PineTime

A Programmer's Toy and Beyond

FOSDEM
3 February 2024

Who I am?

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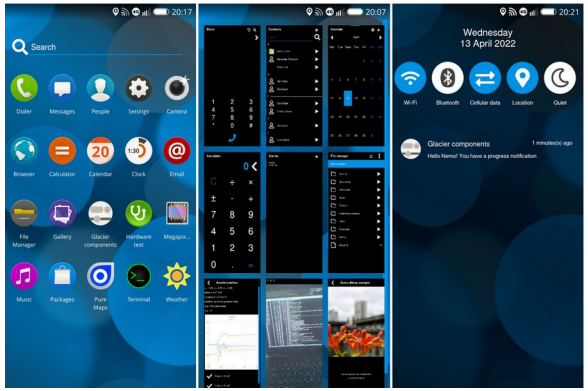
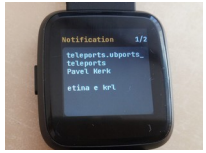


OpenAlt konference



DEVCONF.cz

open source community conference

June 13-15, 2024

Brno, Czech Republic

Call for Proposals

Submit your proposals by March 3, 2024.

What smartwatch you want?

- Zephyr ZSWatch
  https://www.pcbway.com/project/shareproject/ZSWatch_Open_Source_Smartwatch_4ca3bcf6.html
- Bangle.js 2
  https://banglejs.com/
- SQFMI Watchy
  https://watchy.sqfmi.com/
- AsteroidOS
  https://asteroidos.org/
- Pine64 PineTime
  https://wiki.pine64.org/wiki/PineTime

Specifications

- Nordic Semiconductor nRF52832 with 64 MHz ARM Cortex-M4F
- 64 KB RAM
- 512 KB ROM + 4 MB SPI Flash
- ST7789 Display (240x240, RGB 65K) + CST816S Touch Panel
- BMA421, HRS3300, Vibration motor
- BT 5.0 including BLE
- 180 mAh 3.8V LiPo

InfiniTime

Firmware for Pinetime smartwatch written in C++ and based on FreeRTOS

Wasp OS

A MicroPython based development environment for smart watches (including Pine64 PineTime)

Rust Riot

Rust on RIOT Firmware for PineTime Smart Watch with NimBLE and LVGL

GadgetBridge

Android App for Pebble, Mi Band, Amazfit Bip (and more) without the vendor's closed source application and without the need to create an account and transmit any of your data to the vendor's servers.

Amazfish

SailfishOS, Ubuntu Touch, Kirigami, Controls smartwatch companion app

Others

Siglo – gtk based companion app
ITD – go companion app
Watchmate – rust companion app
InfiniLink - iOS app

InfiniTime

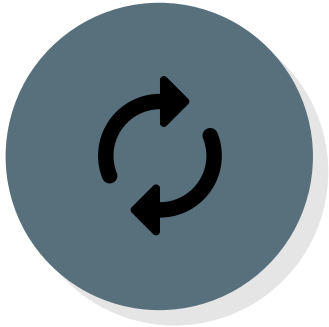
Vision

> InfiniTime is a community-built smartwatch firmware. It offers freedom and privacy advantages unavailable to users of proprietary wearable technology.
>
> InfiniTime is not to be used for medical or other health tracking purposes.

Why you need smartwatch?

Health monitoring

Steps counter
Heart rate
Sleep



Notifications

Phone calls
Emails, Chats
Alarms
Calendars

Activities

Weather forecast
Music remote control
Navigation
Apps/Games (2, pong, calculator, QR/bar codes)

Apps (watch faces, settings, games,...)

Application layer

System Task

Display Task

FreeRTOS

System layer

3rd party libs (LVGL, NimBLE,...)

Device drivers (display, touch panel,...)

Controllers (battery, alarm, fs, motion)

Abstraction layer

NRF SDK

Low level drivers (SPI, I2C,...)

Low level layer

01 User

User initiates feature request; developers assess feasibility and user experience.

02 Simulator

Debugging efficiency is a key advantage. It eliminates the need for firmware loading, saving valuable development time.

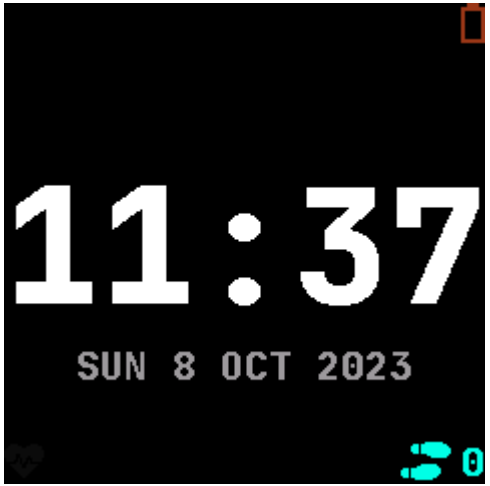
03 InfiniTime

Certian features require direct interaction with the device, necessitating hands-on work. Debugging is limited but achievable via UART.

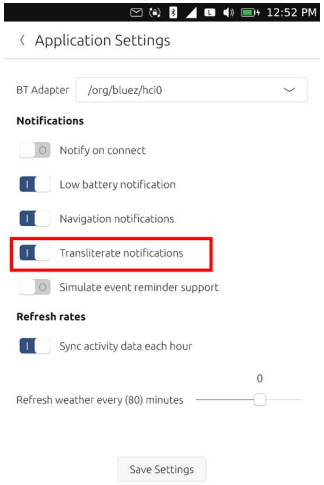
04 Amazfish

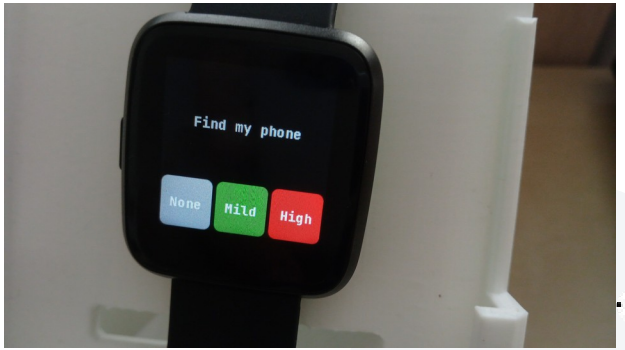
The companion app must be aligned with the new feature, ensuring a cohesive and functional ecosystem for the end user.

Simulator

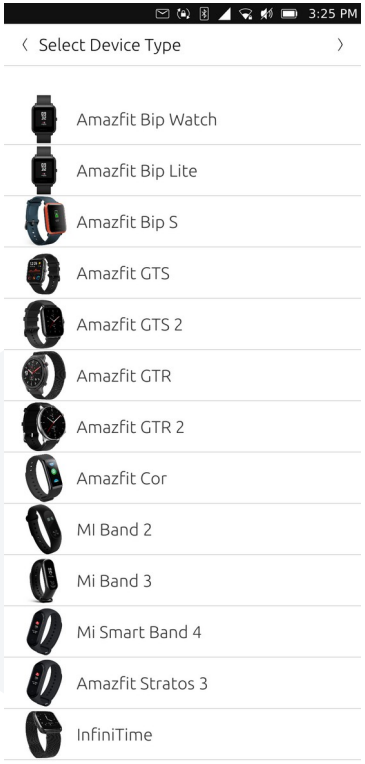


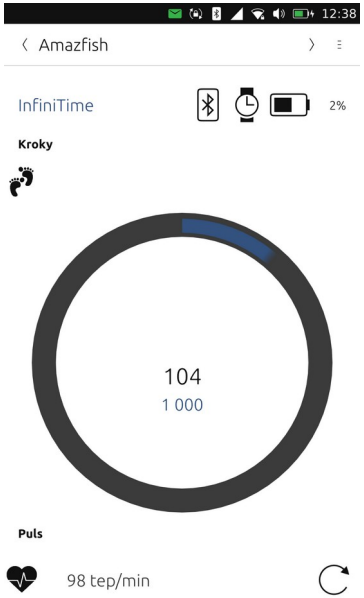
Amazfish Notifications

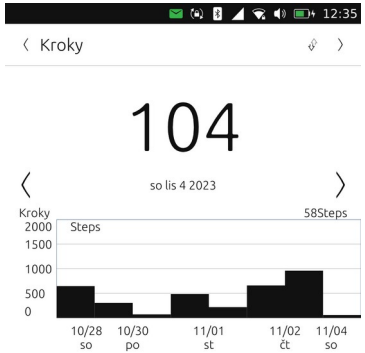




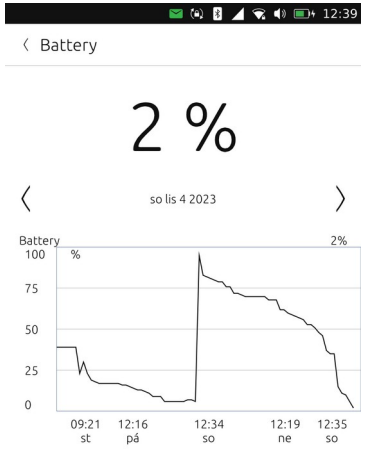
Amazfish


3:25 PM
Select Device Type
Amazfit Bip Watch
Amazfit Bip Lite
Amazfit Bip S
Amazfit GTS
Amazfit GTS 2
Amazfit GTR
Amazfit GTR 2
Amazfit Cor
MI Band 2
Mi Band 3
Mi Smart Band 4
Amazfit Stratos 3
InfiniTime


12:38
Amazfish
InfiniTime
2%
Kroky
104
1 000
Puls
98 tep/min

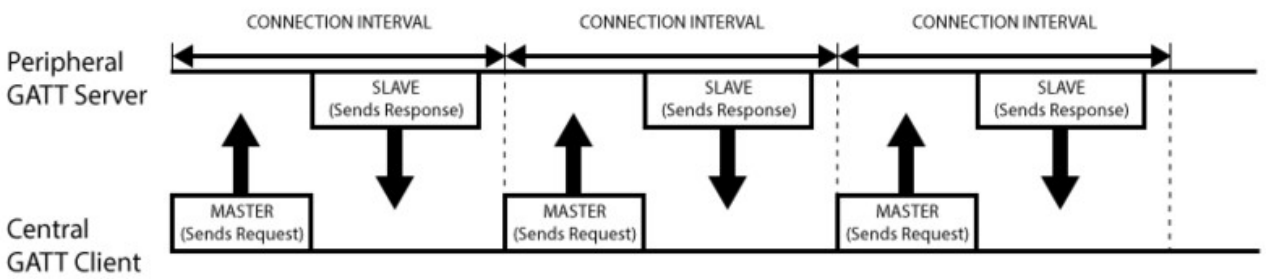

12:35
Kroky
104
so lis 4 2023
Kroky
58Steps
Steps
2000
1500
1000
500
0
10/28 so
10/30 po
11/01 st
11/02 čt
11/04 so

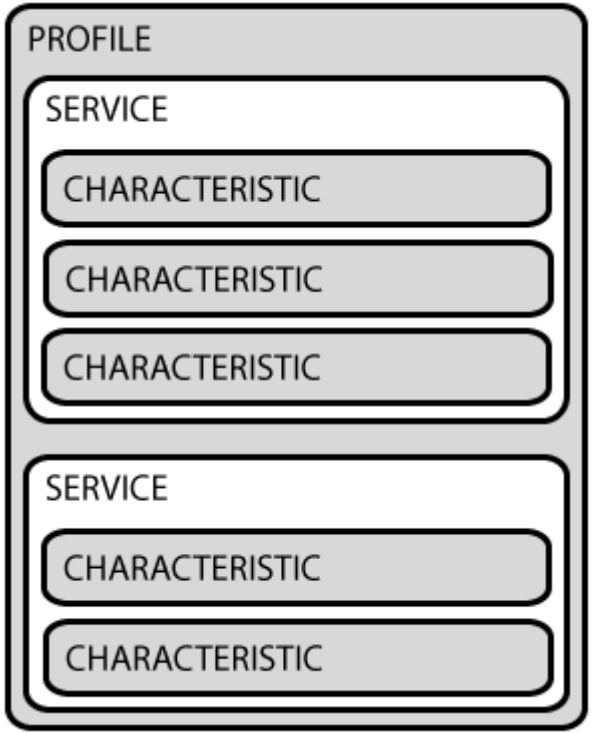
15:55
Puls
95 tep/ min
42
133
so říj 7 2023
TEP/MIN
79BPM
BPM
200
150
100
50
0
06:31
14:54
15:19
15:36
15:53
Uvolněný 40%
Lehká 14%
Intensivní 37%
Aerobic 6%
Anerobic 0%
VO2 Max 0%


12:39
Battery
2 %
so lis 4 2023
Battery
2%
%
100
75
50
25
0
09:21 st
12:16 pá
12:34 so
12:19 ne
12:35 so

Bluetooth low energy

General attribute profile





Battery life

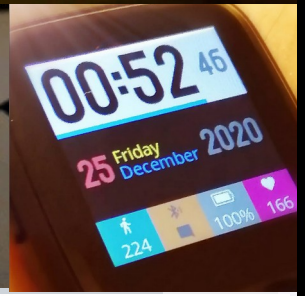
PineTime + Amazfish Features

Pairing	✓*
Notifications	✓
Calls	✓*
Settings	×
Alarms	×
Sync steps/Heartrate	✓
Sync Activities	×
Calendar sync	×
Firmware upload	✓
Battery status	✓
Navigation notifications	~
Music control	✓
Sync time	✓
Sync weather	✓
Gallery app	Desired
Remote (camera) control	Desired
OTP	Desired

13
29 17
WEDNESDAY 5

19°
Chuva/aguaceiros
Domingo 11

19 SUN
19
23
12590
0%


00:52 46
25 Friday
December 2020
224
100%
166

Sunday
09
May
2021
21:39 12
0
25%
12
SUN
09
PineTime
SUN
09
STEPS
0
22
Sun, 09 May
55
23 02
Sun, 09 May
23 · 06
Sunday, 09 May
23 : 09
Sunday, 09 May
23 : 12
Sunday, 09 May
23
16
SUNDAY 9

Display
Wake Up
Time format
Watch face
21:24
WED 21 APR 2021
00:09
InfiniTime
Version 1.0.0
Apr 21 2021
18:28:54
078
21:25
53%
Battery discharging
3.73 volts
01:24/04:41
Selah Sue
Summertime
Notification
1/2

PINE TIME
17:08
SATURDAY 11 JUL 2020
0 BPM
Pinetime
Version:0.6.1
Build: Jul 11 2020
16:06:22
Date: 11/07/2020
Time: 17:08:44
Uptime: 00d 00:49:00
Battery: 100%
Backlight: 1/3
Last reset: softr
Medium
VERSION: 0.6.1
Ok
Firmware update
11 %

Sunday
09
May
2021
21:39 12
0
25%
8
Steps
1000
Today 9 May
14°
Partly cloudy
17° / 13°
Odivelas Municipality
Pinetime
Pinetime
Incoming call
23:53
1/1
Message test from
Pinetime
Message test from
Pinetime
Unknown
53%
Battery discharging
3.77 volts
23:29
Display
Steps
Time format
Watch face
Wake Up
None
Single Tap
Double Tap
Raise Wrist