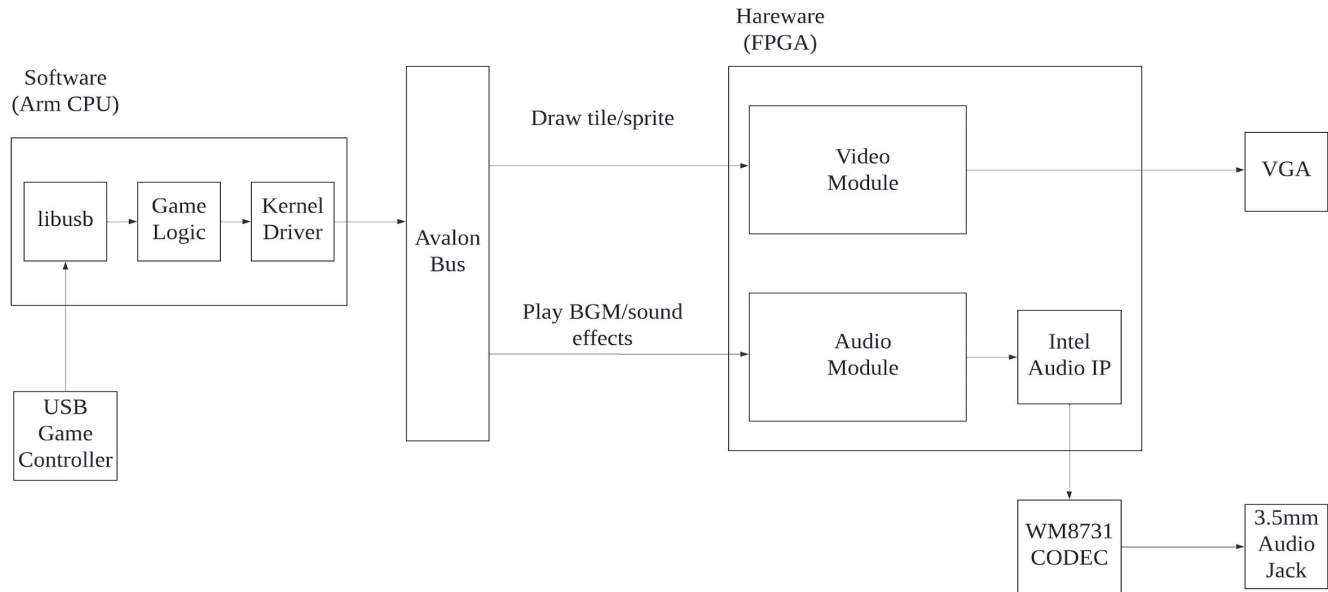




Bubble Bobble

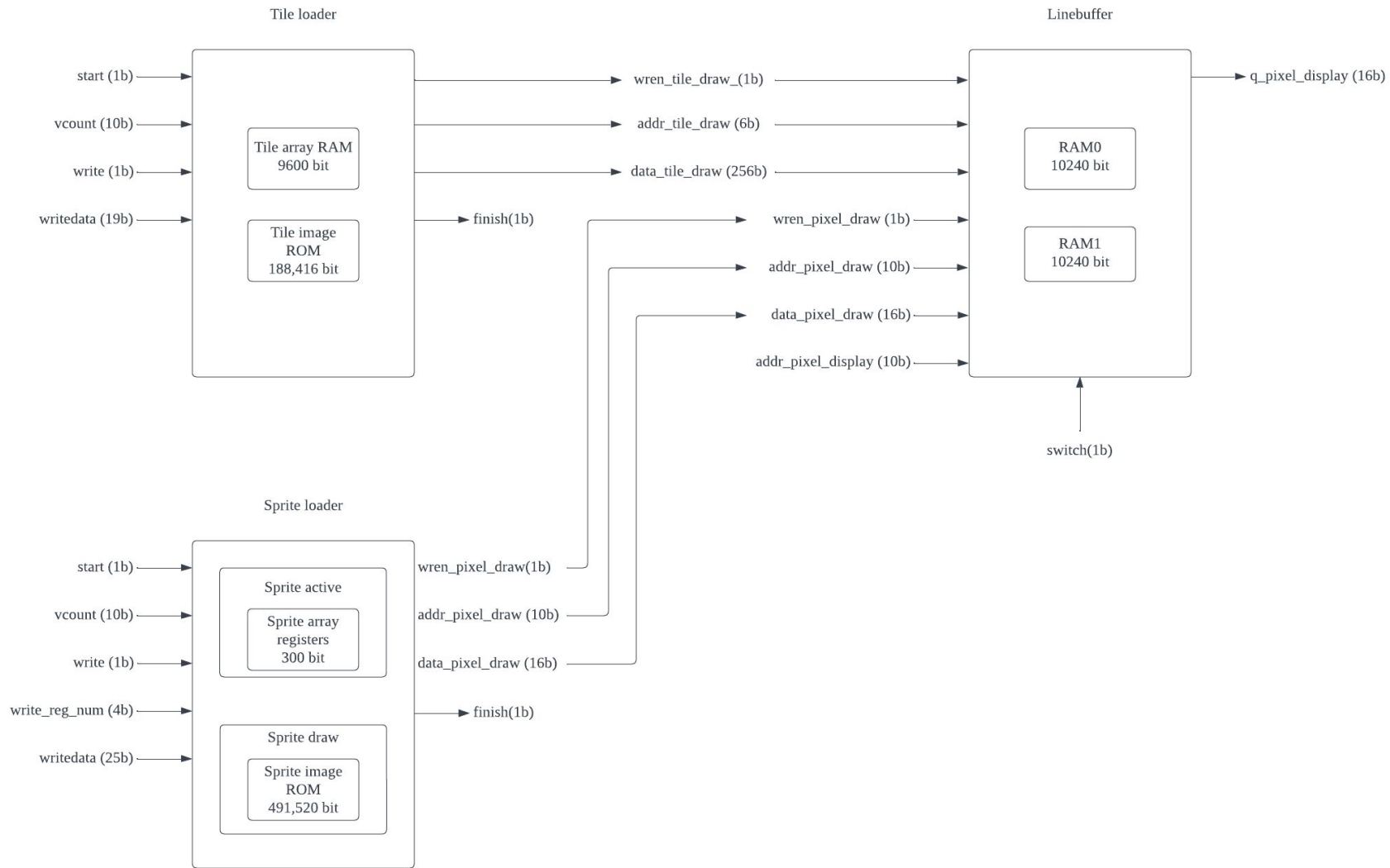
By Hongzheng Zhu, Qingyuan Liu, Ke Liu, Lance Chou

Overall structure:

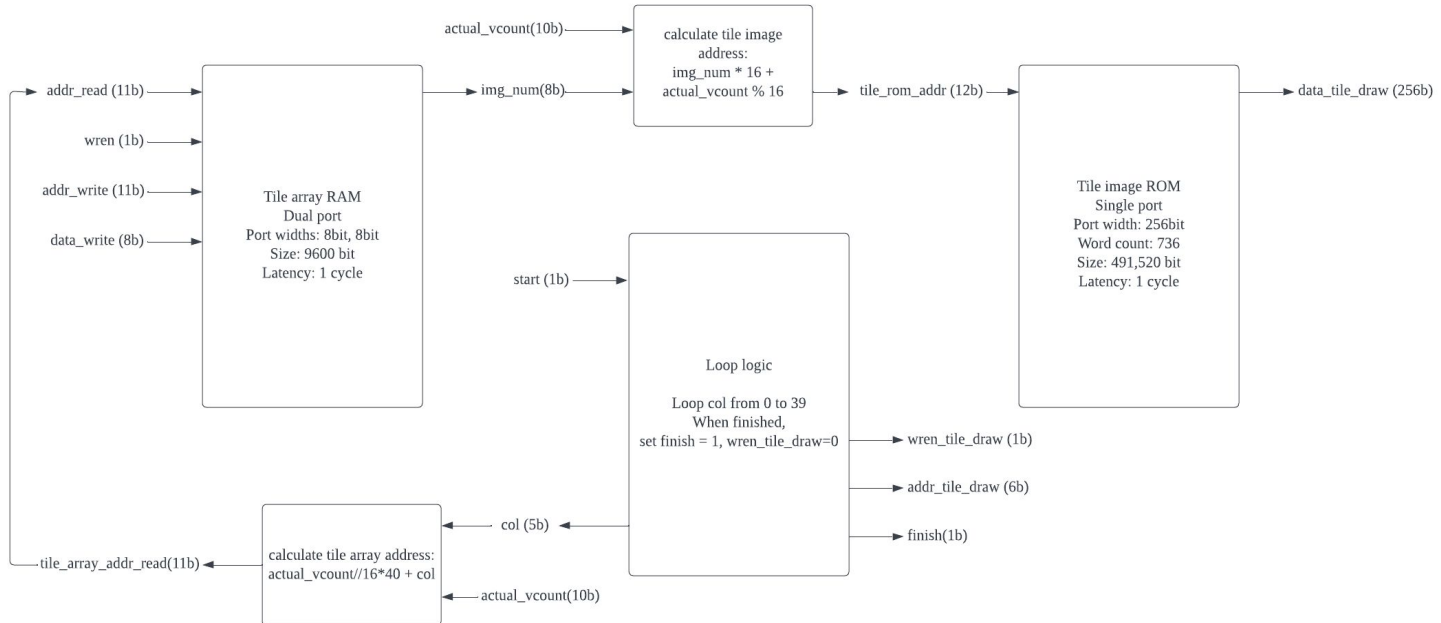




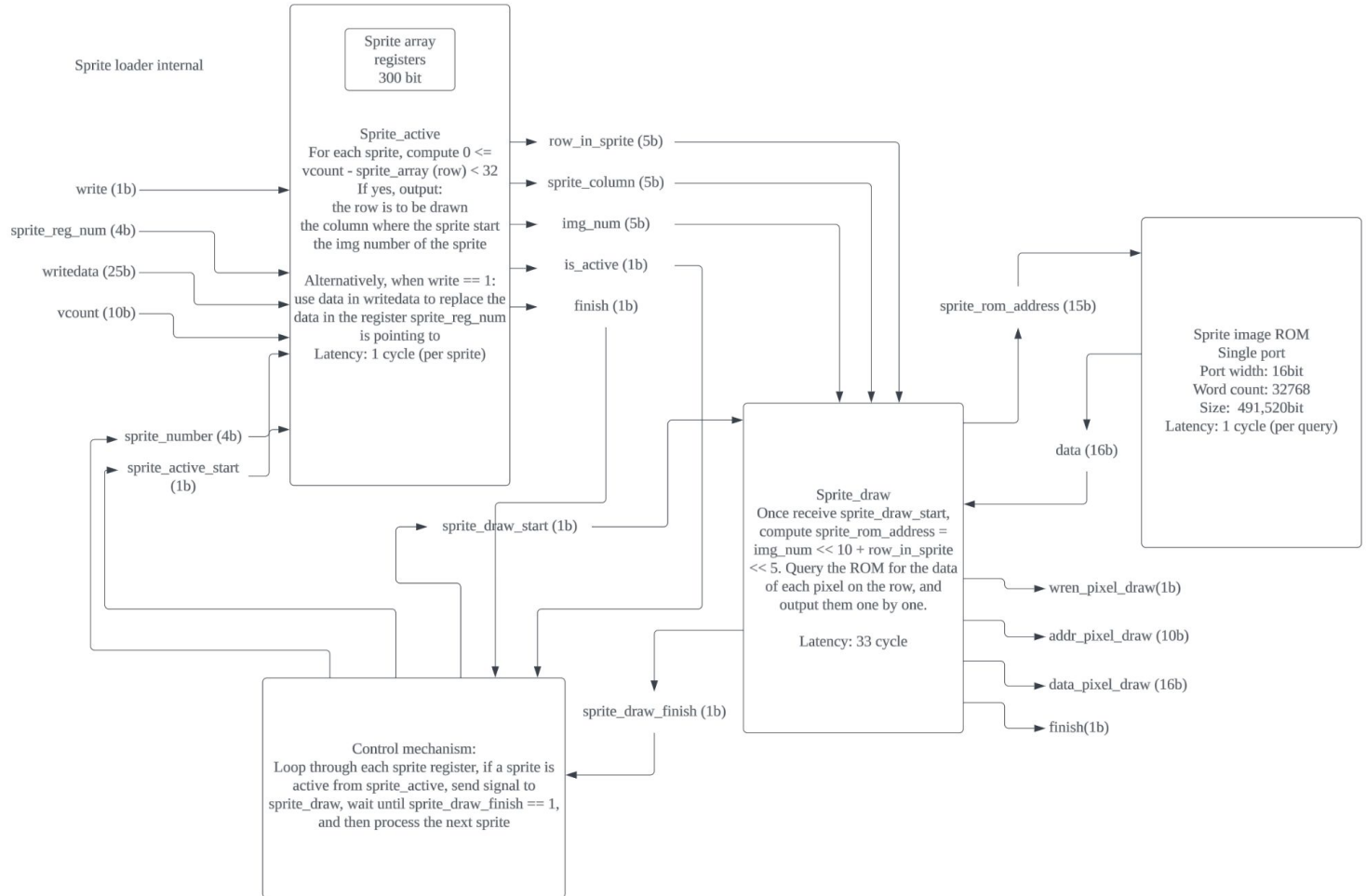
VGA control: vga top module



VGA control: tile drawing



VGA control: sprite drawing





VGA HW/SW interface

```
// def of argument for tiles
```

```
typedef struct {
```

```
    unsigned char r;
```

```
    unsigned char c;
```

```
    unsigned char n;
```

```
} vga_top_arg_t;
```

r 5bit

c 6bit

n 8bit

Total 19 bit

```
// def of argument for sprites
```

```
typedef struct {
```

```
    unsigned char active;
```

```
    unsigned short r;
```

```
    unsigned short c;
```

```
    unsigned char n;
```

```
    unsigned short register_n;
```

```
} vga_top_arg_s;
```

active 1bit

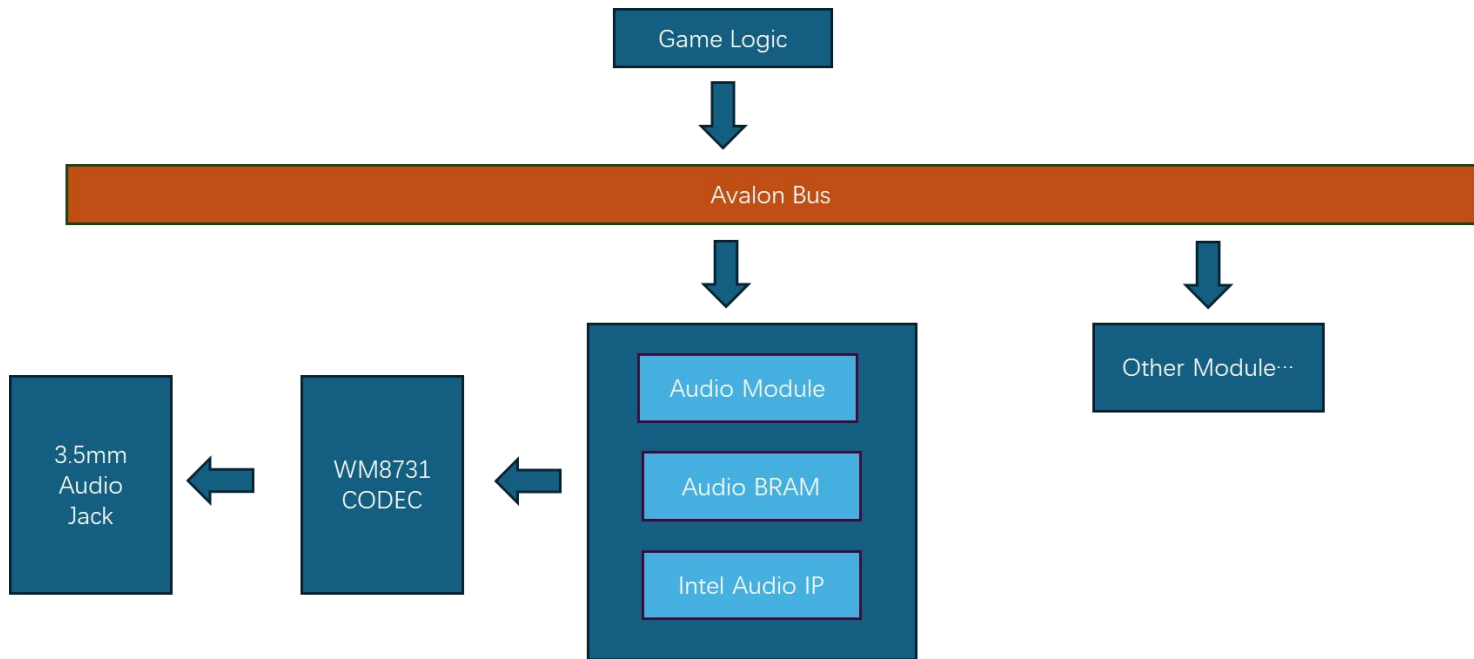
r 9bit

c 10bit

n 5bit

Total 25 bit

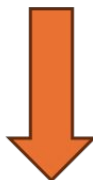
Audio control



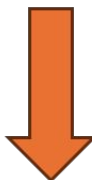


Audio control

Damage Enemy



Loses a Life



Interruption

Victory!



BGM



Audio HW/SW interface

```
typedef struct {  
    unsigned char play;  
} fpga_audio_arg_t;  
  
#define FPGA_AUDIO_BGM_STARTSTOP_IOW(FPGA_AUDIO_MAGIC, 1, fpga_audio_arg_t *)  
#define FPGA_AUDIO_SET_AUDIO_ADDR_IOW(FPGA_AUDIO_MAGIC, 2, fpga_audio_arg_t *)
```

Controller

The controller communicates with a 8 bytes protocol via USB, mapped as below

Constant	Constant	Constant	Left/right arrow	Up/down arrow	X/Y/A/B	Rib/Select/Start	Constant
----------	----------	----------	------------------	---------------	---------	------------------	----------

These keys are mapped to specific interactions in the game:

Left arrow: move left

Right arrow: move right

A: shoot bubble

B: jump

```
struct controller_output_packet {  
    short updown;  
    short leftright;  
    uint8_t select;  
    uint8_t start;  
    uint8_t left_rib;  
    uint8_t right_rib;  
    uint8_t x;  
    uint8_t y;  
    uint8_t a;  
    uint8_t b;  
}
```





Game logic

8 levels with different maps.

Enemy generation and movement.

Attack.

Collision detection : Wall, floor, bubbles, enemy, character, reward.

Requirements to move to the next level.

Winning and defeat condition.

♥ X 3

SCORES 0

LEVEL 0



DELL



Demonstration