

Much Nerves - A Hello World For The Embedded World

@mattrudel - github.com/mtrudel - mat@geeky.net

The Plan

- What Is Nerves?
- Hello World
- GPIO Demo (LEDs and Buttons)
- Beyond GPIO
- Desk Clock Demo

What Is Nerves?

<https://www.nerves-project.org>

- Framework for running Elixir in embedded environments
- Handles cross-compilation, firmware packaging, lots of other details
- Runs the BEAM on top of a Buildroot-based Linux distro
- tl;dr: Elixir running on a RPi

Hello World

Step 1: Install Nerves

- <https://hexdocs.pm/nerves/installation.html>
- Very well documented (like most of Nerves)
- Beware of OTP mismatches! Just listen to instructions for the most part

Hello World

Step 2: Create a new project

- `mix nerves.new hello_nerves`
- `cd hello_nerves`
- `MIX_TARGET=rpi0 mix firmware.burn`

So what can you do with it?

- It's Just Elixir!
- iex REPL
- Can run Phoenix, make HTTP calls, etc
- Can also interact with the physical world

GPIO Hello World

Part 1: Blink an LED

- Usual warnings about LEDs needing resistors

GPIO Hello World

Part 2: Reading Buttons

- https://hexdocs.pm/circuits_gpio/readme.html has a great intro on basic wiring setups

But Wait! There's More!

Physical Protocols

- I2C
- SPI
- RS-232
- HAT & pHAT
- <https://shop.pimoroni.com>, <https://buyapi.ca>, etc

Desk Clock

github.com/mtrudel/desk_clock

- Provides an NTP synced desktop clock
- Powers an SPI OLED display (SSD1322)
- Standard Elixir App (GenServers, Tasks, etc)
- Uses `circuits_spi` & `circuits_gpio` libraries + some extras

SSD1322 Library

github.com/mtrudel/ssd1322

- SSD1322 datasheet as a library
- Drive it with 4 bit greyscale bitmaps

ex_paint Library

github.com/mtrudel/ex_paint

- Thin wrapper around Erlang's EGD library
- Pluggable rasterizers (incl. 4 bit greyscale bitmap!)
- Not terribly performant
- Would love to build this out more someday

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Links

<https://www.nerves-project.org> - Project Page

<https://hexdocs.pm/nerves/installation.html> - Install Docs

https://hexdocs.pm/circuits_gpio/readme.html - Basic GPIO Circuits

<https://shop.pimoroni.com> - Shopping!

<https://buyapi.ca> - Shopping!

Creatron - Local Shopping!

https://github.com/mtrudel/desk_clock - Desk Clock Demo App

<https://github.com/mtrudel/talks> - This talk