

Controlling an RC-Servo

This exercise is about implementing an API that somebody else could use to control the position of the arm on a RC-Servo.

An RC-Servo is used in a lot of radio controlled planes, cars etc. but are also used more professionally in different automatic equipment.

An RC-Servo is controlled by a signal like this:

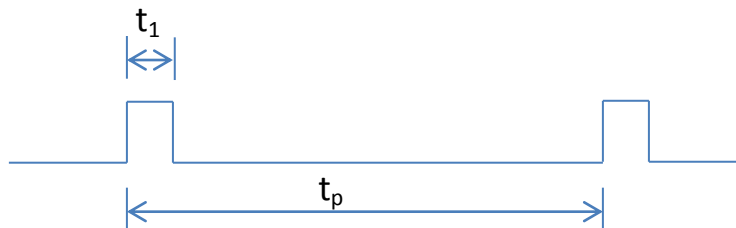


Figure 1 RC-Servo

The length of a period (t_p) must be 20 ms, and the pulse width (t_1) decides the position of the arm. t_1 can be any value between 1 ms and 2 ms.

Table 1 Pulse width to arm position

t_1 [ms]	Arm position
1	left
1.5	middle
2	right

Your task

Create an API that has two functions:

```
void init_rc_servo()
void rc_servo(int8_t percent)
```

init_rc_servo()

Should initialize the timer will use to controlling the RC-Servo. After this method is called the arm of the RC-Servo must be in the middle position.

Note: Use the timer with the highest possible resolution.

rc_servo(int8_t percent)

Should position the arm of the RC-Servo to the position specified by the *percent* parameter where the percentage can vary between -100 to 100. -100 is the left position of the arm, 100 is the right position and 0 is the middle position. Thus 50 will give a position halfway to the right.

The API should be implemented in two different files:

rc_servo.h containing the prototype to the two functions that the API contains.

rc_servo.c containing the implementation of the two functions

Connection to the RC-Servo

Your API must be designed to run on the M1280 Board. And the output pin controlling the servo should be port pin PB7.

Use the special made cable to connect the servo to the M1280 boards CN5 connector like this:

Table 2 Cable connection to connector CN5 on M1280

Wire color in cable	CN5
White	Pin 26
Black	Pin 32
Red	Pin 31

Documentation

You must document your API, so that it will be possible for other programmers to use it.

Test

Test your API with by creating a small program with a main function in another module (c-file), which set the position of the RC-Servo arm.

Use the two debounced buttons (KEY1 and KEY2) on the M1280 board to increase and decrease the position of the arm.