Bouffalo-hal tasks and SyterKit project

2024/9/18 RustSBI team

Add information on examples

- Path: examples/README.md

```
examples > (i) README.md > [abc] ## Peripherals
1
2      ## Peripherals
3
4      | Name | Tested |
5      | `gpio-demo` | √ |
6      // ...
7      |
```

D1 Nezha drivers

- Issue: wrong USB port

- Should use specific FEL software to download image firmware

- Lacks image header

SyterKit solution (take 1)

```
1    #[syterkit::entry] // proc macro
2    fn main() {
3        let (p, c) = allwinner_rt::__rom_init_params();
4
5        let tx = p.gpio.pb8.into_function::<7>();
6        let rx = p.gpio.pb9.into_function::<7>();
7        let mut serial = Serial::new(p.uart0, (tx, rx), Config::default()
8
9        writeln!(serial, "Hello World!").unwrap();
10       // println!("Hello world!");
11   }
12
13   // println!
14
```

SyterKit solution (take 2)

```
1    #[syterkit::entry] // proc macro
2  ∨ fn main() {
3        let (p, c) = allwinner_rt::__rom_init_params();
4
5        println!("Hello world!");
6    }
7
```

build.rs file

```
 1    SECTIONS {
 2        .head : {
 3            KEEP(*(.head.text))
 4            KEEP(*(.head.egon))
 5            // only keep .head.text and .head.egon
 6        } > SRAM
 7        .text : ALIGN(4) {
 8            KEEP(*(.text.entry))
 9            *(.text .text.*)
10        } > SRAM
11    // ...
```

Check compiled binary file of SyterKit

- rust-objdump -d <Input File> # stdout, redirect to file using `> <Output File>`

- Does the code starts at 0x20000? (Not 0x0)

- Do the contents of `.head.text` and `.head.egon` exists? (objdump `.head`)

- Is the function `start` located at 0x20060? (e.g. first instruction being `csrw mie, zero`)

- 010-editor-scripts

Writing a `xtask`

- xtask path: boatd/100ask-d1-h-rs/xtask

- use `cargo new --bin`

- Repair image header (CRC, length, …)

  - Fill CRC code in rustsbi-d1: https://github.com/rustsbi/rustsbi-d1/blob/ea57489c40d3d2a160d08baffcb92c5fb913e22e/xtask/src/components.rs#L219

- Build the SyterKit project with xtask (cargo make ?)

- Run cargo make

- Use xfel or other software to flash, or wrap xfel commands in xtask (cargo flash …)
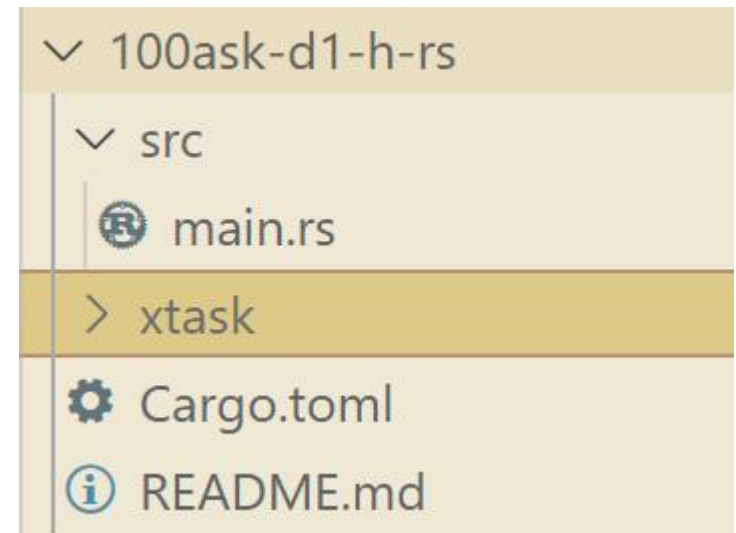
All the examples in 100ask-d1 board

- Hello World

  - Serial output 'Hello World!'

- Dram init

  - Refer to Oreboot code

- SyterBoot (todo)

Bouffalo hal project targets

- PSRAM (Linux kernel, other kernels, RustSBI UEFI, RustSBI itself)

- PSRAM init process includes clock initialization and peripheral initalization

  - dirty approach: *(0x12345678 as *mut u32) = 0x67890123; or ptr::write_volatile

- GDB dump MMIO registers

- Where is PSRAM support code?

  - Should be within bouffalo-hal library directly

  - We can work in example folder first