

EXPERIMENTO 04 – Saída Analógica

Sistema Microcontrolados

13.3.2 Alternate Functions of Port B

The Port B pins with alternate functions are shown in [Table 13-6](#).

Table 13-6. Port B Pins Alternate Functions

Port Pin	Alternate Functions
PB7	OC0A/OC1C/PCINT7 (Output Compare and PWM Output A for Timer/Counter0, Output Compare and PWM Output C for Timer/Counter1 or Pin Change Interrupt 7)
PB6	OC1B/PCINT6 (Output Compare and PWM Output B for Timer/Counter1 or Pin Change Interrupt 6)
PB5	OC1A/PCINT5 (Output Compare and PWM Output A for Timer/Counter1 or Pin Change Interrupt 5)
PB4	OC2A/PCINT4 (Output Compare and PWM Output A for Timer/Counter2 or Pin Change Interrupt 4)
PB3	MISO/PCINT3 (SPI Bus Master Input/Slave Output or Pin Change Interrupt 3)
PB2	MOSI/PCINT2 (SPI Bus Master Output/Slave Input or Pin Change Interrupt 2)
PB1	SCK/PCINT1 (SPI Bus Serial Clock or Pin Change Interrupt 1)
PB0	\overline{SS} /PCINT0 (SPI Slave Select input or Pin Change Interrupt 0)

- **OC0A/OC1C/PCINT7, Bit 7**

OC0A, Output Compare Match A output: The PB7 pin can serve as an external output for the Timer/Counter0 Output Compare. The pin has to be configured as an output (DDB7 set "one") to serve this function. The OC0A pin is also the output pin for the PWM mode timer function.

OC1C, Output Compare Match C output: The PB7 pin can serve as an external output for the Timer/Counter1 Output Compare C. The pin has to be configured as an output (DDB7 set (one)) to serve this function. The OC1C pin is also the output pin for the PWM mode timer function.

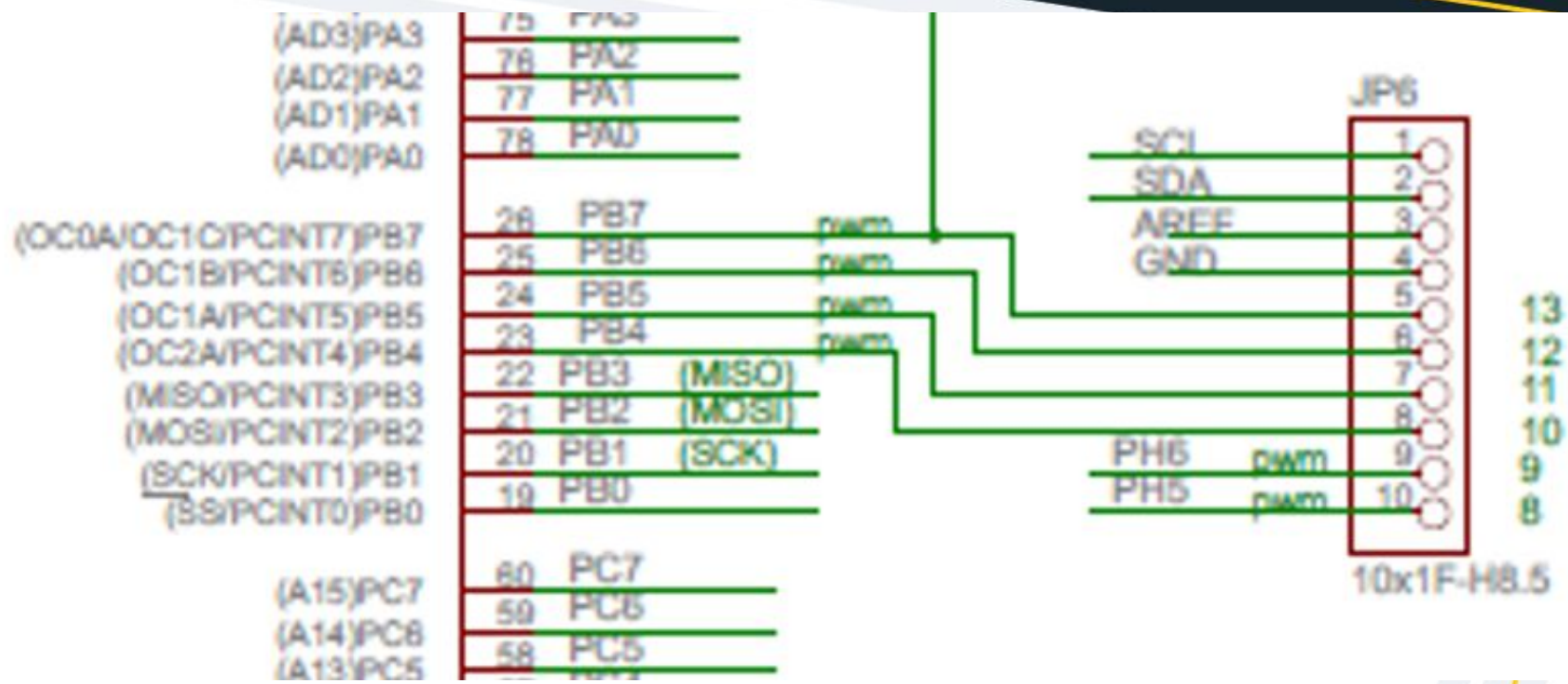
PCINT7, Pin Change Interrupt source 7: The PB7 pin can serve as an external interrupt source.

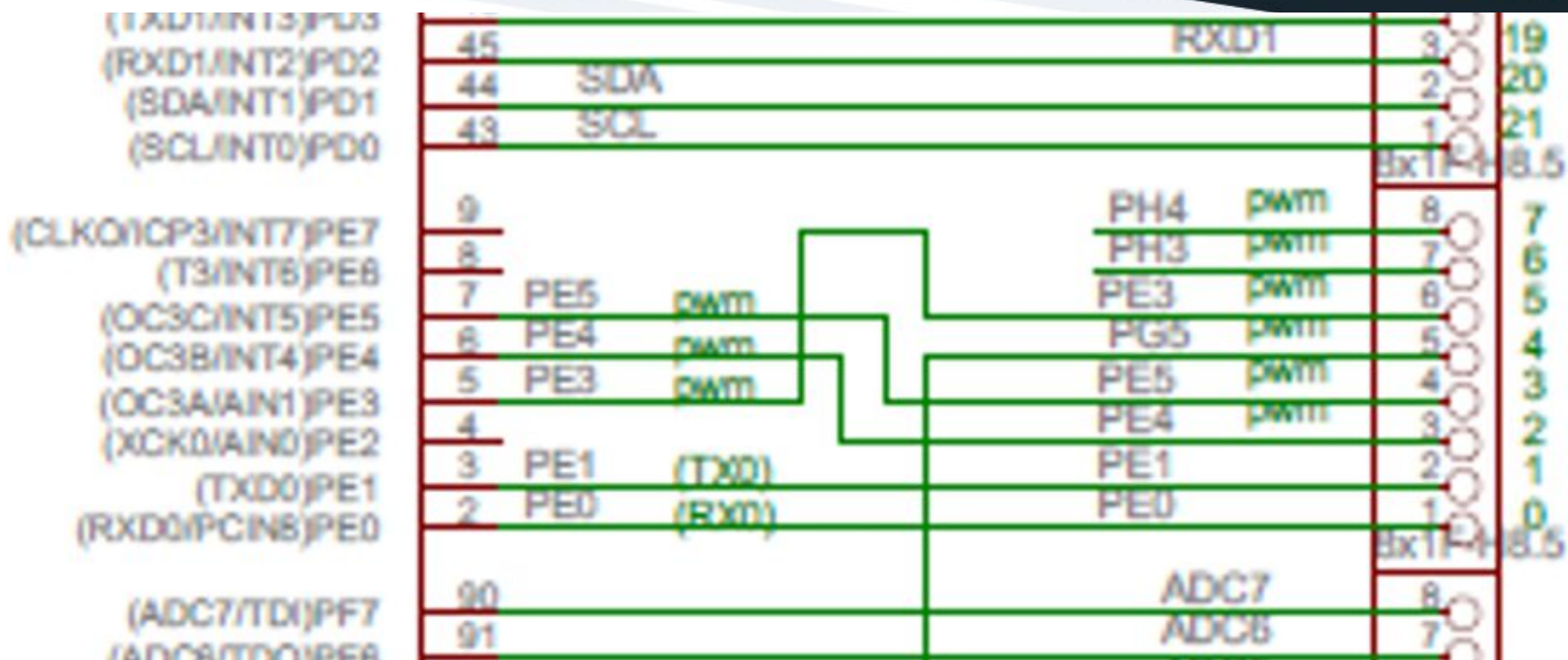
- **OC1B/PCINT6, Bit 6**

OC1B, Output Compare Match B output: The PB6 pin can serve as an external output for the Timer/Counter1 Output Compare B. The pin has to be configured as an output (DDB6 set (one)) to serve this function. The OC1B pin is also the output pin for the PWM mode timer function.

PCINT6, Pin Change Interrupt source 6: The PB6 pin can serve as an external interrupt source.







			PJ0(RXD3/PCINT9)
		27	PH7(T4)
pwm	PH6	18	PH6(OC2B)
pwm	PH5	17	PH5(OC4C)
pwm	PH4	16	PH4(OC4B)
pwm	PH3	15	PH3(OC4A)
		14	PH2(XCK2)
	TXD2	13	PH1(TXD2)
	RXD2	12	PH0(RXD2)

Saída Analógica

Pulse Width Modulation

0% Duty Cycle – `analogWrite(0)`



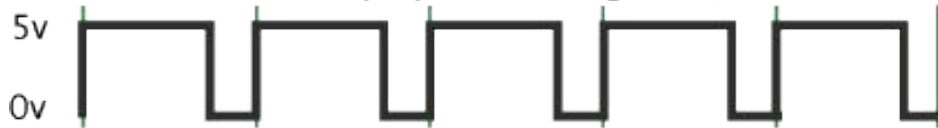
25% Duty Cycle – `analogWrite(64)`



50% Duty Cycle – `analogWrite(127)`



75% Duty Cycle – `analogWrite(191)`



100% Duty Cycle – `analogWrite(255)`



Exemplo

analogWrite()

```
int ledPin = 9;    // LED conectado ao pino digital 9
```

```
int analogPin = 3; // potenciômetro conectado ao pino analógico 3
```

```
int val = 0;      // variável para guardar o valor lido
```

```
void setup() {
```

```
    pinMode(ledPin, OUTPUT); // configura o pino como saída
```

```
}
```

```
void loop() {
```

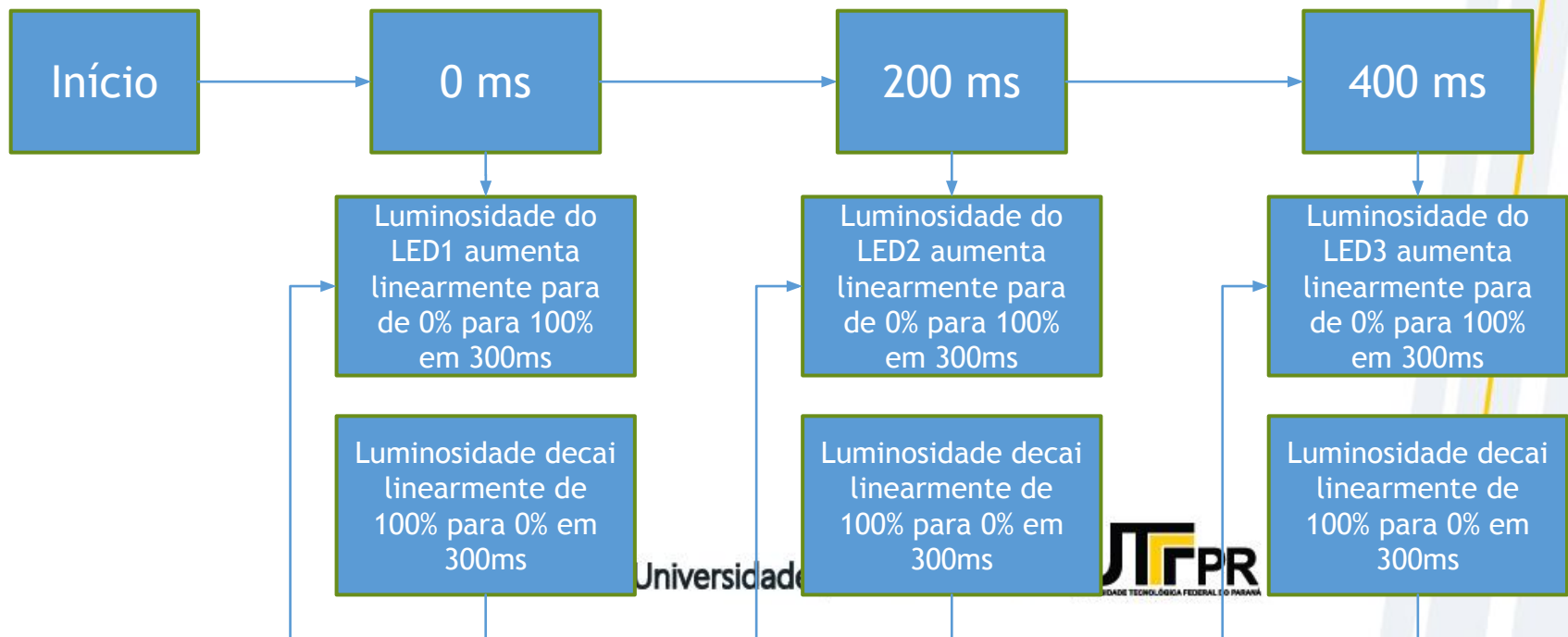
```
    val = analogRead(analogPin); // lê o pino de entrada analógica
```

```
    analogWrite(ledPin, val / 4); // analogRead retorna valores de 0 a 1023, analogWrite  
    recebe de 0 a 255
```

```
}
```

Exercício 3.1

- Crie um script utilizando 3 LEDs nos pinos 13, 12 e 11 do Arduino mega.
- Utilizando o PWM nativo, siga o comportamento apresentado no fluxograma. (não pode usar delay)



LED (também um diodo)

