



Figure 99: PWM counter in up mode example - RisingEdge polarity

The counter is automatically reset to zero when COUNTERTOP is reached and OUT[n] will invert. OUT[n] is held low if the compare value is 0 and held high if set to COUNTERTOP, given that the polarity is set to FallingEdge. Counter running in up mode results in pulse widths that are edge-aligned. The following is the code for the counter in up mode example:

```
uint16_t pwm_seq[4] = {PWM_CH0_DUTY, PWM_CH1_DUTY, PWM_CH2_DUTY, PWM_CH3_DUTY};
NRF_PWM0->PSEL.OUT[0] = (first_port << PWM_PSEL_OUT_PORT_Pos) |
    (first_pin << PWM_PSEL_OUT_PIN_Pos) |
    (PWM_PSEL_OUT_CONNECT_Connected <<
        PWM_PSEL_OUT_CONNECT_Pos);
NRF_PWM0->PSEL.OUT[1] = (second_port << PWM_PSEL_OUT_PORT_Pos) |
    (second_pin << PWM_PSEL_OUT_PIN_Pos) |
    (PWM_PSEL_OUT_CONNECT_Connected <<
        PWM_PSEL_OUT_CONNECT_Pos);
NRF_PWM0->ENABLE = (PWM_ENABLE_ENABLE_Enabled << PWM_ENABLE_ENABLE_Pos);
NRF_PWM0->MODE = (PWM_MODE_UPDOWN_Up << PWM_MODE_UPDOWN_Pos);
NRF_PWM0->PRESCALER = (PWM_PRESCALER_PRESCALER_DIV_1 <<
    PWM_PRESCALER_PRESCALER_Pos);
NRF_PWM0->COUNTERTOP = (16000 << PWM_COUNTERTOP_COUNTERTOP_Pos); //1 msec
NRF_PWM0->LOOP = (PWM_LOOP_CNT_Disabled << PWM_LOOP_CNT_Pos);
NRF_PWM0->DECODER = (PWM_DECODER_LOAD_Individual << PWM_DECODER_LOAD_Pos) |
    (PWM_DECODER_MODE_RefreshCount << PWM_DECODER_MODE_Pos);
NRF_PWM0->DMA.SEQ[0].PTR = ((uint32_t) (pwm_seq) << PWM_DMA_SEQ_PTR_PTR_Pos);
NRF_PWM0->DMA.SEQ[0].MAXCNT = (sizeof(pwm_seq) << PWM_DMA_SEQ_MAXCNT_MAXCNT_Pos);
NRF_PWM0->SEQ[0].REFRESH = 0;
NRF_PWM0->SEQ[0].ENDDELAY = 0;
NRF_PWM0->TASKS_DMA.SEQ[0].START = 1;
```

When the counter is running in up mode, the following formula can be used to compute the PWM period and the step size:

$$\text{PWM period: } T_{\text{PWM(Up)}} = T_{\text{PWM_CLK}} * \text{COUNTERTOP}$$