

It reached its maximum value (equal to the maximum value 0xFF Or output compare register OCR2A ,defined as TOP , The maximum value of the definition MAX When to distinguish), the counter is cleared or decremented. When the count value of the counter TCNT2 Reaches a minimum value (equal to 0x00 ,defined as BOTTOM), The counter will be incremented by one operation. When the count value of the counter TCNT2 Arrivals OCR2A / OCR2B When, also referred to compare match, set or cleared by the output signal of the comparison OC2A / OCR2B To produce PWM Waveform.

Operating mode

Timing counter 2 There are four different operating modes, including normal mode (Normal), Cleared on compare match (CTC) Mode, fast pulse width modulation (FPWM) Mode and a phase correction pulse width modulation (PCPWM) Mode, the mode control bits generated by the waveform WGM2 [2: 0] To choose. The following four modes will be described specifically. Since there are two separate output of the comparison unit, respectively "A" with "B" Represented by lowercase "X" To represent the two channel outputs the comparison unit.

Normal mode

Normal mode timer counter is the simplest mode of operation, this time waveform generation mode control bit WGM2 [2: 0] = 0 Count maximum value TOP for MAX (0xFF). In this mode, a counting mode for each clock count plus an increment, when the counter reaches TOP After the spill back BOTTOM Re-start accumulating. The count value TCNT2 The same count clock becomes zero set timer counter's overflow flag TOV2 . In this mode TOV2 The first sign is like 9 Count bit, but will only be set is not cleared. Overflow interrupt service routine will automatically clear TOV2 Logos, software can use it to improve the resolution of the timer counter. Normal mode is not to be considered a special case, a new count value can be written at any time. Set up OC2x Pin data direction register as an output a comparison signal to obtain an output OC2x Waveform. when COM2x = 1

When, flips compare match OC2x Signal, in this case the frequency waveform may be calculated using the following formula:

$$f_{oc2xnormal} = f_{sys} / (2 * N * 256)$$

among them, N It represents the prescale factor (1 , 8 , 64 , 256 or 1024).

Output Compare unit can be used to generate interrupts, but does not recommend the use of interrupts in the normal mode, it will take up too much CPU time.

CTC mode

Set up WGM2 [2: 0] = 2 When the timer counter 2 enter CTC Max mode, counting TOP for OCR2A . In this mode, a counting mode for each clock count plus an increment, when the value of the counter TCNT2 equal TOP When the counter is cleared. OCR2A It defines the maximum count, i.e., the resolution of the counter. This mode allows the user to easily control the frequency of the compare match output also simplifies the operation of the external event count. When the counter reaches a maximum count, an output compare match flag OCF2 Is set, an interrupt will be generated when the corresponding interrupt enable bit is set. Can be updated in the interrupt service routine OCR2A I.e., the maximum count register. In this mode

OCR2A Do not use double buffering, the counter prescaler to work under no or very low prescaler will be updated as close to the maximum value of the minimum time to be careful. If you write OCR2A The value is less than the time TCNT2 When the value of the counter will miss the compare match. Before a match occurs the next comparison, the first counter had counted to TOP And then from BOTTOM

To start counting OCR2A value. And normal mode, as the count value back BOTTOM The count clock in the set TOV2 Mark. Set up OC2x Pin data direction register as an output a comparison signal to obtain an output OC2x Waveform. when COM2x = 1

When, flips compare match OC2x Signal, in this case the frequency waveform may be calculated using the following formula:

$$f_{oc2xctc} = f_{sys} / (2 * N * (1 + OCR2A))$$

among them, N It represents the prescale factor (1 , 8 , 64 , 256 or 1024). As can be seen from the formula, when set OCR2x for 0x0 And when no prescaler, allowing for maximum frequency $f_{sys} / 2$ The output waveform.