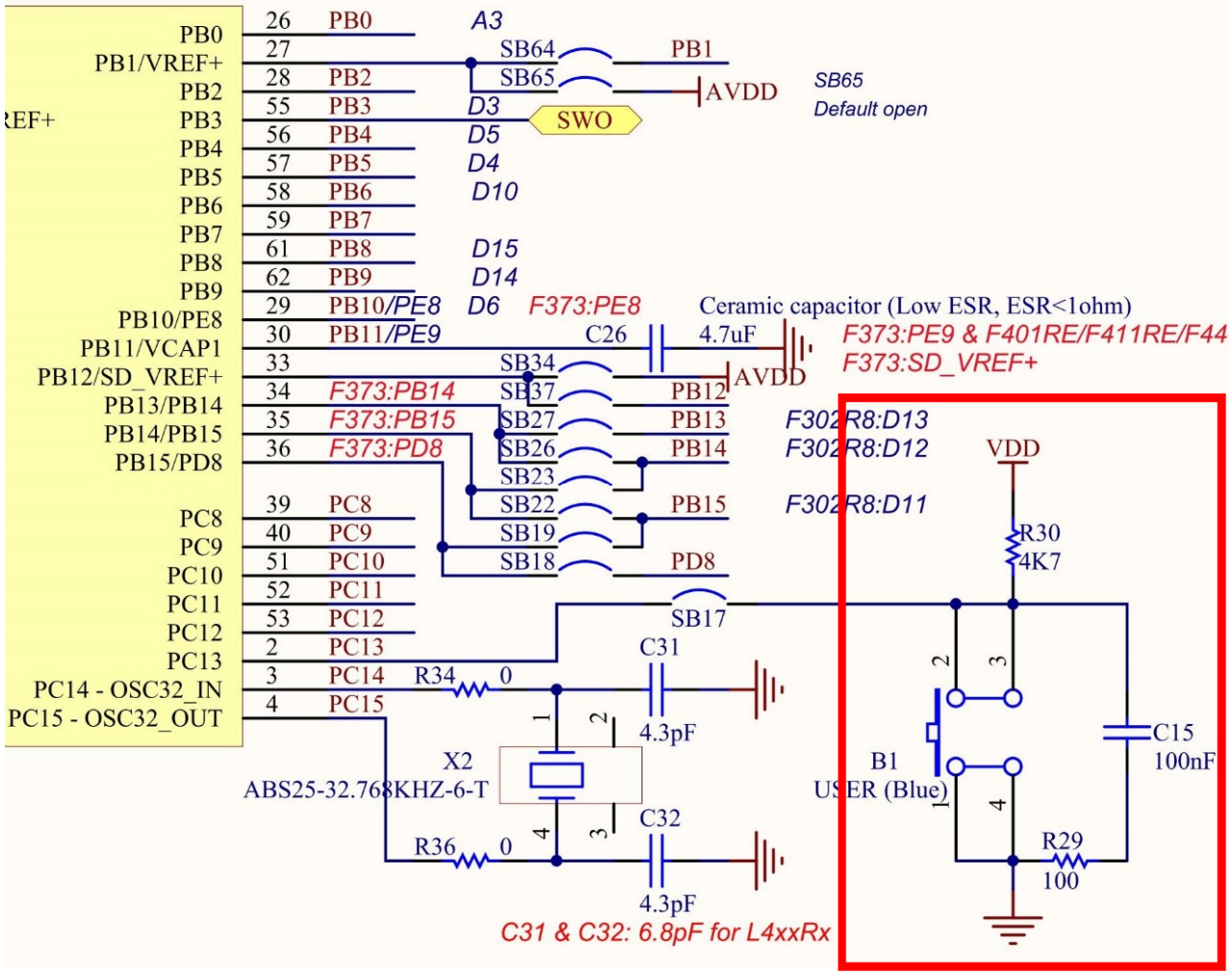
GPIO Pull-Up/Down

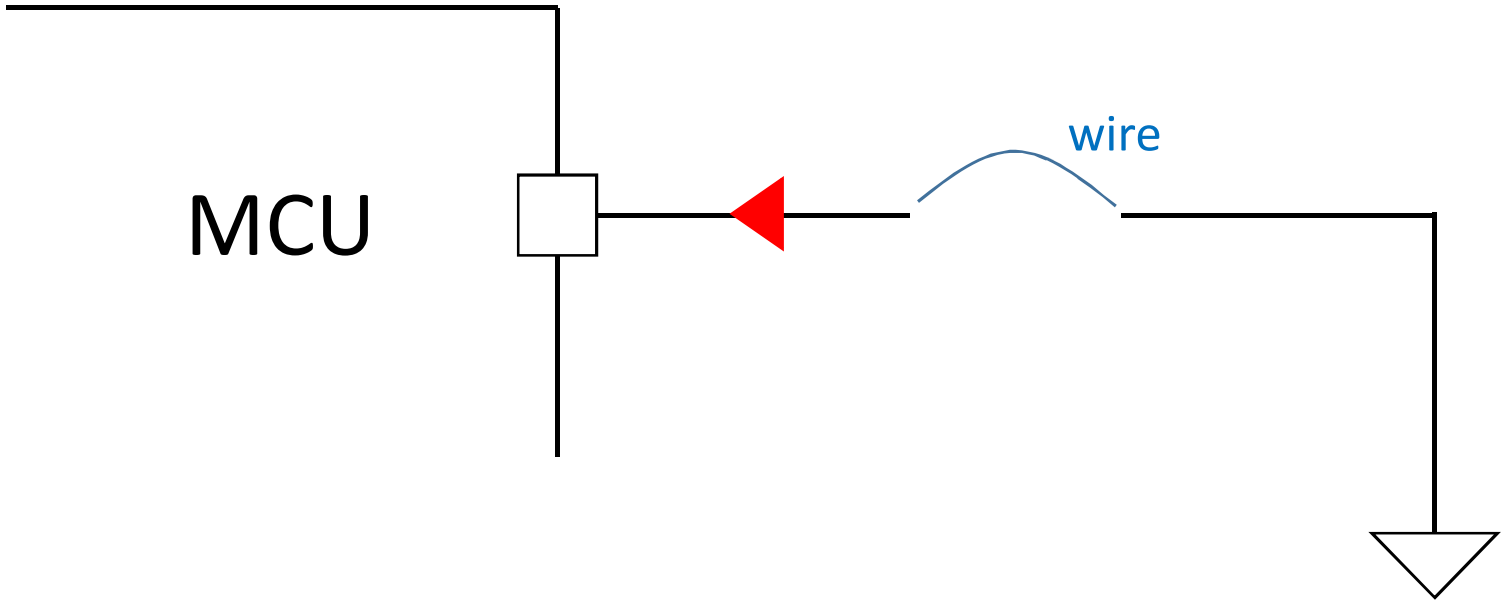
Lecturer: Harvard Tseng

Standard input circuit

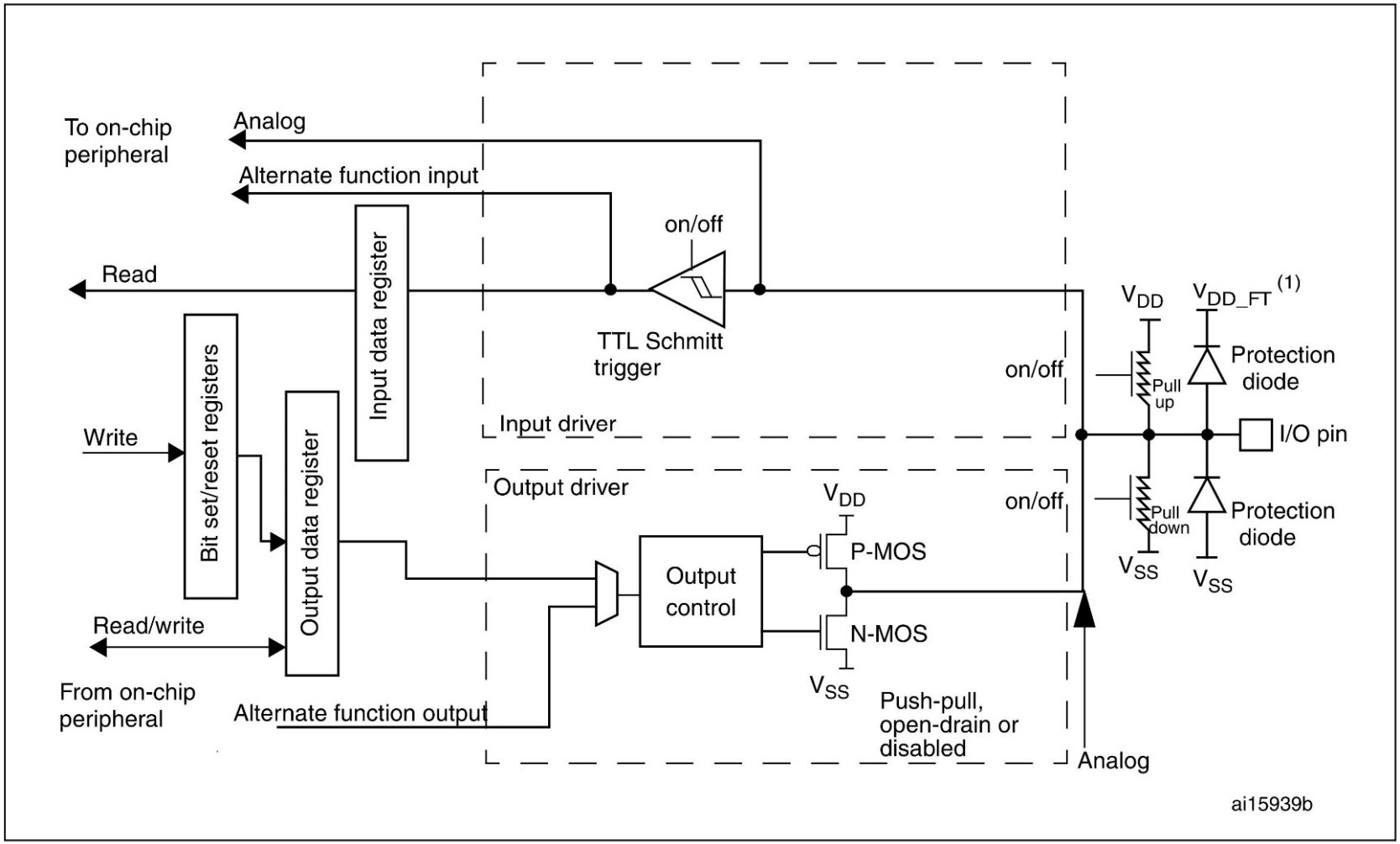


Using single wire to be input

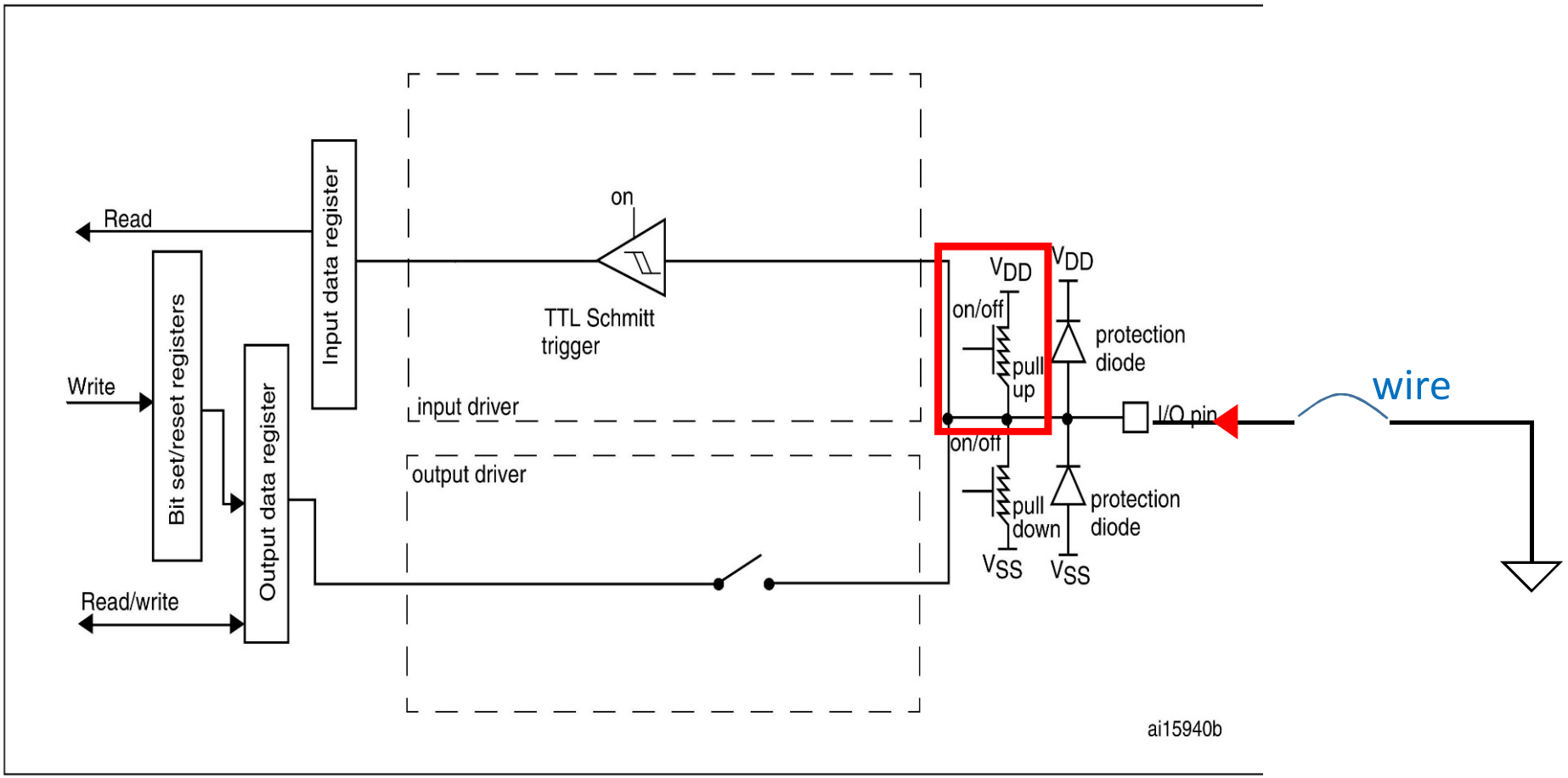
- Input will be floating, it won't work properly.



Basic structure of a I/O port bit



Turn on pull-up resistor



GPIOx_PUPDR

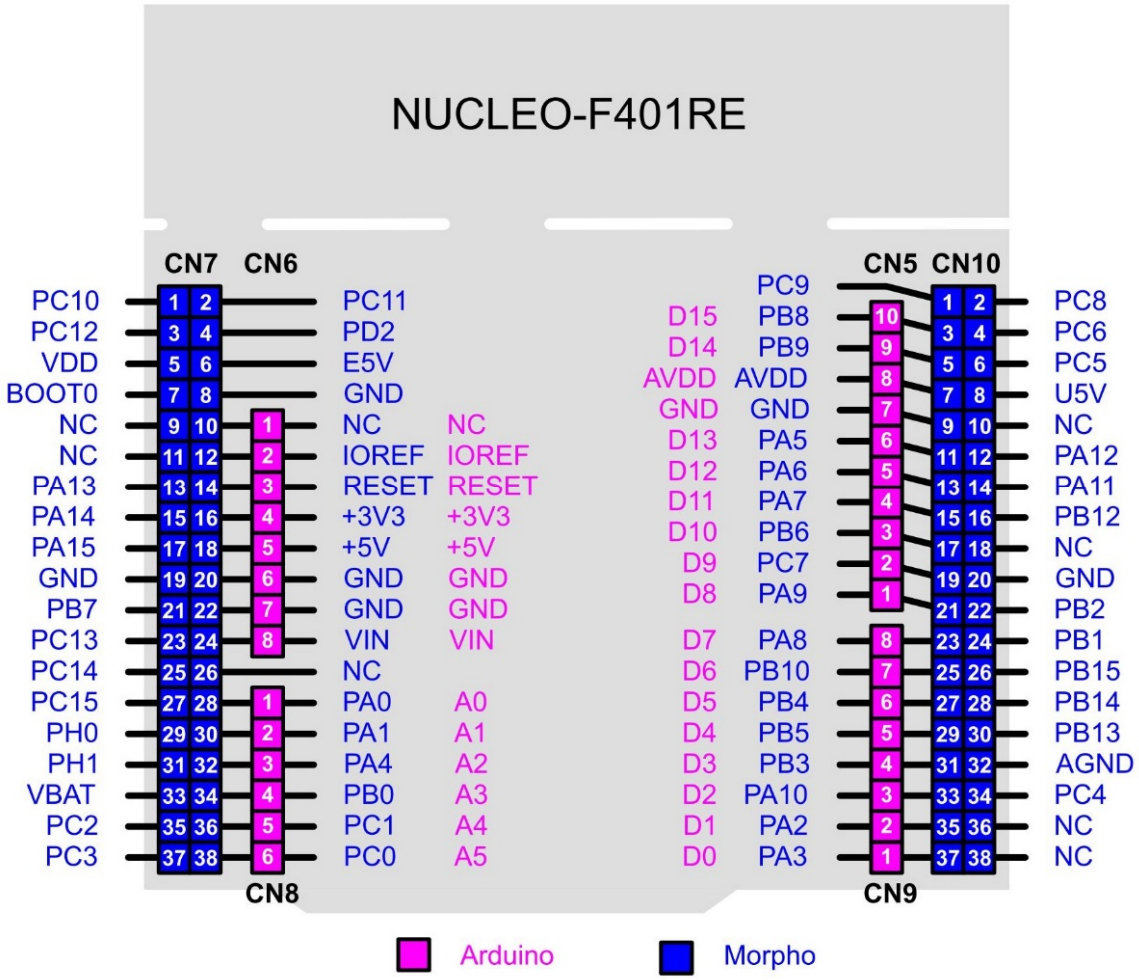
- PUPDRy[1:0]: Port x configuration bits (y = 0..15)
  - 00: No pull-up, pull-down
  - 01: Pull-up
  - 10: Pull-down
  - 11: Reserved

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
PUPDR15[1:0]		PUPDR14[1:0]		PUPDR13[1:0]		PUPDR12[1:0]		PUPDR11[1:0]		PUPDR10[1:0]		PUPDR9[1:0]		PUPDR8[1:0]	
rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
PUPDR7[1:0]		PUPDR6[1:0]		PUPDR5[1:0]		PUPDR4[1:0]		PUPDR3[1:0]		PUPDR2[1:0]		PUPDR1[1:0]		PUPDR0[1:0]	
rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw	rw

PC10 as input by single wire

- GPIOC_MODER &= ~(0x3 << 2 * 10); // Set PC10 as input
- GPIOC_PUPDR |= 0x1 << 2 * 10; // Turn on pull-up resistor

Hardware layout and configuration



Exercise

- Using timer interrupt to create period signal on LED.
- If button pressed, increase frequency by 1. Maximum frequency is 10Hz.
- If wire connected to pin, decrease frequency by 1. Minimum frequency is 1Hz.
- Use ISR to handle actions when button pressed, wire connected, or counter matches compare value.
- Your main function should run nothing!