



the C++ InfiniTime Simulator for PineTime Smartwatch

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2022-04-23

- **Display:**
  - **Size:** 1.3 inches (33mm) diagonal)
  - **Resolution:** 240x240 pixels
- **System on Chip:**

Nordic Semiconductor nRF52832 with  
64 MHz ARM Cortex-M4F
- **Flash:**

514KB with additional 4MB SPI NOR
- **RAM:** 64KB
- **Bluetooth:** 5.0
  - (including Bluetooth Low Energy)
- **Sensors:**

Accelerometer, Heart rate sensor
- **Feedback:** Vibration motor
- **Battery:** 180mAh 3.8V LiPo

<https://wiki.pine64.org/wiki/PineTime>



# The Beginnings

- I've got a PineTime, and I'm loving it!
- I want to hack on the PineTime, but I'm afraid I'm destroying it
- Let's write a Simulator to check my changes before killing my beloved watch



And so the journey began



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

Application layer

System Task

Display Task



FreeRTOS

System layer

3<sup>rd</sup> 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

Figure from PR: <https://github.com/InfiniTimeOrg/InfiniTime/pull/1015>

Need LVGL simulator

...

found one!

[https://github.com/  
lvgl/lv\\_sim\\_eclipse\\_sdl](https://github.com/lvgl/lv_sim_eclipse_sdl)



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settings, games,...)

Application layer

System Task

Display Task

~~RTOS~~

~~FreeRTOS~~

System layer

~~3<sup>rd</sup> party libs  
(LVGL,  
Nordic...)~~

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Abstraction layer



Low level layer  
*Simulated*

C++ Logo: Jeremy Kratz - <https://github.com/isocpp/logos>  
SDL Logo: <https://www.libsdl.org>



My Little Pony: Friendship is Magic. Season 2 "Ponyville Confidential"



by Beavernator on deviantart

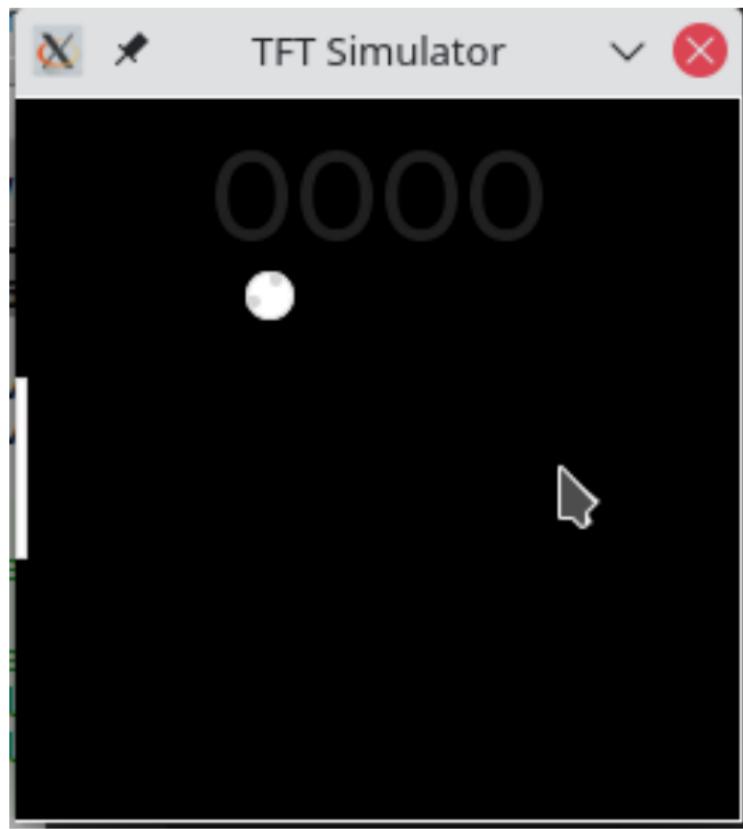
## Minimal Screen Constructor

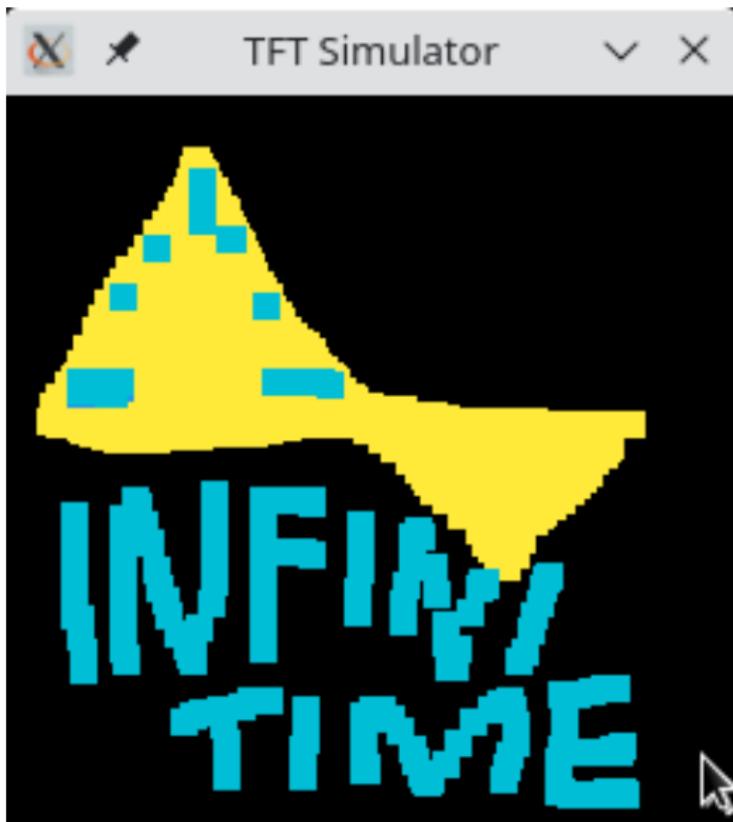
```
Screen(DisplayApp* app, LittleVgl& lvgl);
```

Copy dependencies and comment out everything I haven't handled yet

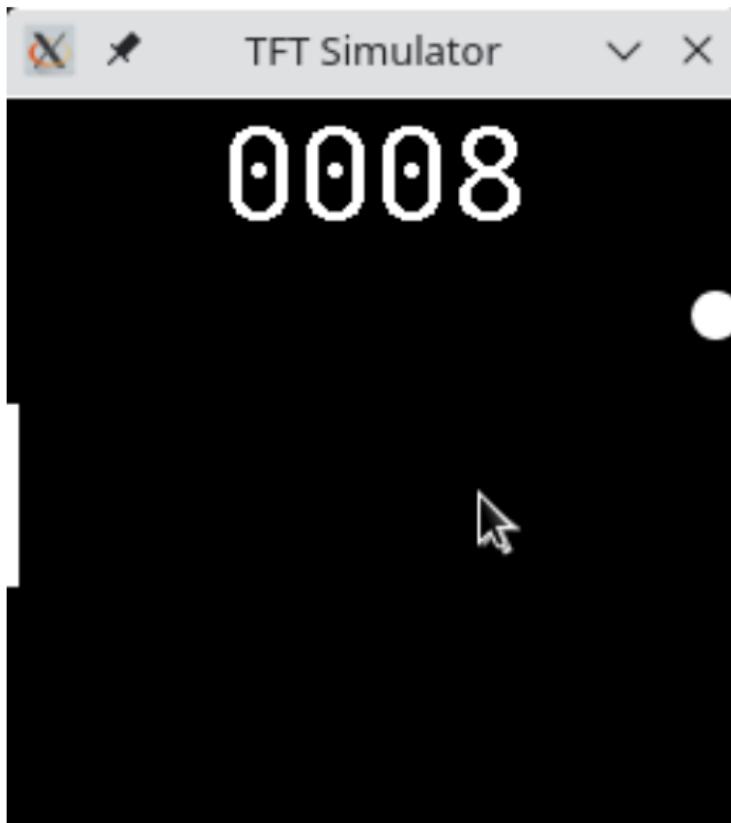
```
src/displayapp/DisplayApp.h  
    -> sim/displayapp/DisplayApp.h  
src/displayapp/DisplayApp.cpp  
    -> sim/displayapp/DisplayApp.cpp  
src/displayapp/LittleVGL.h  
    -> sim/displayapp/LittleVGL.h  
src/displayapp/LittleVGL.cpp  
    -> sim/displayapp/LittleVGL.cpp
```



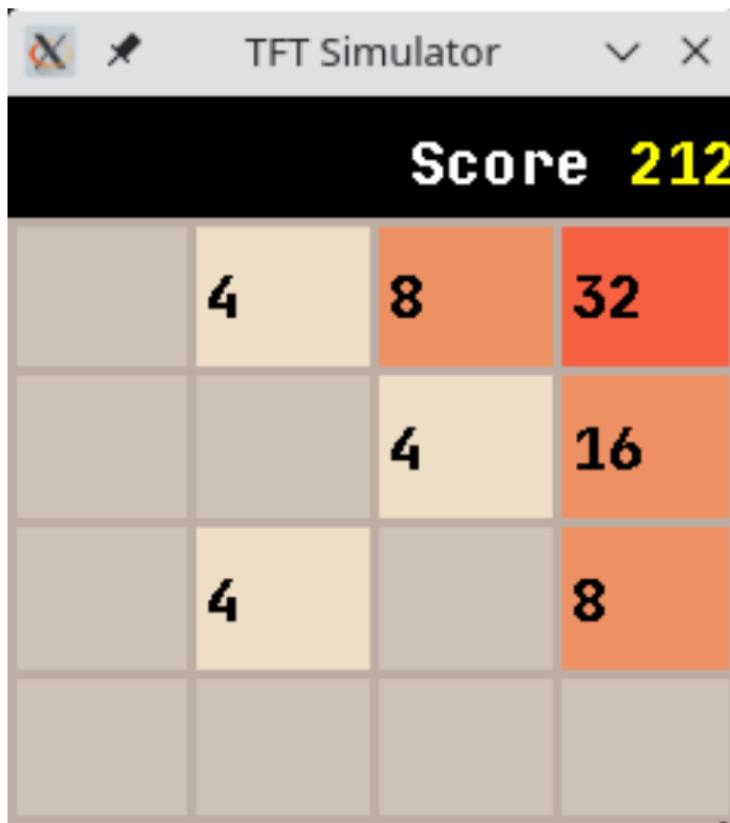




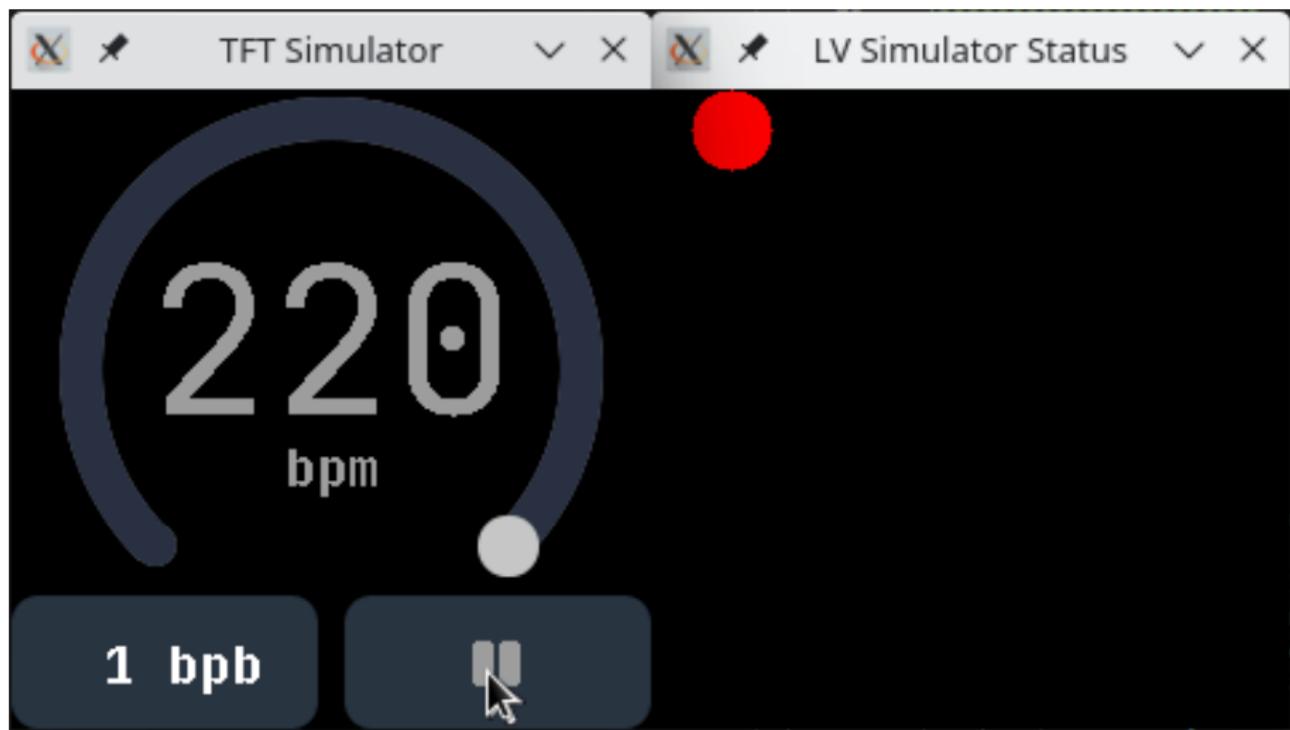
Writes directly to framebuffer, headache to simulate



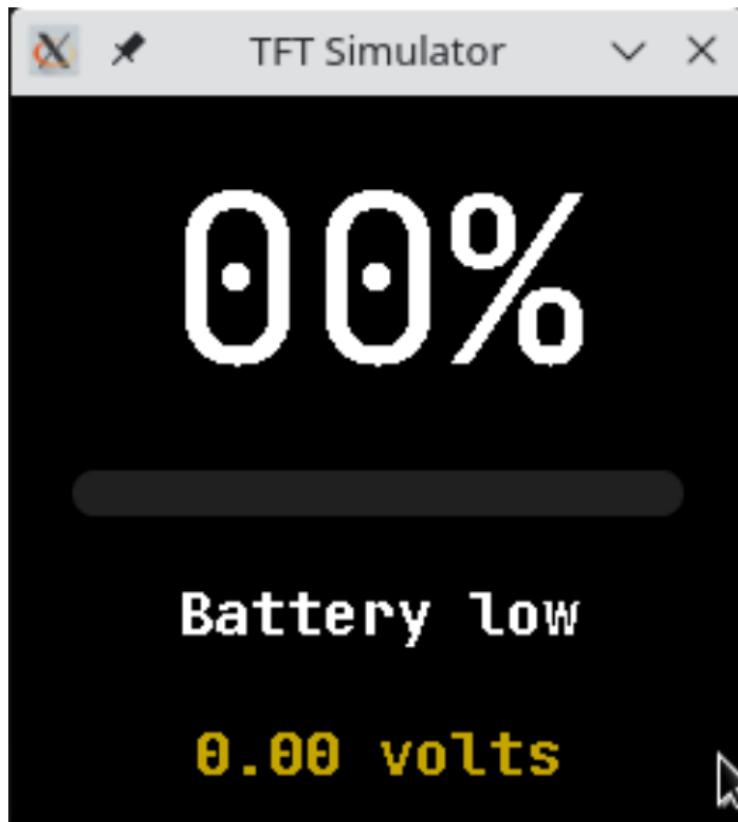
Found the fonts! Now it looks like on the watch



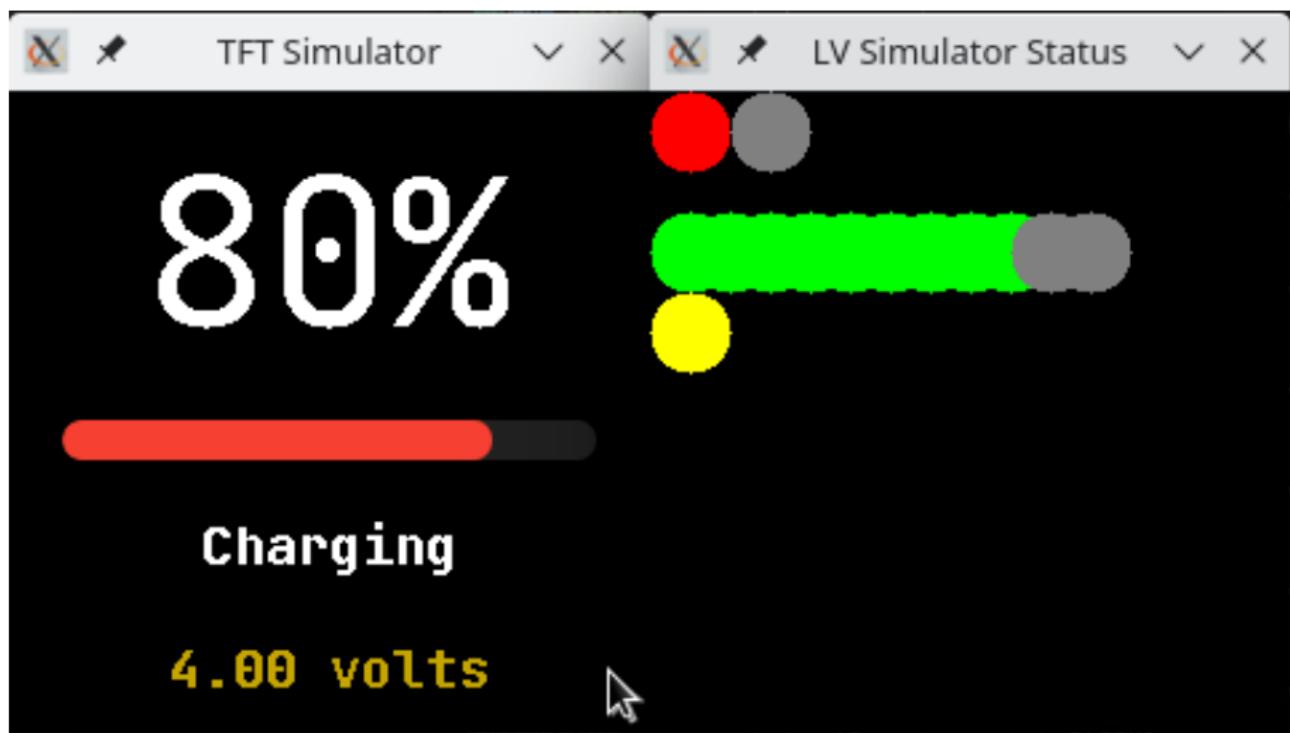
First swipes gestures implemented



First external hardware simulated: MotorController



Battery Empty??? Jokes on you! My PC has no battery!



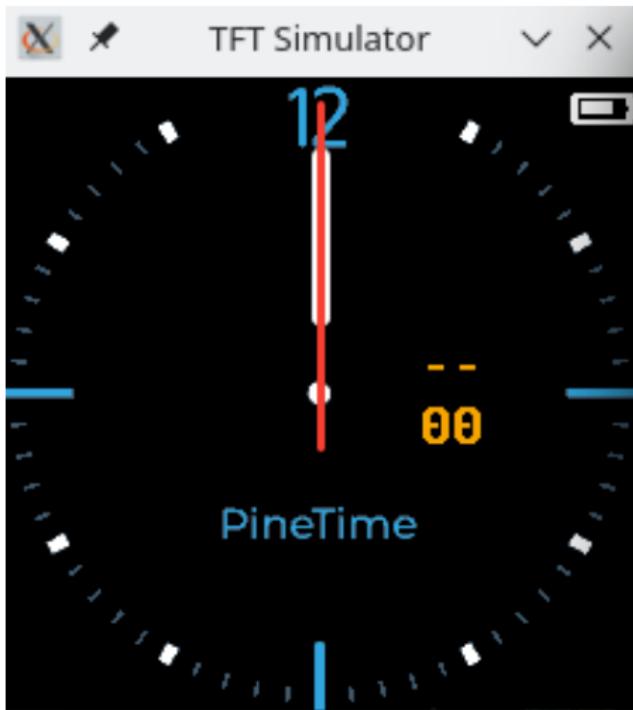
Found my simulated charging cable

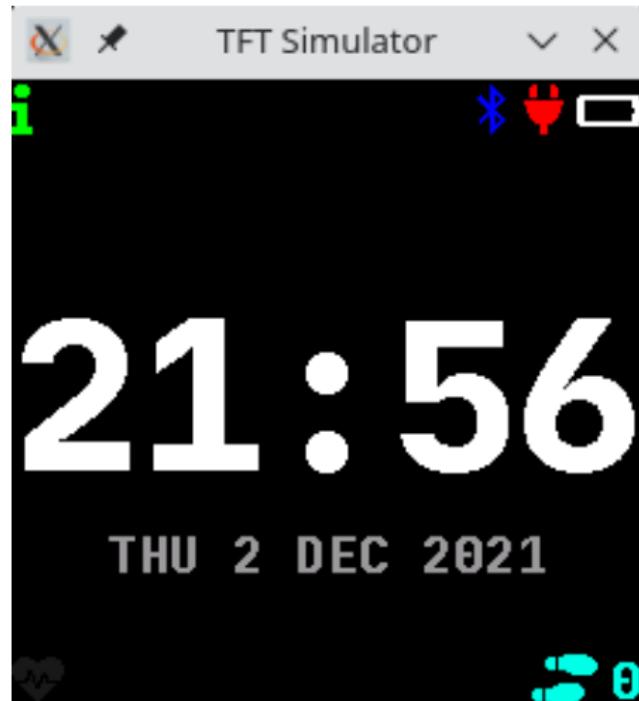
```
// uncomment the screen to use, disable others
#define LV_Paddle
//#define LV_InfiniPaint
//#define LV_Twos
// end compile time selection of screen
#if defined(LV_Paddle)
| Pinetime::Applications::Screens::Paddle screen(&app, lvgl);
#endif
#if defined(LV_InfiniPaint)
| Pinetime::Applications::Screens::InfiniPaint screen(&app, lvgl);
#endif
#if defined(LV_Twos)
| Pinetime::Applications::Screens::Twos screen(&app);
#endif
```

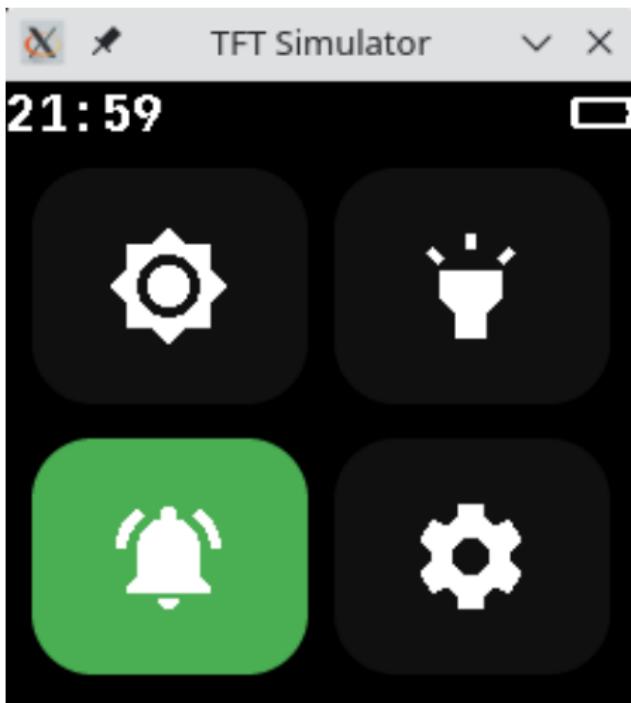
comment, uncomment, recompile, restart

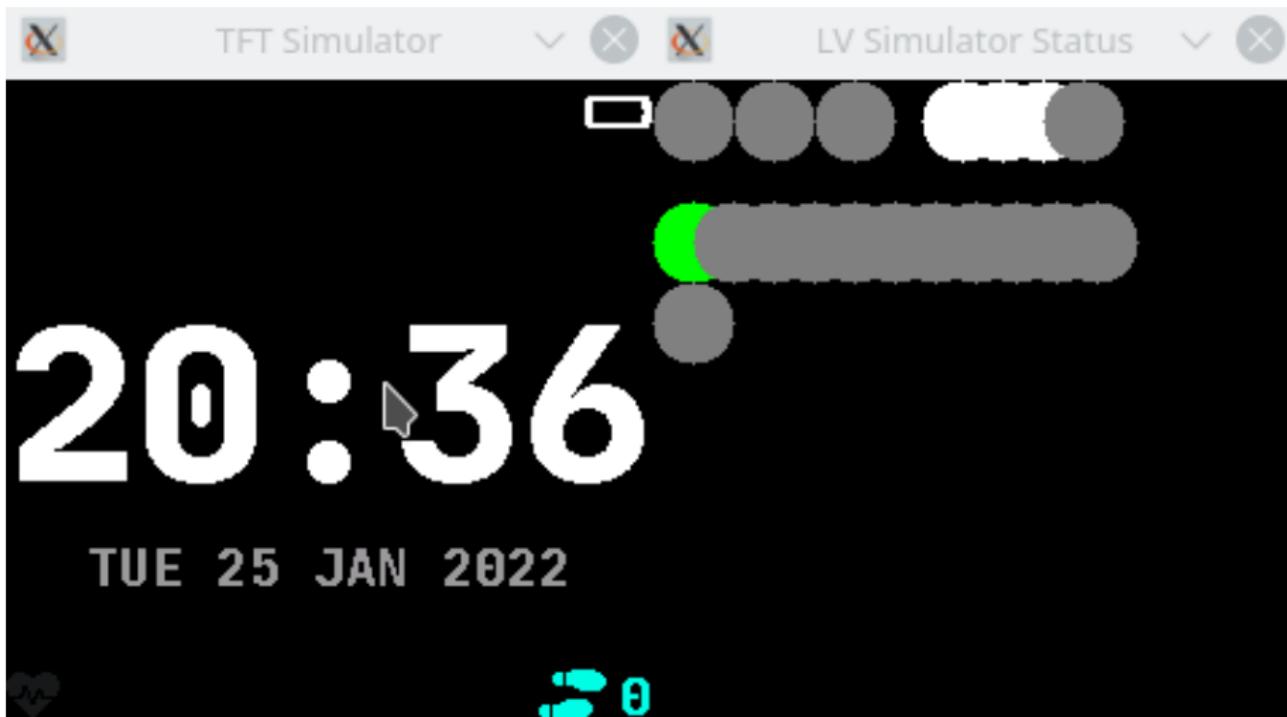
```
void switch_to_screen(uint8_t screen_idx)
{
    screen.reset();
    if (screen_idx == 1) {
        screen.reset(WatchFaceDigitalScreen());
    }
    else if (screen_idx == 2) {
        screen.reset(WatchFaceAnalogScreen());
    }
    else if (screen_idx == 3) {
        screen.reset(PineTimeStyleScreen());
    }
    else if (screen_idx == 4) {
        screen.reset(PaddleScreen());
```

hit key on keyboard, success!









First swiping gif of InfiniSim

<https://user-images.githubusercontent.com/9076163/151057090-66fa6b10-eb4f-4b62-88e6-f9f307a57e40.gif>



My Little Pony: Friendship is Magic. Season 1 Episode 25  
Gummy's "after-birthday" party

jf002 created this DM.



**jf002**

Hi! I'm currently writing the PineTime part of the Pine64 update blog post. I would like to post a few pictures of your simulator for InfiniTime, if you agree , of course :)



neroburner joined the room



InfiniTImeOrg / **InfiniSim** Public

Code Issues 4 Pull requests 3 Actions ...

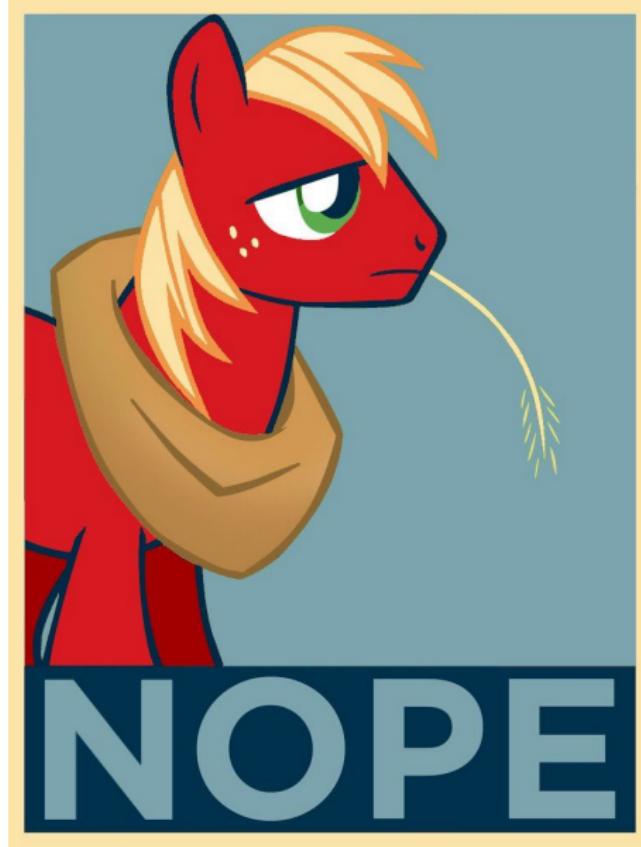
Initial InfiniSim project Browse files

main v1.9.0

NeroBurner committed on Feb 17  
1 parent cea006b commit f19355949b8f72d9269a40a79dff41afc

Showing 78 changed files with 9,978 additions and 0 deletions.

Split Unified



on pinterest by GUMMY MADERFAKER



JF @codingfield · 6 min

...

#InfiniSim, the #InfiniTime simulator by @Pyro4Hell, is running on the #PinephonePro @thepine64 !

Video : [video.codingfield.com/videos/watch/f...](http://video.codingfield.com/videos/watch/f...)

[github.com/InfiniTimeOrg/...](https://github.com/InfiniTimeOrg/)



1

1

5

1

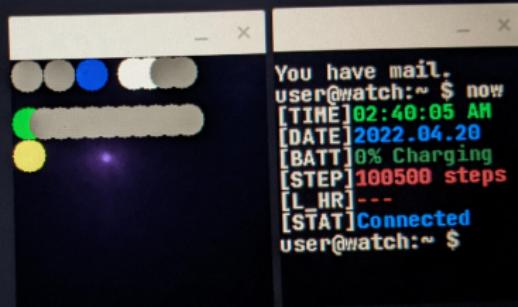
1

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## Pine64 March community update

```
info: [TOUCHPANEL] Sleep
info: [SPIMASTER] Wakeup
info: [TOUCHPANEL] Wakeup
info: [SpinNorFlash] Wakeup
info: [LCD] Wakeup
info: DimTimerCallback
info: Dim timeout -> Dim screen
info: IdleTimerCallback
info: Idle timeout -> Going to sleep
info: [systemtask] Going to sleep
info: [LCD] Sleep
info: [SPIMASTER] sleep
info: [TOUCHPANEL] Sleep
info: [SPIMASTER] Wakeup
info: [TOUCHPANEL] Wakeup
info: [SpinNorFlash] Wakeup
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info: [SPIMASTER] Wakeup
info: [TOUCHPANEL] Wakeup
info: [SpinNorFlash] Wakeup
info: [LCD] Wakeup
```



on reddit by joseph58tech

First swiping gif of InfiniSim

<https://user-images.githubusercontent.com/9076163/151057090-66fa6b10-eb4f-4b62-88e6-f9f307a57e40.gif>

Video - InfiniSim on the PinephonePro

<https://video.codingfield.com/videos/watch/f75c378e-bb0e-4b01-965a-64466c40ee36>

Twitter - InfiniSim on the PinephonePro

<https://twitter.com/codingfield/status/1495505602746986502>

Mastodon - InfiniSim on the PinephonePro

<https://mastodon.codingfield.com/@JF/107832366241507784>

InfiniSim

<https://github.com/InfiniTimeOrg/InfiniSim>



Thanks for  
listening

[https://mlpfanart.fandom.com/wiki/Big\\_Macintosh/Gallery](https://mlpfanart.fandom.com/wiki/Big_Macintosh/Gallery)