other than Ubuntu (many components have been renamed to land properly in the Lomiri namespace).
- Switch from Upstart to Systemd.
- Localization platform (i18n) moved to the hosted weblate service.
- Move our development platform from Github.com to Gitlab.com.
- Use Ayatana Indicators instead of Ubuntu Indicators.
- Move from Anbox to Waydroid (pre-installed for Android 9+ and mainline kernel devices).
- New porting style for device porters (overlay store method).
- Support building many components against GCC-12 and Qt 5.15. (Make the project future-ready).

Most important Bug Fixes:

- Some devices would not mute the phones microphone during phone calls.
- Context menu fix in Morph Browser (amend context menus from Morph and QtWebengine interfering with one another).

2.2 Background: 16.04 Port & Maintainer

2020, Pine64 & UBports partner up:

- PinePhone CE releases w/ Ubuntu Touch
- PineTab follows suit
- Dalton's work



PinePhone_PineTab

master | pinephone / +

History Find file Edit Code

Merge branch 'slicer69-master-patch-79858' into 'master' 2359923c Dalton Durst authored 2 years ago

Name	Last commit	Last update
build	Fix generation of appropriate scr for pin...	2 years ago
overlay/system	Revert "Set HiFi playback rate to 48kHz"	2 years ago
uboot	Switch PineTab image to the correct dt...	2 years ago
.gitignore	Add automatic tarball builder	3 years ago
.gittab-ci.yml	Install the ar utility	2 years ago
README.md	Fix file extension from "gz" to "xz" to re...	2 years ago
build.sh	Fix generation of appropriate scr for pin...	2 years ago

README.md

PinePhone / PineTab

This repository is used for documentation, issue tracking, and project management for the Pine64 PinePhone and Pine64 PineTab ports of Ubuntu Touch. Unlike the other Community Ports repositories, it does not contain Android binaries for building system images.

This repository also contains configuration and scripts to build a device tarball. Device tarballs are unpacked over an Ubuntu Touch tarball during a system-image installation process.

How do I install Ubuntu Touch on my PinePhone?

You will need a microSD card, 8GB or larger.

UBports / Merge requests

Open 3 Merged 479 Closed 34 All 516

Recent searches Author = Dalton Durst

2.3 Background: Intro of PinePhone Pro

A turn of tides in 2022:

- Dalton departs
- PinePhone Pro EE
- Initial interest, but no UT port!

Support status

The following ratings are indicators of the expected support for this port.

Compatibility rating: ★ ★ ★

- ✗ Only manual installation is available
- ✓ Phone maker supports the device
- ✗ Inactive for a long time
→ Last commit on 12/15/2021
- ✓ Has a stable release channel
- ✓ Repositories are hosted by UBports
- ✗ This is an outdated Ubuntu Touch release

✗ Inactive for a long time
→ Last commit on 12/15/2021

Release channels

This device gets updates through these channels, [learn more](#) about OTA updates

Ubuntu Release	Channel	Version	Release Date	Description
16.04 - xenial	stable	2020-09-18	9/18/2020	Stability over newer features (recommended)
16.04 - xenial	rc	2021-08-20	8/18/2021	Testing before the next stable release
16.04 - xenial	devel	2022-11-25	11/21/2022	Daily built development releases

This page contains a list of all available releases and tools for the [PinePhone Pro](#).

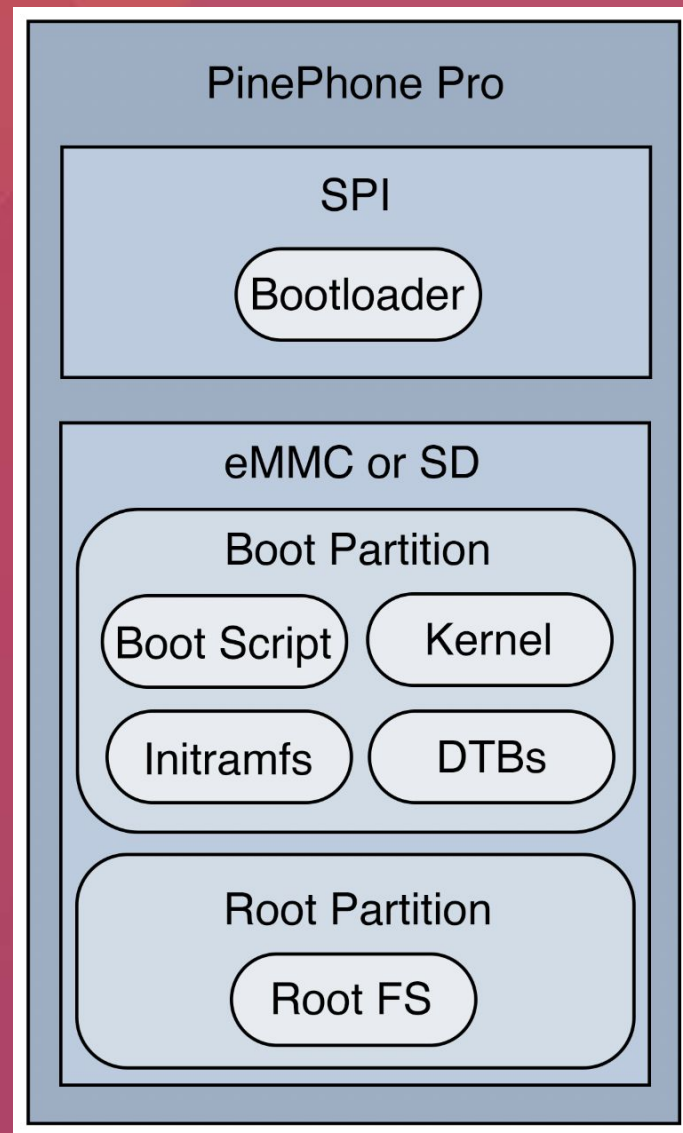
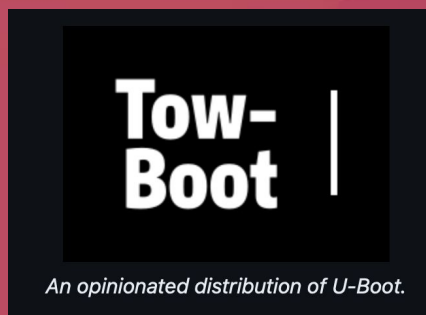
Contents [\[hide\]](#)

- 1 Software releases
 - 1.1 Arch Linux ARM
 - 1.1.1 Download
 - 1.1.2 Notes
 - 1.2 Gentoo
 - 1.2.1 Download
 - 1.2.2 Notes
 - 1.3 GloDroid
 - 1.3.1 Download
 - 1.3.2 Notes
 - 1.4 LuneOS
 - 1.4.1 Download
 - 1.4.2 Notes
 - 1.5 Manjaro ARM
 - 1.5.1 Download
 - 1.6 Mobian
 - 1.6.1 Download
 - 1.6.2 Notes
 - 1.7 Nemo Mobile
 - 1.7.1 Download
 - 1.7.2 Notes
 - 1.8 NiXOS
 - 1.8.1 Download
 - 1.8.2 Notes
 - 1.9 postmarketOS
 - 1.9.1 Download
 - 1.9.2 Notes
 - 1.10 Various DPA Images
 - 1.10.1 Download
 - 1.10.2 Notes
- 2 Tools
- 3 Factory releases



3.1 Process: First Steps

- DPA builder inspiration
- Understanding the structure
- Praise Tow-Boot
- extlinux for boot scripts



DPA images

These are unofficial images of various Debian-based distributions built by me (DPA / Daniel Patrick Abrecht). These images also contain some of my own software.

The build scripts can be found in various places: [GitLab](#), [my server](#), [GitHub](#)

Filter

Board	All	librem5-devkit	librem5-phone	pinephone-pro	raspberry-pi-3-b+
Distro	All	debian	devuan	kali	ubuntu
Release	All	bookworm	daedalus	kali-rolling	jammy
Variant	All	base	dpaw	phosh	
Date	All	2024-01-28			

3.2 Process: Kernel Games

- Downstream DTBs
- Learning from Megi
- Incongruent solutions
- First Ubuntu image

Mainline linux kernel for Orange Pi PC/PC2/PC3/One, TBS A711, PinePhone (Pro), PocketBook Touch Lux 3

This kernel tree is meant for:

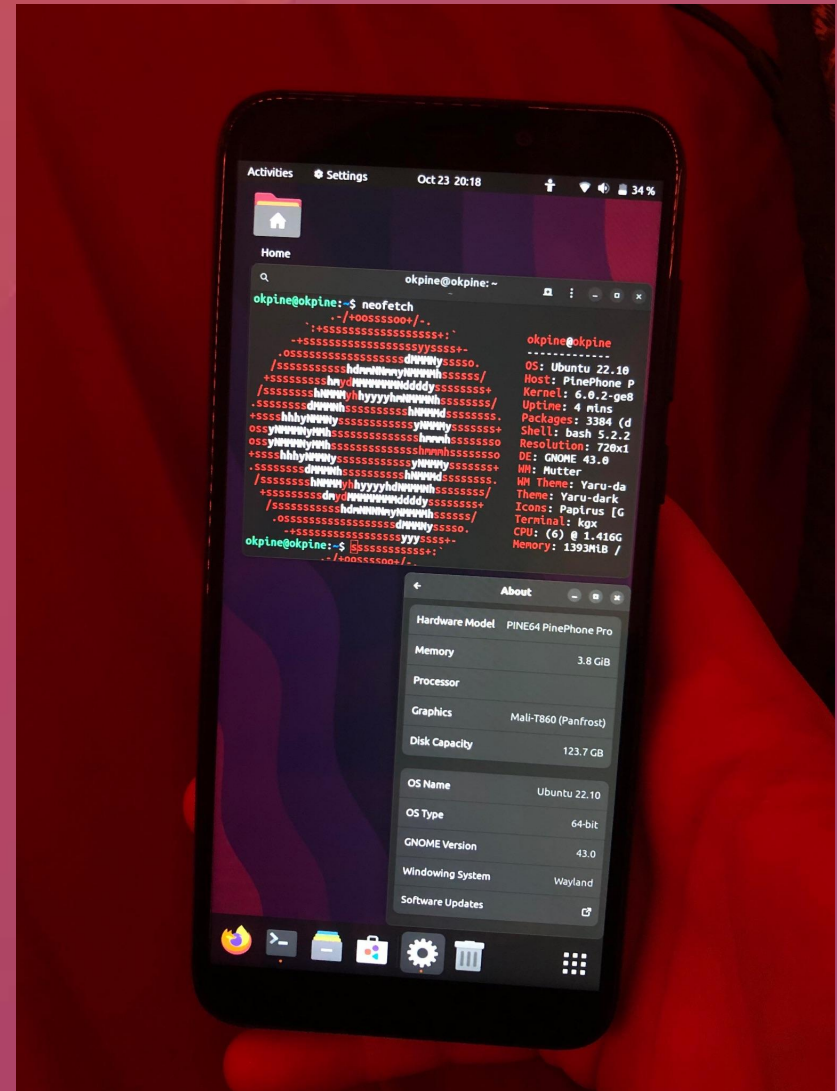
- Orange Pi One
- Orange Pi PC
- Orange Pi PC 2
- Orange Pi 3
- PinePhone 1.0, 1.1 and 1.2(a/b)
- TBS A711 Tablet
- PocketBook Touch Lux 3
- Pinebook Pro
- Pinephone Pro

Features in addition to mainline:

- [Orange Pi One/PC/PC2] More aggressive OPPs for CPU
- [All] Mark one of DRM planes as a cursor plane, speeding up Xorg based desktop with modesetting driver
- [Orange Pi One/PC/PC2] Configure on-board micro-switches to perform system power off function
- [Orange Pi One/PC/PC2/3] HDMI audio
- [Orange Pi 3] Ethernet
- [TBS A711] HM5065 (back camera) / GC2145 (front camera)
- [PinePhone] WiFi, Bluetooth, Audio, Modem power, HDMI out over USB-C, USB-C support, cameras, PMIC improvements, power management, fixes here and there
- [PocketBook Touch Lux 3] Display and Touchscreen support
- [Pinephone Pro] Everything

Pre-built u-boot and kernels are available at <https://xf.cz/kernels/>

You may need some firmware files for some part of the functionality. Those are available at: <https://megous.com/git/linux-firmware>



3.3 Process: Towards Ubuntu Touch

- Debos building
- FOSDEM 2023: early stage 20.04 port for PinePhone Pro
- FOSDEM 2024: stable 20.04 port for 4 devices:
 - PinePhone
 - PinePhone Pro
 - PineTab
 - PineTab2

Actors: <ul style="list-style-type: none">✓ Manual brightness✓ Notification LED✓ Torchlight✓ Vibration	<ul style="list-style-type: none">✓ Volume control in calls Endurance: <ul style="list-style-type: none">✗ 24+ hours battery lifetime✗ 7+ days stability	Network: <ul style="list-style-type: none">✓ Bluetooth✓ Flight mode✓ Hotspot✓ WiFi
Camera: <ul style="list-style-type: none">✓ Flashlight✗ Photo✗ Video✗ Switching between cameras	GPU: <ul style="list-style-type: none">✓ Boot into UI✓ Hardware video playback Misc: <ul style="list-style-type: none">✓ AppArmor patches✓ Battery percentage✗ Offline charging✓ Online charging✓ Reset to factory defaults✓ RTC time✓ SD card storage✓ Shutdown / Reboot✗ Wireless External monitor✓ Waydroid	Sensors: <ul style="list-style-type: none">✗ Automatic brightness✗ GPS✗ Proximity✓ Rotation✓ Touchscreen Sound: <ul style="list-style-type: none">✓ Earphones✓ Loudspeaker✓ Microphone✓ Volume control
Cellular: <ul style="list-style-type: none">✓ Carrier info, signal strength✓ Data connection✓ Incoming, outgoing calls✓ MMS in, out✗ PIN unlock✓ SMS in, out✓ Change audio routings✓ Voice in calls		USB: <ul style="list-style-type: none">✗ Wired External monitor



The screenshot shows the Ubuntu Touch website interface. At the top, it says "ubuntu touch" with a sun icon and a hamburger menu. Below that, it says "4 supported devices" with a dropdown arrow. A search bar contains the word "Pine". There are "Filters" and "Show only" sections. The "Show only" section has buttons for "Phone", "Tablet", and "Others". The "Features" section has buttons for "Installer", "Waydroid", and "Display out". The "Development Stage" section shows four stars and "Core Connectivity". The "Built on" section has buttons for "Haliium", "Native", and "Legacy". The "Release" section has buttons for "16.04 - xenial (outdated)" and "20.04 - focal". The "Sort by" section has buttons for "ABC", "Progress", and "Price". At the bottom, there are four device entries: "PinePhone Pro", "PinePhone", "PineTab", and "PineTab2", each with a horizontal progress bar.

3.4 Process: Revival of the Original PinePhone

- Original PinePhone stuck behind on 16.04
- Learning from Megi, again
- Unified kernel
- Tow-Boot!! :)
- No phone, no problem

PINE64 Pinephone (A64)

Manufacturer
PINE64

Name
Pinephone (A64)

Identifier
pine64-pinephoneA64

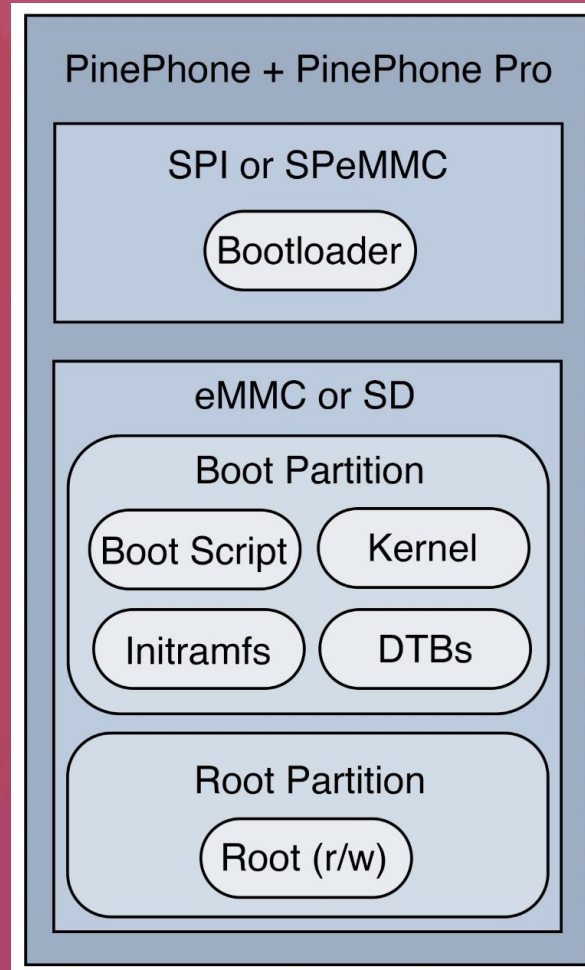
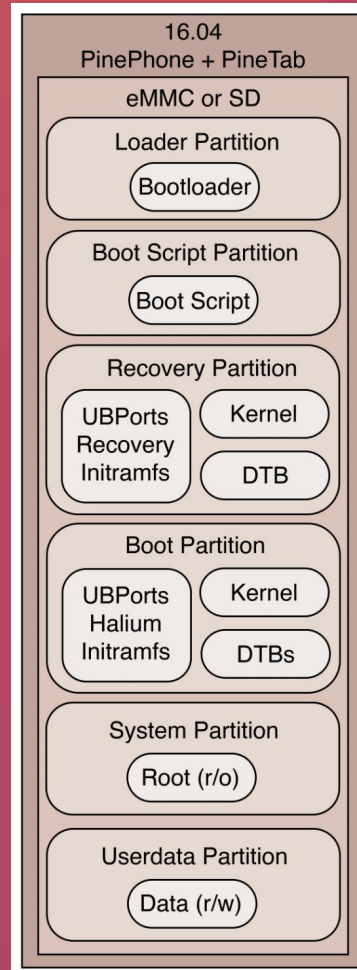
SoC
allwinner-a64

Dedicated firmware storage
yes

Architecture
aarch64-linux

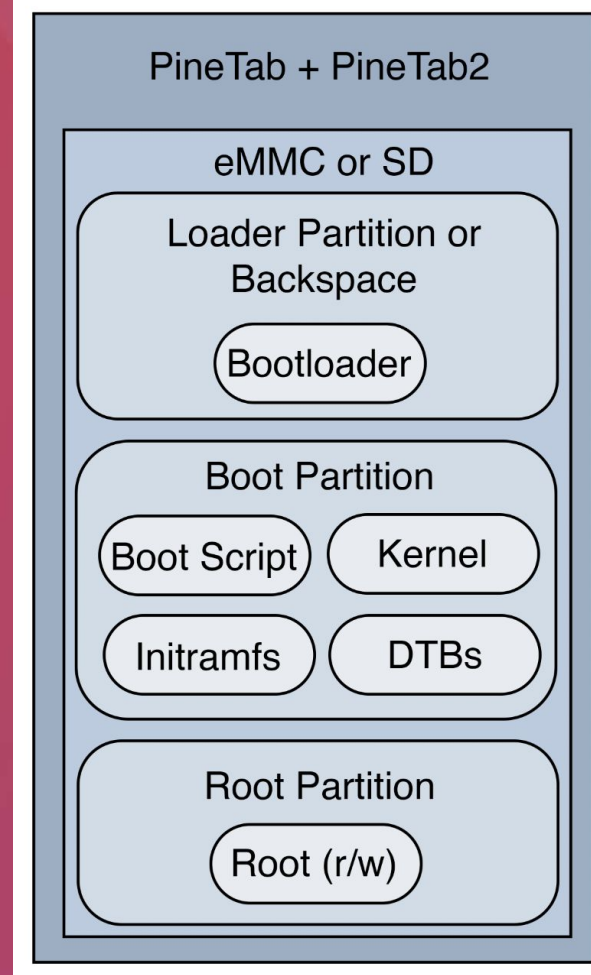
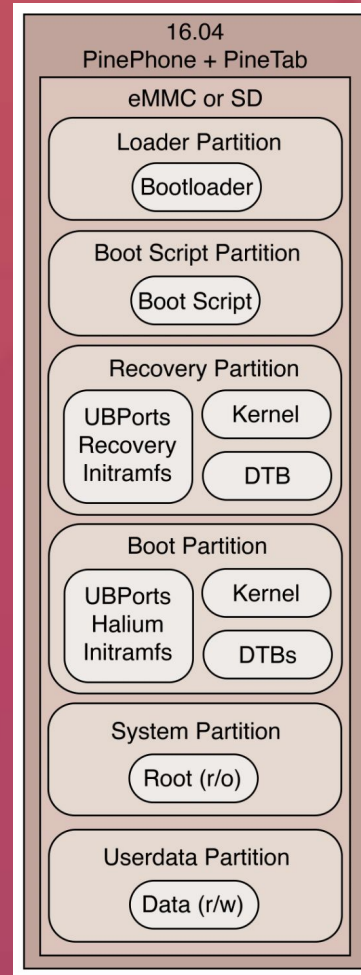
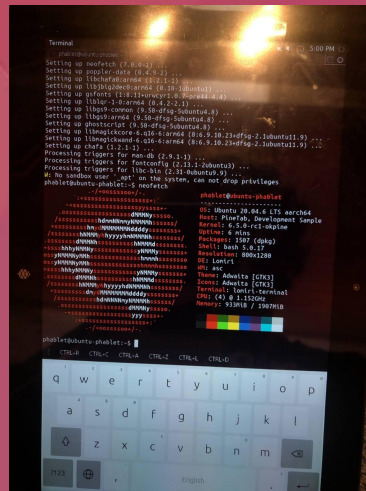
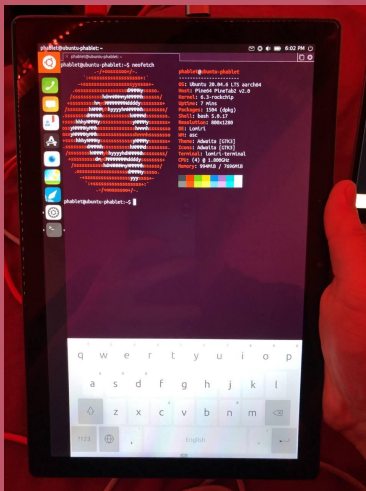
Source
[Tow-Boot repository](#)

Links
[Product page](#)



3.5 Process: PineTab2 Intro & OG PineTab Revival

- PineTab2 release, plus a gift
- Too early for Tow-Boot; u-boot binaries
- Original PineTab stuck behind, a donation offered
- Tow-Boot!! >:(
- Kernel 6.1+ on the PineTab

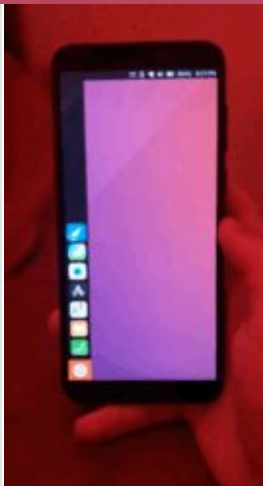


4.1 Struggles: Modem & Rotation

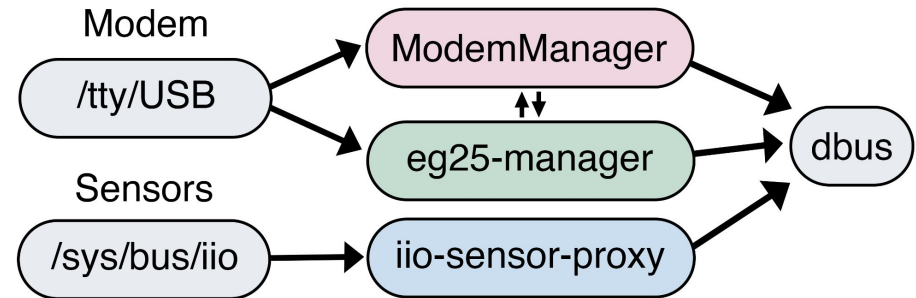
Consequences of Halium-oriented Congruence:

- ModemManager vs ofono: where EG25 is reliable
- iio-sensor-proxy vs sensorfw: writing our own profiles
- DSI enumeration: it's a mir-acle!

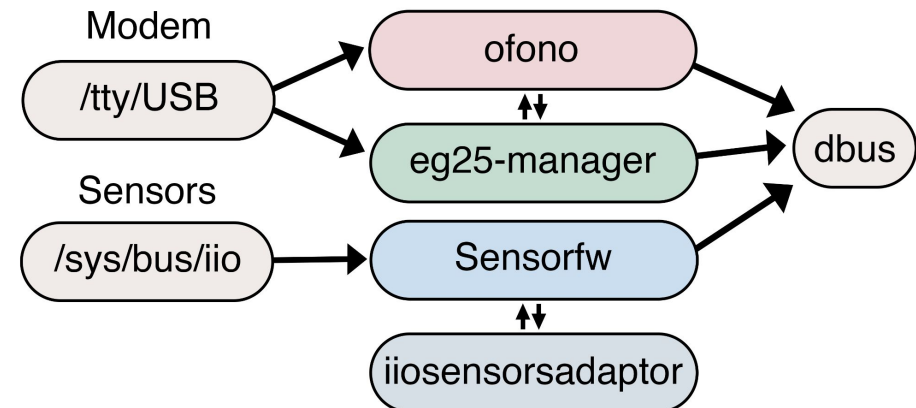
```
124     case Type::HDMI-B:         return
125     QStringLiteral("HDMI-B");
126     case Type::TV:             return
127     QStringLiteral("TV");
127 +   case Type::Virtual:        return
128     QStringLiteral("Virtual");
128 +   case Type::DSI:           return
129     QStringLiteral("DSI");
129 +   case Type::DPI:           return
130     QStringLiteral("DPI");
130     case Type::Unknown:
131     default:
132     return QStringLiteral("Unknown");
```



Most PinePhone-Friendly Distros:



Ubuntu Touch 20.04 Images:

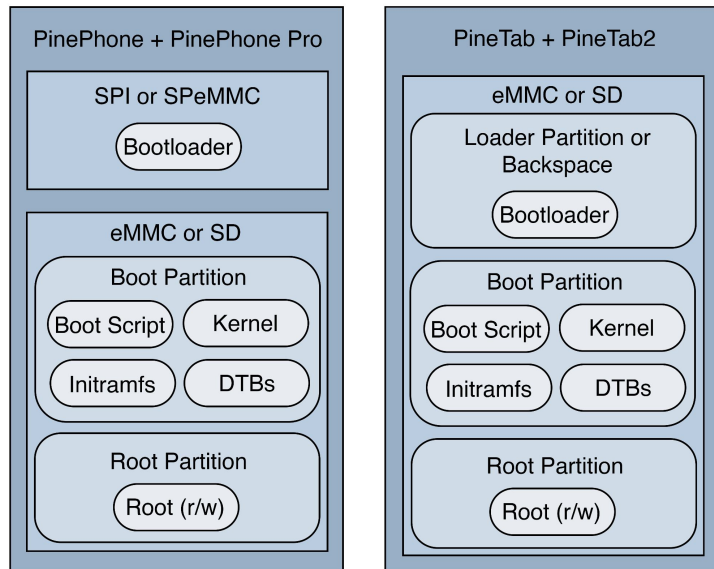


4.2 Struggles: Read-Only & Recovery

- OTA Updates
- Immutability
- Initramfs scripts

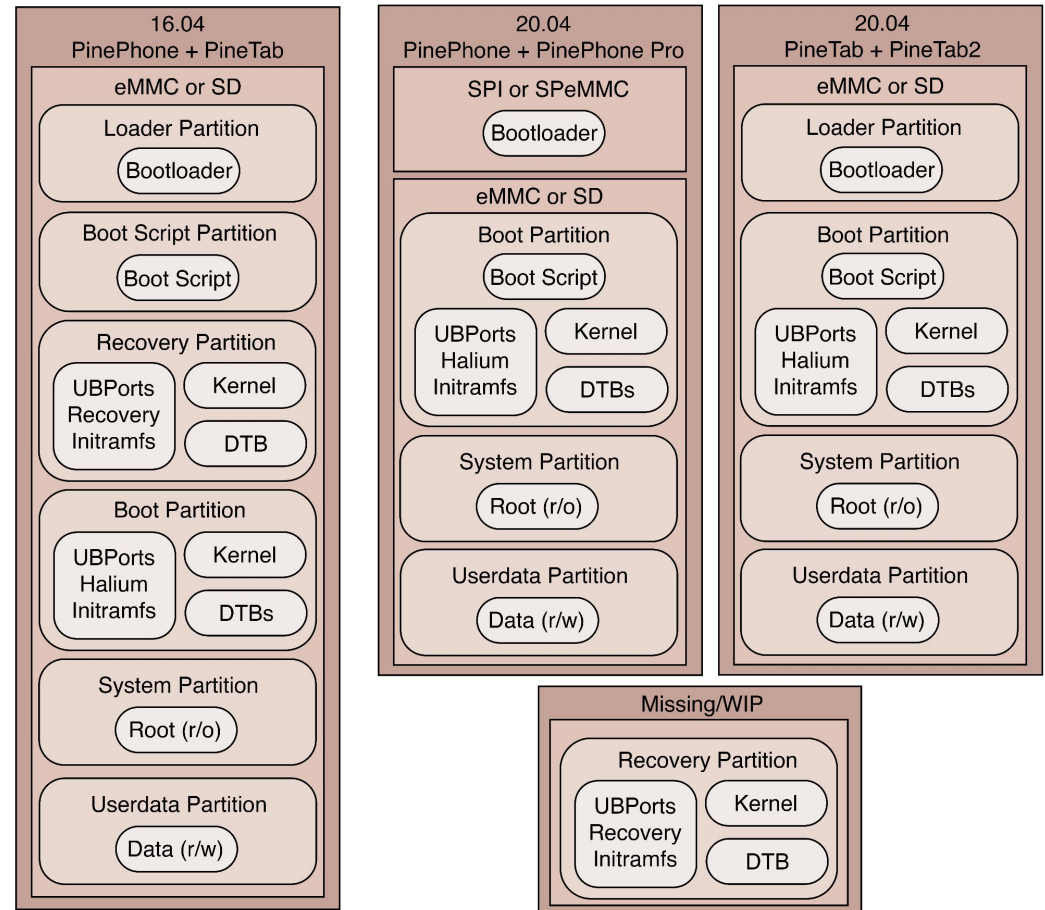
Standard Image Boot Structure

Used by 20.04 Port Before OTA-4



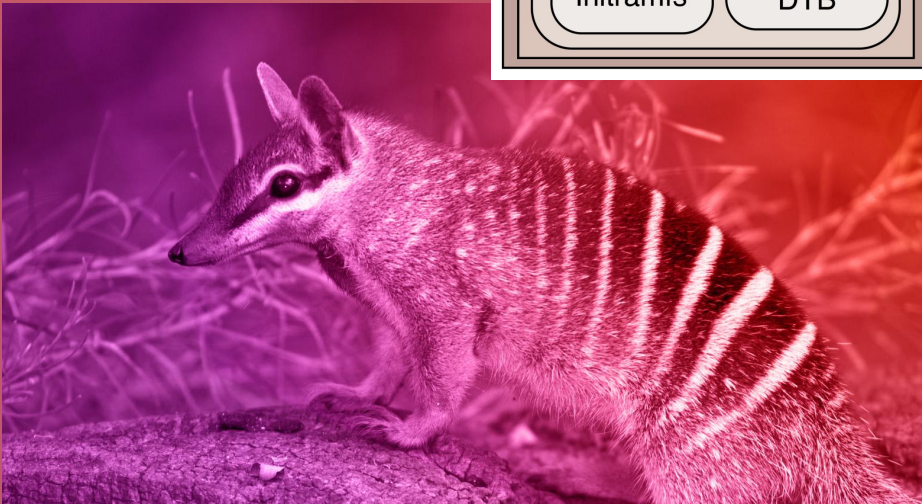
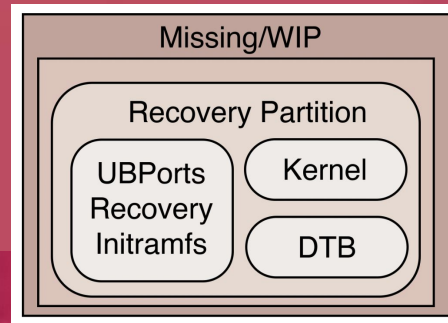
Ubuntu Touch Image Structure

Used by 20.04 Port After OTA-4



5.1 Looking Forward: Where next?

- Recovery & OTA Images
- Prep for 24.04
- Lomiri on Mainline (Debian, Ubuntu)



The screenshot shows the 'lomiri' package page on a website. At the top, there is a search bar with the text 'Jump to package...' and a 'Go' button. The package name 'lomiri' is prominently displayed, followed by the description 'Shell of the Lomiri Operating Environment'. There are links for 'Register', 'Log in', and a 'Subscribe' button. Below this, there are sections for 'general', 'versions', 'versioned links', and 'binaries'. The 'general' section lists source, version, maintainer, uploaders, arch, std-ver, and VCS. The 'versions' section lists stable and unstable versions. The 'versioned links' section shows links for both stable and unstable versions. The 'binaries' section lists various binary packages.

general	
source:	lomiri (main)
version:	0.1.3-1
maintainer:	Debian UBports Team (DMD)
uploaders:	Mike Gabriel [DMD] – Marius Gripsgard [DMD]
arch:	all any
std-ver:	4.6.2
VCS:	Git (Browse , QA)

versions	
stable:	0.1.2-3
unstable:	0.1.3-1

versioned links	
0.1.2-3:	📄 📁 🔗 🔗 🔗 🔗 📦
0.1.3-1:	📄 📁 🔗 🔗 🔗 🔗 📦

binaries	
liblomiri-private0	
lomiri	
lomiri-common	
lomiri-doc	
lomiri-greeter	
lomiri-tests	

Thank you!
Demos, Questions

